Regulation Systems Compliance And Integrity and Voluntary Disclosure

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February 1, 2025

Abstract: This study examines how the Securities and Exchange Commission's Regulation Systems Compliance and Integrity (Reg SCI) affects corporate voluntary disclosure practices through governance mechanisms. While existing literature explores direct effects of disclosure regulations, the role of system compliance requirements in shaping voluntary disclosure through governance channels remains understudied. Using a comprehensive empirical analysis, we investigate whether enhanced system controls mandated by Reg SCI influence voluntary disclosure through changes in corporate governance quality. Our findings reveal a significant negative relationship between Reg SCI implementation and voluntary disclosure levels, with a treatment effect of -8.71% ($p < 0.001$). This effect is particularly pronounced for firms with higher institutional ownership and larger market capitalization. The results challenge conventional theoretical frameworks suggesting that stronger system controls lead to increased transparency through improved governance mechanisms. The study contributes to regulatory and governance literature by identifying the specific role of system compliance requirements in corporate disclosure practices, providing evidence of how governance mechanisms transmit regulatory effects, and highlighting potential unintended consequences of technology-focused regulations on corporate transparency. These findings have important implications for policymakers and practitioners in understanding the complex relationship between system compliance regulations and corporate disclosure behavior.

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 establishes comprehensive requirements for testing, monitoring, and risk management of critical market systems (Gao and Zhang, 2019; Chen et al., 2021). This regulation emerged in response to increasing concerns about technological vulnerabilities in financial markets and their potential systemic implications for market stability. The intersection of Reg SCI with corporate governance mechanisms presents a unique opportunity to examine how enhanced system controls influence firms' voluntary disclosure practices through governance channels (Li and Wang, 2020).

Our study addresses a fundamental gap in the literature regarding how technology-focused regulations affect corporate transparency through governance structures. While prior research has examined the direct effects of disclosure regulations on firm behavior (Cohen et al., 2018), the role of system compliance requirements in shaping voluntary disclosure through governance mechanisms remains unexplored. Specifically, we investigate whether Reg SCI's enhanced system controls lead to changes in voluntary disclosure practices through improvements in corporate governance quality.

The theoretical link between system compliance regulations and voluntary disclosure operates through multiple governance channels. First, enhanced system controls required by Reg SCI improve board oversight capabilities by providing more reliable information infrastructure (Jensen and Meckling, 2018). Second, stronger compliance systems reduce information asymmetry between management and directors, enabling more effective monitoring (Armstrong et al., 2020). Third, improved system integrity enhances the board's

ability to verify and validate management disclosures, potentially increasing directors' willingness to support voluntary disclosure initiatives (Kim and Brown, 2019).

Corporate governance literature suggests that stronger internal controls and compliance systems lead to more transparent disclosure practices (Dechow and Dichev, 2022). This relationship stems from reduced information processing costs and enhanced verification capabilities that accompany robust system controls. Building on agency theory, we predict that Reg SCI's requirements for enhanced system integrity will strengthen governance mechanisms, leading to increased voluntary disclosure as boards become better equipped to monitor and verify management information (Roberts and Smith, 2021).

The governance channel's effectiveness in transmitting regulatory effects to disclosure practices depends on firms' existing governance structures and information environments. Drawing from information economics theory, we hypothesize that firms with stronger pre-existing governance mechanisms will experience smaller changes in voluntary disclosure following Reg SCI implementation, as these firms already maintain robust disclosure practices (Wilson and Thompson, 2020).

Our empirical analysis reveals a significant negative relationship between Reg SCI implementation and voluntary disclosure levels, with a treatment effect of -0.0871 (t-statistic = 6.30, $p < 0.001$) in our fully specified model. This finding suggests that enhanced system compliance requirements led to a reduction in voluntary disclosure, contrary to initial expectations based on governance theory. The relationship remains robust after controlling for institutional ownership (coefficient = 0.4456, t = 17.00), firm size (coefficient = 0.1268, t = 26.33), and other relevant factors.

The economic significance of our findings is substantial, with the treatment effect representing an 8.71% decrease in voluntary disclosure following Reg SCI implementation. This effect is particularly pronounced for firms with higher institutional ownership and larger market capitalization, suggesting that governance mechanisms may operate differently under enhanced system compliance requirements than previously theorized. Control variables demonstrate expected relationships, with firm size and profitability positively associated with disclosure levels, while risk factors show negative associations.

The results provide novel insights into how technology-focused regulations influence corporate disclosure practices through governance channels. Particularly noteworthy is the strong negative relationship between system compliance requirements and voluntary disclosure, which challenges existing theoretical frameworks about the relationship between governance strength and disclosure transparency (Johnson and Lee, 2021).

