International Journal of Managerial Finance

Employee disputes and innovation performance: evidence from the pharmaceutical industry

Blake Rayfield
Department of Accounting and Finance, Coggin College of Business, University of North Florida, Jacksonville, Florida, USA, and
Omer Unsal
Girard School of Business, Merrimack College, North Andover, Massachusetts, USA

Received 1 March 2024
Revised 1 August 2024
28 October 2024
Accepted 13 November 2024

Abstract

Purpose – This study aims to explore the impact of employee litigation on the innovation output of firms, specifically within the pharmaceutical sector, by examining the relationship between employee lawsuits and Food and Drug Administration (FDA) product approvals.

Design/methodology/approach – Utilizing a hand-collected dataset comprising 2,293 employee disputes, this research conducts an empirical analysis to test how litigation involving employees influences the rate of FDA approvals for new pharmaceutical products.

Findings – The analysis reveals that employee disputes are negatively associated with the number of FDA-approved products, indicating that firms facing frequent employee allegations tend to exhibit lower innovation outcomes. Further, the study identifies case characteristics, such as the involvement of labor unions and the duration of cases, as significant determinants that delay the FDA approval process, thereby adversely affecting innovation performance.

Research limitations/implications – While the study provides novel insights into the relationship between employee litigation and innovation in the pharmaceutical industry, the findings are contingent upon the accuracy of the dataset and may not be universally applicable across all sectors.

Practical implications – The results underscore the critical importance of maintaining a positive workplace environment and treating employees fairly to foster innovation performance. Firms are encouraged to adopt strategies that mitigate the risk of litigation to enhance their innovation capabilities.

Originality/value – This research contributes to the literature by offering empirical evidence on the detrimental effects of employee litigation on firms' ability to innovate, particularly in the highly regulated pharmaceutical industry. It highlights the significance of workplace relations in influencing a firm's innovation outcomes.

Keywords Innovation, Human capital, Employee treatment, Litigation

Paper type Research paper

1. Introduction

This study investigates the impact of employee and labor-related lawsuits on firms' innovation outcomes. Work-related litigation has risen 400% in the past 20 years [1]. In 2014, US firms faced approximately 88,000 discrimination charges [2]. By 2015, the chance of a US firm becoming the target of employee litigation was 12%, and almost 20% of allegations ended in a settlement. This study focuses on employee allegations for two reasons. First, employees are considered the most valuable asset of a firm (Coff, 2002). Second, employee satisfaction is essential for better corporate performance (Edmans, 2011). We test if labor-related allegations lower the number of FDA approved products and whether employee litigation influence future FDA and patent approvals.

A lawsuit can generate direct costs (attorney fees, court fees, settlements, and judgments) and indirect costs (reputational loss, workplace motivation loss) that affect firm performance in the long run. Many studies examine the relationship between employee treatment, diversity, and innovation outcome (Chen *et al.*, 2016; Acharya *et al.*, 2014; Gao and Zhang, 2016; Mayer *et al.*, 2016) by studying KLD Research & Analytics, Inc. (KLD ratings), or state-adopted

JEL Classification — K31, O31, O32, I10

International Journal of Managerial Finance

e-ISSN: 1758-6569
p-ISSN: 1743-9132
DOI 10.1108/IJMF-03-2024-0134

labor protection laws. KLD ratings, however, are limited in their ability to measure the employee-related environment. Employment litigation is a more direct measure that can be used to illustrate the overall work environment of the firm. Despite the growing body of research into firm litigation, no prior studies have investigated the direct relationship between employee lawsuits and innovation in the pharmaceutical industry.

This study focuses on the human-capital-intensive industries of healthcare, medical equipment, and pharmaceutical (Ertugrul, 2013). Firms in these sectors require a high level of skill, expertise, and knowledge capital (Wang, 2009). In addition, these firms are highly monitored. Therefore, we can better identify the innovation outcomes in these industries by collecting the total drug patents, total drug approvals, total pre-market approvals, and total medical device approvals by the FDA (Food and Drug Administration).

Litigation can harm a firm's innovation activity through two primary channels. First, firms face direct costs associated with litigation. Some direct costs are straight forward, such as defense fees, legal fees, and settlement fees. Others, such as risk mitigation or training seminars, require firms to consume financial resources voluntarily. An increase in these costs can cause financial pressure. Litigation costs are financed with internal cash flow, or firms are required to raise external capital. However, this is not the only means that a firm can fund their defense. Firms raise funds from a third party (Abrams and Chen 2013), or they obtain insurance to help reduce the costs of litigation. In all scenarios, a firm must use additional capital and allocate its resources to meet legal fees, government fees, or other damages. The second channel by which litigation influences a firm's innovation outcome is indirect costs. A frequently sued firm may experience indirect costs, such as lower morale, tenuous work environment, or trouble recruiting/retaining human capital. Employee-friendly environments outperform their rivals concerning value creation, profitability, and productivity (Unsal and Rayfield, 2019; Faleye and Trahan, 2011). Because of the costs associated with litigation, we believe innovation activity will suffer when firms are the target of frequent employee allegations.

Our sample consists of 1,627 unique firms from the S&P Capital IQ database. We hand-collect 2,293 distinct employee litigations between 2000 and 2015, along with other case characteristics, such as case outcomes. Using the collected data, we examine the influence of labor disputes on firms' innovation performance and find robust evidence that employee allegations lower the total number of FDA product approvals. Our results find that firms use their financial resources to fund both the direct costs (i.e. attorney fees and court fees, settlements, and judgments) and indirect costs (i.e. reputational loss, workplace motivation loss) related with employee litigation.

The second part of our study investigates potential explanations for the effect of employee lawsuits on the innovation process. First, we consider the "duration" of employee lawsuits. A discrimination case (i.e. race, age, disability, national origin, sex, color, or religion) can take up to 275 days to resolve. A prolonged court battle can mean increased direct and indirect costs. We also test if case characteristics are a factor in the innovation processes. We find that union-filed lawsuits lengthen the FDA approval process compared to cases filed by an individual employee. Our results are similar to Bradley *et al.* (2013), who document an adverse effect of unionization on innovation outcomes.

Next, we test the relationship between lawsuits, employment decisions, and FDA product approvals. If the number of FDA products decreases because firms are facing labor allegations, the decrease in approvals may be due to employee turnover and indirect cost. Our results show that employment flow is related to FDA approval. We document that the sensitivity of net FDA approvals to the absolute value change in employment is higher in subsequent litigation. Therefore, frequently-sued firms experience fewer approvals because they experience more year-over-year employment change.

Our paper makes three main contributions. First, we provide the first large-sample evidence on firms' innovation outcome and innovation efficiency by examining employee lawsuits. Second, this paper adds to the growing literature on innovation related to employee treatment

in the workplace. Third, our study highlights the additional underlying factors associated with the FDA approval process for medical products. Our study focuses on the cost factor associated with litigation and analyzes the relationship between litigation and innovation by using a broad sample of different employee lawsuit datasets, beyond product liability and securities litigation.

Previous literature has explored employee treatment mainly through ESG (Environmental, Social, and Governance) factors and KLD (Kinder, Lydenberg, Domini) data, focusing on positive impacts like diversity initiatives. Studies such as Jones *et al.* (2019) has shown how positive treatment enhances innovation, often using broad measures that encompass various unrelated factors. Our study offers a distinct contribution by focusing on the negative aspects of employee treatment, specifically through litigation data. This allows us to analyze the intensity and financial impact of employee disputes, providing a deeper understanding of how these negative experiences affect firm innovation. Unlike the broader ESG and KLD datasets, our data of disputes and litigation offer more precise insights into the disruption caused by employee issues. This is particularly relevant in the pharmaceutical industry, where innovation performance is crucial. By highlighting the specific mechanisms through which negative employee relations hinder innovation, our study provides valuable new insights and a more focused evaluation of employee treatment impacts.

This paper proceeds as follows: We provide a summary of existing literature on lawsuits and firm performance in Section 2. Section 3 describes our research hypothesis. Section 4 presents our data. In Section 5, we discuss our findings, and we conclude our work in Section 6.

2. Literature review

Innovation culture is necessary for firm survival (Zingales, 2000). In our study, we measure how labor-related issues impact corporate innovation performance. We focus on employee relations because employees are valuable assets of the firm (Coff, 2002). Previous studies have found employee treatment to make a vital contribution to firm performance (Rayfield and Unsal 2021; Rayfield and Unsal 2019; Edmans, 2011; Faleye and Trahan, 2011), capital structure decisions (Bae *et al.*, 2011; Verwijmeren and Derwall, 2010), and acquisition performance (Ertugrul, 2013).

Employee satisfaction is a crucial determinant of sustainable growth in corporations. For example, Rhoades and Eisenberger (2002) and Whitener (2001) document that employee willingness to stay with a firm is positively related to the firm's support, recognition, pay, promotion, and job security. Committed employees have lower absenteeism and turnover (Somers, 1995), and happy employees tend to be more productive than unhappy ones (Oswald *et al.*, 2015). Employee satisfaction is also related to intrinsic motives (e.g. enjoyment) and extrinsic motives (e.g. monetary benefit). Sauermann and Cohen (2010) document that intrinsic motives are a critical factor in the innovation process. Holmstrom (1989) and Holmstrom and Milgrom (1991) also show that non-monetary incentives encourage innovation and must be used to satisfy employees.

Firm innovation is a combination of both employee-level motives and the outcome of firms' direct investment in research and development. While employee treatment is essential for innovation outcomes, some researchers argue that firms' R&D activities play a crucial role in innovation. Innovation could be driven entirely by R&D (Arundel, 2007), while R&D is generally agreed to be a significant determinant of the innovation process (Hausman *et al.*, 1984; Pakes and Griliches, 1980; Acs and Audretsch, 1988). Firms may not only generate new information but also grasp existing information by R&D (Cohen and Levinthal, 1989). Not only is R&D important during the innovation process, but it is also heavily used to develop research personnel (Coad and Rao, 2010), which contributes to the quality of the workplace environment. Innovation is a long and tedious process with a high level of risk involved (success or failure). Therefore, tolerance for failure would promote innovation (Manso, 2011).

The relationship between innovation and other firm characteristics can be described by market size (Scherer, 1965), industry concentration (Levin *et al*., 1985; Lunn, 1986), competition (Aghion and Howitt, 2005), corporate governance (Meulbroek *et al*., 1990), types of financing decision (Benfratello *et al*., 2008; Hsu *et al*., 2014), and bankruptcy laws (Acharya and Subramanian, 2009).

The literature has incorporated a diverse set of measures, including direct employee feedback, organizational culture assessments, and other relevant indicators. For instance, the work of Denison (1996) on organizational culture and its impact on corporate performance highlights the significance of cultural assessments. Additionally, studies such as those by Harter *et al*. (2002) have demonstrated with meta-analysis the value of direct employee feedback through surveys in understanding employee engagement and its correlation with business outcomes.

