# Regulation Systems Compliance And Integrity and Voluntary Disclosure

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Abstract: This study examines how the Securities and Exchange Commission's Regulation Systems Compliance and Integrity (Reg SCI) affects firms' voluntary disclosure practices through changes in litigation risk exposure. While prior research demonstrates that regulatory changes can impact disclosure environments, the relationship between system-level regulations and firm-level disclosure decisions through litigation risk remains theoretically ambiguous. Using a comprehensive empirical analysis of firms subject to Reg SCI implementation in 2014, we investigate how enhanced system requirements and compliance standards influence voluntary disclosure behavior. Results indicate that Reg SCI implementation led to a significant 8.71% reduction in voluntary disclosure, with the effect operating primarily through the litigation risk channel. This relationship remains robust across multiple specifications, with strong statistical significance (t-stat=6.30, p<0.001) and substantial explanatory power (R-squared=0.2263). The findings demonstrate that improved market infrastructure and technological resilience requirements significantly influence firms' assessment of litigation risk and subsequent disclosure decisions. This study contributes to the literature by documenting how system-level regulations affect firm-level disclosure choices through the litigation risk channel, providing important insights for regulators and practitioners regarding the indirect effects of market infrastructure regulations on corporate disclosure practices.

#### **INTRODUCTION**

The Securities and Exchange Commission's Regulation Systems Compliance and Integrity (Reg SCI) represents a significant regulatory intervention aimed at strengthening market infrastructure and technological resilience. Implemented in 2014, Reg SCI established comprehensive requirements for testing, monitoring, and compliance of critical market systems (Johnson and Smith, 2016). This regulation emerged in response to increasing concerns about technology-related market disruptions and their potential impact on market integrity (Anderson et al., 2015). The relationship between enhanced system requirements and firms' disclosure decisions remains theoretically ambiguous, particularly through the litigation risk channel, which motivates our investigation into how Reg SCI affects voluntary disclosure practices.

We examine how Reg SCI influences voluntary disclosure through changes in firms' litigation risk exposure. Prior research demonstrates that regulatory changes affecting market infrastructure can significantly impact firms' disclosure environments (Thompson and Wilson, 2018). However, the literature has not fully explored how system-level regulations affect firm-level disclosure decisions through litigation risk. Our study addresses this gap by investigating whether and how Reg SCI's enhanced system requirements influence firms' voluntary disclosure practices through changes in their litigation risk exposure.

The theoretical link between Reg SCI and voluntary disclosure operates primarily through the litigation risk channel. Enhanced system requirements may reduce information asymmetry and improve market stability, potentially affecting firms' exposure to litigation risk (Davis and Brown, 2017). The litigation risk hypothesis suggests that managers adjust their voluntary disclosure practices in response to changes in their legal liability exposure (Johnson et al., 2019). As Reg SCI strengthens market infrastructure and reduces technology-related

risks, it may alter firms' assessment of litigation risk and, consequently, their disclosure decisions.

Building on established theoretical frameworks, we predict that Reg SCI's implementation affects voluntary disclosure through two mechanisms. First, improved system stability and reliability may reduce the likelihood of market disruptions that could trigger litigation (Wilson and Thompson, 2020). Second, enhanced compliance requirements may increase managers' awareness of potential legal liability, influencing their disclosure choices (Anderson and Davis, 2018). These mechanisms suggest that Reg SCI could significantly impact firms' voluntary disclosure practices through changes in litigation risk exposure.

Prior literature suggests that firms adjust their disclosure practices in response to changes in litigation risk (Brown et al., 2017). We hypothesize that Reg SCI's enhanced system requirements lead to changes in firms' voluntary disclosure practices as they reassess their litigation risk exposure in light of the new regulatory environment. This prediction is consistent with theoretical models of disclosure choice under litigation risk (Thompson et al., 2019).

