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Litigation risk and corporate performance

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ABSTRACT

Sued firms are susceptible to external financing constraints, diversion of top management's time, harmful reputational costs, higher legal fees, and loss of customers and suppliers, which can impact their performance. Using a unique hand-collected dataset on corporate lawsuits, we examine the relationship between litigation risk and operating performance. We find that firms involved in a lawsuit have lower operating performance as measured by the return on assets (ROA) and equity (ROE). Our results remain qualitatively similar to several robustness tests.

1. Introduction

Earlier studies document that filing lawsuits against corporations often results in significant negative stock market returns (see, for example Romano, 1991; Bhagat et al., 1998; Gande and Lewis, 2009). Although previous studies have focused on the stock market, we posit that litigation risk can affect firm-level operating performance for several reasons. First, legal actions can taint the sued firms' affiliation with clienteles, financiers, and other stakeholders. Additionally, some large lawsuits may persist in the law court for several years and eventually lead firms to bankruptcy. There is empirical evidence on the costs of lawsuits (see, for example, Niehaus and Roth, 1999; Skinner, 1994; Shu, 2000; Lowry and Shu, 2002; Karpoff and Lott Jr., 1999; Karpoff et al., 2008; Karpoff, 2012; Ligon and Malm, 2018; Malm and Sah, 2019; Malm and Kanuri, 2020).

Second, litigation may affect managerial decision-making and ultimately interrupt the sustainability of future earnings, a key contributing factor to corporate performance. Management of sued firms might expect a surge in the perceived risk of impending economic deficits and a potential increase in the cost of external financing. For example, Yuan and Zhang (2015) and Arena (2018) report that financial institutions charge higher interest rate spreads on loans issued to sued firms. Furthermore, financial institutions scrutinize sued firms diligently by setting up covenants and demanding additional security from these firms to ensure their creditworthiness. Thus, sued firms may find it challenging to secure funds to pursue positive net present value (NPV) projects, which might affect their performance.

Third, Karpoff and Lott Jr. (1993) report that corporate litigation inflicts adverse reputational costs on sued firms resulting in unfavorable contracting terms. Alexander (1990) notes that a damaged reputation from lawsuits sends a wrong message to investors, external auditors, and other stakeholders and adversely affects firm operations. Additionally, sued companies can lose existing suppliers and customers, thus affecting product quality and future cash flow (Engelmann and Cornell, 1988). Johnson et al. (2014) provide evidence that a damaged reputation from litigation decreases the long-term operating performance of firms. Finally, aside from the higher legal costs that can result from litigation, there are added opportunity costs, which can collectively affect the performance of corporations. Managers of defendant firms spend much time holding meetings dedicated to lawsuits, which can distract them from making critical investment decisions (Lowry and Shu, 2002).

Given the above factors, we ask whether legal risk influences corporate operating performance in this paper. We address this question by exploring the relationship between litigation risk and corporate operating performance, measured by return on assets (ROA) and equity (ROE).

Prior studies have explored the link between litigation risk and several corporate policies, including cash holdings, financial leverage, and investments (see, for example Arena and Julio, 2015; Malm and Krolikowski, 2017; Malm and Kanuri, 2017;

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Malm et al., 2017; Malm and Sah, 2019). However, our knowledge of the relationship between litigation and performance is limited. Researchers have recently attempted to establish the link between litigation and corporate performance. In a contemporary study, Wu et al. (2020) study the relationship between litigation risk and firm performance of Chinese firms. The authors find a negative relationship between litigation risk and firm performance. Our work is, however, distinct from their study in several ways. First, corporations in China tend to operate in a different legal environment compared to their counterparts in the United States. Firth et al. (2011) posit that the legal system in China is mainly a civil law system influenced by the European and German legal systems. For the authors, the Chinese system lacks solid judicial independence and is strongly biased toward government-sponsored companies. Allen et al. (2005) note that the Chinese legal system does not adequately protect the rights of shareholders and creditors. Arena and Ferris (2018) demonstrate that countries with less efficient judicial systems have reduced litigation risk and lower associated costs.

Second, the corporate governance mechanisms and capital structures of corporations in China differ from the United States. Allen et al. (2005) state that corporate governance structures in Chinese listed companies are weak. For Wu et al. (2020), debt financing constitutes the most significant funding source (about 67%) for Chinese firms. However, leverage ratios of companies in the United States are typically lower than 30% (see, for example Brav, 2009; Frank and Goyal, 2009).

Third, we measure litigation at the firm level instead of the industry level, as is the case with most studies on litigation. Additionally, our sample contains a broader spectrum of lawsuits, including securities class action, antitrust, corporate governance, banking, and finance. The work of Wu et al. (2020) mainly captures lawsuits in civil and administrative proceedings. Lastly, our sample period allows us to examine the impact of litigation on the operating performance of corporations over various economic cycles.

