The Pricing and Economic Impact of Legal Risk *

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Abstract

Legal risk is an inherent feature of markets governed by the rule of law, influencing corporate behavior, investor decision-making, and financial market outcomes. Despite its significance, measuring legal risk at the firm-level remains a challenge. This paper addresses this gap by introducing a firm-level measure of legal risk based on textual analysis, capturing the extent to which firms discuss legal exposure in earnings call transcripts. At the firm-level, companies facing heightened legal risk from class action lawsuits, climate concerns, cybersecurity threats, and banking regulations tend to exhibit elevated values of this measure. At the aggregate-level, the asset pricing results show that legal risk is systematically priced in financial markets: a long-short portfolio strategy that buys high legal risk firms and sells low legal risk firms delivers an annualized return of 4.7% (t-stat: 3.6) from 2004 to 2024, increasing to 7.1% (t-stat: 4.9) post-2010, when regulatory scrutiny intensified. These findings suggest that investors require a premium for firms with high legal risk due to their exposure to legal tail events, and they are consistent with the Law-CAPM, which integrates legal risk as a priced factor in asset pricing models.

Keywords: Legal Risk, Law-CAPM, Natural Language Processing, Law and Finance, Asset Pricing

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1 Introduction

> *"[...] [U]nder the Rule of Law, the government is prevented from stultifying individual efforts by ad hoc action. Within the known rules of the game, the individual is free to pursue his personal ends and desires, certain that the powers of government will not be used deliberately to frustrate his efforts."*
> – Friedrich A. Hayek, *The Road to Serfdom* (1944, p. 76)

A well-functioning economy relies on the rule of law. Legal and regulatory institutions (such as courts, government agencies, and financial regulators) provide the foundation for economic activity by ensuring that contracts are upheld and property rights are protected, fostering investment and facilitating transactions. However, these same institutions also create legal risk, as businesses must operate within an evolving landscape of laws and regulations. As legal systems expand and regulatory oversight intensifies, firms face increasing complexity in compliance and exposure to potential litigation. In this vein, legal risk is a fundamental aspect of markets.

In the U.S., legal risk has grown more prominent due to the increasing complexity of legal proceedings, regulatory scrutiny, and contractual disputes. For example, litigation-prone industries[1] have expanded both in number and market capitalization, particularly since the early 2000s, as shown in Figure 1. This trend is further reflected in the sharp rise in securities class action lawsuits, which have more than doubled since the 1990s despite a decline in the number of publicly listed firms,[2] as well as the tripling of patent disputes since 2005 (Cohen et al. 2019). Moreover, regulatory enforcement actions have surged in the post-Global Financial Crisis era. As a result, the U.S. stock market has become increasingly exposed to legal risk, with legal challenges playing a growing role in shaping firm valuations and investment strategies.

One compelling avenue to study legal risk and its broader economic implications is financial markets. Asset prices aggregate investor expectations, incorporating assessments of risk that influence firm valuation and capital allocation.[3] Since legal risk affects firm cash flows, governance structures, and regulatory exposure, it is natural to expect that investors

[1] These include firms in the pharmaceutical and biotechnology sectors (SIC 2833 - 2836), computer and office equipment (SIC 3570 - 3577), software and IT services (SIC 7370 - 7374), and electronic and electrical equipment (SIC 3600 - 3674).

[2] See https://corpgov.law.harvard.edu/2021/03/11/recent-trends-in-securities-class-action-litigation/.

[3] See Online Appendix A for case evidence on how legal risk materialization impacts firm valuations.

systematically price legal risk into stock valuations. This insight motivates the core question of this paper: Does legal risk represent a systematic and priced dimension of risk in financial markets?

To address this question, we develop a firm-level measure of legal risk using textual analysis of earnings call transcripts. While institutions shape investment incentives, financial markets, and economic growth at the macro level (Acemoglu et al. 2001, Acemoglu and Johnson 2005), their impact on firm-level legal risk remains underexplored. Our approach, which measures a firm's attention to legal events based on earnings call transcripts, operates on the premise that these calls capture real-time legal concerns of economic agents, offering a dynamic perspective on how markets process legal uncertainty.

At the firm-level, the proposed legal risk measure effectively captures firms' legal concerns related to class action lawsuits, climate concerns, cybersecurity threats, and banking regulations (see Section 3.2 and Section 3.3 for case studies). In asset pricing, empirical evidence reveals a persistent return premium associated with legal risk: a long-short portfolio that buys firms with high legal risk exposure and sells those with low legal risk delivers an annualized return of 4.7% (t-stat: 3.6) over the period of 20 years (July 2004 - June 2024). This return premium strengthens to 7.1% (t-stat: 4.9) in the post-Global Financial Crisis era, when heightened regulatory scrutiny increased firms' legal exposure. Firms with high legal risk are particularly vulnerable to legal tail risk, facing heightened uncertainty from potential lawsuits, regulatory actions, and compliance costs that can influence future corporate behavior. As a result, investors demand higher compensation for bearing this risk. The results also align with the key predictions of the Law-CAPM, a simple equilibrium model that extends traditional asset pricing frameworks by incorporating legal risk as a priced factor. Fianally, given its broader scope, the legal risk factor subsumes the cyber risk factor while remaining largely uncorrelated with other text-based risk measures.

The findings of this paper highlight the fundamental role of the rule of law in shaping economic activity, investment decisions, and market behavior. Legal and regulatory institutions provide the foundation for economic stability by enforcing contracts and protecting property rights, yet they also introduce legal risk as firms navigate an evolving landscape of litigation and compliance. Legal risk is significant both at the firm level and in aggregate, underscoring its growing influence in financial markets. Understanding its impact on firm valuation and capital allocation is therefore essential for both theoretical and empirical research in law and finance.

Literature review: the current study intersects several strands of literature assessing the

impact of legal systems on economics and finance. First, previous research examining stock price reactions to lawsuits—whether targeting individual firms or their industry peers—generally reports a negative price impact (see Kamma et al. 1988; Gande and Lewis 2009; Hadlock and Sonti 2012). However, our work extends beyond these event studies, which focus on the announcement or resolution of lawsuits, by adopting a tradable calendar-time portfolio approach to examine various asset pricing tests and demonstrate that legal risk is a priced factor in the cross-section of stock returns.

Another strand of research in comparativest economics examines how variations in legal origins and institutional frameworks shape financial markets (see La Porta et al. 1998; Glaeser and Shleifer 2002; Djankov et al. 2003; Beck et al. 2005; and McLean et al. 2012). These studies highlight how differences in judicial efficiency, investor protection, and regulatory enforcement impact market dynamics, corporate behavior, and capital allocation. While much of this literature takes a cross-country perspective, my research focuses on the U.S. financial market, which is characterized by high judicial efficiency and relatively low market imperfections, providing a distinct environment to examine the pricing of legal risk.

In corporate finance, numerous literature documents the impact of legal risks on shaping firm behavior and strategic decision-making. Studies by Hughes and Thakor (1992) and Lowry and Shu (2002) suggest that companies facing heightened legal risk may underprice their IPOs as a defensive strategy. Furthermore, firms with significant legal exposure often pursue aggressive growth strategies, such as acquisitions, as observed by Gormley and Matsa (2011). Legal risk also impacts corporate disclosure practices, as firms adjust their transparency levels to minimize exposure to legal or regulatory scrutiny (Skinner 1994). Similarly, auditors are more cautious with high-risk clients, either avoiding them altogether or charging premium fees to account for potential legal liabilities (Shu 2000). Moreover, litigation imposes substantial costs, not only in the form of legal fees, settlement expenses, and the risk of personal liability but also through significant managerial time demands, distractions caused by negative publicity, and reputational damage.

While recent literature has increasingly developed ex-ante measures of legal or litigation risk, most efforts have focused on industry or geographic levels rather than firm-level analyses. For instance, in their pioneering study, Francis et al. (1994) found that companies in biotechnology, computers, electronics, and retail industries face elevated litigation risks. Building on this, Kim and Skinner (2012) argue that industry affiliation alone is insufficient for predicting securities litigation risk, recommending the inclusion of key firm-specific characteristics like size, growth, and stock volatility to improve prediction. More

recently, Hossain et al. (2023) use the liberal ideology of district court judges as an exogenous proxy for ex-ante litigation risk. Additionally, Bennett et al. (2023) use 10-K reports to extract litigation-relevant information but stop short of linking these findings to stock return predictions. This paper contributes to the existing literature by providing an ex-ante measure of legal risk at the firm level. To the best of my knowledge, this is the first empirical study to demonstrate that legal risk is a priced factor in the U.S. stock market. This paper also adds to the growing body of literature examining the relationship between legal outcomes and stock prices. Cohen et al. (2013) show that U.S. Senators' voting behavior on bills that ultimately become law has a significant impact on industry-level pricing. Similarly, Florackis et al. (2023) demonstrate that cybersecurity risk is priced in the cross-section of stock returns—a finding indirectly related to this paper, as firms facing cyberattacks may be exposed to legal claims, liabilities, or regulatory penalties under privacy protection laws. Similarly, Bereskin et al. (2023) examines the asset pricing effects of patent infringement litigation by comparing the stock returns of alleged infringers with those of similar firms not involved in patent disputes. While our research shares a similar focus on the impact of litigation risk on asset pricing, our approach is broader in both the scope of litigation types and the sample of firms analyzed. Specifically, we account for litigation risk stemming not only from patent-related cases but also from class-action lawsuits and Supreme Court matters. Additionally, our study covers a wider sample by including all firms that hold earnings calls, providing more comprehensive market coverage.

This paper also contributes to the growing literature on text-based methods in economics and finance. Researchers have developed techniques to quantify risk from textual data (Baker et al. 2016, Manela and Moreira 2017, Hassan et al. 2019, among others) and have leveraged these measures to forecast economic and financial outcomes. Using quarterly earnings call transcripts, Sautner et al. (2023), Jamilov et al. (2025), and Kruttli et al. (2025) have applied similar approaches to estimate firm-level exposure to climate change, cyber risk, and extreme weather events, respectively.

The remainder of the paper is structured as follows: Section 2 outlines our methodology for measuring firm-level legal risk, while Section 3 examines its variation across firms. Section 4 presents the asset pricing implications, and Section 5 discusses the results. Finally, Section 6 concludes.

2 Data and Methods

2.1 Extracting Legal Risk from Corporate Earnings Conference Calls

[INSERT TABLE 1 HERE]

We construct a text-based measure of ex-ante legal risk at the firm level using quarterly earnings conference calls transcripts of U.S. firms.[4] A key advantage of this approach is that it captures forward-looking legal concerns, rather than ex-post litigation outcomes. In that vein, the (transcripts of) conference calls provide a natural context to learn about the risks firms face and market participants' views thereof (Hassan et al. 2019). Table 1 highlights instances where firms explicitly discuss legal risks in earnings calls, demonstrating how legal uncertainty is a relevant dimension of firm valuation. For instance, in an October 2024 earnings call, Alphabet Inc. (Google) stated: *"But it looks like the way that the Google versus DOJ search trial is going, there's a decent likelihood that the Apple ISA contract and some of the Android pre-install contracts are going to be voided at some point in the future."* This statement underscores the potential for substantial disruption to Google's business model and highlights how legal risks translate into investor concerns. The uncertainty surrounding the trial's outcome has affected not only Google's stock price but also broader market expectations regarding regulatory intervention in the tech industry. Such examples illustrate why markets proactively price legal risk, reinforcing the argument that legal risk is a systematic and priced factor in asset returns.

More broadly, the fact that firms openly discuss legal risks in high-stakes earnings calls where their words are scrutinized by analysts, investors, and regulators suggests that these mentions are far from mere "cheap talk" (Crawford and Sobel 1982; Farrell and Rabin 1996). Earnings conference calls are typically broadcast live over the internet, which encourages management to avoid excessive legal language or jargon, making the information more accessible and transparent.[5] Therefore, mentions of legal risk in earnings call tran-

[4]Typically, firms hold quarterly earnings calls, each aligned with the release of their financial results. These calls begin with a structured management presentation, where senior executives provide an overview of the company's recent performance, financial health, and key operational developments. Following the presentation, the call opens to a Q&A session, during which analysts and, occasionally, investors engage management directly, probing into areas such as strategic initiatives, market challenges, and specific financial metrics. This interactive portion of the call is critical, as it allows stakeholders to gauge management's preparedness, transparency, and responsiveness to both expected and unforeseen circumstances.

[5]This is in line with the 10-K sample as documented in Loughran and McDonald (2011), where the authors find that the Management's Discussion and Analysis (MD&A) section tends to contain fewer litigation-

scripts are particularly meaningful, as their frequency reflects substantive concerns rather than strategic messaging or rhetorical hedging.

A key aspect of this analysis is the construction of a training library of legal bigrams. We initiate this process using the Loughran-McDonald (LM) Dictionary (Loughran and McDonald 2011), particularly its "litigious (Fin-Lit)" category, which encompasses legal jargon and terms related to litigation. The 2023 edition of the LM Dictionary contains 86,553 keywords, 903 of which fall under the "litigious" category. However, rather than relying on unigrams of legal terms as listed in the LM dictionary, our approach focuses on developing a dynamic bigram (or trigram) library tailored to context-specific legal terminology to minimize misclassification and reduce measurement error.[6]

[INSERT TABLE 2 HERE]

With the training library of legal terms $\mathbb{L}$ established (see Table 2 and Online Appendix B), we proceed to define a simple measure of **LRISK**, representing the legal or litigation risk of firm i at quarter t as:

$$\textbf{LRISK}_{it} = \frac{\sum_{b}^{B_{it}} \Big(\mathbb{1}[b \in \mathbb{L}] \Big)}{\text{No. of sentences}} \tag{1}$$

where $b = 0, 1, ...B_{it}$ are the bigrams contained in call of firm i at time t, $\mathbb{1}[\cdot]$ is the indicator function, $\mathbb{L}$ is the set of bigrams contained in $\mathbb{L}$. In summary, the legal risk faced by each firm at any moment is expressed as a simple sum of legal-related content, scaled by the total number of sentences in that transcript. **LRISK** can be further divided into three categories: **LRISK_COURT**, which captures references to court proceedings and judicial actions; **LRISK_TRIAL**, which focuses on mentions of trials and litigation processes; and **LRISK_TERMS**, which includes broader legal terminology such as "legal costs" and "regulatory compliance."