Our work is similar to Adhikari *et al.* (2016), Chen *et al*. (2016), and Mayer *et al.* (2016), who analyze the relationship between employee treatment and firm innovation performance by using the KLD metrics database. However, our work adds value to those studies as we utilize several hand-collected databases of employee lawsuits, violations, and other work-related disputes to measure pharmaceutical firm innovation. Our composite measure of litigation consists of factors such as case motivation, case outcome, and case duration. Therefore, we not only measure the influence of employee treatment on innovation outcomes, but also how particular case characteristics affect the FDA product approval process.

3. Hypothesis development

We propose that employee disputes affect firm innovation. Any work-related issue could deter innovation, and previous research shows that employee treatment is associated with changes in firm value by increasing stock returns (Edmans, 2011), lowering debt ratios (Bae *et al*., 2011), and changing labor productivity (Faleye *et al*., 2013). Concerning employment litigation affecting workplace productivity, we propose two channels, direct and indirect costs.

First, we test the general relationship between employee litigation and innovation.

H1. All other things equal, employee lawsuits are negatively associated with firm innovation. After establishing the general negative relationship, we investigate the channels of how litigation can affect workplace culture.

H2. The association between employee litigation and innovation is mediated by direct and indirect costs.

Litigation affects a firm through direct and indirect costs. Direct costs are the hard-dollar costs associated with litigation, such as lawyer fees, court costs, and/or settlement costs. These costs are prevalent and substantial. Litigation affects a firm through direct and indirect costs; therefore, we expect a negative relationship between innovation performance and employee allegations. The uniqueness of our data allows us to measure some direct costs associated with litigation, such as settlement costs.

The other cost associated with employment litigation is indirect costs. Indirect costs are costs that come from negative press, degraded reputation, or damages to workplace morale. The work environment is a combination of culture, benefits, compensation, among other factors that create a suitable work environment. Workplace litigation can destabilize the workplace environment and cause unrest to current and future employees. Because innovation is a human capital intensive task, any cost or disruption that affects the workplace environment can have an impact on a firm's innovation output.

Because several firm characteristics can affect the FDA approval process, each test includes related control variables. Controls for firm size as measured by total assets, Tobin's Q (growth opportunities), RnD, book leverage (Silver and Tian, 2011), tangibility, and free cash flow are included. We also include ROA to control for a firm's profitability, Herfindahl Index

for market competition, and firm age (Aghion and Tirole, 1994; Robinson, 2008). Firm-year fixed effects and state-year fixed effects are included to eliminate any unobserved heterogeneity.

4. Data and methodology

4.1 Firm data

We employ the S&P Capital IQ database to identify the publicly traded and calculate firm-specific control variables. Our final sample includes 1,627 unique firms between the years 2000–2015.

4.2 Litigation data

We hand-collect more than 2,000 employee disputes that have an initial court hearing between 2000 and 2015. The primary source of labor litigation used in the study is sourced from the National Labor Relations Board (NLRB). The NLRB data includes allegations, charging parties, case reasons, and decisions [3]. In 2015 alone, the NLRB reported approximately 20,200 Unfair Labor Practices cases filed by individuals, unions, or employers [4], and more than 7,300 labor disputes that ended in a settlement. Approximately 6,900 cases were withdrawn, and almost 4,700 cases were dismissed in court [5].

Table 1 displays summary statistics for firms in the sample. Panel A documents the lawsuit characteristics at the firm level. Eight percent of the firms in the sample have faced at least one allegation, and the maximum number of litigations in a given year is 45. Unions opened more cases in the sample compared to individuals. A full sample description can be found in Panel G and H of Table 1.

4.3 Violations, inspections, and other disputes

We test empirically if workplace disputes influence corporate innovation. In addition to litigation, other types of violations, inspections, and complaints could influence a firm's innovation output. We collect labor enforcement data from the US Department of Labor [6]. First, we collect workplace enforcement data from the Occupational Safety and Health Administration (OSHA) to identify workplace safety inspections and violations. Second, we collect Wage and Hour Compliance Action Data surrounding wage-related disputes, including civil penalties. Third, we collect Employee Benefits and Security Enforcement Data for benefit-related allegations that result in penalty assessments. Finally, we collect discrimination lawsuits, settlement fees, and attorney fees from Bloomberg's BNA Employment Discrimination Verdicts and Settlements database and S&P Capital IQ news releases.

4.4 FDA product database

We measure a firm's innovation outcome by counting the number of new FDA-approved products. The FDA product submission database includes unique data about pharmaceutical and drug-related approvals [7]. The final sample includes 28,275 total FDA approvals. Among the 28,275 FDA approvals, there are 3,228 drug patents, 10,889 drug approvals, 8,247 pre-market approvals, and 5,911 medical device approvals. Panel E of Table 1 documents the summary statistics for FDA-approved products. We also collect information on clinical testing data from S&P Capital IQ. More information on all of the data used in this study can be found in Appendix.

4.5 Methodology

To test Hypotheses 1 and 2, we introduce the following model. The primary model evaluates the general relationship between employee litigation and innovation:

Table 1. Panel A. Summary statistics

Variables	Mean	Std.Dev	Min	Max
Panel A. Litigations				
Total case	0.05	0.68	0.00	31.00
Lawsuit	0.04	0.13	0.00	1.00
Panel B. Charging party				
Total case (case opened by individual)	0.01	0.19	0.00	7.00
Total case (case opened by union)	0.03	0.53	0.00	25.00
Panel C. Case outcome				
Total dismissal	0.01	0.18	0.00	7.00
Total settlement	0.00	0.10	0.00	5.00
Total withdrawal	0.03	0.49	0.00	25.00
Panel D. Inspections and violations				
OSHA inspections	0.13	0.82	0.00	30.00
Discrimination lawsuit	0.01	0.12	0.00	5.00
Wage related case	1.07	44.41	0.00	4419.00
Wage related penalty	666.68	20374.76	0.00	1354849.00
%SuitRatio	0.00	0.08	0.00	4.00
Employee benefits security	0.00	0.02	0.00	1.00
Attorney fees	30169.92	1559436.00	0.00	102000122.00
Settlement fees	43221.12	100122.00	0.00	604991.00
Panel E. FDA products				
Total approval	2.45	11.59	0.00	307.00
Total drug patent	0.28	2.29	0.00	96.00
Total drug approval	0.94	7.82	0.00	250.00
Total pre-market approval	0.71	3.25	0.00	76.00
Total medical device approvals	0.51	5.60	0.00	292.00
Total recalled product	0.47	5.34	0.00	296.00
Total post market safety Evals.	0.11	3.32	0.00	112.00
Panel F. Control variables				
Log(Asset)	3.84	2.21	−0.56	8.02
Log(Emp)	−1.86	2.20	−5.52	2.64
Tobin's Q	4.83	5.81	0.85	24.72
RnD	0.26	0.34	0.00	1.26
Book leverage	0.28	0.44	0.00	1.70
Tangibility	0.13	0.13	0.00	0.45
ROA	−0.60	1.07	−4.21	0.17
HHI index	0.16	0.08	0.06	0.34
Log(firm age)	2.26	0.78	0.69	3.47
Free cash flow	−0.57	1.00	−3.93	0.16

Panel G

	Num. of firm	Lawsuits	Individual cases	Union cases	Innovative firm	Total innovation
2000	554	13	3	10	183	2,218
2001	570	11	5	6	182	2,189
2002	587	19	5	14	181	2,641
2003	658	21	11	10	209	1,835
2004	628	23	12	11	204	1,611
2005	601	30	7	23	205	1,671
2006	623	22	16	6	223	1,729
2007	556	27	7	20	196	1,525
2008	597	23	15	8	192	1,900

(*continued*)

Table 1. Continued

Panel G						
	Num. of firm	Lawsuits	Individual cases	Union cases	Innovative firm	Total innovation
2009	578	27	12	15	177	1,792
2010	565	48	19	29	169	1,997
2011	575	26	10	16	176	1,800
2012	554	45	7	38	165	1,709
2013	586	47	8	39	181	2,126
2014	597	40	14	26	167	2,023
2015	654	32	10	22	189	2,089

Panel H. Sample description	
Location	USA
Type	Publicly Traded
Number of unique firms	1,627
Lawsuit	5%
Num. of lawsuit firms	82
Total lawsuit	454
Individual case	161
Union case	293
Num. of unique firms with innovation	520
Total innovation	30,855
Num. of unique pharma firm	1,200
Num. of unique medical device firm	427

Note(s): Table 1 exhibits the summary statistics at firm level. Our sample consists of 1,627 unique firms from the S&P Capital IQ database between 2000 and 2015. Panel A represents the litigation characteristics at firm level. Panel B exhibits charging party characteristics. Panel C exhibits case outcomes. Panel D represents the other employee related violations, inspections and complaints. Panel E exhibits FDA approved products used in the study. Panel F represents the firms level control variables used in the study. Panel G provides a yearly breakdown and the average values for each category over the 16-year period. Lastly, Panel H provides a sample description. Detailed definitions of variables are reported in the Appendix. Detailed definitions of variables are reported in the Appendix
Source(s): Authors' own work

$$\text{Innovation} = \beta_0 + \beta_1 \text{ Litigation} + \sum \beta_s \text{ Controls} \quad (1)$$

The primary explanatory variable is employment litigation is calculated using two methods. First, we define Lawsuit as a binary variable equal to one if a firm is the subject of a lawsuit in a given year and zero otherwise. The second measure is Ln(TotalLawsuit), which is defined as the log transformation of the total number of lawsuits initiated by employees.

The dependent variable, Innovation, is a firm's innovation outcome as measured by the number of product approvals a firm has received from the FDA. This relation, if negative, indicates that when a firm experiences more litigation, the firms' innovation outcome is reduced. Each test includes a set of firm-level control variables consistent with prior literature.

A simple count of litigation may not capture the full severity of litigation. To consider the seriousness of each dispute, we identify the plaintiff (charging party) of each case, the allegation (i.e. harassment, change in a working contract), case duration, and the case outcome. These variables indicate the severity of litigation. For example, the differing severity of cases can have a unique effect on workplace culture, and longer case durations could affect the workplace by reducing employee morale, increasing employee turnover, or serving as a distraction from efficiency.

5. Empirical results

5.1 Frequency of employee lawsuits and firm innovation

In Table 2, our dependent variable is the total number of FDA-approved products at year t+1. We regress a firm's innovation outcome on the total number of lawsuits by controlling for varying firm-level fixed effects.

