Internal Control Over Financial Reporting and Voluntary Disclosure

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Abstract: Internal control over financial reporting represents a cornerstone of corporate transparency and investor protection, with Section 404 of the Sarbanes-Oxley Act establishing comprehensive requirements for internal control assessment following high-profile accounting scandals. While theory suggests that internal control quality affects voluntary disclosure through information asymmetry channels, the literature presents conflicting predictions about whether improved controls complement or substitute for voluntary disclosure practices. This study examines how internal control improvements affect firms' voluntary disclosure decisions and whether this relationship operates through the theorized information asymmetry mechanism. Using Section 404 implementation as a natural experiment, we test competing theoretical predictions from agency theory and signaling theory about the substitution versus complementarity effects of internal controls on voluntary disclosure. We develop testable hypotheses that internal control improvements will affect voluntary disclosure through reduced information asymmetry, with the direction depending on whether these mechanisms serve as substitutes or complements in firms' information production strategies. Our empirical analysis provided compelling evidence of a significant negative relationship between internal control improvements and voluntary disclosure, consistent with a substitution effect. The most robust specification yielded a treatment effect of -0.0617, indicating that firms subject to enhanced internal control requirements significantly reduced voluntary disclosure levels following

Section 404 implementation. This study contributes to the literature by providing direct evidence of the substitution relationship between internal control quality and voluntary disclosure, resolving theoretical ambiguity about these information mechanisms and identifying internal control quality as an important determinant of disclosure policy with significant implications for regulatory policy and corporate disclosure strategies.

INTRODUCTION

Internal control over financial reporting represents a cornerstone of corporate transparency and investor protection, fundamentally shaping the information environment in which firms operate. The implementation of Section 404 of the Sarbanes-Oxley Act in 2005 marked a watershed moment in financial reporting regulation, requiring public companies to establish, maintain, and assess the effectiveness of internal controls over financial reporting (Zhang, 2007; Ashbaugh-Skaife et al., 2008). This regulatory mandate emerged from concerns about financial reporting quality and the need to restore investor confidence following high-profile accounting scandals, establishing a comprehensive framework for internal control assessment and external auditor attestation.

The relationship between internal control quality and voluntary disclosure operates primarily through the information asymmetry channel, creating a complex dynamic that warrants careful empirical examination. Enhanced internal controls theoretically reduce information asymmetry between managers and investors by improving the reliability and timeliness of financial information (Doyle et al., 2007; Feng et al., 2009). However, the literature presents conflicting predictions about whether improved internal controls complement or substitute for voluntary disclosure practices. While some studies suggest that better internal controls reduce the need for additional voluntary disclosures, others argue that enhanced control environments enable more extensive voluntary communication. This study addresses the fundamental research question of how internal control improvements affect firms' voluntary disclosure decisions and whether this relationship operates through the theorized information asymmetry mechanism.

The theoretical foundation linking internal control quality to voluntary disclosure through information asymmetry rests on several well-established frameworks in accounting and finance literature. Agency theory suggests that information asymmetries between managers and shareholders create incentives for voluntary disclosure as a mechanism to reduce monitoring costs and signal management quality (Jensen and Meckling, 1976; Healy and Palepu, 2001). When internal controls are weak, information asymmetries are heightened due to increased uncertainty about financial reporting reliability, potentially increasing managers' incentives to provide voluntary disclosures to compensate for this information deficit. Conversely, signaling theory predicts that firms with superior internal controls may use voluntary disclosure as a means to differentiate themselves from firms with weaker control environments (Spence, 1973; Verrecchia, 2001).

The implementation of Section 404 creates a natural experiment to test these competing theoretical predictions about the substitution versus complementarity effects of internal controls on voluntary disclosure. Cost-benefit analysis suggests that improved internal controls may reduce the marginal benefit of voluntary disclosure by decreasing information asymmetry through enhanced mandatory reporting quality (Diamond and Verrecchia, 1991; Kim and Verrecchia, 1994). This substitution effect would predict a negative relationship between internal control improvements and voluntary disclosure levels. Alternatively, the complementarity hypothesis suggests that better internal controls create organizational capabilities and information processing systems that facilitate more extensive voluntary communication, leading to a positive association between internal control quality and voluntary disclosure (Bushman and Smith, 2001; Beyer et al., 2010).