2.2 Stock Market Data

We match each firm's legal risk exposure to the CRSP and COMPUSTAT databases, covering a sample period from 2003 to 2024. While extending the analysis to earlier years is

related terms compared to the full 10-K document (see Table 2 of that paper).

[6] Refer to Section 5.1 for a comparison highlighting how our approach differs from that of Loughran and McDonald (2011).

not feasible due to the limited availability of transcripts (which begin in 2002), this does not compromise the robustness of our findings. The 20-year sample period (2004–2024) provides a solid foundation for developing investment strategies, spanning two major economic recessions (2008 and 2020). Moreover, as already shown in Figure 1, the growing number of industries prone to litigation around the turn of the century underscores the increasing significance of legal risk since 2000.

3 Firm-level Variation in Legal Risk

This section examines firm-level variation in legal risk exposure, as constructed in the previous section. Through detailed case studies, it explores how well-known firms and industries respond to emerging legal risks, demonstrating that the legal risk exposure measure introduced in this paper effectively captures firms' concerns about legal uncertainty and helps assess both its internal consistency and external validity.

3.1 Legal Risk: Descriptive Statistics

[INSERT FIGURE 2 HERE]

Figure 2 demonstrates that the sample of earnings call-releasing firms analyzed in this study is representative of the overall U.S. stock market. The top panel shows the number of firms releasing earnings calls from 2002 to 2024. The sample consists of standard U.S. stocks listed on the three major stock exchanges (NYSE, NASDAQ, and AMEX) with ordinary shares (CRSP share code 10 or 11). Around 55% of firms began publishing earnings calls in 2002, and this percentage steadily increased, surpassing 80% by 2010. By the late 2010s, the number had reached 85%, though there was a slight decline following the onset of COVID-19. A similar pattern is observed in how these firms represent the market. The middle panel shows that, after 2010, these firms account for approximately 85% of the entire market capitalization. The bottom panel of the figure presents the ratio of the top 100, 500, and 1500 firms by market capitalization at the end of each June. The data indicates that nearly all of the top 100 and 500 firms consistently publish earnings calls each year, suggesting that our sample is highly representative of the U.S. stock market.

[INSERT FIGURE 3 HERE]

Using earnings call transcript data, Figure 3 illustrates the changes in legal risk exposure for prominent corporate entities, most of which are constituents of the well-known S&P 500 index. In each firm's figure, the y-axis categorizes legal risk exposure into three levels: 1 (no legal risk), 2 (moderate legal risk), and 3 (high legal risk), as defined in the following section.

The figure reveals that firms frequently transition between different levels of legal risk exposure, highlighting that legal risk is dynamic and not confined to a specific subset of firms. For instance, Ford Motor Company faced multiple lawsuits in the mid-2000s, including Employment Discrimination related to Apprenticeship Testing (2004–2005), discrimination in loan rates (2005), and Product Liability cases involving sudden acceleration and defective vehicle components (2006). During this period, legal risk exposure, as indicated in the 2006 earnings call transcripts, escalated from a moderate level (2) to the highest level (3). Similarly, Coca-Cola experienced heightened mentions of legal risk during 2020 and 2021, coinciding with significant legal challenges. These included Environmental Greenwashing Allegations (*Earth Island Institute v. Coca-Cola Co.*) where the company was accused of overstating its sustainability efforts while contributing substantially to plastic pollution. Additionally, Coca-Cola faced the 100% Recyclable Labeling Lawsuit (*Swartz v. Coca-Cola Co.*), which challenged the company's claims about the recyclability of its plastic bottles.

[INSERT FIGURE 4 HERE]

We next explore the industry distribution of our legal risk measure. Figure 4 illustrates the distribution of firms across three legal risk categories—No Risk, Medium Risk, and High Risk—represented by green, yellow, and red bars, respectively, conditional on their industry. The industry definitions follow the Fama-French 17 industry classification. On average, firms' mentions of legal risk appear balanced across industries, as indicated by the relatively even distribution of firm-month observations on the y-axis. However, certain industry categories exhibit higher levels of legal risk, as documented in the transcripts of earnings calls, compared to others.

For instance, the utilities sector (denoted as "Utils (14)") shows a significant concentration of firm-month observations in the high-risk portfolio. This concentration aligns with the unique characteristics of the utilities sector, including the nature of its services, the regulatory framework within which it operates, and its distinct business models. Similarly, the finance and accounting literature identifies several sub-industries with elevated exposure

to legal risk: pharmaceuticals and biotech products (SIC 2833–2836; industry category 7), computer and office equipment manufacturing (SIC 3570–3577; industry category 11), electronic equipment and components (SIC 3600–3674; industry category 11), and retail industries (SIC 5200–5962, primarily categorized under industry label 15, with others under label 8).[7] The figure highlights that these industry categories tend to exhibit higher levels of legal risk exposure, as evidenced by the prevalence of yellow (Medium Risk) and red (High Risk) bars compared to green (No Risk). Overall, the industry decomposition presented in Figure 4 confirms that the portfolio analysis is not disproportionately influenced by any single industry or a small subset of industries. Instead, it provides a comprehensive view of the legal risks faced by firms across various industries.

3.2 Case Studies: Are Brown Firms More Exposed to Legal Risk?

[INSERT FIGURE 5 HERE]

A growing body of research in finance examines the implications of climate change for financial markets, with particular attention to the risks associated with carbon emissions and regulatory oversight.[8] Stroebel and Wurgler (2021), in particular, emphasize that regulatory risk is perceived as the most immediate climate-related concern for businesses and investors. Given these insights, legal risk presents a crucial but underexplored dimension of climate finance. *Brown* firms (those with high carbon footprints and heavy reliance on fossil fuels) face increasing scrutiny from regulators, litigation risks from environmental lawsuits, and reputational damage due to changing investor and consumer preferences.

Figure 5 illustrates firm-level legal risk exposure of major energy companies (*Brown* firms), including ConocoPhillips, ExxonMobil, and Halliburton, highlighting periods of heightened legal concerns related to climate regulations, relevant litigations, and firm-specific legal events such as M&A transactions. ConocoPhillips (upper panel) saw increased legal risk in 2002 (FTC approval of its merger with Phillips Petroleum), 2007 (Venezuelan expropriation of the Corocoro oil field that led to arbitration proceedings), 2012 (spinoff of Phillips 66 which involved complex regulatory approvals), 2015 (the company settled

[7] Computer programming and IT services (SIC 7370–7374), although known for legal risk, are omitted from the analysis as they are classified under the "Others" category in the Fama-French 17 industry system.

[8] Studies such as Bolton and Kacperczyk (2021) find that firms with higher carbon emissions tend to earn higher stock returns, suggesting that investors demand compensation for exposure to carbon risk. Similarly, Pastor et al. (2022) highlight how green assets have delivered strong returns in recent years due to shifting investor preferences and regulatory developments, though their expected future returns may be lower.

$11.5 million in environmental litigation over gasoline storage violations in California), 2018 (lawsuit with Oklahoma homeowners over soil and water contamination), and 2023 (scrutiny over oil sands investments led to exclusion from sustainability-focused portfolios). ExxonMobil (middle panel) saw spikes in legal risk in 2009–2010 (shareholder litigation following its $41 billion acquisition of XTO Energy), 2015 (a controversial $225 million settlement with New Jersey over decades of environmental damage at two refineries), and 2024 (a lawsuit filed by the State of California accusing the company of misleading consumers about the recyclability of plastic waste). Finally, Halliburton (lower panel) experienced heightened legal risk in 2004 (a multibillion-dollar settlement to resolve extensive asbestos-related litigation stemming from its former subsidiaries' use of asbestos in construction materials), 2013 (legal proceedings related to its role in the 2010 Deepwater Horizon oil spill, culminating in a $1.1 billion settlement in 2014), and 2016 (failed $34.6 billion merger with Baker Hughes, which was blocked by regulators over antitrust concerns, resulting in a $3.5 billion termination fee).

Overall, the spikes in legal risk exposure in Figure 5 align with major legal disputes, validating the effectiveness of the firm-level legal risk measure in capturing periods of heightened regulatory and litigation risk.

3.3 Case Studies: Are Banks More Exposed to Legal Risk?

Banking sector has been a focal point for legal risk, facing heightened exposure due to regulatory oversight and systemic importance. The 2008 financial crisis, subsequent reforms, and ongoing scrutiny have amplified these risks. This section examines Citigroup, Bank of America, and Wells Fargo to assess how legal risk has shaped their operations and investor perceptions over time.

[INSERT FIGURE 6 HERE]

Citigroup faced major legal challenges in 2011 and 2014. In 2011, the SEC fined Citigroup $285M for misleading investors about a $1B collateralized debt obligation (CDO), concealing its role in asset selection while betting against it. In 2014, the DOJ imposed a $7B settlement for its role in selling faulty residential mortgage-backed securities (RMBS) pre-2009, including a record $4B civil penalty under FIRREA. These legal risks were reflected in earnings call transcripts, as shown in Figure 6 (Panel A). In Panel B, Bank of America's legal risk spiked during 2002–2005, 2012, and 2022. During this period, it was implicated

in the Parmalat scandal, resulting in a $98.5M settlement, joined the $26B National Mortgage Settlement in 2012 over foreclosure abuses, and was fined $16.65B by the DOJ in 2014 for mortgage fraud. In Q4 2022, regulators imposed a $225M penalty for mishandling unemployment benefits during COVID-19.

Lastly, Wells Fargo has faced major legal challenges over the past decade. In 2012, as part of the National Mortgage Settlement, the bank agreed to a $5.4 billion settlement to address allegations of improper foreclosure practices. In 2016, its fraudulent account scandal led to a $185M CFPB fine, followed by the Federal Reserve's 2017 asset cap. In December 2022, the CFPB imposed a $3.7B fine for consumer protection violations. In mid to late 2022, Wells Fargo faced a securities class action lawsuit (*SEB Investment Management AB v. Wells Fargo*) over allegations that it misled investors about its diversity hiring practices. These key legal events, captured in the lower panel of the Figure, corroborate that legal risk is effectively reflected in earnings conference calls.

4 Asset Pricing Implications of Legal Risk

4.1 Law-CAPM

This section introduces a simple equilibrium model that adjusts for legal risk in the standard capital asset pricing model. The model closely follows Acharya and Pedersen (2005).

In an infinite overlapping generations (OLG) economy, where $n \in N$ agents in generation t maximize a Constant Absolute Risk Aversion (CARA) utility function $-E_t \exp(-\alpha c_{t+1})$ where α is the coefficient of risk aversion and c_{t+1} represents an agent's consumption at time $t+1$. The economy features I securities, indexed by $i = 1, 2, \cdots, I$, each with a total of S_i shares available. At time t, security i pays a dividend $D_{i,t}$, has an ex-dividend share price $P_{i,t}$, and incurs a legal cost $L_{i,t}$. This legal cost, modeled as the per-share cost of selling security i, implies that while agents can purchase a share at $P_{i,t}$, they can only sell it at $P_{i,t} - L_{i,t}$.[9] Agents can borrow and lend at an exogenous risk-free rate r_f. Short-selling is prohibited.

[9]This is a reasonable assumption given that high litigation risk amplifies market frictions through asymmetric information, uncertainty, and lower liquidity, all of which justify higher trading costs for the securities of such firms. Kacperczyk and Pagnotta (2024) argue that legal risk and insider trading both heighten transaction costs by increasing information asymmetry and adverse selection risk, prompting liquidity providers to widen bid-ask spreads and further reducing market liquidity. Eleswarapu and Venkataraman (2006) show that firms in countries with weaker legal institutions or lower enforcement of laws (implying higher le-

From the standard CAPM framework:

$$E_t(r_{i,t+1}) = r_f + \gamma_t \underbrace{\frac{cov_t(r_{i,t+1}\ ,\ r_{m,t+1})}{var_t(r_{m,t+1})}}_{\beta_t^{capm}}, \tag{2}$$

where γ_t represents the price of risk, and the subscript t for expectation, covariance, and variance indicates that these operators are conditional on the information set available up to time t. To account for legal costs, the model is extended as follows:

$$E_t(r_{i,t+1} - l_{i,t+1}) = r_f + \gamma_t^l \underbrace{\frac{cov_t(r_{i,t+1} - l_{i,t+1}\ ,\ r_{m,t+1} - l_{m,t+1})}{var_t(r_{m,t+1} - l_{m,t+1})}}_{\beta_t^l} \tag{3}$$

where $r_{i,t+1} = (D_{i,t+1} + P_{i,t+1})/P_{i,t}$ represents the asset's expected gross return, $l_{i,t+1} = L_{i,t+1}/P_{i,t}$ is the relative legal cost of a firm, $r_{m,t+1} = \sum S_i(D_{i,t+1} + P_{i,t+1})/\sum S_i P_{i,t}$ denotes the market return, and $l_{m,t+1} = \sum S_i L_{i,t+1}/\sum S_i P_{i,t}$ is the market-wide legal cost. As demonstrated in Acharya and Pedersen (2005), equilibrium prices in an economy with frictions, such as legal costs, are equivalent to those in a hypothetical frictionless economy where an asset i is assumed to have a dividend of $D_{i,t} - L_{i,t}$.