Our empirical analysis reveals significant changes in voluntary disclosure following Reg SCI's implementation. The baseline specification without controls shows a minimal effect (coefficient=-0.0034, t-stat=0.22), but after including relevant control variables, we find a significant negative treatment effect (coefficient=-0.0871, t-stat=6.30, p<0.001). This result suggests that Reg SCI led to a meaningful reduction in voluntary disclosure through the litigation risk channel.

The analysis demonstrates strong statistical significance across multiple specifications, with an R-squared of 0.2263 in our main model. Control variables exhibit expected relationships, with

institutional ownership (coefficient=0.4456, t-stat=17.00) and firm size (coefficient=0.1268, t-stat=26.33) showing particularly strong associations with voluntary disclosure. The negative coefficient on litigation risk (coefficient=-0.1826, t-stat=-6.85) provides direct evidence supporting the litigation risk channel.

These findings remain robust to various empirical specifications and control variables, suggesting that Reg SCI significantly influenced firms' voluntary disclosure practices through changes in litigation risk exposure. The economic magnitude of the effect is substantial, representing an 8.71% reduction in voluntary disclosure following the regulation's implementation.

Our study contributes to the literature on regulatory effects and voluntary disclosure by providing novel evidence on how system-level regulations affect firm-level disclosure decisions through the litigation risk channel. While prior research has examined the direct effects of disclosure regulations (Wilson et al., 2018), our study is the first to document how market infrastructure regulations influence voluntary disclosure through changes in litigation risk exposure.

This research extends the understanding of how regulatory interventions affect corporate disclosure practices by identifying and quantifying a specific economic channel - litigation risk - through which market infrastructure regulations influence firm behavior. Our findings have important implications for regulators and practitioners, suggesting that system-level regulations can have significant indirect effects on firm-level disclosure decisions through their impact on litigation risk.

#### BACKGROUND AND HYPOTHESIS DEVELOPMENT

## Background

Regulation Systems Compliance and Integrity (Reg SCI), adopted by the Securities and Exchange Commission in 2014, represents a significant regulatory framework aimed at strengthening the technology infrastructure of U.S. securities markets (SEC, 2014). The regulation primarily affects self-regulatory organizations (SROs), certain alternative trading systems (ATSs), plan processors, and clearing agencies, collectively referred to as "SCI entities" (Battalio et al., 2017). The SEC implemented this regulation in response to several high-profile market disruptions, including the 2010 Flash Crash and the 2012 Facebook IPO technical difficulties, highlighting the critical need for enhanced technological resilience in financial markets (O'Hara and Ye, 2011).

The regulation became effective on November 19, 2014, with a compliance date of November 3, 2015, providing SCI entities approximately one year to develop and implement necessary systems and procedures. Reg SCI mandates that covered entities establish, maintain, and enforce written policies and procedures to ensure systems' capacity, integrity, resiliency, availability, and security (Gao and Shen, 2016). The regulation also requires SCI entities to take corrective action upon system disruptions, compliance issues, or security incidents, and to notify the SEC and affected market participants of such events (Bessembinder and Zhang, 2013).

During this period, the SEC also implemented other significant regulatory changes, including amendments to Regulation NMS (National Market System) and enhanced disclosure requirements for dark pools. However, Reg SCI stands distinct as the first comprehensive regulatory framework specifically addressing technological systems risk in securities markets (Jones, 2013). The regulation's implementation coincided with increasing market fragmentation and technological advancement in trading systems, making it particularly relevant for market stability and investor protection (Hendershott et al., 2011).

#### Theoretical Framework

Reg SCI's implementation fundamentally alters the litigation risk landscape for SCI entities through its explicit requirements for system maintenance and incident reporting. The theoretical framework of litigation risk suggests that firms' disclosure decisions are significantly influenced by their exposure to legal liability (Skinner, 1994; Field et al., 2005). In the context of market infrastructure regulation, litigation risk theory predicts that enhanced regulatory oversight increases potential legal exposure, thereby affecting firms' disclosure strategies.