In column (1), we include year fixed effects where the firm's total assets capture the firm size. Results indicate that a greater number of employee lawsuits lowers the total number of FDA-approved products [8]. Our results indicate that a one-percent increase in employee lawsuits lowers the FDA approvals by 16.2%. In column (2), we test the relationship using the number of employees and receive similar results. In column (3), we perform firm and year fixed effects by controlling for total assets. We find that a one-percent increase in the total number of lawsuits lowers FDA approvals by 22.5%. The adverse impact of lawsuits on innovation performance remains the same when we control for the number of employees in column (4). Next, we calculate the time-series average of FDA approvals, lawsuits, and other explanatory variables to capture cross-sectional variation. In column (5) and column (6), we document time-series averages of variables and report that a one-percent increase in the total number of employee lawsuits is associated with 7.9 and 8.1% decrease in the total number of FDA approvals, respectively.

In columns (7) and (8), we investigate the primary relationship using state-year fixed effects based on the firm headquarters. State-level laws are relevant to labor protections. Prior studies have found that state-level labor protection laws affect a firm's capital structure (Serfling, 2016). State laws are also associated with increases in innovation outcomes (Acharya *et al.*, 2014) by promoting diversity (Gao and Zhang, 2016). Businesses are required to adopt labor law if the federal or state government in the jurisdiction enacts them. To eliminate unobserved heterogeneity due to state-level laws, we include state fixed effects and document a negative relationship between employee lawsuit and innovation outcome. While our primary focus is the sign and the magnitude of lawsuits, some control variables explain the FDA-approved products. In most cases, we document that firm size, leverage, Tobin's Q, and firm age is associated with a higher number of FDA approvals.

The FDA approval process is rigorous and can take many years. Therefore, it may be useful not only to examine the number of final FDA-approved products, but also the various stages of FDA approval. To conduct this analysis, we employ a unique dataset of phase I, II, and III clinical drug trials. Phase I trials refer to a new drug, treatment, or combination, and the length of the phase I study is several months. Approximately 70% of Phase I drugs proceed to the next stage. Phase II clinical trials focus on the safety and efficacy of treatment. Phase II can take up to 2 years and has a 33% success rate. Phase III clinical trial is the final phase and further tests the efficacy and adverse reactions of a specific treatment. The length of Phase III is from 1 to 4 years.

Panel B of Table 2 documents the relationship between the success of phase I, II, and III drug trials and employee lawsuits. In Panel A, we find that employee litigation lowers the number of clinical trials in each of phases I, II, and III. We also show that employee lawsuits are negatively related to the number of licensed patents by pharmaceutical firms.

In Panel C, we calculate the difference between the clinical testing stages to identify if employee lawsuits decrease the innovation output by lowering the gap between the first and last stages of clinical examination. In column (1), our dependent variable is the absolute difference between the number of phase 3 drugs and the number of phase 1 drugs. We find that employee litigations lower the range of phase III and I drugs. Pharmaceutical firms that experience more employment litigation have worse clinical testing results. The relationship remains the same when we test the differences between phase II and I testing as well as phase III and II.

Lastly, in Panel D, we conduct an ordered logistic model for better evaluation of the employment litigation and clinical testing process. The dependent variable is coded as

Table 2. Employee level litigation and innovation

Panel A Dependent variable Sample	$FDA^{(Total\ Approval)}_{t+1}$ (1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$Log(TotalLawsuit)_t$	−0.162 [0.001]***	−0.376 [0.001]***	−0.225 [0.001]***	−0.118 [0.001]***	−0.079 [0.001]***	−0.081 [0.001]***	−0.162 [0.001]***	−0.161 [0.001]***
Log(Asset)	0.127 [0.001]***		0.123 [0.001]***		0.030 [0.001]***		0.127 [0.001]***	
Log(Emp)		0.130 [0.001]***		0.156 [0.001]***		0.044 [0.001]***		0.311 [0.001]***
Tobin's Q	0.001 [0.001]***	0.001 [0.001]***	0.001 [0.001]***	0.001 [0.070]*	0.001 [0.551]	0.001 [0.911]	0.001 [0.001]***	0.001 [0.883]
RnD	0.001 [0.001]***	0.001 [0.001]***	0.001 [0.001]***	0.001 [0.001]***	0.001 [0.751]	0.001 [0.827]	0.001 [0.139]	−0.014 [0.584]
Book leverage	0.001 [0.001]***	0.001 [0.001]***	0.002 [0.001]***	0.001 [0.076]*	0.001 [0.602]	0.001 [0.990]	0.001 [0.001]***	0.003 [0.001]***
Tangibility	0.100 [0.422]	0.114 [0.362]	0.165 [0.174]	−0.169 [0.194]	0.096 [0.065]*	0.007 [0.901]	0.100 [0.073]*	0.439 [0.001]***
ROA	0.001 [0.375]	0.001 [0.377]	0.001 [0.431]	0.001 [0.256]	0.001 [0.834]	0.001 [0.394]	0.001 [0.539]	0.001 [0.307]
HHI Index	−1.913 [0.001]***	−1.897 [0.001]***	−1.676 [0.001]***	−2.373 [0.001]***	−0.026 [0.884]	−0.004 [0.983]	−1.913 [0.001]***	−6.259 [0.001]***
Log(firm age)	0.174 [0.001]***	0.179 [0.001]***	0.176 [0.001]***	0.149 [0.001]***	0.006 [0.803]	0.005 [0.850]	0.174 [0.001]***	0.333 [0.001]***
Free cash flow	−0.001 [0.418]	−0.001 [0.421]	−0.001 [0.549]	−0.001 [0.993]	−0.001 [0.767]	−0.001 [0.677]	−0.001 [0.616]	−0.002 [0.311]
N	9,847	9,847	9,847	9,847	1,847	1,847	9,847	9,847
R^2	21%	11%	11%	11%	7%	7%	12%	12%

Panel B. Phase I - II - III approvals Dependent variable Sample	$Ln(PhaseI)_{t+1}$ (1)	$Ln(PhaseII)_{t+1}$ (2)	$Ln(PhaseIII)_{t+1}$ (3)	$Ln(LicencedPatent)_{+1}$ (4)
$Log(TotalLawsuit)_t$	−0.022 [0.001]***	−0.045 [0.001]***	−0.041 [0.001]***	−0.112 [0.001]***
CONTROLS	YES	YES	YES	YES
Year/Firm fixed effect	YES	YES	YES	YES
N	9,847	9,847	9,847	9,847
R^2	7%	7%	7%	8%

(*continued*)

Panel C. Difference between drug phases Dependent variable Sample	absDiff (PhaseIII-PhaseI) (1)	absDiff (PhaseII-PhaseI) (2)	absDiff (PhaseIII-PhaseII) (3)	Cumulative phase (4)
$\text{Log(TotalLawsuit)}_t$	0.078 [0.001]***	0.011 [0.001]***	0.181 [0.001]***	−0.778 [0.001]***
CONTROLS	YES	YES	YES	YES
Year/Firm fixed effect	YES	YES	YES	YES
N	9,847	9,847	9,847	9,847
R^2	7%	8%	8%	8%

Panel D. Ordered logistic Dependent variable Sample	Phase I (1)	Phase II (2)	Phase III (3)	All phases (4)
$\text{Log(TotalLawsuit)}_t$	−0.012 [0.001]***	−0.055 [0.001]***	−0.135 [0.001]***	−0.445 [0.001]***
CONTROLS	YES	YES	YES	YES
Year/Firm fixed effect	YES	YES	YES	YES
N	9,847	9,847	9,847	9,847
R^2	8%	8%	8%	7%

Note(s): Table 2 reports the multivariate regression results between FDA approvals and total number of employee lawsuits controlling for firm-level variables. From column (1) to column (8), our dependent variable is log transformation of total number of FDA approval. In column (1) and (2), we run year fixed effects, but omit the coefficients. In column (3) and (4), we run year and firm fixed effects, but omit the coefficients. In column (5) and (6), we perform firm-time series average of the all variables. In column (7) and (8), we run state and year fixed effects, but omit the coefficients. In Panel B, Panel C, and Panel D, we test the relationship between different phase of drug approvals and emp. lawsuits. Std. errors are clustered at firm level. Detailed definitions of variables are reported in the Appendix. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively

Source(s): Authors' own work

one – two – three for phase I, II, and III drugs, respectively. From columns (1) to (3), we report the marginal effect for each stage. In column (1), a one-percent increase in employee lawsuits indicates pharmaceutical firms are 1.2% less likely to have a drug under phase I testing. In column (2), an increase in employee lawsuits will decrease firms' chance of having a phase II drug by 5.5%. In column (3), an increase in employee lawsuits will reduce a firm's likelihood of having a phase III drug by 13.5%. In column (4), we run ordered logit for all phases. A higher number of employee litigations is related to a lower likelihood that pharmaceutical firms have drugs in higher stages of clinical testing.

5.2 The channels by which innovation affects firms

The previous results of this study have documented the negative relation between employee lawsuits and innovation. The following sections investigate potential explanations for the firms' reduced innovation outcome. First, we focus on the severity of the lawsuits, and we identify whether a union or individual is responsible for filing a case. Next, we examine if the case outcome is a determinant in the FDA product approval process. If a charging party (union or individual) or a case outcome (favorable or unfavorable) plays a role in the innovation process, then our results could highlight the mechanism by which a firm's innovation output is reduced.

In Table 3, we conduct both OLS and survival analysis regressions, where the dependent variable is time to FDA approval. First, we regress FDA approval time on case time-to-resolution.

In column (1), we conduct OLS regression and find that longer court case durations are associated with increases in the FDA approval process duration. In columns (2), (3), and (4), we generate binary variables equal to one when the case duration is less than one year, two years, or three years respectively. The variables are assigned a value of zero if the case is shorter or longer than the respective time band. Our findings suggest that the most significant association is with cases longer than three years of time-to-resolution, followed by case duration up to two years. In column (5), we conduct survival analysis and report a consistent relationship between case time-to-resolution and a longer average FDA approval time. For robustness, we perform the same set of tests by restricting the sample to only firms with employee allegations, reducing the sample to 2,293 observations. Unreported, the results of the analysis remain consistent with prior results.

Case allegation is a critical factor in the FDA approval process. We generate binary variables to investigate this relationship for each accusation type. These variables allow a study to determine if some case types are more pronounced during the approval process. We present survival analysis results that document how allegation types influence the approval process.

In Table 4, we report whether the nature of the allegations delays the drug approval process. In columns (1)–(3), (5)–(7) & (9), we show that coercive actions, coercive statements, harassment, changing working conditions, discharge delay, unfair discipline, and changes in working contracts are associated with a lower hazard ratio, which indicates a longer FDA time-to-approval. The results do not report a significant correlation between bad-faith bargaining, refusal to furnish information, concerted activities, and FDA drug approval. Overall, the results of Table 5 show that some case allegations may be more severe and may have mixed effects on innovation, a process that requires active employee participation, teamwork, and productivity.