Using the covariance property, equation 3 can be rewritten as

$$\begin{aligned} E_t(r_{i,t+1}) = r_f + E_t(l_{i,t+1}) \\ + \gamma_t^l \underbrace{\frac{cov_t(r_{i,t+1}\ ,\ r_{m,t+1})}{var_t(r_{m,t+1} - l_{m,t+1})}}_{\text{(A) } \beta_{1,t}^l} \\ - \gamma_t^l \underbrace{\frac{cov_t(r_{i,t+1}\ ,\ l_{m,t+1})}{var_t(r_{m,t+1} - l_{m,t+1})}}_{\text{(B) } \beta_{2,t}^l} \\ - \gamma_t^l \underbrace{\frac{cov_t(l_{i,t+1}\ ,\ r_{m,t+1})}{var_t(r_{m,t+1} - l_{m,t+1})}}_{\text{(C) } \beta_{3,t}^l} \\ + \gamma_t^l \underbrace{\frac{cov_t(l_{i,t+1}\ ,\ l_{m,t+1})}{var_t(r_{m,t+1} - l_{m,t+1})}}_{\text{(D) } \beta_{4,t}^l} \end{aligned} \tag{4}$$

gal or litigation risk) experience significantly higher trading costs. Although their focus is on cross-country variation in legal and political institutions, the findings illustrate how weaker institutional environments amplify information risk and deter investor participation, thereby directly impacting trading costs.

Equation 4 states that the required return for security i comprises the following components: the expected relative legal cost, $E_t(l_{i,t+1})$; exposure to the market beta-equivalent component (adjusted for trading costs in the denominator, referred to as term (A)); and exposures to three additional factors. The first part, (B), captures the sensitivity of expected returns to the covariance between the individual security's returns and aggregate market legal risk. It enters the equation negatively because investors are willing to accept lower returns on stocks that perform better (or at least do not perform poorly) during periods of heightened market-wide legal risk. The second component, (C), reflects investors' willingness to accept a lower expected return on securities with lower levels of legal risk during economic downturns, as these periods coincide with times when investors are financially constrained, and such securities provide a hedge against worsening economic conditions. Lastly, the third part, (D), represents the legal risk arising from the comovement of an individual security's legal risk with broader market legal risk (i.e., commonality in legality). Investors demand additional compensation for holding securities whose legal risk is highly correlated with market-wide legal risks. In the next Section, we match these key predictions with empirical results.

4.2 Portfolio Construction and Asset Pricing Results

We now assess the economic value of legal risk exposure by computing the value-weighted calendar-time portfolio returns. To account for potential biases in legal risk measurement, we adopt a tercile portfolio approach, rather than the standard quintile or decile portfolio, when sorting firms based on an ex-ante measure of legal risk. This choice reflects a deliberate effort to mitigate the limitations of word frequency-based classification, where firms that proactively discuss legal risks as part of transparent governance may appear riskier than firms that downplay or obscure their legal exposure. While legal terms such as "litigation risk" or "legal cost" often indicate substantive concerns, their frequency alone does not necessarily capture the true extent of a firm's legal vulnerability. A firm with robust compliance practices may frequently reference legal matters without facing heightened litigation risk, whereas another firm that avoids such discussions could still be significantly exposed to legal liabilities. By using terciles, we reduce the sensitivity to extreme word counts, ensuring that the legal risk measure is less distorted by variations in disclosure practices and instead better reflects meaningful differences in actual legal exposure.

In our approach, which closely follows Florackis et al. (2023), portfolio 1 consists of firms with no legal risk disclosures in their transcripts. The remaining stocks are then assigned

to portfolio 2 and 3 based on the median values of legal risk. To align with the construction of other well-known anomalies and ensure a fair empirical comparison between the legal risk factor and other factors, we adopt a portfolio strategy formed at the end of June each year, starting in June of 2004. Stocks are weighted by their market capitalization as of the same date,[10] and the legal risk portfolio is rebalanced annually.

Evaluating legal risk based on the past year, rather than solely the previous quarter, provides a more comprehensive and robust measure for several reasons. The existing literature presents a nuanced view of how firms disclose bad news. On one hand, Skinner (1994) argue that firms facing significant negative earnings news often voluntarily issue warnings to mitigate legal liability. On the other hand, deHaan et al. (2015) demonstrate that managers may strategically time the disclosure of bad news during periods of lower market attention, such as after trading hours or on busy reporting days. This complex interplay suggests that bad news related to legal risk may not always be immediately evident in earnings calls, as its disclosure may be influenced by strategic timing decisions. Moreover, firms frequently prioritize other pressing topics in earnings calls, causing litigation risks to emerge only after one or two quarters. By aggregating transcripts from the past four quarters, we account for these timing nuances and capture legal risks that may be disclosed in a less predictable manner, thereby providing a more accurate and holistic assessment of a firm's legal risk exposure.

To reflect this approach, we adopt what we term the (12-12) strategy, which uses information from the past 12 months (four quarters) to construct a portfolio held for the subsequent 12 months. As demonstrated in the Online Appendix C, alternative strategies such as (12-3), (12-6), and (6-6) yield quantitatively similar results, underscoring the robustness of this approach. In alignment with existing literature on cross-sectional anomalies, we exclude utility firms (SIC 4900–4999) and financial firms (SIC 6000–6411, SIC 6500–6553, and SIC 6700–6799) from the construction of the cross-sectional strategy. These exclusions account for the unique characteristics of these industries, including their regulatory environments and distinct business models. Notably, utility firms report a higher frequency of legal-related terms; for instance, when sorting firms by total legal risk exposure over the full sample, utility firms constitute approximately half of the top 100 firms

[10]We focus on value-weighted portfolio results because legal consequences are generally more pronounced for larger firms. While smaller or micro-cap stocks may exhibit higher exposure to legal risk, the actual material impact of such risks tends to be limited given their smaller operational and financial scale. Larger firms, on the other hand, often face more substantial regulatory scrutiny, legal liabilities, and market reactions, making them more consequential for our analysis. This approach ensures that the analysis captures the most economically significant legal exposures.

(unreported). While including these industries does not alter the main results, their exclusion ensures consistency with prior studies.

[INSERT TABLE 3 HERE]

Table 3 presents the results, with portfolio returns starting from July 2004, as the analysis requires data from the prior four quarters of earnings conference calls. In the baseline analysis, average excess returns increase from 0.638% to 1.035% per month between low and high legal risk stocks in value-weighted portfolios. The corresponding long-short portfolio (P3 - P1) generates average return difference of 34 basis points per month (0.397% per month, or 4.7% per annum), with a Newey-West adjusted t-statistic of 3.66.[11] This strong cross-sectional relationship between legal risk and future stock returns is notable, especially considering that existing literature has not documented such a connection. The premium associated with firms exposed to legal risk is economically significant, exceeding three times the size premium (1.11% per annum over the same period). The value premium is negative during this timeframe, at -0.7% per annum, while the momentum premium yields a weak return of 0.66% per annum.

Next, we examine whether existing asset pricing models account for the legal risk factor. The factor spanning tests presented in the same table indicate that the legal risk factor remains significant across various models, including the CAPM, Fama-French three-factor model, Fama-French three-factor model with momentum, Fama-French three-factor model with liquidity, and the q-factor model. The annualized alpha results suggest that a zero-cost portfolio on legal risk earns an abnormal return of 0.439% per month (5.2% per annum) when benchmarked against the CAPM. Similar results hold when using other asset pricing models, such as the Fama-French three-factor model and the q-factor model. To summarize, legal risk remains unexplained by standard asset pricing models, representing a distinct and priced source of systematic risk.

In Panel B of the same table, we demonstrate that firms generally exhibit balanced characteristics across portfolios. However, firms with no exposure to legal risk tend to be smaller compared to those with some degree of legal risk. This is consistent with the previous literature that deep pockets are associated with legal risk (DuCharme et al. 2004). Finally, Panel C documents the frequency of firms positioned in each tercile. On average, 38% of companies that had no previous experience with legal risk saw a rise in their exposure

[11] We use 6 lags; however, the results remain consistent when using 3, 9, or 12 lags, and the implications remain unchanged.

within the subsequent year. Interestingly, around 33% of companies previously at the highest levels of legal risk also transitioned to other terciles. Overall, the transition matrix exercise helps alleviate concerns about certain firms consistently having higher or lower exposure to legal risk.

4.3 Legal Tail Risk

What is the source of the return premium on legal risk? This paper argues that it arises from firms with higher legal exposure carrying tail risk specific to legal incidents. Firms facing greater legal risk are more susceptible to large negative shocks, such as regulatory penalties, fines, and litigation costs, which can trigger sharp downward price movements. These adverse events create an uneven distribution of returns, with an increased likelihood of extreme losses. Investors, aware of this legal tail risk, demand higher expected returns as compensation for the heightened financial distress and uncertainty associated with these firms. This explains why legal risk is systematically priced in asset markets—firms with greater legal exposure must offer a return premium to account for the elevated probability of severe downside events.

One simple avenue to test this idea is to measure the ex-ante skewness on the returns of each portfolio, P1 (firms with no legal risk) and P3 (firms with high level of legal risk) and compare their skewness. To conduct this, we follow Jondeau et al. (2019) in constructing the monthly standardized skewness of stock i defined as

$$Sk_{i,t} = \sum_{d=1}^{D_t} \left(\frac{(r_{i,d} - \overline{r}_{i,t})}{\sigma_{i,t}} \right)^3 \tag{5}$$

where $r_{i,d}$ is the excess return of stock i in day $d \in \{1, 2, ...D_t\}$, $\overline{r}_{i,t}$ is the average daily excess return of stock i in month t, and $\sigma_{i,t} = \sum_{d=1}^{D_t} (r_{i,d} - \overline{r}_{i,t})^2$.

[INSERT FIGURE 7 HERE]

We compute the mean ex-ante skewness for both P1 (low legal risk) and P3 (high legal risk) portfolios and examine their differences. As expected, firms with high legal risk consistently exhibit significantly lower skewness than those with no legal risk across all sample years, as shown in Figure 7. The mean skewness difference between the two portfolios over the full sample period is statistically significant at the 0.1% level (unreported).

This finding confirms that legal risk is associated with increased downside risk, as firms facing legal exposure are more vulnerable to large negative return shocks. The negative skewness observed in firms with higher legal risk reinforces the idea that investors demand a return premium to compensate for the asymmetric risk profile associated with legal uncertainty.[12]

4.4 Time-variation of Aggregate Legal Risk

How does legal risk change over time? Between 2003 and 2007, the aggregate level of legal risk was likely mixed. On one hand, the Sarbanes-Oxley Act (SOX) of 2002 introduced stringent compliance requirements, heightened board accountability, and increased penalties for non-compliance, creating a more stringent legal environment. On the other hand, the lingering effects of the Gramm-Leach-Bliley Act (GLBA) of 1999 and Universal Demand (UD) laws (enacted during the 1980s and 1990s) contributed to a more lenient legal landscape. The GLBA dismantled key provisions of the Glass-Steagall Act, allowing financial institutions to engage in riskier activities with reduced oversight. Similarly, UD laws raised the procedural threshold for shareholder derivative lawsuits, suppressing litigation risk for firms and fostering a more permissive environment in the early 2000s.

After the Global Financial Crisis (GFC), however, the legal risk environment shifted decisively toward greater stringency. A series of regulatory reforms aimed at addressing vulnerabilities exposed by the crisis fundamentally reshaped U.S. legal risk landscape. Notable among these were the Dodd-Frank Act's whistleblower provisions and the SEC's enhanced enforcement activities in 2010, which strengthened protections, introduced monetary incentives for reporting corporate misconduct, and expanded regulatory oversight. These changes sought to improve market transparency, enhance corporate accountability, and mitigate systemic risk. While these reforms addressed weaknesses revealed during the GFC, they also significantly increased firms' exposure to legal and regulatory scrutiny, creating a harsher legal environment in the post-GFC era. See Online Appendix E for further details. A similar argument has been made by Jamilov et al. (2025) in the context of cybersecurity risk, where the authors argue that the SEC mandated listed firms to report material cybersecurity incidents and exposures. They highlight that after 2015, several high-profile cyberattacks made headlines, significantly escalating the aggregate level of cybersecurity risk.

[12]Legal risk, however, is not merely a proxy for skewness. The Pearson correlation between the LAW factor and risk factors derived from well-known skewness measures (Harvey and Siddique 2000) is very low, indicating that legal risk captures distinct information beyond traditional skewness-based risk factors.

[INSERT FIGURE 8 HERE]

This transformation in the U.S. legal environment is illustrated in Figure 8, where the cumulative returns of a $1 investment in a long-short portfolio strategy based on firms' exposure to legal risk (LAW) are depicted alongside several well-known asset pricing factors. The graph highlights two key findings regarding the legal risk factor introduced in this paper. First, the lenient (or mixed) legal environment during the early sample period influenced the performance of the long-short strategy, as investors failed to adequately distinguish between high- and low-legal-risk firms.[13] In contrast, the sharp upward trend beginning around 2009-2010 reflects a major shift in the U.S. legal landscape, driven by stricter policies such as Whistleblower provisions and the SEC's enhanced enforcement activities. Another key development was the Supreme Court's *Cyan, Inc. v. Beaver County Employees Retirement Fund* (*2018*) ruling, which allowed class-action lawsuits under the Securities Act of 1933 to proceed in state courts. This increased the risk of forum shopping, exposing public companies to simultaneous litigation in multiple jurisdictions, leading to higher legal costs, greater uncertainty, and prolonged legal battles.

Second, the legal risk factor demonstrates notable resilience during economic downturns, including the 2008 Global Financial Crisis and the 2020 COVID-19 shock. Legal risks become particularly concerning when they escalate during market downturns, as firms and investors are already under financial stress. Investors tend to value firms whose legal risks remain stable or decrease during such periods, either paying a premium for securities with lower legal risk exposure or demanding compensation for securities with higher legal risk. In both cases, this dynamic boosts the performance of long-short strategy returns during economic downturns, consistent with the predictions of the Law-CAPM model. By contrast, other factors, particularly momentum, experience significant declines during or shortly after these recessions (Daniel and Moskowitz 2016).