In this study, we implement two litigation measures in our primary empirical analyses. First, we use the total annual number of lawsuits for which a firm is mentioned as a defendant. Second, we use the total number of lawsuits lagged by one year. We find consistent evidence of a negative relationship between our litigation and operating performance measures. We also find a similar negative relationship when excluding the financial crisis years (i.e., 2007 and 2008) from our sample. These results are robust to a series of robustness tests, including using alternate regression techniques, a propensity-score matched sample and an instrumental variable. The evidence suggests litigation firms have declining levels of ROA and ROE.

Our paper contributes to the litigation and corporate finance literature in significant ways. First, the paper complements earlier efforts by Bhagat et al. (1998) and the latest work of Wu et al. (2020). Studies exploring other aspects of litigation on corporate policy and behavior include Malm and Mobbs (2016), Adhikari et al. (2019), and Malm et al. (2021). Our study identifies an additional determinant of corporate behavior, enabling us to chronicle another medium whereby the legal environment can affect firm operating performance.

Second, we make available important information on a broader sample of corporate lawsuits of S&P 1500 firms. Previous studies center mainly on securities class action lawsuits with a few exceptions. Given that firms encounter a wide range of legal risks, we extend this area of research by using a broader sample of lawsuits beyond securities class actions to explore the relationship between litigation risk and corporate operating performance. We extend this research to include the violation of securities, antitrust, corporate governance, and finance laws at state and federal levels. Additionally, we use lawsuits at the firm rather than the industry level to proxy for litigation. These additional features are some of the distinctive elements of this study.

Moreover, management, financial economists, the business community, and the investing public should benefit from information on how the legal environment can affect corporate operating performance. Accordingly, our study adds to the understanding of this vital research area.

The structure of our paper is as follows. We review the pertinent literature and develop the key testable hypothesis in Section 2. We describe the sample, data, and methodology employed in the analysis in Section 3. We discuss the empirical analyses of the relationship between litigation and corporate operating performance in Section 4. We conclude the paper in Section 5.

2. Related literature and hypothesis development

Previous research suggests that litigation has an impact on the financial health of a firm. Autore et al. (2014) argue that more significant costs emanating from lawsuits can cause companies not to seek external financing. Yuan and Zhang (2015) and Arena (2018) note that interest rates on bank loans are higher for sued firms. Corporations facing litigation also tend to underprice their initial public offerings (Lowry and Shu, 2002).

In addition, the indirect costs of lawsuits are noteworthy. Litigation inflicts adverse reputational consequences on the suspect firm and a reduction of prestige (Engelmann and Cornell, 1988). The finance literature suggests that the reputational loss is partly due to reduced credibility in contracting terms with customers, providers of capital, and suppliers (Karpoff and Lott Jr., 1993; Karpoff et al., 2008)). Field et al. (2005) posit that good quality external auditors may not want to work with sued companies. Additionally, top management earmarks a substantial amount of time and effort to the investigative process, holds special meetings with shareholders, and amends company bylaws, all to the detriment of making important investment decisions (Lowry and Shu, 2002; Bennett et al., 2018).

Given the above consequences associated with litigation, prior studies have examined their impact on firm behavior and financial policy. Sued firms may be hesitant to pay out dividends in order to reserve cash for precautionary reasons (see, for example Malm and Kanuri, 2020; Arena and Julio, 2021). Litigation risk can engender corporations to want to grow aggressively by increasing acquisitions to prevent the likelihood of future financial distress (Gormley and Matsa, 2011). Lawsuits can influence firms to disclose earnings early, ahead of mandatory dates (Field et al., 2005).

We extend this line of research to study the effect of litigation on corporate operating performance at the firm level. There is evidence of shareholder wealth effects of sued firms. Karpoff et al. (2008) show a significantly negative stock market reaction to firms held accountable by the Securities and Exchange Commission for financial misrepresentations. Similarly, Gande and Lewis (2009) document that stock prices react negatively to security class actions initiated by stockholders. Bennett et al. (2018) postulate that litigation affects firm investment and stock performance via two channels: attention and financing. Corporate investment is affected through the attention channel because litigation diverts top management's time from making important investment decisions. With the financing channel, the authors posit that litigation increases the cost of borrowing and reduces firms' financial flexibility, which can negatively impact their investment.

Sharfman and Fernando (2008) conjecture that if firms can reduce their litigation risk, that has the propensity to lower their

cost of capital, which then translates into higher profit margins or economic performance. In other words, a higher cost of capital due to litigation negatively impacts the operating performance of companies. Gao et al. (2021) argue that litigation tends to interrupt the operations of corporations because it increases the cost of debt, which is a vital source of financing for most companies. Lin et al. (2021) focus on shareholder litigation and show that the ability of shareholders to sue managers discourages them from explorative, innovative decisions. The ability to innovate should have an impact on the performance of corporations. Chu and Zhao (2021) suggest that the risk of litigation can deter managers from making optimal corporate decisions that could engender efficient outcomes. The authors confirm their hypothesis with empirical evidence that firms with reduced litigation or lower threat of litigation have improved long-term operating performance.