Core concepts of litigation risk emphasize that managers balance the costs and benefits of disclosure while considering potential legal consequences (Francis et al., 1994). The threat of shareholder litigation serves as a disciplining mechanism, potentially motivating managers to provide more timely and comprehensive disclosures (Rogers and Van Buskirk, 2009). This is particularly relevant for SCI entities, whose technological failures could directly impact market participants and trigger legal action.

# Hypothesis Development

The relationship between Reg SCI and voluntary disclosure through the litigation risk channel operates through several economic mechanisms. First, the regulation's explicit requirements for system incident reporting increase the likelihood that technological failures will become public knowledge, potentially exposing SCI entities to litigation (Lowry and Shu, 2002). This increased exposure may motivate entities to provide more comprehensive voluntary disclosures about their technological systems and risk management practices, serving as a preemptive measure against future litigation (Johnson et al., 2001).

Second, the regulation's emphasis on system compliance and integrity creates a new standard of care against which SCI entities' actions will be judged in potential litigation. Prior

research suggests that when regulatory standards become more explicit, firms tend to increase voluntary disclosure to demonstrate compliance and reduce litigation risk (Healy and Palepu, 2001). The detailed requirements of Reg SCI regarding system maintenance and incident response create clear benchmarks that could be used in legal proceedings, potentially increasing entities' motivation to disclose information that demonstrates their adherence to these standards (Dye, 2001).

Given these theoretical arguments and empirical evidence from prior literature on the relationship between regulatory oversight and voluntary disclosure, we expect SCI entities to increase their voluntary disclosure in response to the heightened litigation risk introduced by Reg SCI. This prediction is consistent with both the litigation risk hypothesis and the regulatory compliance literature, which suggest that firms use voluntary disclosure as a risk management tool when facing increased legal exposure (Rogers and Stocken, 2005).

H1: Following the implementation of Regulation Systems Compliance and Integrity, affected entities increase their voluntary disclosure of information related to technological systems and risk management practices.

## MODEL SPECIFICATION

# Research Design

We identify firms affected by Regulation Systems Compliance and Integrity (Reg SCI) through their classification as market centers under SEC Rule 600(b)(38). The Securities and Exchange Commission (SEC) implemented Reg SCI in 2014 to enhance the technological infrastructure of U.S. securities markets. Following Rogers and Van Buskirk (2009), we classify firms as treated if they operate as self-regulatory organizations, alternative trading systems, plan processors, or clearing agencies.

To examine how Reg SCI affects voluntary disclosure through litigation risk, we employ the following difference-in-differences specification:

FreqMF = 
$$\beta_0 + \beta_1$$
Treatment Effect +  $\gamma$ Controls +  $\epsilon$ 

where FreqMF represents the frequency of management forecasts, measured as the natural logarithm of one plus the number of management earnings forecasts issued during the fiscal year (Ajinkya et al., 2005). Treatment Effect is an indicator variable that equals one for firms affected by Reg SCI in the post-regulation period and zero otherwise.

We include several control variables known to influence voluntary disclosure decisions. Institutional Ownership captures monitoring intensity (Bushee and Noe, 2000). Firm Size, measured as the natural logarithm of total assets, controls for disclosure sophistication (Lang and Lundholm, 1993). Book-to-Market ratio proxies for growth opportunities, while ROA and Stock Return control for firm performance (Kothari et al., 2009). Earnings Volatility captures underlying business uncertainty, and Loss indicates firms reporting negative earnings. Following Kim and Skinner (2012), we include Class Action Litigation Risk to control for firms' ex-ante litigation exposure.

Our sample spans from 2012 to 2016, centered on Reg SCI's implementation in 2014. We obtain financial data from Compustat, stock returns from CRSP, institutional ownership from Thomson Reuters, and management forecast data from I/B/E/S. We require firms to have non-missing values for all control variables and restrict our sample to firms with complete data throughout the sample period. The treatment group consists of firms directly affected by Reg SCI, while the control group includes other firms in the financial services industry (SIC codes 6000-6999) not subject to the regulation.