[INSERT TABLE 4 HERE]

Table 4 presents the results of the portfolio exercise for the 2010–2024 subsample, a period characterized by post-GFC reforms that collectively increased the aggregate level of legal

[13] It is worth noting that the data used in this study, as shown in Figure 2, reflects slightly less comprehensive market coverage during the 2003–2007 period. The earnings call transcripts utilized for constructing the long-short portfolio strategy accounted for approximately 60–70% of the total market capitalization of the stock market and covered around 60–70% of all publicly listed firms. While this coverage is substantial, it is not as comprehensive as in the post-2010 period.

risk for all firms, reflecting a heightened focus on compliance and enforcement. Consistent with the time-varying nature of the aggregate legal risk environment, the long-short portfolio strategy achieves an even higher annual return of 7.1% (t-stat: 4.91) during this period, driven by the strong performance of the high legal risk portfolio. This outcome underscores the evolving legal landscape in the United States following the Global Financial Crisis. Notably, the enhanced performance of the long-short strategy arises from both sides of the portfolio. The Law-CAPM model predicts that, in a high legal risk environment, investors demand greater compensation for holding securities with elevated legal risk, which is reflected in the boosted performance of the long-side portfolio. Similarly, the model suggests that investors are willing to accept lower returns on stocks that are less exposed to legal risk, particularly those firms that do not disclose legal risks and are unlikely to face potential legal harm. This preference is reflected in the strongly negative performance of the short-side portfolio.

5 Validation

This section compares the text-based legal risk exposure measure with existing firm-level text-based metrics to establish its distinct role in capturing legal risk-related components.

5.1 Comparison with other text-based measures

How our measure relates to the Loughran-McDonald measure: Our work builds on the pioneering research of Loughran and McDonald (2011) (henceforth LM). While legal terms such as litigation and plaintiff appear in both the "Fin-Neg" and "Fin-Lit" categories proposed by LM, we tailor our approach to the spoken dynamics of earnings calls in two major ways, and these refinements provide a more precise and contextually relevant measure of legal language in financial discourse.

Many keywords in LM's Fin-Lit dictionary are formal and specialized—terms that are more likely to be found in legal contracts or court rulings rather than in real-time corporate discussions. To illustrate this distinction, consider a few examples. The LM dictionary includes complex legal terms such as *"appurtenance"* (referring to a right, privilege, or improvement associated with a piece of property) and *"conveniens"* (derived from *forum non conveniens*, a legal doctrine that determines the most appropriate or convenient forum

for a case). While these terms may be useful in legal scholarship, they are unlikely to appear in earnings calls, where executives communicate in a more accessible and practical manner. Similarly, complex legal verbs such as *"exculpate"*, *"indemnify"*, and *"usurp"* are rarely used in corporate discussions and thus are excluded from our legal dictionary.

Furthermore, our methodology highlights the importance of bigrams (or trigrams) over unigrams in analyzing legal language. While both the LM dictionary and our legal dictionary include unigrams such as antitrust, lawsuit, litigation, plaintiff, prosecutor, and settlement (all of which clearly signal legal risks associated with a firm), many legal terms related to judicial entities, legal proceedings, and legal concepts (the three broad categories in our keyword library) are often overlooked when relying solely on unigrams. For instance, mentioning the term *"Department of Justice"* during earnings calls may suggest potential regulatory scrutiny or legal challenges related to a firm's future operations. However, a unigram-based analysis would fail to capture the phrase in its entirety, missing the broader legal context it conveys. Additionally, relying solely on unigrams can lead to misinterpretation, as they may fail to distinguish between a positive statement about a valuable *"patent"* and a legal concern involving *"patent infringement,"* thereby distorting the assessment of legal risk.[14] To conclude, we believe these two key refinements enhance our ability to measure legal risk more effectively, contributing to the pricing of legal risk in our work, in contrast to prior studies.[15]

[INSERT TABLE 5 HERE]

How our measure relates to the Political Risk Measure: In a related study, Hassan et al. (2019) construct several text-based measures of risk exposure, including political risk (**PRISK**), non-political risk (**NPRISK**), and overall risk (**RISK**), each accompanied by a corresponding sentiment measure: **PSENT** (political sentiment), **NPSENT** (non-political sentiment), and **SENT** (overall sentiment).

To assess whether **LRISK** captures a unique dimension of legal risk, we compute its correlation with these related measures, presenting the results in Table 5. We find that the com-

[14] For a related discussion on the advantages of using bigram or trigram approaches over unigrams, see Caldara and Iacoviello (2022).

[15] On page 55 of Loughran and McDonald (2011), the authors document that a calendar-time portfolio strategy based on negative words ("Fin-Neg") does not generate significant abnormal returns: *"We calculate the Fama and French (1993) four-factor portfolio returns generated by taking a long position in stocks with a low negative word count and a short position in stocks with a high negative count.* [...] [*N*]*one of the* [*alpha*] *values are statistically significant. Hence, after controlling for various factors, the relation between 1-year returns and negative word counts is not enough to warrant active trading by investors."* Similarly, Loughran and McDonald (2013) find that legal word lists are not significantly associated with first-day IPO returns.

posite measure **LRISK** is highly correlated with its key components, **LRISK_COURT** and **LRISK_TRIAL**, with correlations between 0.80 and 0.90. In contrast, **LRISK_TERMS**—which includes general legal phrases such as "legal costs" and "legal dimension"—exhibits more modest correlations. Most importantly, **LRISK** and its components show low correlations with other text-based risk measures, reinforcing that our legal risk metric captures a distinct legal dimension that firms face in the market.

How our measure relates to the Cyber Risk measure: In a series of recent works, researchers have developed firm-level measures of cyber risk to assess its impact on financial markets. Florackis et al. (2023) analyze 10-K filings, Jiang et al. (2024) use machine learning techniques on firm characteristics, and Jamilov et al. (2025) apply natural language processing to earnings calls to construct firm-level cyber risk measures and assess their financial impacts.

We compare our legal risk measure with the cyber risk measure developed by Jamilov et al. (2025). Since both measures are derived from the same textual source (earnings call transcripts), their cyber risk search terms serve as a natural benchmark for our study. Specifically, we construct a cyber risk dictionary, $\mathbb{C}$, based on Table 2 of Jamilov et al. (2025), along with a law-specific cyber risk dictionary $\mathbb{C}_{\text{LAW}}$ to obtain **Cyber Risk** and **Cyber Risk Law**, respectively.

[INSERT TABLE 6 HERE]

First, we observe that **LRISK** has essentially no correlation with **Cyber Risk** but exhibits a modest correlation of 0.42 with **Cyber Risk Law**, as shown in Panel A of Table 6. This result is expected, as cyber risk and legal risk capture distinct dimensions. In the Online Appendix D, we also provide firm-level evidence using SolarWinds, which was the target of major cyberattacks, to illustrate that legal risk exposure and cyber risk exposure represent separate aspects of risk.

The legal components of cyber risk, represented by **Cyber Risk Law**, share many common keywords—such as bankruptcy court, lawsuit, legal claim, and plaintiff—which naturally explains this correlation. In Panel B of the same table, we implement a long-short portfolio strategy, as documented in Section 4, and find that both **LRISK** (replicating the results from Table 3) and **Cyber Risk** are priced, whereas **Cyber Risk Law** is not. The pricing of **Cyber Risk** independently affirms the findings of Florackis et al. (2023) and Jiang et al. (2024) that cybersecurity matter is a priced source of risk.

Importantly, Panel C presents the results of a factor spanning test, where the **LAW** factor (constructed from firms' exposure to **LRISK**) explains both factors constructed from **Cyber Risk** and **Cyber Risk Law**. Crucially, it is not subsumed by the presence of these measures under the Fama-French three-factor model augmented with momentum. Equation (1) shows that the legal risk factor loads positively on both **Cyber Risk** and **Cyber Risk Law**, yet remains distinct and not fully captured by these factors. Conversely, Equations (2) and (3) in the same panel demonstrate that the presence of the law factor (**LRISK**) not only loads positively on **Cyber Risk** and **Cyber Risk Law** as expected, but also subsumes these factors.

[INSERT FIGURE 9 HERE]

In addition to the above findings that legal risk is distinct from both political risk and cyber risk, Figure 9 further underscores the uniqueness of the legal risk factor (**LAW**) within the broader factor zoo. Specifically, we examine the correlation between **LAW** and the full set of 196 anomalies with complete data that align with the legal risk factor's sample period (July 2004 to June 2023; the anomaly data is sourced from Chen and Zimmermann 2022). The results indicate that none of these anomalies exhibit an absolute Pearson correlation greater than 0.4, underscoring that the legal risk factor constructed in this paper is a distinct and significant driver of cross-sectional variation in stock returns.[16] Finally, as demonstrated in the case studies, legal risk is closely linked to both environmental concerns and the banking sector. Moreover, in an unreported result, we confirm that the LAW factor subsumes the ESG factor (Green Minus Brown, Pastor et al. 2022) and the bank size factor (Gandhi and Lustig 2015), reinforcing the argument that the LAW factor has a broader scope.

6 Conclusion

This paper identifies legal risk as a significant and systematic force shaping financial markets. By constructing a novel firm-level measure of legal risk using textual analysis of earnings call transcripts, this study demonstrates that legal risk is proactively priced by investors. The empirical evidence reveals a persistent return premium associated with

[16] A similar judgment rule based on Pearson correlation is used in Birru et al. (2024). Additionally, we find that the correlations between **LAW** and other well-known factors are as follows: **MKT** (-0.14), **SMB** (-0.26), **HML** (-0.19), **MOM** (0.25), **RMW** (0.10), **CMA** (0.04), and **LIQ** (-0.02).

legal risk exposure: a long-short portfolio that buys high-legal-risk firms and sells low-legal-risk firms earns an annualized return of 4.1% (t-stat: 3.1) over the period 2003–2023, with an even stronger premium of 7.1% (t-stat: 4.6) in the post-Global Financial Crisis era. These findings support the predictions of a simple equilibrium model, the Law-CAPM, which incorporates legal risk as a priced factor in asset markets.

Beyond asset pricing, this study highlights the broader economic implications of legal risk. Legal uncertainty influences corporate governance, regulatory responses, and firm decision-making, creating a dynamic feedback loop between law and finance. Investors do not merely react to legal outcomes; rather, they anticipate and incorporate legal risk into firm valuations, reinforcing the view that legal institutions play a central role in shaping economic activity. The results suggest that litigation and regulatory uncertainty are not anomalies but fundamental components of risk that influence capital allocation and market efficiency. Understanding how legal risk is priced in financial markets is not just an academic question but a critical issue for investors, policymakers, and corporate managers. As regulatory environments evolve and litigation risks continue to rise, legal risk will remain a fundamental factor shaping market outcomes and investment strategies.

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List of Figures

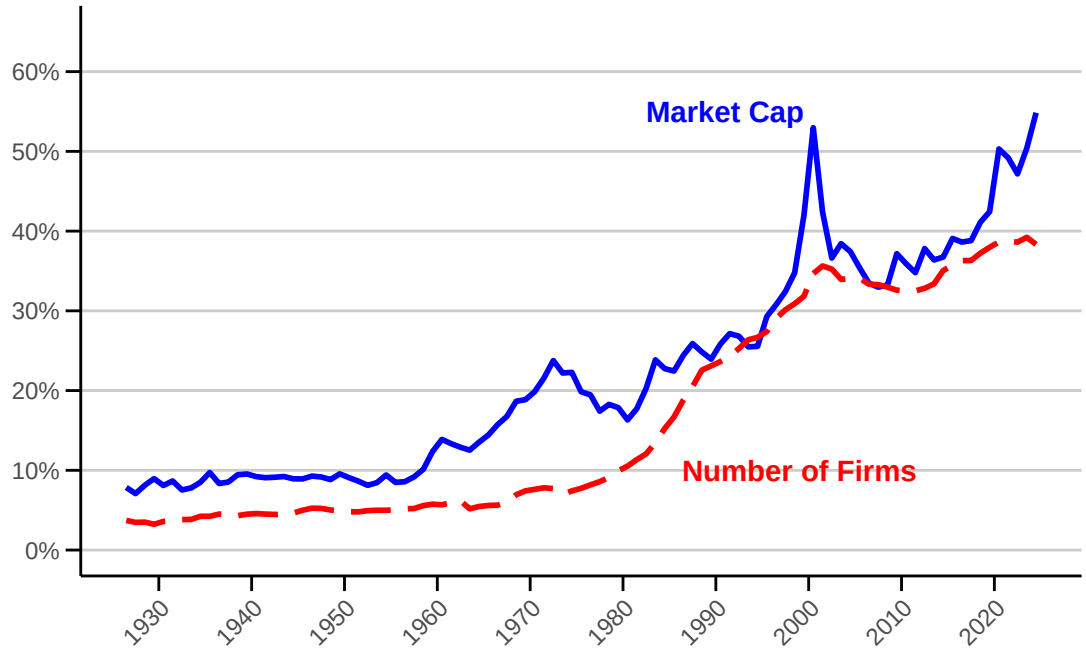


Figure 1: Growth of high litigation industries

Note: This figure illustrates the number of firms (red dotted line) and the market capitalization ratio (blue solid line) of companies operating in high-litigation industries, relative to all publicly traded firms on the NYSE, NASDAQ, and AMEX from 1926 to 2024. The industries prone to litigation include pharmaceuticals and biotechnology (SIC 2833 - 2836), computer and office equipment (SIC 3570 - 3577), software and IT services (SIC 7370 - 7374), and electronic and electrical equipment (SIC 3600 - 3674). These industries are frequently involved in litigation due to intellectual property disputes, regulatory challenges, and product liability risks.