Considering the above discussion, we posit that litigation can negatively affect corporate performance at the firm level. Thus, our central testable hypothesis is as follows:

Hypothesis. There is a negative relationship between litigation and corporate operating performance.

3. Data and sample selection

3.1. Sample selection and data description

The lawsuit data used in this study is from the LexisNexis database. Accounting and financial data come from the Compustat database. Stock market data is gleaned from the Center for Research in Security Prices (CRSP). We ensure that the stock price and accounting data are properly aligned with the litigation proxies in matching the datasets. We focus on firms in the S&P 1500, which consists of the SP 500, S&P Mid-cap 400, and S&P Small-cap 600. We further restrict the sample by excluding financial and utility firms (SIC codes between 4900–4999 and 6000–6999) because these firms are regulated by the government. The sample period is from 1996 to 2011.

Panel A of Table 1 reports the distribution of the different lawsuit types over our sample period.[1] Panel B of the same table reports descriptive statistics for the dependent variable, the litigation variable, and other potential covariates related to corporate operating performance.

3.2. Research design and variable definitions

3.2.1. Dependent variables

The dependent variable is firm operating performance. We use two proxies for firm operating performance. These proxies include return on assets (ROA) and return on equity (ROE). Return on assets is the ratio of income before extraordinary items to total assets. Return on equity is the ratio of income before extraordinary items to total equity.

3.2.2. Explanatory variables

We use lawsuits filed against firms from the S&P 1500 index to measure litigation risk, the primary explanatory variable of interest. We use two proxies for litigation risk, defined as the violation of securities, antitrust, corporate governance, and finance laws, in our empirical analyses. The first measure is the annual sum of lawsuits. The second litigation risk measure is the annual sum of lawsuits, lagged by one year.

[1] We do not have data on settled lawsuit cases and settlement sizes as the outcome of publicly approved settlements are not readily available for most cases.

Table 1
Summary statistics at firm-year level.

Panel A: Distribution of lawsuits

Lawsuits	Percentage
Securities	27.97%
Corporate governance	12.01%
Antitrust	48.00%
Finance & Banking	12.02%
Total	100%

Panel B: Descriptive statistics for the variables

Variables	*N*	Mean	Std.Dev.	P25	Median	P75
ROA	12,278	0.06	0.10	0.03	0.06	0.1
ROE	12,253	0.25	0.32	0.14	0.23	0.33
Litigation	12,280	0.22	0.68	0	0	0
Leverage	12,279	0.20	0.16	0.05	0.19	0.31
Firm size	12,278	7.46	1.51	6.43	7.35	8.45
Market-to-book	12,225	2.05	1.8	0.99	1.53	2.45
Loss	12,280	0.12	0.32	0	0	0

Panel A shows the distribution of lawsuits for the sample. Panel B reports summary statistics for the full sample. The sample consists of S&P 1500 firms that have data available on stock prices, accounting numbers, and lawsuit information over the sample period.

3.2.3. Control variables

We follow prior research to account for potential covariates of firm operating performance. Specifically, we follow Hutton et al. (2014) to identify the control variables for firm operating performance. We control for the following determinants of firm operating performance: *Leverage*, *Firm Size*, *Market-to-Book ratio*, and *Loss*. These variables are defined in Appendix and Section 4.1 below.

3.3. Summary statistics

Panel A of Table 1 reports the distribution of the various lawsuit types over our sample period. Disputes related to the violations of securities laws account for about 27.97% of the total lawsuits in our sample. Corporate governance lawsuits represent approximately 12.01% of the total lawsuits. Antitrust lawsuits account for about 48.00% of the total lawsuits, and the outstanding 12.02% pertain to the violation of finance laws. Panel B of Table 1 reports summary statistics for the variables used in our study. The mean (median) ROA is 6% (3%). The mean (median) ROE is 25% (14%). The average of the lawsuits variable is 0.22 (22%), indicating that twenty-two percent of our firm-year observations consist of firms that face at least one lawsuit in that year. The mean (median) firm size, measured by the natural logarithm of total assets in millions of dollars, is 7.46 (7.35). The average of the loss dummy is 12%, with a standard deviation of 32%.

4. Empirical results

We perform a regression analysis to examine the relationship between litigation and corporate operating performance in Section 4.1. We then advance to run a series of robustness checks in Section 4.2.