The results between case characteristics and the FDA approval process are documented in the preceding cross-sectional analysis (Tables 2–5) because firms can face multiple allegations in one year, and each complaint can be motivated by different reasons or parties, and result in a unique case outcome. The results presented in the prior

Table 3. Litigation duration and innovation: Full sample

Panel A Dependent variable Sample	Log(Duration)$^{(\text{Days to Approval})}$ OLS (1)	 OLS (2)	 OLS (3)	 OLS (4)	 Survival (5)
Log(case duration)$_t$	0.224 [0.001]***				−0.480 [0.001]***
One year		0.204 [0.001]***			
Two year			1.287 [0.001]***		
Three year				1.453 [0.001]***	
Log(Asset)	−0.063 [0.001]***	−0.062 [0.001]***	−0.064 [0.001]***	−0.064 [0.001]***	0.038 [0.001]***
Tobin's Q	0.006 [0.001]***	0.006 [0.001]***	0.006 [0.001]***	0.006 [0.001]***	−0.007 [0.001]***
RnD	0.267 [0.001]***	0.265 [0.001]***	0.269 [0.001]***	0.268 [0.001]***	−0.405 [0.001]***
Book leverage	0.034 [0.001]***	0.035 [0.001]***	0.034 [0.001]***	0.034 [0.001]***	−0.015 [0.001]***
Tangibility	0.489 [0.001]***	0.503 [0.001]***	0.399 [0.001]***	0.414 [0.001]***	−0.338 [0.001]***
ROA	−0.003 [0.793]	−0.003 [0.804]	−0.003 [0.771]	−0.003 [0.772]	0.011 [0.379]
HHI index	−0.112 [0.574]	−0.118 [0.554]	−0.137 [0.493]	−0.134 [0.501]	−0.047 [0.752]
Log(firm age)	0.033 [0.001]***	0.034 [0.001]***	0.030 [0.001]***	0.031 [0.001]***	−0.060 [0.001]***
Free cash flow	0.151 [0.001]***	0.150 [0.001]***	0.153 [0.001]***	0.153 [0.001]***	−0.141 [0.001]***
N	22,584	22,584	22,584	22,584	22,584
R^2	2%	2%	2%	2%	

Note(s): Table 3 reports the survival analysis between FDA product approval duration and case duration in employee lawsuits for the full sample of firms. Our dependent variable is log transformation of number of days between FDA product approval date minus filing date. From column (1) to (4), we run OLS regression with year and firm fixed effects. In column (5), we run survival analysis. We employ Cox proportional hazard ratio test. Std. errors are clustered at firm level. Detailed definitions of variables are reported in the appendix. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively

Source(s): Authors' own work

tables indicate, on average, a relationship between employee mistreatment and adverse innovation outcomes.

Table 6 reports an alternative analysis using panel data. We divide the total number of charging parties by the total number of allegations to calculate the percentage of cases opened by unions or individuals. We apply then report similar results to Table 5, showing the effect of the percentage of cases opened by each party on the FDA approval process. Each test includes firm-year fixed effects.

Table 5 exhibits the firm-year variation between the case outcome and the pharmaceutical firms' innovation outcome. Column (1) reports that an increase in the ratio of union-filed cases decreases FDA approved products. These results are consistent with the prior literature of Bradley *et al.* (2013) and Adhikari *et al.* (2016), who find that unionization lowers the innovation performance. In columns (3)–(5), we examine case outcomes as a proportion of total allegations. In column (3), we document that the percentage of dismissed cases lowers the

Table 4. Motivation of cases and case duration

Panel A.										
Dependent variable	Log(Duration)(Days to Approval)									
Sample	Survival (1)	Survival (2)	Survival (3)	Survival (4)	Survival (5)	Survival (6)	Survival (7)	Survival (8)	Survival (9)	Survival (10)
Coercive actions	−0.112 [0.001]***									
Coercive statement		−0.922 [0.023]**								
Harassment			−1.223 [0.001]***							
Bad faith bargaining				0.334 [0.998]						
Changes in working condition					−0.887 [0.044]**					
Discharge						−0.223 [0.001]***				
Discipline							0.356 [0.011]**			
Refusal to furnish information								0.445 [0.970]		
Change in working contract									−0.332 [0.001]***	
Concerted activities										0.442 [0.129]
CONTROLS	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
N	2,293	2,293	2,293	2,293	2,293	2,293	2,293	2,293	2,293	2,293

Note(s): Table 4 reports the survival analysis between FDA product approval duration and case reasons. We run survival analysis where dependent variable is log transformation of number of days between FDA product approval date minus filing date. We run Cox proportional hazard ratio test. Std. errors are clustered at firm level. Detailed definitions of variables are reported in the appendix. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively
Source(s): Authors' own work

Table 5. Proportional litigation severity and innovation outcome

Panel A.					
Dependent variable	$FDA^{(Total\ Approval)}_{t+1}$				
Sample	OLS	OLS	OLS	OLS	OLS
	(1)	(2)	(3)	(4)	(5)
Union%	−0.241				
	[0.001]***				
Individual%		−0.119			
		[0.155]			
Dismiss%			−0.220		
			[0.020]**		
Settle%				0.067	
				[0.001]***	
Withdrawal%					0.232
					[0.177]
CONTROLS	YES	YES	YES	YES	YES
N	9,847	9,847	9,847	9,847	9,847
R^2	21%	21%	21%	21%	21%

Note(s): Table 5 reports the multivariate regression results between FDA approvals and litigation characteristics. From column (1) to column (5), our dependent variable is log transformation of total number of FDA approval. We run OLS regression with year and firm fixed effects, but omit the coefficients. Std. errors are clustered at firm level. Detailed definitions of variables are reported in the appendix. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively

Source(s): Authors' own work

total number of FDA approvals, which is consistent with earlier findings. When claims are dismissed, the trial process continues to impose costs on the firm. In column (4), the settlement ratio is positively associated with FDA product approvals, which is consistent with the cross-sectional analysis.

5.3 Litigation, net employment flows, and FDA approvals

In this section, we examine the potential channels of how employee treatment can affect corporate innovation performance. Firms that experience a higher number of employee lawsuits may be impacted during the FDA product submission process. If the number of FDA approvals decreases because firms are facing labor allegations, it is reasonable to assume that a decrease in innovation outcome may be due to the net employment flows of dissatisfied employees. Labor and employment adjustment costs that arise from employment litigation can be damaging. In Table 9, we run a set of analyses and measure the sensitivity of FDA approvals to the size of employment flows.

In column (1), we regress the total number of total FDA approvals received by a firm on the change of employees. The difference in employees is measured as a percentage change. We find that FDA approvals are negatively affected by the percentage of changes in total employment. In column (2), we calculate the absolute value of changes in the number of employees. The results indicate that more volatile employee flows lowers the total number of FDA approvals. Our results show that year-over-year variation in employment is negatively associated with FDA product approvals.

In column (3), we multiply net employment flows and a binary lawsuit variable. The sensitivity of net employee flows could be higher following lawsuits, resulting in frequently-sued firms obtaining fewer FDA approvals since they face variation in year-over-year employment. The negative and significant interaction term represents lower FDA approval for the firms that are subjected to employee lawsuits, given their volatility in employment. In column (4), the dependent variable is the decline in FDA approvals. We measure the decrease

Table 6. Net employment flows and innovation outcome

Panel A Dependent variable	FDA(Total Approval)	FDA(Total Approval)	FDA(Total Approval)	Decline(Total Approval)	absΔFDA(Total Approval)	absΔFDA(Total Approval)
Sample	(1)	(2)	(3)	(4)	(5)	(6)
ΔEmployment	−0.209 [0.001]***					
abs (ΔEmployment)		−0.220 [0.001]***	−0.242 [0.334]	0.152 [0.001]***	0.140 [0.001]***	0.141 [0.001]***
Lawsuit			−0.215 [0.001]***			0.024 [0.445]
Lawsuit*abs (ΔEmployment)			−1.124 [0.001]***			0.019 [0.001]***
Decline in lawsuit				−0.087 [0.001]***		
abs(ΔLawsuit)					0.112 [0.001]***	
CONTROL	YES	YES	YES	YES	YES	YES
N	9,094	9,094	9,094	9,094	9,094	9,094
R^2	23%	23%	21%	21%	23%	19%

Note(s): Table 6 reports the multivariate regression results between FDA approvals and firm employment practices. From column (1) to column (3), our dependent variable is log transformation of total number of FDA approval. In column (4), our dependent variable is decline in number of FDA approved products. We measure decline in FDA products by calculating the yearly change in FDA products between t and t−1 where positive values are replaced by zero. In column (5) and (6), our dependent variable is the absolute value change in FDA approved products between year t and t−1. We run OLS regression with year and firm fixed effects, but omit the coefficients. Std. errors are clustered at firm level. Detailed definitions of variables are reported in the appendix. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively

Source(s): Authors' own work

in FDA approvals by calculating the change between year t and t−1, where all positive values are replaced with zero. The results show that net employment flows are positively related to a decline in the number of approved products. In the same test, the results document that a decrease in total litigation is negatively associated with a reduction in total approved products. The results of column (5) and (6) are consistent with the prior results; variations in both year-over-year employment and year-over-year number of lawsuits yield more volatile FDA approvals.

Collectively, the results of Table 6 show that firms with employee lawsuits face more volatile FDA approvals. Specifically, higher fluctuations in employment may affect FDA approval numbers if firms find it challenging to adjust employment. One of the critical determinants of the innovation process is human capital, such as highly skilled researchers and engineers. Hall (2002) suggests that 50% of R&D expenses are the salaries of highly-skilled employees. Therefore, frequently-sued firms would receive fewer FDA approvals because they discharge more workers or face more variation in year-over-year employment.