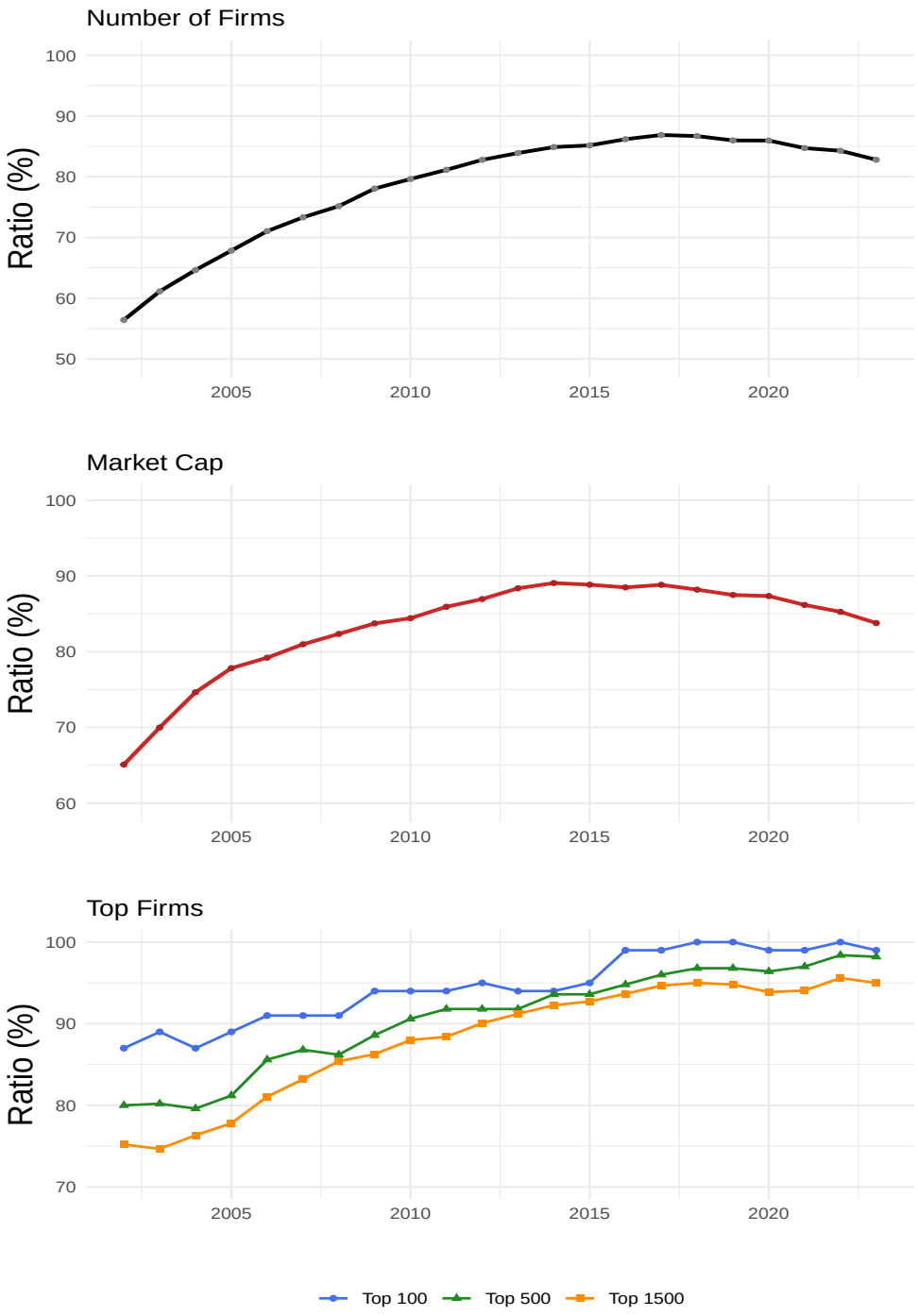


Figure 2: Summary statistic on U.S. firms publishing earnings calls transcripts

Note: The figures display the following: the proportion of firms publishing earnings call transcripts (top), the proportion of market capitalization of those firms that publish earnings calls (middle), and the proportion of the top 100, top 500, and top 1500 firms by market capitalization that publish earnings call transcripts (bottom). The ratio is calculated by dividing the number of relevant firms by the number of firms listed on the three major stock exchanges (NYSE, NASDAQ, and AMEX) with ordinary shares (share code 10 or 11).



Figure 3: Legal Exposure of Well-known Firms

Note: This figure illustrates the legal risk exposure of prominent corporate entities analyzed in this study. The x-axis shows the years over which portfolio sorting based on firm-level legal risk exposure was conducted, spanning from 2003 to 2023. The y-axis categorizes the legal risk into three levels: 1 indicates no legal risk, 2 represents moderate legal risk, and 3 denotes high legal risk.

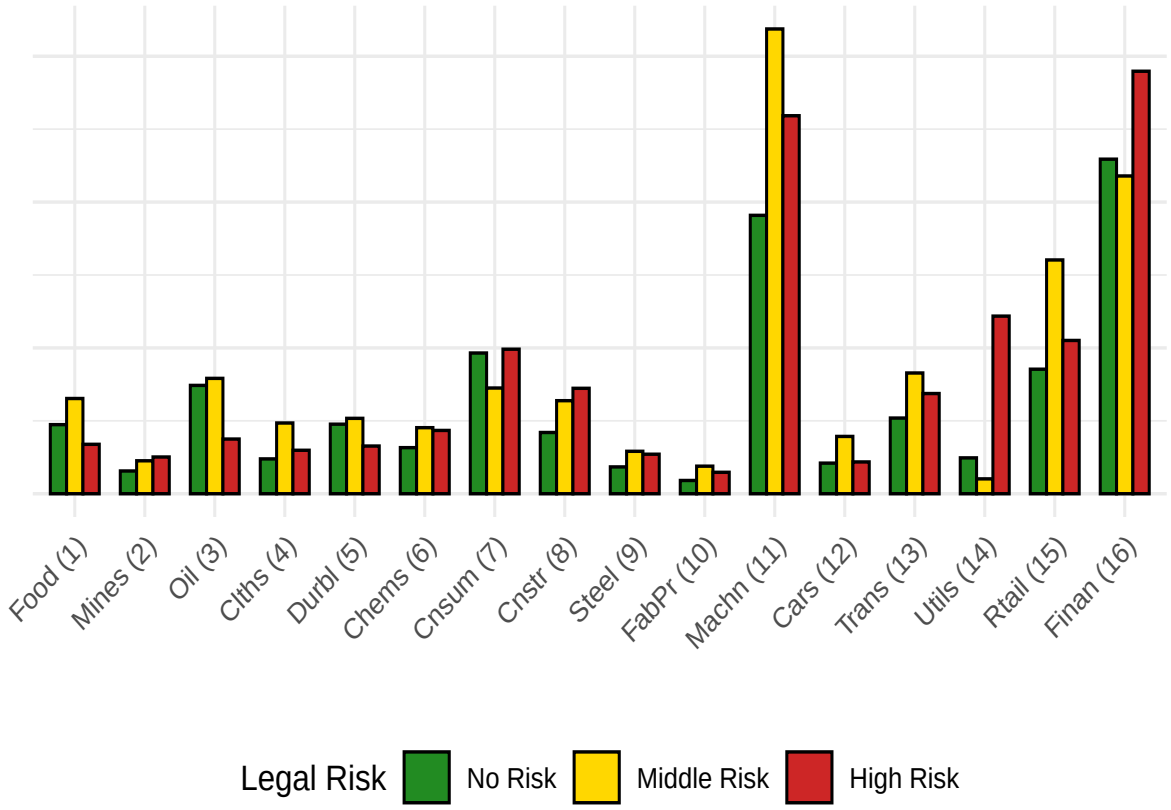


Figure 4: Industry Distribution of Legal Risk

Note: The figures illustrate the industry contributions to the tercile portfolios described in this paper. The x-axis represents the Fama-French 17 industry categories: Food (FF industry category 1), Mines (2), Oil (3), Clothes (4), Consumer Durables (5), Chemicals (6), Consumer goods (7), Construction (8), Steel (9), Fabricated Products (10), Machinery and Business Equipment (11), Cars (12), Transportation (13), Utilities (14), Retails (15), Finance (16) and Others (omitted). The y-axis displays the frequency of firm-month observations categorized into one of the three portfolio sorts based on legal risk exposure: green (No legal risk), yellow (Medium legal risk), and red (High legal risk).

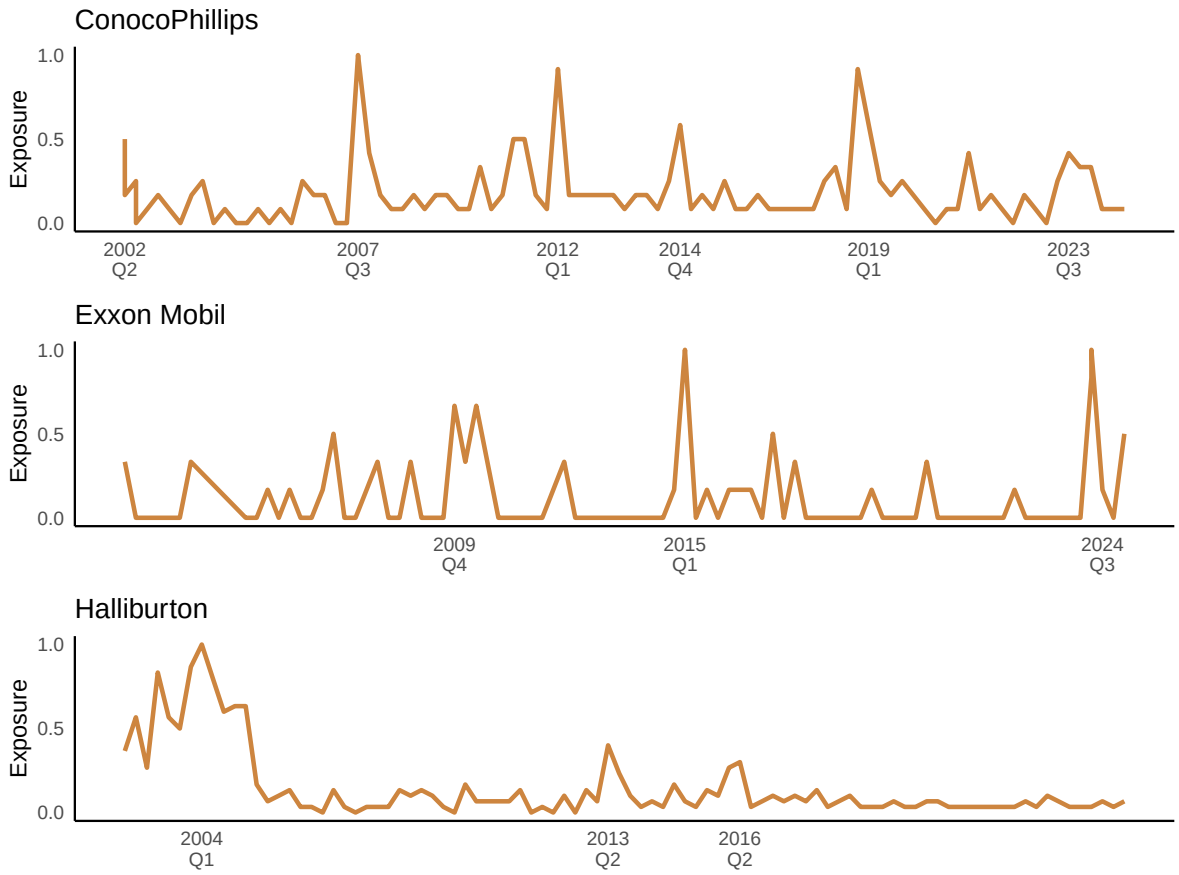


Figure 5: Case Studies: Brown Firms

Note: This figure illustrates the firm-level legal risk exposure of three representative companies in the oil industry: ConocoPhillips, ExxonMobil, and Halliburton. All three are constituents of the S&P 500. The brown solid line in each figure represents the standardized firm-level legal risk exposure, as measured from earnings call transcripts.



Figure 6: Case Studies: Bank Firms

Note: This figure illustrates the firm-level legal risk exposure of three representative companies in the banking industry: Citigroup, Bank of America, and Well Fargo. All three are constituents of the S&P 500. The purple solid line in each figure represents the standardized firm-level legal risk exposure, as measured from earnings call transcripts.

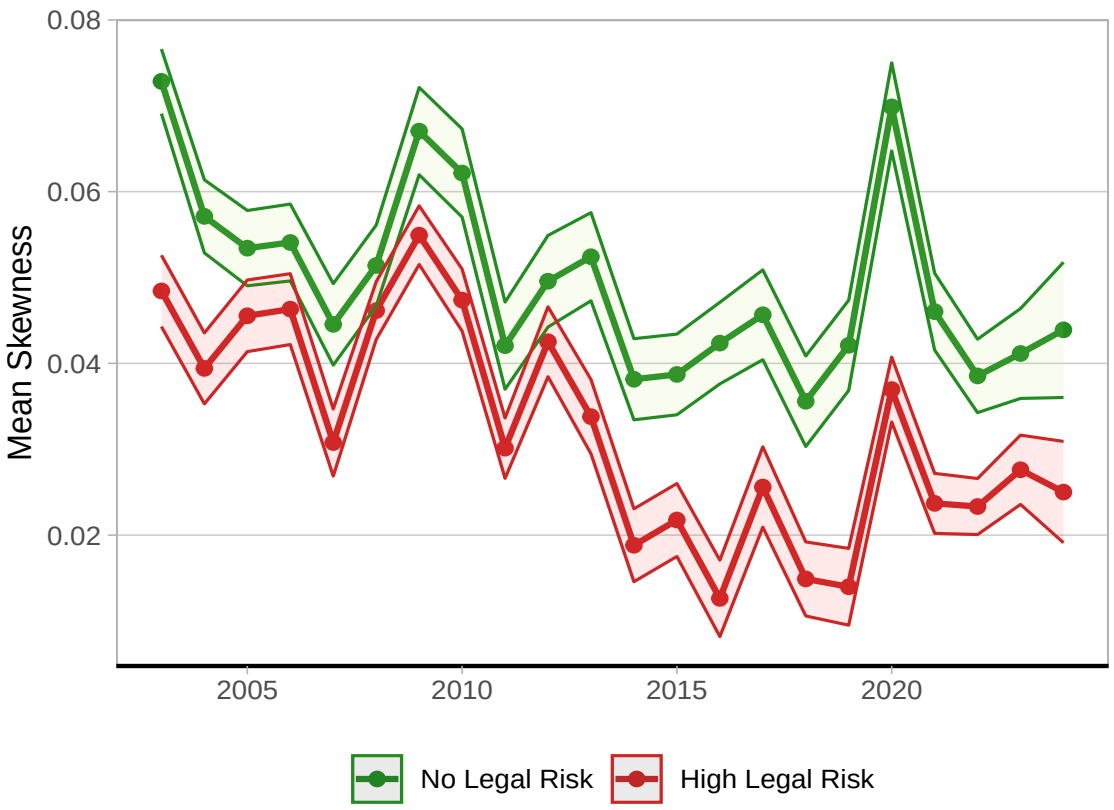


Figure 7: Ex-Ante Skewness of Legal Risk Portfolios

Note: This figure illustrates the ex-ante return skewness of two portfolios: P1 (firms with no legal risk, represented by the green solid line) and P3 (firms with high legal risk, represented by the red solid line). Return skewness is calculated using daily returns for each firm, which are then aggregated at the monthly level. The skewness values for P1 and P3 are averaged within their respective portfolios. The shaded regions are 95% Confidence Intervals.