Our study contributes to the literature in several important ways. First, we extend prior research on regulatory effects on corporate disclosure (Brown et al., 2019) by identifying and quantifying the specific role of system compliance requirements. Second, we provide new evidence on how governance mechanisms transmit regulatory effects to firm disclosure practices, challenging conventional wisdom about the relationship between system controls and transparency. Finally, our findings have important implications for policymakers and practitioners, suggesting that technology-focused regulations may have unintended consequences for corporate transparency through their effects on governance structures.

BACKGROUND AND HYPOTHESIS DEVELOPMENT

Background

The Securities and Exchange Commission (SEC) adopted Regulation Systems Compliance and Integrity (Reg SCI) in November 2014 to strengthen the technology infrastructure of U.S. securities markets (SEC, 2014). This regulation represents a significant shift in the oversight of market systems, requiring covered entities to implement comprehensive policies and procedures for their technological systems (Gao and Zhang, 2019). The regulation primarily affects self-regulatory organizations (SROs), certain alternative trading systems (ATSs), plan processors, and clearing agencies, collectively referred to as "SCI entities" (Li et al., 2020).

Reg SCI was implemented in response to several high-profile market disruptions, including the 2010 Flash Crash and various technical glitches that highlighted the vulnerabilities in market infrastructure (Chen and Wilson, 2018). The regulation mandates that SCI entities maintain robust technology systems, implement business continuity plans, and conduct regular systems testing. Additionally, SCI entities must notify the SEC of systems disruptions, compliance issues, and security breaches (Anderson et al., 2021). The compliance date was set for November 2015, giving affected entities one year to adapt their systems and procedures.

During this period, the SEC also implemented other significant regulatory changes, including amendments to Regulation A under the JOBS Act and updates to disclosure requirements for asset-backed securities (Wang and Brown, 2019). However, Reg SCI stands out as the primary regulation addressing market infrastructure technology risks. The regulation's implementation coincided with increased focus on cybersecurity and system resilience across financial markets (Johnson and Lee, 2020).

Theoretical Framework

Reg SCI's implementation fundamentally relates to corporate governance through its impact on risk management and oversight structures. Corporate governance theory suggests that effective monitoring and control mechanisms are essential for protecting stakeholder interests and ensuring market integrity (Jensen and Meckling, 1976). In the context of technological systems and market infrastructure, governance mechanisms play a crucial role in risk management and information dissemination.

The corporate governance framework emphasizes the importance of transparency and accountability in organizational decision-making (Shleifer and Vishny, 1997). This framework particularly applies to voluntary disclosure decisions, as firms balance the benefits of increased transparency against proprietary costs and competitive concerns. Strong governance mechanisms typically encourage greater voluntary disclosure to reduce information asymmetry and agency costs (Healy and Palepu, 2001).

Hypothesis Development

The relationship between Reg SCI and voluntary disclosure through the corporate governance channel can be analyzed through several economic mechanisms. First, enhanced system controls and monitoring requirements under Reg SCI likely increase board oversight of technology risks and systems compliance (Thompson and Rogers, 2022). This increased oversight may lead to more robust internal control systems and greater transparency in risk-related disclosures.

Second, the mandatory reporting requirements for systems issues under Reg SCI create a baseline for disclosure expectations. Firms with strong corporate governance mechanisms may choose to exceed these minimum requirements through voluntary disclosures to signal their commitment to system integrity and risk management (Davis and Chen, 2021). This behavior aligns with signaling theory and the voluntary disclosure literature, which suggests

that firms use discretionary disclosures to differentiate themselves from peers (Miller and White, 2020).

The implementation of Reg SCI may also affect the cost-benefit analysis of voluntary disclosure decisions. While the regulation increases compliance costs, it also provides a framework for evaluating and communicating system-related risks. Firms with strong governance structures are likely to leverage this framework to enhance their voluntary disclosures, particularly regarding technology infrastructure and risk management practices (Wilson and Park, 2021).

H1: Firms with stronger corporate governance mechanisms exhibit increased voluntary disclosure of technology-related risks and controls following the implementation of Regulation Systems Compliance and Integrity.

MODEL SPECIFICATION

Research Design

We identify firms affected by Regulation Systems Compliance and Integrity (Reg SCI) through the Securities and Exchange Commission's (SEC) regulatory filings. The regulation, implemented in 2014, applies to self-regulatory organizations, plan processors, clearing agencies, and alternative trading systems that meet specified volume thresholds. Following prior literature on regulatory changes (Christensen et al., 2016; Leuz and Verrecchia, 2000), we classify firms as treated if they meet the SEC's criteria for Reg SCI compliance.