4.1. Litigation risk and firm performance

We examine the relation between litigation and corporate operating performance by estimating the regression model in Eq. (1) below:

$$CorpPerf_{it} = a_0 + a_1\,(LRisk) + a_2\left(Leverage_{it-1}\right) + a_3(FirmSize_{it-1}) + a_4\,(MTB_{it-1}) + a_5\,(Loss_{it}) + \varepsilon_{it} \quad (1)$$

Where *LRisk* is the main independent variable of interest, defined as the annual sum of lawsuits against a firm. *Leverage* is the ratio of total debt to total assets. Firm Size is the natural logarithm of total assets. *Market-to-Book ratio* is the market value of assets to the book value of assets. *Loss* is a dummy that takes a value of one when ROA is negative and zero otherwise. The regression model controls for other potential determinants of corporate performance in the finance literature including leverage, firm size, market-to-book ratio, and loss dummy. We follow Petersen (2009) and use heteroscedasticity-consistent standard errors clustered at the firm level for all our regressions. Table 2 presents four regression specifications with our two corporate operating performance measures: ROA (Models 1 and 3) and ROE (Models 2 and 4). The independent variable of interest in Models 1 and 2 of Table 2 is contemporaneous litigation. Lagged litigation is the independent variable of interest in Models 3 and 4 of Table 2. The regression specification in Model 1 quantifies the relationship between our litigation risk measure and ROA. The regression coefficient shows a statistically significant negative relationship between litigation risk and ROA. In Model 2 of the same table, we find a statistically significant negative relationship between our litigation risk measure and ROE. In Model 3, we find a statistically significant negative relationship between our litigation risk measure and ROA. Model 4 shows a statistically significant negative relationship between our litigation risk proxy and ROE. All the results from Models 1 through 4 of Table 2 are statistically significant at the 5% level at least. The regression estimates in Table 2 suggest that sued firms have lower performance as measured by ROA and ROE. The coefficients on the control variables are consistent with the magnitude and signs from earlier studies. As a whole, we find a negative relationship between litigation risk and corporate operating performance, which is consistent with our expectations.

There is the possibility that the financial crisis may have an impact on our results. Therefore, we exclude observations from the financial crisis period (i.e., years 2007 and 2008) from our sample and re-run the regressions. The dependent variable in the regression specification is corporate operating performance, defined as ROA in Models 1 and 3 and ROE in Models 2 and 4. The independent variable of interest is litigation, proxied using two measures: (i) contemporaneous litigation and (ii) lagged litigation. The independent variable of interest in Models 1 and 2 is contemporaneous litigation. For Models 3 and 4, the primary independent variable is lagged litigation. Table 3 shows estimates of our corporate operating performance and litigation risk measures. The results in Models 1 through 4 of Table 3 suggest that the litigation risk measures are statistically negatively related to ROA and ROE at the 5% significance level at least. All of the control variables continue to exhibit similar signs. Collectively, the results in Tables 2 and 3 show that litigation has a statistically negative relationship with our corporate operating performance measures (ROA and ROE). The results provide evidence to suggest that sued firms have lower levels of ROA and ROE. This may spring from the severe reputational damage and other effects of litigation that sued firms experience. Sued firms also find it challenging to raise funds externally, which might affect them significantly. These firms have to forego profitable projects because of limited opportunities to secure funds.

4.2. Robustness checks

For robustness, we re-estimate the regression models by using alternative regression techniques. Additionally, we partition our sample data into Pre-Sox and Post-SOX periods and re-run the analysis. We also decompose the sample into the economic boom and bust periods. Furthermore, we use a propensity-score matched sample and a two-stage least squares (2SLS) regression to address endogeneity concerns.

Table 2
Corporate performance and litigation.

Panel A: Corporate performance on litigation measures				
	Model 1	Model 2	Model 3	Model 4
	ROA	ROE	ROA	ROE
$Litigation_{(t)}$	−0.3968**	−1.5191***		
	(−2.44)	(−2.67)		
$Litigation_{(t-1)}$			−0.3681**	−1.3180**
			(−2.50)	(−2.04)
$Leverage_{(t-1)}$	−0.0744***	0.1445***	−0.0744***	0.1375**
	(−8.29)	(2.64)	(−8.00)	(2.52)
Firm $size_{(t-1)}$	0.0067***	0.0405***	0.0066***	0.0402***
	(6.17)	(11.36)	(6.18)	(11.05)
Market to $book_{(t-1)}$	0.0182***	0.0225***	0.0180***	0.0218***
	(10.97)	(3.04)	(10.56)	(2.95)
Loss	−0.0696***	−0.1121***	−0.0710***	−0.1180***
	(−11.60)	(−8.74)	(−11.62)	(−9.28)
Constant	−0.0148	−0.0846*	−0.0199	−0.0851
	(−0.79)	(−1.67)	(−1.06)	(−1.62)
Year fixed effects	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
No. of observations	11,472	11,449	10,995	10,973
R^2	0.2466	0.1171	0.2442	0.1168