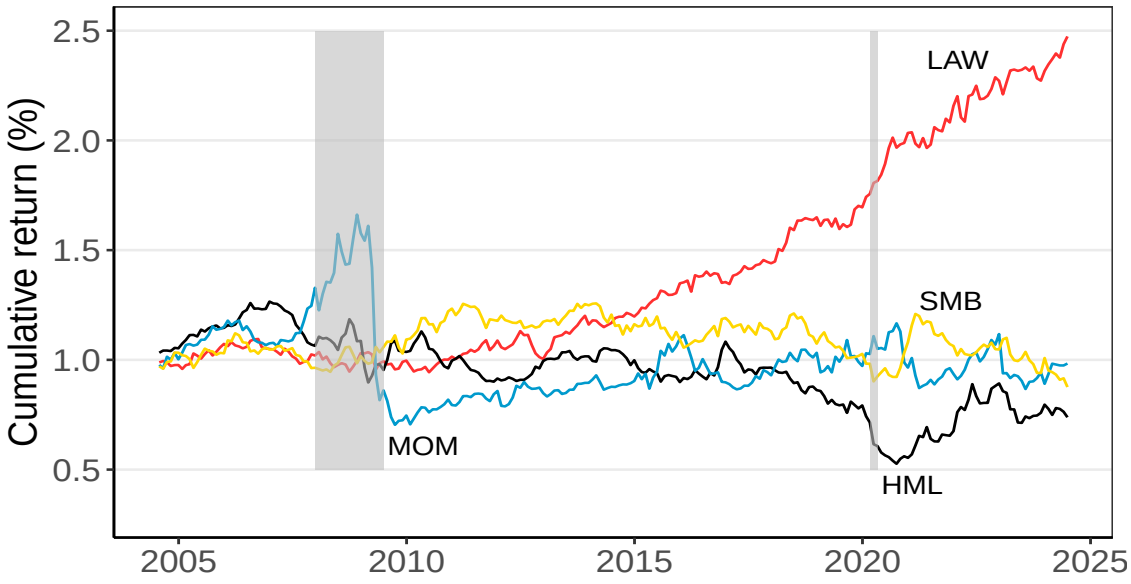


Figure 8: Cumulative Return Performance of Legal Risk Factor (LAW)

Note: This figure plots the cumulative return performance of $1 invested in each of the four risk factors (LAW, SMB, HML, and MOM) at the end of 2004:06. The legal risk factor is the long-short portfolio strategy returns created using tercile portfolio approach. SMB, HML, and MOM are standard asset pricing factors described in the finance literature. The shaded area are NBER economic recession periods.

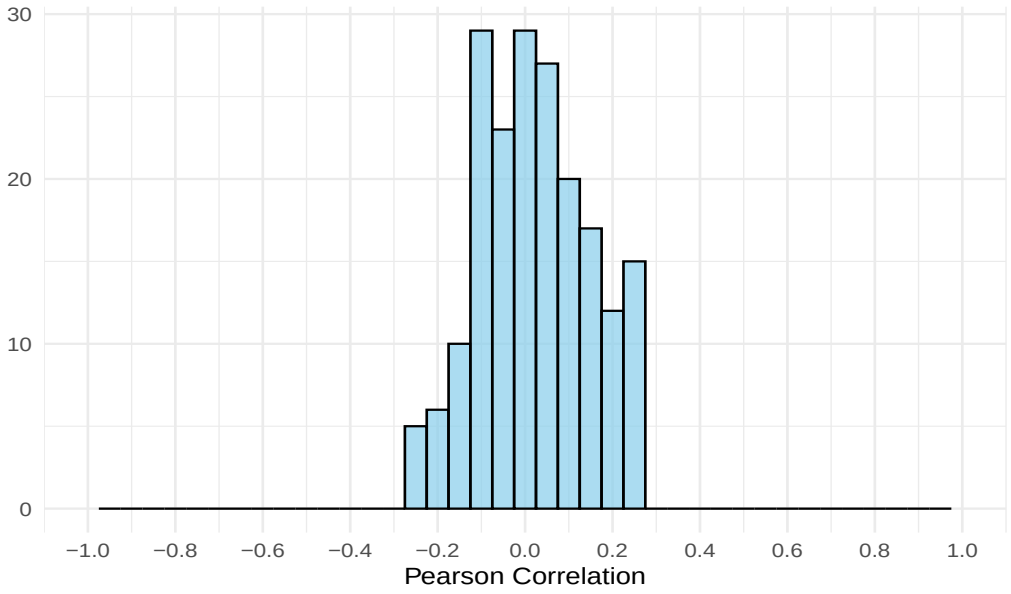


Figure 9: Risk factor correlation

Note: The figure displays a histogram of Pearson correlation coefficients between the legal risk factor ("LAW" factor) and 193 risk anomalies identified in the finance literature. The sample period spans from July 2004 to December 2023, based on the availability of the factor dataset. The x-axis represents the correlation coefficients (ranging from -1 to 1), while the y-axis shows the number of risk anomalies within each correlation bin.

List of Tables

No	Companies	Date	SIC	Texts
1	NV Energy Inc	Feb 10, 2003	4911	The **lawsuit** filed *against* us in **Federal Bankruptcy Court** by Enron is an ongoing matter.
2	Metro International SA	Feb 13, 2007	2711	However, over the years, the **case law** has developed and at the end of 2005, it became apparent that certain deductions could be challenged by the Swedish tax agency.
3	AngioDynamics Inc	July 24, 2007	3841	Diomed's filing goes before the same **judge** who issued the injunction and the timing of any ruling is uncertain.
4	Associated Materials LLC	Nov 17, 2011	3089	But in any event, they went to the same **lawyers** that were handling the first-**class action** suit, and in order to avoid an issue in commonality they set up a second suit against us.
5	Hong Kong Technology Venture Co Ltd	Nov 21, 2012	4813	They won't be able to grant me a license of 2015 because, as I mentioned earlier, in order to protect our investor interest, if we don't get our license by end of the year we will seriously consider to raise the **judicial review** against the government and get a **court** to push the government to issue the license in a reasonable timeframe.
6	Odyssey Marin Exploration Inc	March 16, 2015	8732	The **oral argument** for this final claim is scheduled for early May, that claim was dismissed at the **trial court** level and we expect the dismissal to be upheld.
7	ParkerVision Inc	November 14, 2016	3663	It's also important to note that we filed last month an infringement case against Apple in Munich, citing the same patent as in the LG case, and we've just recently learned that the **hearing** for that case has been set for May 4, 2017, less than 6 months from now.
8	Digital Ally Inc	Apr 1, 2019	3663	And quite frankly, we think even the **patent infringement** that we're seeing out there is becoming more and more brazen, not only with Axon and WatchGuard, who we have active **lawsuits** with, but we believe potentially even other competitors out there.
9	Johnson & Johnson	July 20, 2023	2834	The **bankruptcy judge** is expected to rule by August 2 on the motion to dismiss hearing that took place in the last week of June.
10	Alphabet Inc	Oct 29, 2024	7370	But it looks like the way that the Google versus **DOJ** search trial is going, there's a decent likelihood that the Apple ISA contract and some of the Android pre-install contracts are going to be voided at some point in the future

Table 1: Examples of U.S. Firms mentioning Litigation-related terms in their Transcripts

Note: This table shows the corporate earnings calls transcripts of some U.S. companies that mention legal- or litigation-related terms. The bold red text indicates legal-related terms

Categories	Key terms in this category
Judicial Entities and Key Participants (**LRISK_COURT**)	**Judicial Entities**: Bankruptcy Court, Department of Justice, Federal Circuit, Supreme Court, Trial Court, ... **Key Participants**: Administrative Law Judge, Judges, Jury, Plaintiffs, Prosecutors, ...
Legal Processes and Disputes (**LRISK_TRIAL**)	**Legal Processes**: Appeals, Arbitration, Bankruptcy Proceeding, Class Action, Oral Argument, Trial Date, ... **Legal Disputes**: Antitrust Case, Civil Litigation, Patent Infringement, ...
Legal Terms and Concepts (**LRISK_TERMS**)	Adverse Ruling, Case Law, Legal Costs, Sub Judice, ...

Table 2: Word Choices to Measure Litigation Risk

Note: This table shows the list of legal terms contained in the legal dictionary $\mathbb{L}$. Broadly put, there are three distinct categories, terms related to (1) Judicial Entities and Key Participants; (2) Legal Processes and Disputes; and (3) Legal Terms and Concepts. Refer to the online appendix for the full list of keywords and word choices.

Panel A: Value-weighted future excess returns (%)

	P1 No legal risk	P2 Middle legal risk	P3 High legal risk	P3 - P1 Long - Short
Excess return	0.638	0.912	1.035	**0.397*** **
	(2.02)	(3.23)	(3.37)	**(3.66)**
CAPM alpha	-0.207	0.094	0.232	**0.439*** **
	(-2.17)	(1.50)	(3.79)	**(4.15)**
FF3 alpha	-0.193	0.084	0.205	**0.398*** **
	(-1.92)	(1.39)	(4.56)	**(3.87)**
FF3 + Mom alpha	-0.157	0.095	0.215	**0.372*** **
	(-1.67)	(1.62)	(4.89)	**(3.72)**
FF3 + Liquidity alpha	-0.198	0.100	0.195	**0.392*** **
	(-1.96)	(1.65)	(4.46)	**(3.81)**
FF5 alpha	-0.193	0.028	0.178	**0.372*** **
	(-1.88)	(0.536)	(3.79)	**(3.43)**
FF5 + Mom alpha	-0.162	0.037	0.189	**0.351*** **
	(-1.65)	(0.739)	(4.01)	**(3.31)**
q-factor alpha	-0.124	0.063	0.204	**0.328** **
	(-1.18)	(1.01)	(3.81)	**(2.96)**

Panel B: Firm characteristics

	P1 No legal risk	P2 Middle legal risk	P3 High legal risk
Num. of Firms	701	895	895
Market value (log)	5.5	7.16	6.69
Book-to-market ratio	0.72	0.60	0.64
Gross Profit	0.23	0.32	0.31
Investment	0.33	0.26	0.29
Momentum	0.13	0.12	0.11
Asset Tangibility	0.20	0.22	0.19
Long-term Debt / Total Liabilities	0.27	0.33	0.30

Panel C: Transition Matrix (% of firms moving from one portfolio to another)

	(to) P1	(to) P2	(to) P3	Total
(from) P1	62.0	26.6	11.3	100
(from) P2	17.8	53.8	28.4	100
(from) P3	7.5	26.3	66.2	100

Table 3: Legal risk portfolio results

Note: Panel A presents the average future excess returns (2004:07 - 2024:06) alongside the alpha results derived from portfolios constructed based on ex-ante legal risk measures. Firms in P1 (No legal risk) are those with no exposure to legal risk. Firms with non-zero exposure to legal risk are split into two groups, placed in P2 or P3 according to their level of exposure. The portfolio return data spans from July 2003 to December 2023. Utility firms (SIC codes 4900–4999) and financial firms (SIC codes 6000 - 6411, 6500 - 6553, and 6700 - 6799) are excluded due to the highly restrictive nature of government regulation. The numbers in parenthesis are Newey-West t-statistics with 6 lags. Panel B records the firm characteristics of companies analyzed in the portfolio analysis. Investment is defined as CAPX / PPENT; Asset tangibility is defined as PPENT / AT; Long-term Debt / Total Liabilities is defined as DLTT/ LT. Panel C shows the average transition probabilities. ***/**/* denote the statistical significance at 1%/5%/10% level.