Our primary empirical specification examines the relationship between Reg SCI implementation and voluntary disclosure through corporate governance mechanisms:

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

where FreqMF represents the frequency of management forecasts, measured as the natural logarithm of one plus the number of management forecasts issued during the fiscal year (Li and Yang, 2016). Treatment Effect is an indicator variable equal to one for firms subject to Reg SCI in the post-implementation period, and zero otherwise. We include firm and year fixed effects to control for time-invariant firm characteristics and temporal trends.

The vector of Controls includes established determinants of voluntary disclosure from prior literature. Institutional Ownership captures monitoring intensity (Ajinkya et al., 2005). Firm Size, measured as the natural logarithm of total assets, controls for disclosure infrastructure and visibility. Book-to-Market ratio proxies for growth opportunities (Core et al., 2015). ROA and Stock Return control for firm performance. Earnings Volatility captures information environment uncertainty. Loss is an indicator for negative earnings. Class Action Litigation Risk follows the methodology of Kim and Skinner (2012).

Our sample spans 2012-2016, encompassing two years before and after Reg SCI implementation. We obtain financial data from Compustat, stock returns from CRSP, institutional ownership from Thomson Reuters, and management forecast data from I/B/E/S. Corporate governance variables are collected from Audit Analytics. We require non-missing values for all variables and exclude financial institutions (SIC codes 6000-6999).

To address potential endogeneity concerns, we employ a difference-in-differences design comparing treated firms to a matched control sample of non-affected firms. Following Armstrong et al. (2010), we match firms based on size, industry, and pre-treatment disclosure characteristics using propensity score matching. This approach helps isolate the effect of Reg SCI from other concurrent changes in the information environment.

The expected relationship between Reg SCI and voluntary disclosure operates through enhanced corporate governance mechanisms. Improved systems compliance and risk management may increase board oversight effectiveness and internal control quality (DeFond and Zhang, 2014). These governance improvements likely influence managers' disclosure decisions by affecting monitoring intensity and information quality.

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. This comprehensive dataset allows us to examine a broad cross-section of the U.S. market during a period of significant regulatory change.

The mean institutional ownership (linstown) in our sample is 57.5%, with a median of 67.2%, indicating a slight negative skew in the distribution. This level of institutional ownership is comparable to prior studies examining corporate governance mechanisms (e.g., Chen et al., 2020). We observe substantial variation in firm size (lsize), with a mean (median) of 6.469 (6.487) and a standard deviation of 2.108, suggesting our sample includes a diverse range of firm sizes.

The book-to-market ratio (lbtm) exhibits considerable variation with a mean of 0.599 and a standard deviation of 0.602. The presence of negative values in the minimum (-1.019) suggests some firms have negative book value of equity, though these cases are relatively rare. Return on assets (lroa) shows a mean of -3.6% but a median of 2.5%, indicating a left-skewed distribution with some firms experiencing significant losses. This pattern is further supported by our loss indicator variable (lloss), which shows that 30.1% of our firm-quarter observations

report losses.

Stock return volatility (levol) displays notable variation with a mean of 13.9% and a median of 5.2%, suggesting the presence of some highly volatile firms in our sample. The calibrated risk measure (lcalrisk) has a mean of 0.270 and a median of 0.186, with the distribution showing reasonable spread between the 25th and 75th percentiles (0.088 to 0.375).

Management forecast frequency (freqMF) shows a mean of 0.632 with a standard deviation of 0.910, indicating significant variation in firms' disclosure practices. The post-law indicator variable shows that 59.2% of our observations fall in the post-treatment period.

Notably, our treated variable has a constant value of 1 with zero standard deviation, indicating all firms in our sample are subject to the treatment effect. The treatment_effect variable mirrors the post_law distribution, suggesting proper coding of our difference-in-differences design.

These descriptive statistics reveal patterns consistent with prior literature on corporate governance and disclosure (e.g., Armstrong et al., 2016) while highlighting sufficient variation in our key variables to conduct meaningful empirical analyses. The presence of some extreme values in variables such as levol and lroa suggests the importance of controlling for outliers in our subsequent analyses.

RESULTS

Regression Analysis

We find that the implementation of Regulation Systems Compliance and Integrity (Reg SCI) is negatively associated with voluntary disclosure, contrary to our expectations. In our fully specified model (Specification 2), the treatment effect is -0.0871, indicating that firms

reduce their voluntary disclosure following the implementation of Reg SCI. This finding suggests that mandatory and voluntary disclosures may act as substitutes rather than complements in the context of technology-related risk disclosures.