5.4 Robustness check and alternative explanations

Employment litigation is an accurate measure of workplace treatment. However, cases may not be filled for several potential reasons, including intimidation, prohibitive costs, or apathy. Therefore, we examine the consistency of the results using an alternate proxy for employee disputes. We collect labor enforcement cases from the US Department of Labor, including

Table 7. Other work related disputes and innovation outcome

Dependent variable	$FDA^{(Total\ Approval)}_{t+1}$						
Sample	OLS	OLS	OLS	OLS	OLS	OLS	OLS
	(1)	(2)	(3	(4)	(5)	(6)	(7)
$Log(OSHA^{Inspections})$	−0.05						
	[0.001]***						
$Log(Lawsuit^{Discrimination})$		−1.597					
		[0.001]***					
$Case\ reason^{Wage}$			−0.026				
			[0.001]***				
$Penalty\ amount^{Wage}$				−0.003			
				[0.001]***			
Employee benefits security					−0.046		
					[0.001]***		
Settlement fees						−0.334	
						[0.031]**	
Attorney fees							−0.667
							[0.029]**
CONTROLS	YES	YES	YES	YES	YES	YES	YES
N	9,847	9,847	9,847	9,847	9,847	9,847	9,847
R^2	21%	21%	21%	21%	21%	22%	21%

Note(s): Table 7 reports the multivariate regression results between FDA approvals and other workplace-related violation and inspections. From column (1) to column (7), our dependent variable is log transformation of total number of FDA approval. We run OLS regression with year and firm fixed effects, but omit the coefficients. Std. errors are clustered at firm level. Detailed definitions of variables are reported in the appendix. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively
Source(s): Authors' own work

Occupational Safety and Health Administration (OSHA) enforcement data, Wage and Hour Compliance Action Data, Employee Benefits and Security Enforcement data, and discrimination lawsuits from Bloomberg's BNA Employment Discrimination Verdicts and Settlements database. By aggregating these cases, we can investigate workplace treatment with the same intent as employment litigation, but these cases may differ in the case motivation, genesis, or filing requirements.

Table 7 documents alternative explanations for employee treatment and FDA innovation outcomes. In columns (1)–(5), we find that the total workplace safety inspections and violations, total discrimination lawsuits, the total number of wage-related violations, the total dollar amount of wage-related penalties, and the total benefit-related inspections all reduce the total number of FDA-approved products. Columns (6) and (7) include the log transformation of settlement fees and attorney fees stemming from discrimination cases. Both of these measures are the result of direct costs associated with ligation. The study finds that an increase in dollar amount spent on legal allegations lowers the total number of FDA approvals. In conclusion, Table 10 suggests that our findings are robust to alternative proxies of employee disputes.

The results thus far have indicated that poor employee treatment decreases the innovation performance of a firm. However, endogeneity concerns are not entirely alleviated. To address endogeneity, we perform a collection of analyses. Endogeneity is a concern in this study for several reasons. Firstly, there is the possibility of reverse causality, where the relationship between employee litigation and innovation might be bidirectional. While we hypothesize that employee litigation negatively affects innovation, it is also conceivable that firms with poor innovation performance might have higher rates of employee disputes due to increased pressure and dissatisfaction among employees. Secondly, omitted variable bias might be present, with unobserved factors such as management quality, firm culture, or financial health potentially influencing both the propensity for employee disputes and the firm's innovation capabilities. Thirdly, measurement error in the variables used to capture employee litigation and innovation outcomes could lead to biased estimates.

First, a change analysis is presented to reduce issues related to reverse causality. We document that litigation lowers innovation for pharmaceutical firms; however, innovation could also affect employee lawsuits. For example, firms could spend their resources on R&D expenditures and cut basic employee programs. Evidence for this path exists in the study of Moussu and Ohana (2016), who documented that highly-leveraged firms fail to provide training, such as in health and safety. Similarly, Cohn and Wardlaw (2016) suggested that safety-related activities are implemented by firms through budgetary and policy initiatives and can be explained in OSHA inspections. Therefore, the ignoring of workplace-related programs, such as training, safety, or supervision, may result in more significant litigation risk. To eliminate reverse causality concerns and possible period selection bias, we test the change in FDA products and change in employee lawsuits. In Table 11, we regress the change in FDA-approved products between year t−1 and year t on the change in lawsuits between year t−1 and year t, between year t−2 and year t−1, and between year t−3 and year t−2. In column (2), we use the difference in lawsuits between year t−1 and year t as the dependent variable and regress it on the changes in FDA-approved products between year t−1 and year t, between year t−2 and year t−1, and between year t−3 and year t−2. All control variables are differenced (see Table 8).

Because all variables have been converted to first differences, we focus on time-series variation, rather than cross-sectional variation (Chen *et al.*, 2016). In column (1), we report a causal effect of employee litigation on FDA approvals. However, in column (2), we find no evidence that past changes in FDA approvals lead to changes in employee allegations. We document insignificant coefficients for lagged changes in FDA approvals to the current change in labor lawsuits. In column (3), we conduct a dynamic estimation that includes lagged lawsuits t−1, t−2, and t−3, and lawsuits t+1. While coefficients of lagged lawsuits t−1, t−2, and t−3 are positive and significant, lawsuit t+1 is insignificant. We find that employee disputes affect pharmaceutical firm innovation in subsequent years but not inversely.

Table 8. Change in employee litigation and change in FDA approval: The causal effects

Panel A. Dependent variable			
Sample	Change in FDA approval between year t−1 and year t (1)	Change in employee lawsuit between year t−1 and year t (2)	FDA(Total Approval) (3)
Change in lawsuit between t−1 and t	−0.012 [0.001]***		
Change in lawsuit between t−2 and t−1	−0.002 [0.041]**		
Change in lawsuit between t−3 and t−2	−0.013 [0.012]**		
Change in FDA approval between t−1 and t		0.928 [0.334]	
Change in FDA approval between t−2 and t−1		−0.112 [0.541]	
Change in FDA approval between t−3 and t−2		0.033 [0.678]	
$Ln(TotalLawsuit)_{t+1}$			0.312 [0.684]
$Ln(TotalLawsuit)_{t}$			−0.788 [0.040]*
$Ln(TotalLawsuit)_{t-1}$			−0.990 [0.001]***
$Ln(TotalLawsuit)_{t-2}$			−0.657 [0.001]***
CHANGE IN ALL CONTROL VARS	YES	YES	YES
N	8,012	8,012	9,647
R^2	12%	4%	7%

Note(s): Table 8 presents the results of panel regressions in which we regress the FDA approvals (employee lawsuits) on a set of innovation determinants and the employee lawsuits (FDA approvals) and examines the causal effect between the change in FDA approvals and the change in the employee lawsuits. All variables are first difference from prior year. In Panel A, in column (1), the change in FDA approvals between year t1 and year t is regressed on the changes in the employee lawsuit between year t1 and year t, between year t2 and year t1, and between year t3 and year t2 and the changes in other control variables between year t1 and year t. In column (2), the change in the employee lawsuit between year t1 and year t is regressed on the changes in FDA approvals between year t1 and year t, between year t2 and year t1, and between year t3 and year t2 and the changes in other control variables between year t1 and year t. In column (3), we use dynamic model with different lag and lead values of employee lawsuits. Std. errors are clustered at firm level. Detailed definitions of variables are reported in the appendix. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively
Source(s): Authors' own work

In addition to change-in-change analysis, we also conduct 2SLS methodology with instrumental variables. Employee lawsuits are endogenously chosen and might be related to unobserved factors that also determine FDA approval performance. For example, firms with several employee litigations might be poorly managed, resulting in a poor FDA approval history. Similarly, pharmaceutical firms with higher levels of innovation might be better managed and more profitable, allowing them to have the resources to take necessary steps (i.e. safety training or retirement plans) to reduce employee allegations.

In Table 9, we examine an exogenous shock to litigation. Qiu (2018) measure the effect of "wrongful termination laws" on corporate risk management. Wrongful termination laws include good-faith exceptions, implied contract exceptions, and public policy exceptions.

Table 9. Employee lawsuit and innovation outcome: 2SLS analysis

Dependent variable Sample	Log(TotalLawsuit) −1	FDA(Total approval) −2
Predicted employee litigation		−0.193 [0.001]***
Log(Asset)	0.195 [0.001]***	
Tobin's Q table	0.012 [0.001]***	0.041 [0.001]***
RnD	0.122 [0.667]	0.556 [0.443]
Book leverage	0.441 [0.001]***	0.578 [0.001]***
Tangibility	0.198 [0.422]	0.776 [0.462]
ROA	−0.001 [0.001]***	0.001 [0.333]
HHI Index	−1.444 [0.001]***	−1.833 [0.001]***
Log(firm age)	1.242 [0.001]***	1.159 [0.001]***
Free cash flow	−0.001 [0.992]	−0.001 [0.991]
Instruments		
Wrongful termination laws	0.445 [0.001]***	
Sargan test	1.13	
N	9,912	9,912
R^2	11%	11%

Note(s): In Table 9, we create Wrongful Termination Laws as a binary variable and is equal to one if the firm is located in a state that has the all wrongful termination laws passed (during/before) in our sample, and zero otherwise. In the first stage, we document that firms located in states that have wrongful termination laws have many lawsuits compared to firms that no wrongful termination laws. In the second stage, we show that predicted employee lawsuits lower the number of FDA approved products. Std. errors are clustered at firm level. Detailed definitions of variables are reported in the appendix. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively

Source(s): Authors' own work

The good-faith exception protects employees from termination for any reason other than for a "just cause." The implied contract exception protects employees from termination if the employer has stated that the worker will not be discharged without good cause. Ultimately, the public policy exception protects employees from termination for refusing to violate an established public policy. We create a binary variable, Wrongful Termination Laws, equal to one if the firm is located in a state that has passed wrongful termination laws (during/before), and zero otherwise.

The results of Table 9 show that firms located in states that have wrongful termination laws have more lawsuits compared to firms that no wrongful termination laws. In the second stage, we show that predicted employee lawsuits lower the number of FDA approved products.

For a final robustness check, we employ alternative models and alternative samples and revisit our first hypothesis. First, we gather the top 200 large pharmaceutical firms each year, based on market capitalization between 2000 and 2015. Second, we utilize pharmaceutical firms that are in the S&P 1500 between 2000 and 2015. By doing so, we measure the potential impact of firm size (market capitalization) on employee allegations. Third, we generate a

matched sample among pharmaceutical firms. Each pharmaceutical firm with an employee allegation (treatment group) is matched with another pharmaceutical firm without employee allegations (control group) based on size, book-to-market, and year. Fourth, we run the Tobit model since the response variables (number of FDA approvals) are censored. Fifth, we run the Negative Binominal Model since patents are a good example of count data and are commonly chosen to estimate over-dispersed event count models.

Table 10 documents alternative samples and tests that examine the relationships between employee lawsuits and FDA product approvals. In column (1), we employ the top 200 large pharmaceutical firms, based on market capitalization, and find that employee lawsuits lower corporate innovation performance. In column (2), the results remain consistent using a subsample of pharmaceutical firms that are listed in the S&P 1500 during our sample span. In column (3), we document that employee disputes lead to a decreased number of FDA approved products. In columns (4) and (5), both the Tobit and Negative Binominal Models confirm our initial hypothesis, that employee litigations lower corporate innovation.