To address potential endogeneity concerns, we employ firm and year fixed effects to control for time-invariant firm characteristics and common time trends. Following Roberts and Whited (2013), we conduct parallel trends tests in the pre-treatment period to validate the parallel trends assumption underlying our difference-in-differences design. Additionally, we perform a battery of robustness tests including entropy balancing and propensity score matching to ensure comparable treatment and control groups.

#### **DESCRIPTIVE STATISTICS**

# Sample Description and Descriptive Statistics

Our sample comprises 14,397 firm-quarter observations representing 3,769 unique firms across 253 industries from 2012 to 2016. The sample size is comparable to recent studies examining corporate disclosure and litigation risk (e.g., Johnson et al., 2019; Kim and Zhang, 2020).

We find that institutional ownership (linstown) averages 57.5% with a median of 67.2%, suggesting a relatively high level of institutional presence in our sample firms. The distribution is slightly left-skewed, with the interquartile range spanning from 24.8% to 87.6%. Firm size (lsize), measured as the natural logarithm of market capitalization, exhibits a mean of 6.469 and a median of 6.487, indicating a fairly symmetric distribution.

The book-to-market ratio (lbtm) displays a mean of 0.599 and a median of 0.479, with substantial variation as evidenced by a standard deviation of 0.602. Return on assets (lroa) shows a mean of -3.6% but a median of 2.5%, suggesting the presence of some firms with significant losses pulling down the average. This observation is further supported by the loss indicator variable (lloss), which shows that 30.1% of our sample observations report losses.

Stock return volatility (levol) exhibits considerable right-skew with a mean of 0.139 but a median of 0.052. The calculated litigation risk measure (lcalrisk) averages 0.270 with a median of 0.186, indicating that our sample firms face moderate litigation risk exposure. The frequency of management forecasts (freqMF) shows a mean of 0.632 with a median of 0, suggesting that while many firms do not issue forecasts, those that do tend to issue multiple forecasts.

We observe that 59.2% of our observations fall in the post-law period (post\_law), and all firms in our sample are treated firms (treated = 1). The treatment effect variable matches the post-law distribution, consistent with our difference-in-differences research design.

These descriptive statistics are generally consistent with prior studies examining similar phenomena in the accounting literature (e.g., Rogers and Van Buskirk, 2016). However, we note that our sample firms exhibit slightly higher institutional ownership and lower profitability compared to broader market samples, potentially due to our focus on firms affected by specific regulatory changes during this period.

The presence of some extreme values, particularly in return volatility and book-to-market ratios, suggests the importance of controlling for outliers in our subsequent analyses. We address this concern through robustness tests using winsorized variables at the 1st and 99th percentiles.

# **RESULTS**

Regression Analysis

Our analysis reveals that the implementation of Regulation Systems Compliance and Integrity (Reg SCI) is associated with a decrease in voluntary disclosure among affected entities. Specifically, we find a negative and statistically significant treatment effect of -0.0871 (t = -6.30, p < 0.001) in our fully specified model, suggesting that firms subject to Reg SCI reduce their voluntary disclosure activities following the regulation's implementation. This finding is contrary to our initial hypothesis and challenges the traditional litigation risk hypothesis framework.

The treatment effect is both statistically and economically significant. The coefficient magnitude of -0.0871 represents approximately an 8.71% decrease in voluntary disclosure, which is substantial given the sample mean. The high statistical significance (p < 0.001) and robust t-statistic (-6.30) provide strong evidence that this effect is not due to chance. Comparing specifications (1) and (2), we observe that the inclusion of control variables substantially improves the model's explanatory power, with R-squared increasing from 0.0000 to 0.2263. This improvement suggests that firm characteristics play an important role in explaining voluntary disclosure behavior.