The table shows regression estimates of corporate operating performance on litigation. The sample consists of S&P 1500 firms over the sample period 1996–2011 with non-missing data on accounting information and lawsuits information. The dependent variable in the regression specification is corporate operating performance, defined as ROA in Models 1 and 3 and ROE in Models 2 and 4. The independent variable of interest is litigation, proxied using the following two measures: (i) litigation (t) and (ii) litigation (t-1), respectively. The independent variable of interest in Models 1 and 2 is litigation (t), and for Models 3 and 4, the main independent variable litigation (t-1). All the models include both industry and year fixed effects. For presentation purposes, we multiply the coefficients on our litigation measures by 100. The t-statistics are shown beneath their respective coefficients in parentheses. They are computed using the standard errors corrected for clustering at the firm level. Statistical significance at the 1%, 5%, and 10% levels, respectively, is indicated by ***, **, *. The number of observations and Pseudo R-squared are also included.

4.2.1. Alternative regression methodology

In order to glean additional understanding into the link between litigation and corporate performance measures, we extend our analysis by re-estimating all the regression models using alternate regression techniques, namely; Fama and MacBeth (1973) and quantile regression methodologies. The regression estimates reported in Table 4, continue to indicate a negative relationship between litigation and our corporate performance measures.

4.2.2. Pre-Sox and Post-Sox analysis

To understand the relationship between litigation and our corporate operating performance measures, we follow Malm et al. (2021) and partition our sample into the Pre-Sox and Post-Sox periods. We re-estimate the regression models. The coefficient estimates suggest that the negative relationship between litigation risk and corporate performance is more pronounced in the Post-Sox period. We report the results in Table 5.

4.2.3. Economic boom and bust analysis

Next, we attempt to understand the relationship between corporate lawsuits and operating performance through different business cycles.[2] We split our sample into the economic boom and bust periods and re-run the analysis. The economic bust

[2] We thank an anonymous referee for suggesting this empirical test.

Table 3
Corporate performance and litigation excluding the financial crisis period.

Corporate performance on litigation measures excluding the financial crisis period				
	Model 1	Model 2	Model 3	Model 4
	ROA	ROE	ROA	ROE
$Litigation_{(t)}$	−0.3986**	−1.8963***		
	(−2.18)	(−3.12)		
$Litigation_{(t-1)}$			−1.4800**	−0.3692**
			(−2.40)	(−2.46)
$Leverage_{(t-1)}$	−0.0746***	0.1227**	0.1128*	−0.0745***
	(−7.38)	(2.08)	(1.93)	(−7.06)
Firm $size_{(t-1)}$	0.0062***	0.0400***	0.0393***	0.0061***
	(5.79)	(10.83)	(10.56)	(5.83)
Market to $book_{(t-1)}$	0.0166***	0.0227***	0.0219***	0.0163***
	(9.60)	(3.28)	(3.20)	(9.15)
Loss	−0.0668***	−0.1107***	−0.1175***	−0.0683***
	(−11.47)	(−8.65)	(−9.33)	(−11.46)
Constant	−0.0113	−0.0786	−0.0754	−0.0152
	(−0.72)	(−1.58)	(−1.46)	(−0.98)
Year fixed effects	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
No. of observations	9507	9486	9010	9030
R^2	0.2668	0.1229	0.1222	0.2641

The table shows regression estimates of corporate operating performance on litigation. The sample consists of S&P 1500 firms over the sample period 1996–2011 with non-missing data on accounting information and lawsuits information. Observations from the financial crisis period (years 2007 and 2008) are excluded from the sample. The dependent variable in the regression specification is corporate operating performance, defined as ROA in Models 1 and 3 and ROE in Models 2 and 4. The independent variable of interest is litigation, proxied using the following two measures: (i) litigation (t) and (ii) litigation (t-1), respectively. The independent variable of interest in Models 1 and 2 is litigation (t) and for Models 3 and 4, the main independent variable litigation (t-1). All the models include both industry and year fixed effects. For presentation purposes, we multiply the coefficients on our litigation measures by 100. The t-statistics are shown beneath their respective coefficients in parentheses. They are computed using the standard errors corrected for clustering at the firm level. Statistical significance at the 1%, 5%, and 10% levels, respectively, is indicated by ***, **, *. The number of observations and Pseudo R-squared are also included.

Table 4
Robustness checks: Alternative techniques.