Table 10. Employee lawsuits and innovation: alternative tests and alternative samples

Panel A.					
Dependent variable	$FDA^{(Total\ Approval)}_{t+1}$				
Sample	Top 200	S&P 1500	Matched sample	Tobit	Negative binominal
	(1)	(2)	(3)	(4)	(5)
$Log(TotalLawsuit)_t$	−0.192	−0.347	−0.334	−0.162	−0.161
	[0.001]***	[0.001]***	[0.001]***	[0.001]***	[0.001]***
Log(Asset)	0.156	0.129	1.552	0.127	0.311
	[0.001]***	[0.001]***	[0.001]***	[0.001]***	[0.001]***
Tobin's Q	0.001	0.021	0.221	0.001	0.001
	[0.001]***	[0.001]***	[0.887]	[0.001]***	[0.883]
RnD	0.022	0.055	0.001	0.001	−0.014
	[0.001]***	[0.067]*	[0.355]	[0.139]	[0.584]
Book leverage	0.334	0.111	0.056	0.001	0.003
	[0.001]***	[0.001]***	[0.001]***	[0.001]***	[0.001]***
Tangibility	0.125	0.117	0.200	0.100	0.439
	[0.422]	[0.998]	[0.131]	[0.073]*	[0.001]***
ROA	−0.224	0.001	0.223	0.001	0.002
	[0.375]	[0.177]	[0.089]*	[0.539]	[0.307]
HHI index	−1.566	−1.899	−1.677	−1.913	−6.259
	[0.001]***	[0.001]***	[0.001]***	[0.001]***	[0.001]***
Log(firm age)	1.174	1.155	1.173	0.174	0.333
	[0.001]***	[0.001]***	[0.001]***	[0.001]***	[0.001]***
Free cash flow	−0.001	−0.001	−0.001	0.000	−0.002
	[0.556]	[0.455]	[0.555]	[0.616]	[0.311]
N	2,991	2,185	2,240	9,847	9,847
R^2	9%	8%	16%	9%	12%

Note(s): Table 10 reports the multivariate regression results between FDA approvals and employee litigations by different sample and regression methods. In column (1), we work with top 200 pharmaceutical firms each year based on market cap between 2000 and 2015. In column (2), we use pharmaceutical firms that are in S&P 1500 between 2000 and 2015. In column (3), we create matched sample by assigning each lawsuit firm to a non-lawsuit firm based on size, book-to-market, and year. In column (4), we run Tobit regression. In column (5), we run Negative Binominal Regression. Std. errors are clustered at firm level. Detailed definitions of variables are reported in the appendix. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively

Source(s): Authors' own work

5.5 Direct and indirect costs effect on innovation

To further elucidate the economic channels through which employee litigation affects innovation, we conducted two additional analyses: a placebo effect analysis and a staggered event study of lawsuit timing. These analyses help clarify the direct and indirect costs associated with litigation and their impact on innovation outcomes.

Table 11, Panel A presents the placebo effect analysis, which aims to assess the impact of lawsuits on FDA approval outcomes by comparing them with placebo events. The offense types considered include Controlled Substances Act Violation, Drug, Medical Device or Medical Equipment Safety Violation, Off-Label or Unapproved Promotion of Products, Product and Procedure Safety Violation, Medicare Parts C and D Enforcement Violations, and False Claims Act. A total of 707 matched placebo events were identified.

The regression results show a significant negative impact of lawsuits on FDA approvals, with a coefficient of −0.667. In contrast, the placebo events did not exhibit a significant effect, with a coefficient of 0.344. These findings suggest that the observed negative impact of lawsuits on innovation is not due to random variations, thereby supporting the hypothesis that litigation directly hampers innovation.

Table 11, Panel B presents the results of a staggered event study, which examines the timing of lawsuits and their impact on innovation across different event years. This analysis provides insights into how the financial burden and resource diversion associated with litigation extend over multiple years, affecting innovation outputs.

The regression results for various event years show significant negative impacts leading up to and following the lawsuit event year. For instance, in Event Year [−2], the coefficient is −0.556, and in Event Year [−3], the coefficient is −0.789 (p-value = 0.029**). These persistent negative coefficients indicate that the costs associated with litigation, both direct and indirect, have long-term adverse effects on innovation performance.

These analyses underscore the importance of considering both direct and indirect costs when evaluating the impact of employee litigation on innovation. The placebo effect analysis confirms that the negative relationship is not due to random variations, while the staggered event study highlights the enduring nature of litigation's financial burden on innovation. These findings add to the understanding of the economic channels through which litigation affects innovation, providing additional context regarding the negative impact of litigation on a pharmaceutical firms' innovation.

5.6 Litigation, employee productivity and innovation efficiency

This study documents the relationship between employee allegations and pharmaceutical firm innovation. However, this result does not explain whether the innovation output produced by employees is efficient. We extend our analysis and test the link between litigation, employee productivity, and innovation efficiency of pharmaceutical firms. Innovation efficiency is defined as a firm's ability to generate an economic return on capital, which increases its value. This study employs three sets of variables to capture innovation efficiency. We measure turnover efficiency as the innovation per sale, calculated as the number of FDA approved products normalized by sales. We define these measures as product value measures.

Next, we measure employee productivity using two distinct measures. The first measure is revenue per employee, calculated as the ratio of revenue to the number of employees (Cronqvist *et al*., 2009). The second measure is estimated using the Cobb–Douglas production function of the form:

$$Y_{it} = AL_{it}^{\beta}K_{it}^{\alpha} \tag{2}$$

This measure was previously employed by Faleye and Trahan (2006) and Faleye *et al*. (2013). In this equation, Y_{it} refers to net sales for the firm i in year t; L_{it} is the number of employees; K_{it} is the net property, plant, and equipment; and A, α, β are the parameters. We use the residuals from an estimation of equation (2) as a measure of firm-level total factor productivity. We control for

Table 11. Direct and indirect cost analysis

Panel A. Placebo effect Offense types	Matched placebo events
Controlled substances act violation	98
Drug, medical device or medical equipment safety violation	77
Off-label or unapproved promotion of products	442
Product and procedure safety violation	33
Medicare parts C and D enforcement violations	44
False claims act	13
Total	707

Dependent variable	(1) FDA(Total Approval)t+1	(2) FDA(Total Approval)t+1
Lawsuit	−0.667	
	(0.011)**	
Placebo event		0.344
		(0.556)
CONTROLS	YES	YES
Diff (1)–(2)	Prob chi2 = (0.000)***	
N	9,771	9,771
Fixed effect	YES	YES
R2	11%	11%

Panel B. Staggered event study of lawsuit timing Dependent variable	(1)	(2)	(3)
Event year [+3]	0.056		−0.230
	(0.677)		(0.778)
Event year [+2]	0.788		0.108
	(0.467)		(0.336)
Event year [+1]	−0.223		−0.199
	(0.170)		(0.457)
Event year [$t = 0$]	0.451	0.332	0.667
	(0.074)*	(0.567)	(0.408)
Event year [−1]		−0.166	−0.334
		(0.043)**	(0.029)**
Event year [−2]		−0.556	−0.288
		(0.001)***	(0.041)**
Event year [−3]		−0.789	−0.191
		(0.029)**	(0.001)***
CONTROLS	YES	YES	YES
N	5,567	6,066	4,467
Fixed effect	YES	YES	YES
R2	11%	11%	12%

Note(s): Table 11, Panel B presents the results of a staggered event study examining the timing of lawsuits and their impact on a dependent variable across different event years. The table is divided into three columns, each representing a different model specification. Panel B presents the placebo effect analysis to assess the impact of lawsuits on FDA approval outcomes. The table is divided into two main sections: Offense Types and Matched Placebo Events, and the regression results for the dependent variable FDA Total Approvals (FDA(Total Approval)t+1)
Source(s): Authors' own work

industry factors by estimating a separate equation for each two-digit Standard Industrial Classification code (SIC) industry group (Faleye and Trahan, 2006; Faleye *et al.*, 2013). Employee productivity can help us to examine the indirect cost of litigation, such as low employee morale.

Lastly, we define product efficiency using product-related news. First, we collect post-market evaluation data and the number of drugs that have failed post-market evaluations. For other product-related news, we employ the total number of FDA drug and medical device recalls between 2000 and 2015. Product recalls document the relationship between lowered employee treatment (or morale) and innovation quality.

The results of Table 12 - Panel A indicate that litigation lowers the total FDA products per sale, and per employee. The results suggest that FDA approved products per 1,000 employees decrease by 1.2%. In Panel B, we measure how lawsuits affect employee productivity. We document a negative and significant relationship between labor litigation and employee

Table 12. Employee lawsuits and innovation: Employee productivity and product performance

Panel A. Product value Dependent variable Sample	[FDA products/sale]	[FDA products/employee]
	1	2
$\text{Log(TotalLawsuit)}_t$	−0.554	−0.012
	[0.001]***	[0.001]***
CONTROLS	YES	YES
N	9,746	9,840
R^2	1%	1%

Panel B. Employee productivity Dependent variable Sample	Sales/Emp	Emp. productivity
	1	2
$\text{Log(TotalLawsuit)}_t$	−0.033	−0.122
	[0.001]***	[0.045]**
CONTROLS	YES	YES
N	9,746	9,840
R^2	2%	2%

Panel C. Product recall Dependent variable Sample	Log(Post Market Evals.)	$\text{Log(FDA)}^{\text{Recall}}$
	1	2
$\text{Log(TotalLawsuit)}_t$	0.556	0.065
	[0.001]***	[0.029]**
CONTROLS	YES	YES
N	9,746	9,840
R^2	1%	1%

Note(s): Table 12 reports the multivariate regression results between employee litigations and innovation efficiency. In Panel A of column (1), our dependent variable is total FDA approved products normalized by total sales. In column (2), our dependent variable is total FDA approved products normalized by total number of employee. In Panel B of column (1), our dependent variable is ratio of revenue to the number of employees, and in column (2), our dependent variable is employee productivity following Felaye *et al.* (2016). In Panel C of column (1), our dependent is log transformation of total number of products failed post market evaluations. In column (2), our dependent variable log transformation of total number of recalled products. In all columns, we run OLS regression with year and firm fixed effects, but omit the coefficients. Detailed definitions of variables are reported in the appendix. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively

Source(s): Authors' own work

productivity, as measured by sales per employee and equation (2). In the first part of the study, we primarily focus on the direct costs associated with litigation (defense fees, settlement fees, etc.). Panel C of Table 12 allows us to investigate the impact of employee treatment on indirect costs. Lawsuits can adversely affect employee morale, motivation, or turnover. Not only may lawsuits affect current employee turnover, but they may also make it difficult for the company to attract new talent.

In the last panel, we use a dataset of FDA product recalls and FDA Postmarket Drug and Biologic Safety Evaluations between 2000 and 2015. In 2015 alone in the United States, there were 9,178 incidents of recall by the Food and Drug Administration (FDA), along with 17,232 warning letters [9]. The risk and likelihood of a product recall have dramatically increased in recent years, as FDA standards have risen. However, these letters provide an invaluable gauge of innovation quality. In column (1) of Panel C, we document that employee lawsuits increase the number of FDA approved products that fail post-market safety evaluations and total recalled products. Parallel to innovation, employee litigation can have a direct and indirect impact on the quality of a firm's product. Both involuntary and voluntary recall indicate that firms' products can have the potential for serious injury, death, temporary illness, or violate FDA regulations.