The control variables in our model exhibit relationships consistent with prior literature. We find that institutional ownership (0.4456, t = 17.00) and firm size (0.1268, t = 26.33) are positively associated with voluntary disclosure, aligning with findings from prior studies suggesting larger firms and those with higher institutional ownership tend to disclose more (Healy and Palepu, 2001). The negative associations between voluntary disclosure and both book-to-market ratio (-0.0801, t = -8.16) and stock return volatility (-0.1027, t = -5.27) are also consistent with existing literature. However, our main finding does not support Hypothesis 1, which predicted an increase in voluntary disclosure following Reg SCI implementation. This unexpected result suggests that the relationship between mandatory disclosure requirements

and voluntary disclosure may be more complex than previously theorized, possibly indicating that firms view mandatory and voluntary disclosures as substitutes rather than complements in the context of technological system compliance and integrity.

Note: While our analysis establishes a strong statistical association between Reg SCI implementation and decreased voluntary disclosure, we cannot definitively establish causality due to potential endogeneity concerns and the observational nature of our data.

#### **CONCLUSION**

This study examines how the implementation of Regulation Systems Compliance and Integrity (Reg SCI) affects firms' voluntary disclosure practices through the litigation risk channel. Specifically, we investigate whether enhanced systems security requirements for market infrastructure operators influence their disclosure behavior in response to changed litigation exposure. Our analysis contributes to the growing literature on the intersection of regulatory compliance, information technology risk management, and corporate disclosure policies.

While our study does not present empirical findings, the theoretical framework we develop suggests that Reg SCI's enhanced systems security requirements likely influence market participants' disclosure decisions through two competing mechanisms. First, the increased operational standards and explicit accountability measures introduced by Reg SCI may elevate litigation risk, potentially leading firms to enhance their voluntary disclosures as a risk management strategy, consistent with Skinner (1994) and Field et al. (2005). Conversely, the standardization of systems compliance requirements could reduce uncertainty about firms' technological infrastructure, potentially decreasing litigation risk and the associated pressure for preemptive disclosures, as suggested by the theoretical work of Dye (2017).

The implementation of Reg SCI represents a significant shift in the regulatory landscape governing market infrastructure operators. Our analysis suggests that this regulation's impact on voluntary disclosure practices likely varies based on firms' pre-existing technological capabilities, risk management frameworks, and disclosure policies. This heterogeneous effect aligns with prior literature documenting varied firm responses to changes in litigation risk (Rogers and Van Buskirk, 2009).

Our findings have important implications for multiple stakeholders in financial markets. For regulators, understanding how Reg SCI affects disclosure practices through the litigation risk channel can inform future policy decisions regarding the balance between prescriptive requirements and principles-based guidance. Managers of market infrastructure firms should consider how their disclosure strategies interact with compliance requirements and litigation exposure under the new regulatory regime. For investors, the potential changes in disclosure practices following Reg SCI implementation may affect their ability to assess technological risks and make informed investment decisions.

These insights extend the broader literature on the relationship between regulation, litigation risk, and voluntary disclosure. While previous studies have examined how general changes in litigation risk affect disclosure decisions (e.g., Johnson et al., 2001), our analysis specifically considers how technology-focused regulations can influence disclosure practices through the litigation risk channel. This perspective becomes increasingly relevant as financial markets continue to rely more heavily on technological infrastructure.

Several limitations of our study present opportunities for future research. First, empirical investigation of our theoretical predictions would provide valuable insights into the actual impact of Reg SCI on disclosure practices. Second, researchers could examine how the regulation's effects vary across different types of market infrastructure operators and different categories of technological risks. Future studies might also explore how Reg SCI interacts with

other regulations affecting market infrastructure operators' disclosure decisions and litigation risk exposure.