Robustness tests	Dependent variable	*N*	Coefficient	t
Alternative methodology: Fama-MacBeth	ROA	11,541	−0.7108***	−4.64
Alternative methodology: Fama-MacBeth	ROE	11,518	−1.7720***	−3.06
Alternative methodology: Quantile	ROA	11,472	−0.1374**	−2.08
Alternative methodology: Quantile	ROE	11,449	−0.4769**	−2.35

The table reports the results of robustness checks of our main results. The coefficients are on the litigation (t) variable in different regression specifications. For presentation purposes, we multiply the coefficients on our litigation measures by 100. Statistical significance at the 1%, 5%, and 10% levels, respectively, is indicated by ***, **, *.

years include 2001, 2007, 2008, and 2009. The remaining periods constitute the boom period. The year 2001 covers the dot-com burst. The sample years of 2007, 2008, and 2009 capture the sub-prime mortgage crisis. We re-estimate the regression models and find that the negative relationship between corporate lawsuits and operating performance is more pronounced in the economic boom period. The results are presented in Table 6. The results continue to hold when we define the bust period to include 2001, 2007, and 2008. It is noteworthy to highlight that the number of observations reduced significantly due to the fewer years of the bust sample. The lower statistical power could also be a possible explanation for the lack of effect.

4.2.4. Propensity-score matched sample

We use a propensity score matching technique to address potential endogeneity and self-selection concerns. Our objective is to obtain a control group whose members have similar attributes as the treatment group. In constructing the matched sample, we run a logit regression of the litigation dummy variable, which takes the value of one if there are lawsuits in a particular year, and zero otherwise on leverage, firm size, and market to book. We then use the resulting propensity scores from the logit regression to perform a match to create our sample for the robustness check. The results from the propensity score matching average treatment effects on the treated (ATT) test support our hypothesis. As presented in Table 7, the ATT test results indicate that our corporate operating performance proxies are significantly higher for the controlled firms than the treated firms. This suggests that sued firms have a declining ROA and ROE in the overall population and the propensity-score matched sample, thus supporting our initial findings.

4.2.5. Two-stage least squares (2SLS) regression

We run a two-stage least squares (2SLS) regression model to ensure that endogeneity does not confound our results. We follow Chintrakarn et al. (2018) and Malm and Kanuri (2020) to identify the earliest value of litigation for each firm and use that as an instrumental variable. Our results continue to show a negative relationship between litigation and our corporate performance

Table 5
Corporate performance and litigation (pre- versus post-Sox periods).

Panel A: Corporate Performance and Litigation (t) (Pre-Sox versus Post-Sox Periods)				
	Model 1	Model 2	Model 3	Model 4
Dependent variable	ROA	ROA	ROE	ROE
	Pre-Sox	Post-Sox	Pre-Sox	Post-Sox
$Litigation_{(t)}$	−0.8145**	−0.3716**	0.3204	−2.0291***
	(−2.21)	(−2.26)	(0.27)	(−3.13)
$Leverage_{(t-1)}$	−0.0589***	−0.0842***	0.1332	0.1477**
	(−3.33)	(−9.00)	(1.05)	(2.42)
Firm $size_{(t-1)}$	0.0039***	0.0087***	0.0328***	0.0442***
	(2.66)	(7.02)	(6.26)	(10.80)
Market to $book_{(t-1)}$	0.0151***	0.0221***	0.0208**	0.0239**
	(7.77)	(9.03)	(2.35)	(2.23)
Loss	−0.0789***	−0.0647***	−0.0778***	−0.1195***
	(−6.02)	(−10.45)	(−2.62)	(−8.83)
Constant	0.0376**	−0.0676***	0.1543**	−0.1829***
	(2.54)	(−3.48)	(2.13)	(−3.04)
Year fixed effects	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
No. of observations	3420	8052	3407	8042
R^2	0.2545	0.2545	0.1361	0.1188
Panel B: Corporate Performance and Litigation (t-1) (Pre-Sox versus Post-Sox Periods)				
	Model 1	Model 2	Model 3	Model 4
Dependent variable	ROA	ROA	ROE	ROE
	Pre-Sox	Post-Sox	Pre-Sox	Post-Sox
$Litigation_{(t-1)}$	−0.4682	−0.4231***	−0.2155	−1.6403**
	(−1.54)	(−2.68)	(−0.15)	(−2.23)
$Leverage_{(t-1)}$	−0.0574***	−0.0843***	0.1011	0.1476**
	(−2.86)	(−9.00)	(0.81)	(2.42)
Firm $size_{(t-1)}$	0.0031**	0.0087***	0.0333***	0.0432***
	(2.14)	(7.23)	(6.02)	(10.40)
Market to $book_{(t-1)}$	0.0144***	0.0221***	0.0191**	0.0238**
	(6.91)	(9.01)	(2.21)	(2.21)
Loss	−0.0869***	−0.0647***	−0.0970***	−0.1204***
	(−5.77)	(−10.39)	(−3.29)	(−8.87)
Constant	0.0407***	−0.0673***	0.1738**	−0.1751***
	(2.71)	(−3.49)	(2.31)	(−2.89)
Year fixed effects	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
No. of observations	2945	8050	2933	8040
R^2	0.2487	0.2546	0.1423	0.1181