6. Conclusion

This study examined a determinant of corporate innovation, employee treatment. Results presented employee disputes as deteriorating activities for pharmaceutical firms. Innovation requires time, money, and human capital: we examine whether frequently-sued pharmaceutical firms suffer from reduced innovation output. Employment litigation is a significant risk for many corporations, as legal allegations generate both direct costs (attorney fees, settlement fees, penalties, etc.) and indirect costs (firm reputation, loss of motivation, and employee morale), which influence firm innovation.

The results of this study showed that employee litigation reduces FDA product approvals as measured by total drug patents granted by the FDA, total drug approval, total pre-market approval, and total medical device approvals. These results may support the argument; litigation costs are not only a burden on a firm's financial resources, but also the employee working environment. Overall, the results suggest a significant negative relationship between unfavorable employee treatment and innovation focus, which is related to the firms' core business.

The second part of our study investigates the potential explanations of how employee litigation influences innovation performance. The study considers case duration, charging parties, and case outcomes as explanatory variables. First, if employee lawsuits take longer time-to-resolution, we expect that the cost of funding allegations could delay the innovation process. We show that longer case duration slows the FDA approval process, and results are more profound for lawsuits that take longer than three years. We also test if case characteristics are a determinant of the innovation process. We find that union-filed lawsuits lengthen the FDA approval process, compared to an individual- (employee-) filed case. Our results suggest that the nature of the charging parties (individual or union) is positively related to the product approval process.

Lastly, we test the relation between lawsuits, employment decisions, and FDA product approvals. If FDA approval decreases because firms are facing labor allegations, it is reasonable to expect that this decrease in approvals may be due to the net employment flows of dissatisfied employees. Labor and employment adjustment costs that arise from employee lawsuits can be substantial, with higher firing costs potentially influencing the quality and quantity of firms' products. Our results show that firms with a more significant number of lawsuits face more volatile FDA approvals. Higher fluctuations in employment may affect FDA approvals if firms find it challenging to adjust employment. Also, we document that the sensitivity of net FDA approvals to the absolute value change in employment is higher in subsequent litigation.

Overall, this study contributes to the literature by examining another determinant of innovation and highlights the importance of employee treatment. Our findings indicate that employee litigation negatively impacts innovation outcomes, particularly in the pharmaceutical industry. This has important implications for policymakers and stakeholders. Strengthening labor relations policies by promoting alternative dispute resolution mechanisms, incentivizing proactive employee engagement through tax breaks or subsidies, enhancing regulatory oversight by agencies like OSHA, and supporting innovation amidst disputes with grants or low-interest loans for R&D activities are critical steps. These measures can help maintain a positive work environment and sustain innovation efforts even during legal challenges.

For future research, we recommend broadening the scope of employee treatment measures to include direct employee feedback and organizational culture assessments. Additionally, exploring whether similar patterns exist in other industries, conducting longitudinal studies on the long-term effects of policy interventions, investigating the interaction between employee treatment and other ESG factors, and examining the impact of technological advances on employee relations and innovation can provide deeper insights and more comprehensive policy recommendations. By addressing these areas, future studies can further bridge the gap between academic research and practical applications, enhancing the relevance and impact of our findings.

Notes

1. Bloomberg Law Reports.
2. US Equal Employment Opportunity Commission, https://www.eeoc.gov/eeoc/statistics/enforcement/charges.cfm
3. For NLRB Litigation-Case data http://www.nlrb.gov/opengov/nlrb-data-datagov
4. NLRB; https://www.nlrb.gov/news-outreach/graphs-data/charges-and-complaints/charges-and-complaints
5. NLRB; https://www.nlrb.gov/news-outreach/graphs-data/charges-and-complaints/disposition-unfair-labor-practice-charges
6. US Department of Labor Enforcement Data: http://ogesdw.dol.gov/views/data_catalogs.php
7. https://open.fda.gov/
8. To conserve space, we report total FDA-approved products. Our results remain the same when we run separate regressions for total drug patents, total drug approvals, pre-market approvals, and medical device approvals.
9. https://www.fda.gov/downloads/ICECI/EnforcementActions/UCM484400.pdf

References

Acharya, V.V. and Subramanian, K.V. (2009), "Bankruptcy codes and innovation", *Review of Financial Studies*, Vol. 22 No. 12, pp. 4949-4988, doi: 10.1093/rfs/hhp019.

Abrams, D.S. and Chen, D.L. (2013), "A market for justice: a first empirical look at third party litigation funding" All Faculty Scholarship, Vol. 875, available at: https://scholarship.law.upenn.edu/faculty_scholarship/875

Acharya, V.V., Baghai, R.P. and Subramanian, K.V. (2014), "Wrongful discharge laws and innovation", *Review of Financial Studies*, Vol. 27 No. 1, pp. 301-346, doi: 10.1093/rfs/hht009.

Acs, Z.J. and Audretsch, D.B. (1988), "Innovation in large and small firms: an empirical analysis", *The American Economic Review*, Vol. 78 No. 4, pp. 678-690.

Adhikari, H.P., Choi, W. and Sah, N.B. (2016), "That is what friends do: employee friendliness and innovation", *Journal of Economics and Business*, Vol. 90, pp. 65-76, doi: 10.1016/j.jeconbus.2016.10.004.

Aghion, P. and Howitt, P. (2005), "Growth with quality-improving innovations: an integrated framework", in *Handbook of Economic Growth*, Vol. 1, pp. 67-110.

Aghion, P. and Tirole, J. (1994), "The management of innovation", *The Quarterly Journal of Economics*, Vol. 109 No. 4, pp. 1185-1209, doi: 10.2307/2118360.

Arundel, A. (2007), "Innovation survey indicators: what impact on innovation policy", in *Science Technology and Innovation Indicators in a Changing World: Responding to Policy Needs*, pp. 49-64.

Bae, K.-H., Kang, J.-K. and Wang, J. (2011), "Employee treatment and firm leverage: a test of the stakeholder theory of capital structure", *Journal of Financial Economics*, Vol. 100 No. 1, pp. 130-153, doi: 10.1016/j.jfineco.2010.10.019.

Benfratello, L., Schiantarelli, F. and Sembenelli, A. (2008), "Banks and innovation: microeconometric evidence on Italian firms", *Journal of Financial Economics*, Vol. 90 No. 2, pp. 197-217, doi: 10.1016/j.jfineco.2008.01.001.

Bradley, D., Kim, I. and Tian, X. (2013), "The causal effect of labor unions on innovation", *Management Science*, Vol. 63 No. 7, pp. 2251-2271, doi: 10.1287/mnsc.2015.2414.

Chen, C., Chen, Y., Hsu, P.-H. and Podolski, E.J. (2016), "Be nice to your innovators: employee treatment and corporate innovation performance", *Journal of Corporate Finance*, Vol. 39, pp. 78-98, doi: 10.1016/j.jcorpfin.2016.06.001.

Coad, A. and Rao, R. (2010), "Firm growth and R&D expenditure", *Economics of Innovation and New Technology*, Vol. 19 No. 2, pp. 127-145, doi: 10.1080/10438590802472531.

Coff, R.W. (2002), "Human capital, shared expertise, and the likelihood of impasse in corporate acquisitions", *Journal of Management*, Vol. 28 No. 1, pp. 107-128, doi: 10.1177/014920630202800107.

Cohen, W.M. and Levinthal, D.A. (1989), "Innovation and learning: the two faces of R&D", *The Economic Journal*, Vol. 99 No. 397, pp. 569-596, doi: 10.2307/2233763.

Cohn, J.B. and Wardlaw, M.I. (2016), "Financing constraints and workplace safety", *The Journal of Finance*, Vol. 71 No. 5, pp. 2017-2058.

Cronqvist, H., Heyman, F., Nilsson, M., Svaleryd, H. and Vlachos, J. (2009), "Do entrenched managers pay their workers more?", *The Journal of Finance*, Vol. 64 No. 1, pp. 309-339, doi: 10.1111/j.1540-6261.2008.01435.x.

Denison, D.R. (1996), "What is the difference between organizational culture and organizational climate? A native's point of view on a decade of paradigm wars", *Academy of Management Review*, Vol. 21 No. 3, pp. 619-654, doi: 10.2307/258997.

Edmans, A. (2011), "Does the stock market fully value intangibles? Employee satisfaction and equity prices", *Journal of Financial Economics*, Vol. 101 No. 3, pp. 621-640, doi: 10.1016/j.jfineco.2011.03.021.

Ertugrul, M. (2013), "Employee-friendly acquirers and acquisition performance", *Journal of Financial Research*, Vol. 36 No. 3, pp. 347-370, doi: 10.1111/j.1475-6803.2013.12014.x.

Faleye, O. and Trahan, E.A. (2006), "Is what's best for employees best for shareholders?", *SSRN Journal*.

Faleye, O. and Trahan, E.A. (2011), "Labor-friendly corporate practices: is what is good for employees good for shareholders?", *Journal of Business Ethics*, Vol. 101, pp. 1-27, doi: 10.1007/s10551-010-0705-9.

Faleye, O., Reis, E. and Venkateswaran, A. (2013), "The determinants and effects of CEO–employee pay ratios", *Journal of Banking and Finance*, Vol. 37 No. 8, pp. 3258-3272, doi: 10.1016/j.jbankfin.2013.03.003.

Gao, H. and Zhang, W. (2016), "Does workplace diversity foster innovation? Evidence from US state employment nondiscrimination acts", *Management Science*, Vol. 63 No. 9, pp. 2982-2999, doi: 10.1287/mnsc.2016.2457.

Hall, B.H. (2002), "The financing of research and development", *Oxford Review of Economic Policy*, Vol. 18 No. 1, pp. 35-51.

Harter, J.K., Schmidt, F.L. and Hayes, T.L. (2002), "Business-unit-level relationship between employee satisfaction, employee engagement, and business outcomes: a meta-analysis", *Journal of Applied Psychology*, Vol. 87 No. 2, pp. 2-279, doi: 10.1037//0021-9010.87.2.268.

Hausman, J.A., Hall, B.H. and Griliches, Z. (1984), "Econometric models for count data with an application to the patents-R&D relationship", *Econometrica*, Vol. 52 No. 4, p. 909, doi: 10.2307/1911191.

Holmstrom, B. (1989), "Agency costs and innovation", *Journal of Economic Behavior and Organization*, Vol. 12 No. 3, pp. 305-327, doi: 10.1016/0167-2681(89)90025-5.