Additionally, researchers could investigate how the regulation's impact on disclosure practices evolves over time as firms adapt their compliance programs and risk management strategies. Studies might also examine whether Reg SCI's effects on disclosure practices through the litigation risk channel differ from those of other technology-focused regulations in financial markets. These extensions would further enhance our understanding of how regulatory requirements influence firms' disclosure decisions through various economic channels.

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**Table 1**Descriptive Statistics

Variables	N	Mean	Std. Dev.	P25	Median	P75
FreqMF	14,397	0.6316	0.9104	0.0000	0.0000	1.6094
Treatment Effect	14,397	0.5920	0.4915	0.0000	1.0000	1.0000
Institutional ownership	14,397	0.5755	0.3468	0.2485	0.6717	0.8763
Firm size	14,397	6.4692	2.1076	4.9415	6.4874	7.9507
Book-to-market	14,397	0.5990	0.6020	0.2505	0.4794	0.8080
ROA	14,397	-0.0355	0.2433	-0.0195	0.0253	0.0667
Stock return	14,397	0.0100	0.4244	-0.2205	-0.0317	0.1644
Earnings volatility	14,397	0.1389	0.2839	0.0226	0.0523	0.1337
Loss	14,397	0.3009	0.4587	0.0000	0.0000	1.0000
Class action litigation risk	14,397	0.2702	0.2449	0.0883	0.1860	0.3748

This table shows the descriptive statistics. All continuous variables are winsorized at the 1st and 99th percentiles.

Table 2
Pearson Correlations
RegulationSystemsComplianceandIntegrity Litigation Risk

	Treatment Effect	FreqMF	Institutional ownership	Firm size	Book-to-market	ROA	Stock return	Earnings volatility	Loss	Class action litigation risk
Treatment Effect	1.00	-0.00	0.07	0.09	-0.13	-0.05	0.03	0.04	0.05	-0.12
FreqMF	-0.00	1.00	0.39	0.44	-0.17	0.23	-0.01	-0.18	-0.24	-0.03
Institutional ownership	0.07	0.39	1.00	0.61	-0.22	0.33	-0.02	-0.25	-0.29	-0.01
Firm size	0.09	0.44	0.61	1.00	-0.35	0.37	0.06	-0.26	-0.40	0.09
Book-to-market	-0.13	-0.17	-0.22	-0.35	1.00	0.07	-0.17	-0.10	0.03	-0.03
ROA	-0.05	0.23	0.33	0.37	0.07	1.00	0.15	-0.56	-0.61	-0.17
Stock return	0.03	-0.01	-0.02	0.06	-0.17	0.15	1.00	-0.04	-0.15	-0.07
Earnings volatility	0.04	-0.18	-0.25	-0.26	-0.10	-0.56	-0.04	1.00	0.37	0.17
Loss	0.05	-0.24	-0.29	-0.40	0.03	-0.61	-0.15	0.37	1.00	0.20
Class action litigation risk	-0.12	-0.03	-0.01	0.09	-0.03	-0.17	-0.07	0.17	0.20	1.00

This table shows the Pearson correlations for the sample. Correlations that are significant at the 0.05 level or better are highlighted in bold.

Table 3

The Impact of Regulation Systems Compliance and Integrity on Management Forecast Frequency

	(1)	(2)
Treatment Effect	-0.0034 (0.22)	-0.0871*** (6.30)
Institutional ownership		0.4456*** (17.00)
Firm size		0.1268*** (26.33)
Book-to-market		-0.0801*** (8.16)
ROA		0.0982*** (3.80)
Stock return		-0.0875*** (6.32)
Earnings volatility		-0.1027*** (5.27)
Loss		-0.0761*** (4.30)
Class action litigation risk		-0.1826*** (6.85)
N	14,397	14,397
R <sup>2</sup>	0.0000	0.2263

Notes: t-statistics in parentheses. \*, \*\*, and \*\*\* represent significance at the 10%, 5%, and 1% level, respectively.