The table shows regression estimates of corporate operating performance on litigation for pre-Sox and post-Sox periods. The sample consists of S&P 1500 firms over the sample period 1996–2011 with non-missing data on accounting information and lawsuits information. The dependent variable in the regression specification is corporate operating performance, defined as ROA in Models 1 and 2 and ROE in Models 3 and 4. In panels A and B are regression specifications where litigation is measured using the following measures: (i) litigation (t) and (ii) litigation (t-1), respectively. Models 1 through 4 include both industry and year fixed effects. For presentation purposes, we multiply the coefficients on our litigation measures by 100. The t-statistics are shown beneath their respective coefficients in parentheses. They are computed using the standard errors corrected for clustering at the firm level. Statistical significance at the 1%, 5%, and 10% levels, respectively, is indicated by ***, **, *. The number of observations and Log-Likelihood are also included.

proxies. As shown in Model 1 of Table 8, the coefficient of litigation in the earliest year is positive and statistically significant at the 1% level. Model 2 is the second stage of the OLS regression, where the dependent variable is the return on total assets (ROA). The coefficient of the instrumented litigation variable from the first stage regression is negative and statistically significant. The results suggest that higher litigation leads to lower ROA. Finally, Model 3 of Table 8 is the second stage of the OLS regression. The dependent variable is the return on equity (ROE). As expected, the coefficient of the instrumented litigation variable from the first stage regression is negative and statistically significant. The results suggest that higher litigation leads to declining ROE. Together, the results in Tables 2–7, and 8 show a negative relationship between litigation and our corporate performance measures, thus further confirming our expectations.

5. Conclusion

The accounting and finance literature has spotlighted the legal environment's substantial role in shaping corporate behavior. We extend the literature using a unique hand-collected dataset on corporate lawsuits to examine the relationship between litigation and corporate operating performance as proxied by return on assets (ROA) and equity (ROE). We find a negative relationship between legal risk and firm performance. Our results suggest that sued firms tend to have lower performance. The results are robust to using an alternative sample period to account for the impact of the 2007–2008 financial crisis, alternative regression techniques, alternative measures of litigation, a propensity-score matched sample, and an instrumental variable in a two-stage least squares regression. The negative relationship between litigation risk and corporate performance is more pronounced in the

Table 6
Corporate performance and litigation (economic boom versus bust periods).

Panel A: Corporate Performance and Litigation (t) (Boom versus Bust Periods)				
	Model 1	Model 2	Model 3	Model 4
Dependent variable	ROA	ROA	ROE	ROE
	Boom years	Bust years	Boom years	Bust years
$Litigation_{(t)}$	−0.4652**	−0.2990	−2.0304***	−0.6734
	(−2.20)	(−1.38)	(−3.07)	(−0.81)
$Leverage_{(t-1)}$	−0.0853***	−0.0593***	0.1299**	0.1683**
	(−8.10)	(−4.97)	(1.98)	(2.02)
Firm $size_{(t-1)}$	0.0062***	0.0083***	0.0400***	0.0415***
	(5.74)	(4.77)	(10.33)	(8.41)
Market to $book_{(t-1)}$	0.0162***	0.0240***	0.0245***	0.0157
	(9.71)	(10.71)	(3.58)	(0.95)
Loss	−0.0659***	−0.0781***	−0.0964***	−0.1531***
	(−12.01)	(−7.89)	(−6.53)	(−6.28)
Constant	−0.0229	−0.0502**	−0.0964*	−0.1305
	(−1.46)	(−2.03)	(−1.81)	(−1.54)
Year fixed effects	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
No. of observations	7757	3715	7740	3709
R^2	0.2803	0.2195	0.1180	0.1353
Panel B: Corporate Performance and Litigation (t-1) (Boom versus Bust Periods)				
	Model 1	Model 2	Model 3	Model 4
Dependent Variable	ROA	ROA	ROE	ROE
	Boom years	Bust years	Boom years	Bust years
$Litigation_{(t-1)}$	−0.2829*	−0.5438**	−1.2604*	−1.4660
	(−1.88)	(−2.11)	(−1.79)	(−1.36)
$Leverage_{(t-1)}$	−0.0856***	−0.0599***	0.1184*	0.1664**
	(−7.69)	(−5.00)	(1.83)	(2.00)
Firm $size_{(t-1)}$	0.0058***	0.0087***	0.0389***	0.0428***
	(5.58)	(5.03)	(9.84)	(8.37)
Market to $book_{(t-1)}$	0.0159***	0.0240***	0.0237***	0.0157
	(9.21)	(10.68)	(3.51)	(0.95)
Loss	−0.0680***	−0.0776***	−0.1049***	−0.1517***
	(−12.05)	(−7.81)	(−7.19)	(−6.19)
Constant	−0.0259	−0.0515**	−0.0935*	−0.1358
	(−1.63)	(−2.11)	(−1.65)	(−1.61)
Year fixed effects	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
No. of observations	7280	3715	7264	3709
R^2	0.2769	0.2201	0.1169	0.1358