Post-2010 Result (%)

	P1 No legal risk	P2 Middle legal risk	P3 High legal risk	P3 - P1 Long - Short
Excess return	0.841	1.173	1.434	**0.593*** **
	(2.91)	(4.47)	(5.12)	**(4.91)**
CAPM alpha	-0.371	-0.013	0.282	**0.653*** **
	(-3.64)	(-0.21)	(3.93)	**(5.58)**
FF3 alpha	-0.370	-0.027	0.0.236	**0.606*** **
	(-3.53)	(-0.432)	(4.91)	**(5.41)**
FF3 + Mom alpha	-0.319	-0.001	0.244	**0.563*** **
	(-3.28)	(-0.023)	(4.96)	**(5.18)**
FF3 + Liquidity alpha	-0.374	-0.015	0.212	**0.587*** **
	(-3.42)	(-0.24)	(4.57)	**(5.03)**
FF5 alpha	-0.339	-0.057	0.212	**0.551*** **
	(-3.26)	(-1.00)	(4.16)	**(4.93)**
FF5 + Mom alpha	-0.292	-0.034	0.223	**0.515*** **
	(-2.99)	(-0.60)	(4.30)	**(4.71)**
q-factor alpha	-0.280	-0.046	0.230	**0.509*** **
	(-2.84)	(-0.68)	(3.99)	**(4.43)**

Table 4: Post-2010 results

Note: This table presents the average future excess returns alongside the alpha results derived from portfolios constructed based on ex-ante legal risk measures, spanning post-2010 sample (2010:07 - 2024:06). Firms in P1 (No litigation risk) are those with no exposure to legal risk. Firms with non-zero exposure to legal risk are split into two groups, placed in P2 or P3 according to their level of exposure. The portfolio return data spans from July 2003 to December 2023. Utility firms (SIC codes 4900–4999) and financial firms (SIC codes 6000 - 6411, 6500 - 6553, and 6700 - 6799) are excluded due to the highly restrictive nature of government regulation. The numbers in parenthesis are Newey-West t-statistics with 6 lags. ***/**/* denote the statistical significance at 1%/5%/10% level.

	LRISK	LRISK_COURT	LRISK_TRIAL	LRISK_TERMS	PRISK	NPRISK	RISK	PSENT	NPSENT	SENT
LRISK	1.00									
LRISK_COURT	0.80	1.00								
LRISK_TRIAL	0.88	0.48	1.00							
LRISK_TERMS	0.44	0.20	0.29	1.00						
PRISK	0.09	0.09	0.07	0.03	1.00					
NPRISK	0.05	0.04	0.03	0.03	0.19	1.00				
RISK	0.08	0.08	0.06	0.03	0.47	0.49	1.00			
PSENT	-0.15	-0.13	-0.14	-0.09	-0.07	-0.09	-0.14	1.00		
NPSENT	-0.10	-0.08	-0.07	-0.08	-0.06	-0.04	-0.09	0.30	1.00	
SENT	-0.18	-0.15	-0.14	-0.10	-0.12	-0.12	-0.21	0.68	0.56	1.00

Table 5: Correlation between **LRISK** and other text-based firm-level exposure measures

Note: This table presents the Pearson correlation between **LRISK** and its three components—**LRISK_COURT**, **LRISK_TRIAL**, and **LRISK_TERMS**—alongside relevant text-based measures. Political and non-political risk, as well as sentiment measures, are sourced from Hassan et al. (2019). Correlations are computed at the aggregate level, though first grouping by firm or year before calculating correlations does not affect the main implications.

Panel A: Correlation

	LRISK	Cyber Risk	Cyber Risk Law
LRISK	1.00		
Cyber RISK	-0.05	1.00	
Cyber Risk Law	0.42	-0.01	1.00

Panel B: Risk Factor Performance

	LRISK	Cyber Risk	Cyber Risk Law
Excess return	**0.397*** **	**0.360** **	0.142
(% per month)	**(3.66)**	**(2.05)**	(1.19)
FF3 + Mom alpha	**0.372*** **	**0.309*** **	0.114
(% per month)	**(3.71)**	**(2.66)**	(1.06)

Panel C: Factor Spanning Test

	(1)	(2)	(3)
→ Dependent variable:	**LRISK**	**Cyber Risk**	**Cyber Risk Law**
↓ Independent variable:			
Intercept	**0.277*** **	0.164	-0.093
	(2.85)	(1.49)	(-0.96)
LRISK		**0.244** **	**0.256** **
		(2.24)	**(2.16)**
Cyber Risk	**0.203** **		**0.361*** **
	(2.12)		**(5.24)**
Cyber Risk Law	**0.281** **	**0.475*** **	
	(2.08)	**(4.59)**	
MKT	0.004	0.005	0.007
	(0.14)	(0.21)	(0.29)
SMB	**-0.120** **	-0.029	0.061
	(-2.56)	(-0.53)	(1.37)
HML	0.06	**-0.353*** **	0.065
	(1.10)	**(-5.68)**	(1.32)
MOM	**0.05***	-0.002	0.041
	(1.70)	(-0.04)	(1.44)

Table 6: Comparing LRISK and Cyber Risk

Note: This table compares **LRISK**, constructed in this paper, with **Cyber Risk** and its component measure, **Cyber Risk Law**. All three measures are derived from earnings call transcripts, covering the sample period from 2004:07 to 2024:06. Panel A reports the Pearson correlation at the firm level. Panel B presents the performance of a long-short portfolio strategy over the sample period. Panel C shows the factor spanning test, where the dependent variable is one of the three measures, and the benchmark model is the Fama-French three-factor model augmented with momentum, as well as the two remaining measures not used as the dependent variable. In Panels B and C, numbers in parentheses represent Newey-West t-statistics with six lags. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Legal Risk

Online Appendix

A Market Responses to Legal Risk: Case Evidence

Legal risk is not merely an abstract concern for firms—it has tangible financial consequences that investors and corporate decision-makers systematically monitor. High-profile lawsuits, regulatory actions, and emerging legal challenges frequently trigger significant market reactions, demonstrating that legal uncertainty is a key determinant of firm value. Boards of directors are also highly responsive to heightened litigation risk, adjusting their oversight and decision-making accordingly (Laux 2010).[1] The following cases illustrate how legal risk translates into substantial stock price movements and strategic corporate responses.

Investors systematically care about legal risk as they actively monitor and react to such risks. For instance, shares of GSK dropped over 9% after a Delaware judge allowed 70,000 lawsuits alleging that its discontinued heartburn drug, Zantac, caused cancer to proceed, wiping out nearly $8.9 billion in market value. These lawsuits have posed a significant concern, erasing approximately $40 billion in combined market value from GSK, Sanofi, Pfizer, and Haleon during a similar legal scare in August 2022.[2]

Recent evidence further highlights the significant financial repercussions of legal risk. Climate change litigation, for example, has emerged as a material financial risk for firms in carbon-intensive industries. A study examining lawsuits against major polluters found that litigation announcements lead to statistically significant declines in share prices, reflecting investor concerns over regulatory penalties, reputational damage, and future compliance costs.[3] As climate-related litigation becomes more prevalent, firms exposed to environmental liabilities face heightened legal uncertainty, reinforcing the notion that legal risk is a systematic force shaping investment decisions.

[1] See also https://fticommunications.com/the-decade-of-disputes-litigation-is-on-the-boardroom-agenda-for-the-year-ahead/

[2] https://www.reuters.com/business/healthcare-pharmaceuticals/gsk-shares-tumble-9-after-70000-zantac-lawsuits-allowed-move-forward-2024-06-03/

[3] https://www.theguardian.com/environment/2023/may/22/big-polluters-share-prices-fall-climate-lawsuits-fossil-fuels-study

B Some further details on search terms in Corporate Earnings Calls Transcripts

Extracting keywords from earnings call transcripts is essential for identifying underlying signals of litigation risk faced by firms. This section of the online appendix provides additional details to clarify the robustness of our analysis and ensure its accuracy.

To begin, I adopt a conservative approach and deliberately exclude the keyword ”litigation” and closely related terms. This decision is guided by two key considerations. First, most firms are required to include disclaimers at the start of their earnings calls, such as:

“Before we begin, may I draw your attention to the disclaimer on our presentation and company announcement regarding forward-looking statements as defined in the U.S. Private Securities Litigation Reform Act of 1995.”

This standardized disclaimer, ubiquitous across firms, could inadvertently introduce noise into the analysis by classifying firms with no genuine litigation exposure into portfolios of firms with such risks. Including the term ”litigation” could therefore compromise the integrity of the portfolio sorting process. Second, the terms ”litigation” and ”legal” are often used interchangeably in earnings calls. Since ”legal” is already incorporated into my analysis, we believe that excluding ”litigation” does not result in any substantive loss of information or analytical rigor.

Another important aspect of keyword extraction is dealing with terms that have multiple meanings, which can vary significantly based on context. Take, for example, the term “judge.” As a verb, it could simply mean making a decision or forming an opinion, which may have no legal relevance. However, the term “Judge” (i.e., used with a capital letter) specifically refers to a legal authority figure. To maintain the precision of the dataset, we include “Judge” but exclude the lowercase ”judge” to ensure we capture relevant legal contexts. While a similar approach could be applied to the term “court” (which could imply an attempt to entice someone), we include both “court” and “Court” because it is unlikely that “court” would refer to social enticement given the corporate context of earnings calls.

Litigations related to patents are quite common, making patent-related terms an important consideration in this analysis. However, to maintain precision, we include only terms with clear legal implications, such as ”patent infringement,” while excluding broader terms like

"patent." The rationale for this distinction is that technology firms often reference their patents in contexts unrelated to legal issues, such as discussing innovation or intellectual property strategies. Including the term "patent" indiscriminately could introduce noise, as it might capture mentions that have no legal significance, thereby diluting the accuracy of the analysis. By focusing on terms with explicit legal linkage, we ensure the analysis remains targeted and relevant. Ambiguity in language poses a significant challenge in text analysis, particularly when extracting legal nuances from corporate communications. For example, the term "complaint" could refer to a legal filing but may also be used in non-legal contexts, such as describing a customer's dissatisfaction with a product. Such ambiguity can obscure the legal relevance of the term if not carefully managed.

To address this, we exclude terms like "complaint" when used in isolation, focusing instead on more legally specific phrases, such as "amended complaint," which refers to a formal revision of a plaintiff's original filing. Similarly, ambiguous terms such as "claim"—which could refer to insurance claims or warranty claims in non-legal contexts—are excluded unless they appear in explicitly legal contexts, such as "legal claim," "counterclaim," or terms associated with clear legal proceedings. Additionally, terms like "settle" are carefully evaluated, as they may relate to financial contexts rather than legal settlements. By excluding these ambiguous or context-dependent terms unless they are part of a legally meaningful phrase, the keyword extraction process is refined to more accurately identify instances of litigation risk while minimizing noise from irrelevant mentions.

As a result, the final set of keywords used to identify firm-level legal risk is listed below. Keywords frequently appearing in corporate earnings calls are highlighted in italics.

- **Judicial Entities and Key Participants (LRISK_COURT)**
  - **Judicial Entities**: Administrative Court, Appeal Court, Apppellate Court, Arbitration Court, Arbitration Tribunal, Bankruptcy Court, ***Commission***, Constitutional Court, ***Court(s)***, ***Department of Justice*** (***DOJ***), District court, Eastern District, European Court, European Court of Justice (ECJ), Federal Court, Fifth Circuit, High Court, Lower Court, Northern District, Oversight Board, Patent Office, Southern District, ***Supreme Court***, Trial Court,
  - **Key Participants**: Administrative Law Judge (ALJ), Arbitrator, Attorney General, Defendants, Federal Judge, ***Judge***, Jury, Plaintiff(s), Prosecutor(s)
- **Legal Processes and Disputes (LRISK_TRIAL)**

- **Legal Processes**: ***Appeals***, ***Arbitration***, Bankruptcy Process, Binding Arbitration, Class Action, Court Approval, Court Hearing, Court Process, Court Proceedings, Evidentiary Hearings, ***Hearing*(*s*)**, IPR Process, Judicial Process, Judicial Review, Legal Proceeding, Legal Process, Markman, Mediation Process, Next Hearing, Oral Argument, Oral Hearing, Pending Cases, Rebuttal Testimony, Retrial, Trial Date, Full Trial, ***Petition***, Procedural Schedule, ***Settlement***, ***Settlement Agreement***
- **Legal Disputes**: Adverse Ruling, Antitrust Case, Arbitration Case, Class Action Lawsuit, Civil Cases, Civil Litigation, Infringement, ***Injunction***, IP Litigation, ***Lawsuit*(*s*)**, Legal Challenges, Legal Claim, Legal Disputes, Patent Case, Patent Claims, Patent Dispute, Patent Infringement, ***Ruling***, Settlement Agreement, Tentative Settlement

- **Legal Terms and Concepts (LRISK_TERMS)**
  - Amended Complaint, Case Law, Compliance Filing, Constitutionality, Counterclaims, Injunctive Relief, Legal Basis, ***Legal Costs***, ***Legal Fees***, ***Legal Expenses***, Sub Judice, Regulatory Issue

C Additional Empirical Analysis

This section expands the empirical analysis by introducing additional portfolio strategies to test the robustness of the main findings. The primary result employs a (12-12) portfolio strategy, where portfolios are formed at the end of June each year using the past 12 months (i.e., 4 quarters) of earnings calls transcripts information, and stocks are weighted by their market capitalization as of that date. The formed portfolio lasts for the next 12 months, ending in June of the following year. This approach aligns with the standard methodology for constructing risk factor anomalies.

To leverage the higher frequency of quarterly earnings conference calls, Table B.1 reports three additional portfolio strategies: (12-3), (12-6), and (6-6). Moreover, we present an alternative "zero-nonzero" approach under the (12-12) strategy, where portfolios are sorted by stocks with zero versus positive exposure to legal risk. To ensure that any performance differences arise solely from the portfolio formation periods, we preserve the original setting by using market capitalization weights as of the end of June each year.

The results from all four strategies, as summarized in Table B.1, exhibit strong statistical significance. These findings confirm that variations in portfolio formation periods do not alter the primary conclusion.