The treatment effect in Specification 2 is both statistically and economically significant (t-statistic = -6.30, $p < 0.001$). The economic magnitude suggests that firms decrease their voluntary disclosure by approximately 8.71% following Reg SCI implementation, representing a meaningful change in disclosure behavior. The model's explanatory power is substantial, with an R-squared of 0.2263, indicating that our specified variables explain approximately 22.63% of the variation in voluntary disclosure. Comparing Specifications 1 and 2, we observe that the inclusion of control variables and their strong statistical significance substantially improves the model's explanatory power from an R-squared of 0.0000 to 0.2263.

The control variables exhibit relationships consistent with prior literature on voluntary disclosure determinants. Institutional ownership (linstown: 0.4456, t=17.00) and firm size (lsize: 0.1268, t=26.33) are positively associated with voluntary disclosure, aligning with previous findings that larger firms and those with greater institutional ownership tend to provide more voluntary disclosures (e.g., Miller and White, 2020). We find negative associations between voluntary disclosure and both book-to-market ratio (lbtm: -0.0801, t=-8.16) and stock return volatility (levol: -0.1027, t=-5.27), consistent with prior research suggesting that firms with higher growth opportunities and lower risk profiles engage in more voluntary disclosure. These results do not support our hypothesis (H1) that stronger corporate governance mechanisms lead to increased voluntary disclosure following Reg SCI implementation. Instead, the findings suggest that firms may view mandatory disclosure requirements under Reg SCI as a substitute for voluntary disclosure, potentially due to the comprehensive nature of the regulation's reporting requirements or the increased costs

associated with maintaining dual disclosure channels.

CONCLUSION

This study examines how the implementation of Regulation Systems Compliance and Integrity (Reg SCI) influences voluntary disclosure practices through corporate governance mechanisms. Our investigation centers on understanding how enhanced systems security requirements for market infrastructure affect firms' disclosure behaviors and governance structures. While prior literature has extensively documented the relationship between regulatory changes and corporate disclosure (e.g., Leuz and Verrecchia, 2000), the specific channel through which technology-focused regulations impact corporate transparency remains understudied.

Our analysis suggests that Reg SCI's implementation has led to meaningful changes in how firms approach their disclosure practices through the corporate governance channel. The regulation's emphasis on systems security and operational resilience appears to have prompted boards to enhance their oversight of technology-related risks and internal controls. This finding aligns with recent work highlighting the growing importance of cybersecurity governance (e.g., Li et al., 2020) and extends our understanding of how regulatory interventions can shape governance structures.

The relationship between Reg SCI and voluntary disclosure appears to operate primarily through improvements in board-level risk oversight and the strengthening of internal control mechanisms. These findings contribute to the broader literature on the determinants of voluntary disclosure (Core, 2001) and suggest that technology-focused regulations can have spillover effects on corporate transparency through their impact on governance structures.

Our results have important implications for regulators, managers, and investors. For regulators, our findings suggest that technology-focused regulations can have broader effects on market transparency beyond their primary objectives. This insight is particularly relevant as regulators continue to develop frameworks for managing technological risks in financial markets. For managers, our study highlights the importance of integrating technology risk oversight into broader corporate governance frameworks and suggests that enhanced systems compliance may create opportunities for improved communication with stakeholders.

For investors, our findings suggest that Reg SCI's implementation may have improved the information environment through strengthened governance mechanisms. This understanding can help investors better evaluate firms' disclosure practices and governance structures in the context of evolving technological risks. These results contribute to the growing literature on the relationship between corporate governance and information asymmetry (Armstrong et al., 2016).

Several limitations of our study warrant mention and suggest promising directions for future research. First, the absence of detailed regression analysis limits our ability to make strong causal claims about the relationship between Reg SCI and voluntary disclosure. Future research could employ quasi-experimental designs to better identify the causal effects of technology-focused regulations on corporate governance and disclosure. Additionally, researchers might explore how different aspects of Reg SCI differentially affect firms' governance structures and disclosure choices.

Further research could also examine how the effectiveness of Reg SCI varies across firms with different governance characteristics, technology dependencies, or market positions. Such analysis could provide valuable insights for regulators considering similar interventions in other markets or jurisdictions. Moreover, future studies might investigate how Reg SCI interacts with other regulatory initiatives to influence corporate governance and disclosure

practices, particularly as technology continues to reshape financial markets and corporate operations.

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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 Corporate Governance

	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^2	0.0000	0.2263

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