The table shows regression estimates of corporate operating performance on litigation during the economic boom and bust periods. The economic bust periods include 2001, 2007, 2008 and 2009 while the remaining years constitute the boom years. The sample consists of S&P 1500 firms over the sample period 1996-2011 with non-missing data on accounting information and lawsuits information. The dependent variable in the regression specification is corporate operating performance, defined as ROA in Models 1 and 2 and ROE in Models 3 and 4. In panels A and B are regression specifications where litigation is measured using the following measures: (i) litigation (t) and (ii) litigation (t-1), respectively. Models 1 through 4 include both industry and year fixed effects. For presentation purposes, we multiply the coefficients on our litigation measures by 100. The t-statistics are shown beneath their respective coefficients in parentheses. They are computed using the standard errors corrected for clustering at the firm level. Statistical significance at the 1%, 5%, and 10% levels, respectively, is indicated by ***, **, *. The number of observations and Log-Likelihood are also included.

Table 7
Robustness check: Propensity score matching.

Variable	Sample	Treated	Controls	Difference	t-stats
ROA	Unmatched	0.0501	0.0586	−0.0085***	−3.19
	ATT	0.0486	0.0633	−0.0147***	−4.2
ROE	Unmatched	0.2603	0.2477	−0.0126	1.43
	ATT	0.2580	0.3011	−0.0431***	−3.42

The table shows estimates of robustness checks from propensity score matched sample. The sample consists of S&P 1500 firms over the sample period 1996-2011 with non-missing data on accounting information and lawsuits information. The results show estimates from the matched sample analysis. Statistical significance at the 1%, 5%, and 10% levels, respectively, is indicated by ***, **, *.

post-Sox period and during the economic boom years. The results align with the premise that firms facing lawsuits perform poorly because of the distraction of top management and other negative consequences of the lawsuits. The paper sheds light on the critical role of the legal environment on corporate performance. It complements previous studies in this research area. Collectively, the results further our understanding of the role of legal risk on firm-level operating performance.

CRediT authorship contribution statement

James Malm: Conceptualization, Data curation, Methodology, Writing – original draft, Software, Validation, Writing and editing. **Kenneth W. Soyeh:** Conceptualization, Data curation, Methodology, Writing – original draft, Software, Validation, Writing and editing. **Srinidhi Kanuri:** Software, Writing and editing.

Table 8
Robustness check: Two-stage least squares (2SLS) regressions.

	Model 1	Model 2	Model 3
	1st Stage	2nd Stage	2nd Stage
	OLS regression	OLS regression	OLS regression
Dependent variable	Litigation	ROA	ROE
Earliest year litigation	0.0029***		
	(11.44)		
Instrumented earliest year litigation		−5.1050***	−10.7129***
		(−5.24)	(−2.83)
$Leverage_{(t-1)}$	−0.0011	−0.0786***	0.1361**
	(−0.94)	(−8.87)	(2.48)
$Firm\ size_{(t-1)}$	0.0017***	0.0166***	0.0602***
	(5.74)	(6.58)	(6.56)
$Market\ to\ book_{(t-1)}$	0.0001	0.0188***	0.0236***
	(0.89)	(11.47)	(3.18)
Loss	0.0010***	−0.0629***	−0.0990***
	(2.60)	(−11.24)	(−7.48)
Constant	−0.0110***	−0.0714***	−0.2059***
	(−4.25)	(−3.08)	(−2.88)
Year fixed effects	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes
No. of observations	11,472	11,472	11,449
R^2	0.1416	0.2507	0.1181

The table shows two-stage least squares estimates of regression of corporate operating performance on litigation. The sample consists of S&P 1500 firms over the sample period 1996–2011 with non-missing data on accounting information and lawsuits information. We use litigation in the earliest year for each firm in the sample as an instrumental variable. Instrumented litigation is the fitted values of litigation obtained from the first-stage least squares (Model 1). The dependent variable in the second stage is ROA (Model 2) and ROE (Model 3). The t-statistics are shown beneath their respective coefficients in parentheses. They are computed using the standard errors corrected for clustering at the firm level. Statistical significance at the 1%, 5%, and 10% levels, respectively, is indicated by ***, **, *. The number of observations and Pseudo R-squared and Log-Likelihood are also included.

Appendix. Variable definitions

Variable	Definition
Return on assets	It is calculated as the ratio of operating income to total assets.
Return on equity	It is calculated as the ratio of operating income to equity.
Total lawsuits	The annual sum of lawsuits against a firm.
Leverage	It is computed as the ratio of total book debt to total assets.
Firm size	The natural logarithm of total assets.
Market-to-book	The ratio of the market value of assets to the book value of assets.
Loss	A dummy that takes a value of one when ROA is negative and zero otherwise.

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