Panel A: (12-3) strategy (%)

	P1	P2	P3	P3 - P1
	No legal risk	Middle legal risk	High legal risk	long - short
Excess return	0.626	0.950	0.970	**0.347*** **
	(2.02)	(3.26)	(3.29)	**(3.34)**
FF3 alpha	-0.185	0.107	0.154	**0.339*** **
	(-2.26)	(2.03)	(2.81)	**(3.32)**
FF5 alpha	-0.156	0.062	0.133	**0.289*** **
	(-2.13)	(1.25)	(2.97)	**(3.09)**

Panel B: (12-6) strategy (%)

	P1	P2	P3	P3 - P1
	No legal risk	Middle legal risk	High legal risk	Long - Short
Excess return	0.693	0.946	0.979	**0.286*** **
	(2.21)	(3.29)	(3.29)	**(3.03)**
FF3 alpha	-0.163	0.109	0.153	**0.316*** **
	(-2.07)	(2.04)	(2.87)	**(3.33)**
FF5 alpha	-0.163	0.042	0.120	**0.283*** **
	(-2.24)	(0.87)	(2.32)	**(3.08)**

Panel C: (6-6) strategy (%)

	P1	P2	P3	P3 - P1
	No legal risk	Middle legal risk	High legal risk	Long - Short
Excess return	0.746	1.003	0.953	**0.207** **
	(2.54)	(3.41)	(3.22)	**(2.40)**
FF3 alpha	-0.085	0.171	0.112	**0.198** **
	(-1.32)	(3.28)	(1.94)	**(2.31)**
FF5 alpha	-0.117	0.122	0.063	**0.180*** **
	(-1.88)	(2.45)	(1.22)	**(2.27)**

Panel D: (12-12) strategy using Zero-Nonzero legal risk approach (%)

	P1	P2	P2 - P1
	No legal risk	Any legal risk	Long - Short
Excess return	0.645	0.969	**0.324*** **
	(2.03)	(3.37)	**(3.44)**
FF3 alpha	-0.209	0.139	**0.348*** **
	(-2.17)	(3.66)	**(3.64)**
FF5 alpha	-0.205	0.089	**0.294*** **
	(-2.10)	(2.88)	**(3.05)**

Table B.1: Long-Short Strategy results using different formation period

Note: In both panels, the average future excess returns (2004:07 - 2024:06) alongside the alpha results derived from portfolios constructed based on ex-ante legal risk measures are presented. Panel A presents a portfolio strategy that uses (12-3) strategy, and Panel B presents (3-3) strategy. Firms in P1 (Low litigation risk) are those with no exposure to litigation risk. Firms with litigation risk are split into two groups, placed in P2 or P3 according to their level of exposure. The portfolio return data spans from July 2003 to December 2023. Utility firms (SIC codes 4900–4999) and financial firms (SIC codes 6000 - 6411, 6500 - 6553, and 6700 - 6799) are excluded due to the highly restrictive nature of government regulation. The numbers in parenthesis are Newey-West t-statistics with 6 lags. ***/**/* denote the statistical significance at 1%/5%/10% level.

D Firm-level Evidence: Case studies using SolarWinds

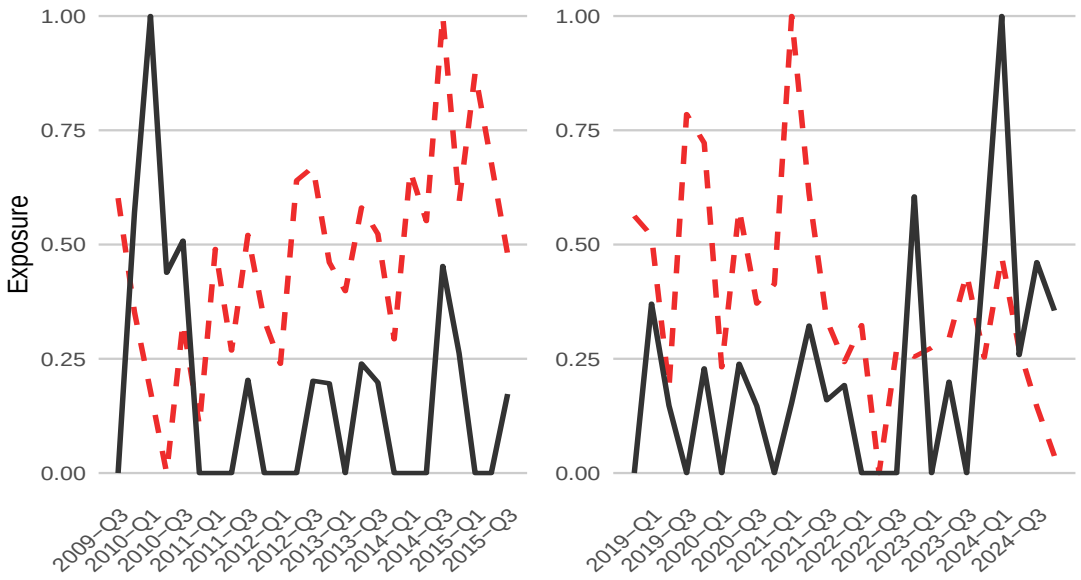


Figure A.1: Case study - SolarWinds

Note: This figure presents the legal risk exposure (black solid line) and cyber risk exposure (red dotted line) for SolarWinds Inc. Both text-based exposure measures are normalized to range from 0 to 1 within each subperiod: 2009-Q3 to 2015-Q3 and 2018-Q4 to 2024-Q4. SolarWinds first went public in May 2009, was taken private in October 2015, and subsequently returned to the public market in October 2018.

SolarWinds[4] provides a compelling case study to discuss legal risk exposure of that firm. The study of SolarWinds' cyber risk exposure, pioneered in Florackis et al. (2023) and Jamilov et al. (2025) provide an interesting benchmark to illustrate the legal risk inherent in the cyberrisk-related issues. Our analysis builds on these findings by showing that firms responding to cyber risk often face legal risk as a related but distinct mechanism. Notably, SolarWinds first encountered a securities class action lawsuit in 2010, which resulted in a Notice of Voluntary Dismissal. Despite this resolution, our textual analysis of earnings call transcripts during this period shows a noticeable increase in legal risk-related discussions (black solid line in left panel of Figure A.1). This trend reemerged in 2015 when

[4]The company, a provider of IT infrastructure management software, first went public in May 2009. However, in October 2015, it was taken private in a $4.5 billion buyout by private equity firms Silver Lake Partners and Thoma Bravo. In October 2018, SolarWinds re-entered the public markets with its second initial public offering (IPO). More recently, the company announced its intention to delist again in 2025 following an acquisition agreement with Turn/River Capital. Because of this transition between public and private ownership, our analysis presents two separate graphs to illustrate how legal risk exposure and market perception evolved over these distinct periods.

the company was again subject to a class action lawsuit. In this instance, the case concluded with a Court's Order of Dismissal, yet the company's legal risk exposure remained heightened. These early signals suggest that, even when lawsuits do not directly impact financial outcomes, firms anticipate and communicate about potential legal risks in their disclosures, which influences investor perceptions and stock price behavior.

A defining moment for SolarWinds occurred in December 2020 when it became the target of the SolarWinds supply chain attack (SUNBURST attack) that affected thousands of government and private-sector clients. As expected, our analysis shows a sharp spike in the firm's cyber risk measure (denoted by the red dotted line on the right panel) in response to the attack. This event triggered cascading legal consequences, including a class action lawsuit from shareholders and customers who alleged that SolarWinds had failed to implement adequate cybersecurity measures. In addition to these lawsuits, regulatory scrutiny intensified. In October 2023, the U.S. Securities and Exchange Commission (SEC) filed charges against SolarWinds and its Chief Information Security Officer (CISO) for allegedly misleading investors about the company's cybersecurity practices before and during the breach. The SEC's charges significantly increased SolarWinds' legal risk exposure, as reflected in a pronounced uptick in our legal risk measure. This exposure culminated in early 2024, when SolarWinds agreed to a $26 million settlement to resolve investor claims stemming from the 2020 breach.

E Legal Shifts: Implications for Firms and Markets

This section examines the evolution of the U.S. legal landscape throughout the 21st century and its implications for firms and markets. Specifically, we explore how the early 2000s were characterized by a mix of deregulatory measures and heightened regulatory oversight, while the post-Global Financial Crisis (GFC) era introduced a wave of stringent reforms that reshaped the regulatory framework.

E.1 Mixed Legal Shifts in the Early 2000s

Background: The early 2000s marked a period of mixed legal shifts in the U.S. financial and corporate governance landscape. On one hand, the repeal of key provisions of the Glass-Steagall Act through the Gramm-Leach-Bliley Act (GLBA) in November 1999 facilitated financial consolidation. The Glass-Steagall Act, originally enacted in 1933 during

the Great Depression, established a strict separation between commercial and investment banking activities to prevent conflicts of interest and financial instability. However, the GLBA allowed for the integration of commercial banks, investment banks, and insurance companies, paving the way for financial conglomerates like Citicorp and Travelers Group and enabling institutions to offer a combination of services that had previously been segregated.

Simultaneously, many states adopted Universal Demand (UD) laws during the late 1980s and 1990s, which raised the procedural threshold for filing shareholder derivative lawsuits. These laws required shareholders to submit a formal demand to the board of directors before initiating litigation, effectively giving boards the power to decide whether to pursue such lawsuits. By reducing the frequency of shareholder derivative actions, UD laws created a litigation environment that favored corporate boards and executives. Although these laws were primarily enacted in the late 20th century, their impact was long-lasting and persisted into the early 2000s, shaping a permissive legal atmosphere that fostered corporate flexibility and growth.

One compelling example of UD laws' long-term influence is their role in reducing board accountability during the early 2000s. Studies have shown that firms headquartered in states with UD laws faced significantly fewer shareholder lawsuits, even in cases of alleged misconduct or governance failures (Houston et al. 2018). Thus, while UD laws were enacted decades earlier, their enduring impact shaped the corporate legal environment into the early 2000s, reducing litigation risks and reinforcing a deregulatory trend that defined this period.

Contrasting this deregulatory trend, the Sarbanes-Oxley Act (SOX) of 2002 imposed stringent requirements on corporate governance and financial reporting in response to accounting scandals like Enron and WorldCom. SOX established rigorous standards for internal controls, increased executive accountability, and mandated enhanced financial disclosures, thereby raising the legal and compliance burden for publicly listed firms. While SOX aimed to restore investor confidence and prevent corporate malfeasance, it coexisted with the lenient regulatory effects of the GLBA and UD laws, creating a legal environment that was simultaneously permissive in some aspects and stringent in others.

These mixed legal shifts promoted financial innovation and corporate expansion but also contributed to systemic vulnerabilities that would later be exposed during the GFC.

E.2 Stringent Legal Shifts After the Global Financial Crisis

Background: The 2008 GFC exposed systemic weaknesses in the U.S. financial system, including excessive risk-taking, regulatory gaps, and corporate misconduct. The resulting economic downturn and public outrage over corporate malfeasance prompted a wave of legislative and regulatory reforms designed to prevent similar crises in the future. The Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010 was a cornerstone of these reforms, introducing comprehensive measures to enhance market oversight, improve transparency, and promote corporate accountability.

The Securities and Exchange Commission (SEC) played a pivotal role in these reforms by implementing stricter enforcement measures. In 2010, the SEC established specialized units within its Enforcement Division, such as the Market Abuse Unit and the Asset Management Unit, to address complex financial misconduct more effectively. Additionally, the SEC's cooperation program encouraged firms and individuals to assist in investigations through tools like cooperation agreements, deferred prosecution agreements, and non-prosecution agreements. According to Leone et al. (2021), the program's early years were marked by higher enforcement probabilities and increased penalties. However, from 2011 to 2014, enhanced cooperation led to reduced enforcement probabilities and lower penalties, reflecting the program's evolving effectiveness.

A landmark provision in securities law enforcement came with the whistleblower program established under Section 922 of the Dodd-Frank Act. This program offered monetary rewards ranging from 10% to 30% of sanctions collected from SEC enforcement actions exceeding $1 million, alongside robust anti-retaliation protections for whistleblowers. These incentives encouraged individuals to report misconduct early, thereby strengthening the SEC's ability to detect and deter securities violations. Heese and Perez-Vacazos (2021) examine how the costs of retaliation influence employees' decisions to whistleblow, underscoring the program's effectiveness. Beyond the SEC's whistleblower program, the *Cyan, Inc. v. Beaver County Employees Retirement Fund* (*2018*) decision further heightened legal risk in the U.S. by allowing class-action lawsuits under the Securities Act of 1933 to proceed in state courts, increasing the risk of forum shopping. This exposed public companies, particularly those undergoing IPOs or secondary offerings, to costly and unpredictable litigation across multiple venues. Beyond direct legal costs, Cyan raised uncertainty around liability, complicated securities defense strategies, and increased the legal risk premium investors demanded. The prospect of parallel lawsuits in different states strained corporate legal teams, drove up settlement costs, and deterred some firms from

capital-raising activities. The ruling also impacted D&O insurance markets, as insurers adjusted premiums to reflect heightened litigation exposure. Alongside other post-GFC regulatory shifts, Cyan played a key role in shaping the modern U.S. legal risk landscape and its asset pricing implications.

Impact on Firms Listed on U.S. Public Markets: The post-GFC reforms significantly elevated the legal risk exposure for publicly listed firms. Companies faced greater regulatory scrutiny and higher compliance costs as they bolstered internal controls and governance frameworks to mitigate legal risks. Financial institutions like JPMorgan Chase and Goldman Sachs incurred substantial penalties for past misconduct and adopted stringent compliance measures in response. The whistleblower provisions of the Dodd-Frank Act further amplified firms' legal risk, evidenced by high-profile cases like the $104 million reward to UBS whistleblower Bradley Birkenfeld, whose disclosures led to significant penalties for the firm. These reforms marked a transformative shift in the U.S. legal landscape, with firms now encountering intensified accountability for both historical and ongoing practices.

In summary, the early 2000s were marked by a blend of deregulatory measures and heightened corporate oversight, fostering both growth and risk. In contrast, the post-GFC era introduced stringent reforms aimed at enhancing market oversight and accountability. The increasing complexity of regulatory requirements and the heightened potential for whistleblower actions have made legal risk a critical consideration in corporate strategy and governance. Our findings, based on post-2010 data, underscore the substantial impact of these legal shifts on U.S. public markets.

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