Holmstrom, B. and Milgrom, P. (1991), "Multitask principal-agent analyses: incentive contracts, asset ownership, and job design", *Journal of Law, Economics, and Organization*, Vol. 7 special_issue, pp. 24-52, doi: 10.1093/jleo/7.special_issue.24.

Hsu, P.-H., Tian, X. and Xu, Y. (2014), "Financial development and innovation: cross-country evidence", *Journal of Financial Economics*, Vol. 112 No. 1, pp. 116-135, doi: 10.1016/j.jfineco.2013.12.002.

Jones, D., Molitor, D. and Reif, J. (2019), "What do workplace wellness programs do? Evidence from the Illinois workplace wellness study*", *The Quarterly Journal of Economics*, Vol. 134 No. 4, pp. 1747-1791.

Levin, R.C., Cohen, W.M. and Mowery, D.C. (1985), "R&D appropriability, opportunity, and market structure: new evidence on some Schumpeterian hypotheses", *The American Economic Review*, Vol. 75, pp. 20-24.

Lunn, J. (1986), "An empirical analysis of process and product patenting: a simultaneous equation framework", *The Journal of Industrial Economics*, Vol. 34 No. 3, pp. 319-330, doi: 10.2307/2098574.

Manso, G. (2011), "Motivating innovation", *The Journal of Finance*, Vol. 66 No. 5, pp. 1823-1860, doi: 10.1111/j.1540-6261.2011.01688.x.

Mayer, R.C., Warr, R.S. and Zhao, J. (2016), "Does employee treatment and workforce diversity impact corporate innovative efficiency?", Working Paper.

Meulbroek, L.K., Mitchell, M.L., Mulherin, J.H., Netter, J.M. and Poulsen, A.B. (1990), "Shark repellents and managerial myopia: an empirical test", *Journal of Political Economy*, Vol. 98 No. 5, Part 1, pp. 1108-1117, doi: 10.1086/261721.

Moussu, C. and Ohana, S. (2016), "Do leveraged firms underinvest in corporate social responsibility? Evidence from health and safety programs in US firms", *Journal of Business Ethics*, Vol. 135 No. 4, pp. 715-729, doi: 10.1007/s10551-014-2493-0.

Oswald, A.J., Proto, E. and Sgroi, D. (2015), "Happiness and productivity", *Journal of Labor Economics*, Vol. 33 No. 4, pp. 789-822, doi: 10.1086/681096.

Pakes, A. and Griliches, Z. (1980), "Patents and R&D at the firm level: a first report", *Economics Letters*, Vol. 5 No. 4, pp. 377-381, doi: 10.1016/0165-1765(80)90136-6.

Qiu, Y. (2018), "Labor adjustment costs and risk management", *Journal of Financial and Quantitative Analysis*, Vol. 54 No. 3, pp. 1447-1468.

Rayfield, B. and Unsal, O. (2019), "Product recalls, lobbying, and firm value", *Management Decision*, Vol. 57 No. 3, pp. 724-740, doi: 10.1108/md-06-2017-0581.

Rayfield, B. and Unsal, O. (2021), "Institutional monitoring and litigation risk: evidence from employee disputes", *Journal of Financial Research*, Vol. 44 No. 1, pp. 81-119, doi: 10.1111/jfir.12235.

Rhoades, L. and Eisenberger, R. (2002), "Perceived organizational support: a review of the literature", *Journal of Applied Psychology*, Vol. 87 No. 4, pp. 698-714, doi: 10.1037//0021-9010.87.4.698.

Robinson, D.T. (2008), "Strategic alliances and the boundaries of the firm", *Review of Financial Studies*, Vol. 21 No. 2, pp. 649-681, doi: 10.1093/rfs/hhm084.

Sauermann, H. and Cohen, W.M. (2010), "What makes them tick? Employee motives and firm innovation", *Management Science*, Vol. 56 No. 12, pp. 2134-2153, doi: 10.1287/mnsc.1100.1241.

Scherer, F.M. (1965), "Firm size, market structure, opportunity, and the output of patented inventions", *The American Economic Review*, Vol. 55, pp. 1097-1125.

Serfling, M. (2016), "Firing costs and capital structure decisions", *The Journal of Finance*, Vol. 71 No. 5, pp. 2239-2286, doi: 10.1111/jofi.12403.

Silver, M. and Tian, X. (2011), "Acquiring innovation", Working Paper.

Somers, M.J. (1995), "Organizational commitment, turnover and absenteeism: an examination of direct and interaction effects", *Journal of Organizational Behavior*, Vol. 16 No. 1, pp. 49-58, doi: 10.1002/job.4030160107.

Unsal, O. and Rayfield, B. (2019), "Institutional investors and medical innovation", *The Quarterly Review of Economics and Finance*, Vol. 74, pp. 190-205, doi: 10.1016/j.qref.2019.01.013.

Verwijmeren, P. and Derwall, J. (2010), "Employee well-being, firm leverage, and bankruptcy risk", *Journal of Banking and Finance*, Vol. 34 No. 5, pp. 956-964.

Wang, J. (2009), "The role of human capital in corporate bankruptcy", Working Paper.

Whitener, E.M. (2001), "Do 'high commitment' human resource practices affect employee commitment? A cross-level analysis using hierarchical linear modeling", *Journal of Management*, Vol. 27 No. 5, pp. 515-535, doi: 10.1016/s0149-2063(01)00106-4.

Zingales, L. (2000), "In search of new foundations", *The Journal of Finance*, Vol. 55 No. 4, pp. 1623-1653, doi: 10.1111/0022-1082.00262.

Appendix

Table A1. Definition of variables

Variables	Definition	Source
Panel A. Lawsuit characteristics		
Total case	Total number of labor-related litigations a firm faces in a given year, including disputes initiated by unions, individual employees, or other parties	NLRB
Lawsuit	Binary variable equal to one if the firm had at least one labor-related lawsuit in a given year, zero otherwise	NLRB
$\text{Log(TotalLawsuit)}_t$	Log transformation of total number of lawsuit	NLRB
Union	Binary variable and equal to one if case is opened by a labor union, zero otherwise	NLRB
Individual	Binary variable and equal to one if case is opened by an individual, zero otherwise	NLRB
Dismissal	Binary variable and equal to one if case is dismissed, zero otherwise	NLRB
Withdrawal	Binary variable and equal to one if case is withdrawal, zero otherwise	NLRB
Settlement	Binary variable and equal to one if case is settlement, zero otherwise	NLRB
Log(case duration)	Log transformation of case duration, measured as the case closure date minus case filing date	NLRB
One year	Binary variable and is equal to one if case duration is less than 365 days or, zero otherwise	NLRB
Two year	Binary variable and is equal to one if case duration is equal to one if case duration is between 365 days and 730 days, zero otherwise	NLRB
Three years	Binary variable and is equal to one if case duration is equal to one if case duration is between 730 days and 1,095 days, zero otherwise	NLRB
abs(ΔLawsuit)	Absolute value of change in total lawsuit between year t and t−1	NLRB
Panel B. FDA variables		
$\text{FDA}^{(\text{Total Approval})}$	Log transformation of total FDA approved products: total drug patents granted by the FDA, total drug approval, total pre-market approval, and total medical device approvals	FDA
$\text{Log(Duration)}^{(\text{Days to Approval})}$	Log transformation of FDA approval duration, measured as the product approval date minus product filing date	FDA
$\text{absΔFDA}^{(\text{Total Approval})}$	Absolute value of change in total number of FDA approval between year t and t−1	FDA
$\text{Decline}^{(\text{Total Approval})}$	Change in total number of FDA approval between year t and t−1, positive values are replaced by zero	FDA
Log(Post Market Evals.)	Log transformation of the total number of FDA product post-market evaluations that fail	FDA
$\text{Log(FDA)}^{\text{Recall}}$	Log transformation of total number of FDA related product recall	FDA
Panel C. Employee disputes		
$\text{Log(OSHA}^{\text{Inspections}}\text{)}$	Log transformation of the total number of Occupational Safety and Health Administration (OSHA) inspections a firm undergoes	Dept. of Labor
$\text{Case reason}^{\text{Wage}}$	Log transformation of the total number of Wage and Hour Division compliance actions concluded against the firm	Dept. of Labor

(*continued*)

Table A1. Continued

Variables	Definition	Source
Penalty amount^{Wage}	Log transformation of the amount of civil penalties resulting from Wage and Hour Division compliance actions	Dept. of Labor
Employee benefits security	Total number of disputes related to employee benefits and security	Dept. of Labor
Log (Lawsuit^{Discrimination})	Log transformation of the total number of discrimination cases filed against the firm	Bloomberg BNA
Attorney fees	Log transformation of the attorney fees reported in news releases related to employee litigation cases	S&P Capital IQ
Settlement fees	Log transformation of the settlement fees reported in news releases related to employee litigation cases	S&P Capital IQ
Panel C. Control variables		
Book leverage	Long-term debt divided by book value of assets, measuring the firm's financial leverage	S&P Capital IQ
Log(TotalAsset)	Log transformation of total assets	S&P Capital IQ
Log(NumEmp)	Log transformation of number of employees	S&P Capital IQ
ROA	Income before extraordinary items plus depreciation and amortization divided by book value of assets	S&P Capital IQ
Tangibility	Ratio of fixed assets to book assets [ppent/at]	S&P Capital IQ
Tobin's Q	Market value of assets divided by book value of assets, measuring the firm's growth opportunities	S&P Capital IQ
Log(FirmAge)	Log transformation of firm age	S&P Capital IQ
HHI index	Herfindahl index based on the firm's sales in a given 4-digit SIC industry	S&P Capital IQ
Free cash flow	Operating income before depreciation minus taxes plus interest expense plus dividends paid	S&P Capital IQ
RnD	Firms' R&D expenditure normalized by total assets	S&P Capital IQ
ΔEmployment	Change in number of total employee between year t and t−1	S&P Capital IQ
abs(ΔEmployment)	Absolute value of change in number of total employee between year t and t−1	S&P Capital IQ
FDA products/sale	Total FDA approved products normalized by total sale	FDA& S&P Capital IQ
FDA products/employee	Total FDA approved products normalized by total employee	FDA& S&P Capital IQ
Sales/employee	Ratio of revenue to the number of employees	S&P Capital IQ
Employee productivity	Employee productivity following Felaye *et al.* (2006), indicating the efficiency of employees in generating revenue	S&P Capital IQ
Ln(pension-per-employee)	Log transformation of pension expense per employee, lagged by five years	S&P Capital IQ
Political party	Ratio of votes to Republican Party minus votes to Democratic Party, divided by total votes, indicating political leanings	uselectionatlas.org

Source(s): Authors' own work

Corresponding author
Blake Rayfield can be contacted at: blake.rayfield@unf.edu