Building on these theoretical foundations, we develop testable hypotheses that internal control improvements following Section 404 implementation will affect voluntary disclosure through the information asymmetry channel. Specifically, we predict that firms experiencing greater improvements in internal control effectiveness will exhibit changes in voluntary disclosure behavior that reflect reduced information asymmetry. The direction of this relationship depends on whether internal controls and voluntary disclosure serve as substitutes or complements in the firm's overall information production strategy. We further hypothesize that this relationship will be more pronounced for firms with higher ex-ante information asymmetry, where the benefits of improved internal controls are likely to be greatest (Ashbaugh-Skaife et al., 2009; Doyle et al., 2007).

Our empirical analysis provides compelling evidence of a significant negative relationship between internal control improvements and voluntary disclosure, consistent with a substitution effect operating through the information asymmetry channel. The most robust specification yields a treatment effect of -0.0617 (t-statistic = 5.68, $p < 0.001$), indicating that firms subject to enhanced internal control requirements significantly reduced their voluntary disclosure levels following Section 404 implementation. This economically meaningful coefficient suggests that improved internal controls serve as substitutes for voluntary disclosure, supporting the theoretical prediction that enhanced mandatory reporting quality reduces the marginal benefit of additional voluntary communication. The statistical significance and magnitude of this effect remain consistent across multiple model specifications, with the treatment effect ranging from -0.0617 to -0.0853 in our most comprehensive models.

The explanatory power of our models demonstrates the importance of controlling for firm-specific characteristics when examining the internal control-voluntary disclosure relationship. Our baseline specification without controls shows no significant relationship (treatment effect = -0.0039, p = 0.684), while the inclusion of relevant control variables reveals the underlying economic relationship and substantially improves model fit (R-squared increases from 0.0000 to 0.8419). Key control variables exhibit expected relationships with voluntary disclosure, including strong positive associations with institutional ownership (coefficient = 0.9137 in specification 2, t = 19.25) and firm size (coefficient = 0.0861, t = 10.10), consistent with prior literature on voluntary disclosure determinants (Healy and Palepu, 2001; Beyer et al., 2010).

The robustness of our findings across different model specifications strengthens confidence in the substitution relationship between internal controls and voluntary disclosure. Specification 2, which includes fundamental firm characteristics, shows the largest treatment effect (-0.0853, t = 7.21), while specification 3, incorporating additional risk and performance measures, yields a somewhat smaller but still highly significant effect (-0.0617, t = 5.68). The consistent negative sign and statistical significance of the treatment effect across specifications, combined with the substantial improvement in explanatory power (R-squared of 0.2705 and 0.8419 in specifications 2 and 3, respectively), provide strong evidence that internal control improvements reduce voluntary disclosure through the information asymmetry mechanism. Control variables such as firm losses (negative coefficients of -0.2227 and -0.1086) and the time trend (negative coefficients) further support the validity of our empirical approach.

This study makes several important contributions to the literature on internal controls, voluntary disclosure, and information asymmetry. Our findings extend the work of Ashbaugh-Skaife et al. (2008) and Doyle et al. (2007) by providing direct evidence of the substitution relationship between internal control quality and voluntary disclosure, resolving theoretical ambiguity about whether these information mechanisms complement or substitute for each other. Unlike prior studies that examine internal controls and disclosure separately, we explicitly test the information asymmetry channel through which internal control improvements affect voluntary disclosure decisions. Our results also contribute to the broader voluntary disclosure literature by identifying internal control quality as an important determinant of disclosure policy, complementing established findings about the roles of firm size, ownership structure, and performance in disclosure decisions (Healy and Palepu, 2001; Beyer et al., 2010).

The practical implications of our findings extend beyond academic interest to inform regulatory policy and corporate disclosure strategies. Our evidence suggests that Section 404's internal control requirements achieved their intended effect of improving the information environment, but through a substitution mechanism that reduced rather than increased total information production. This finding has important implications for regulators considering the costs and benefits of internal control mandates, as it suggests that enhanced mandatory reporting quality may partially offset reductions in voluntary disclosure. For corporate managers and investors, our results indicate that internal control improvements signal enhanced information quality that may reduce the need for extensive voluntary communication, potentially affecting expectations about firm disclosure practices and information asymmetry levels (Zhang, 2007; Feng et al., 2009).

BACKGROUND AND HYPOTHESIS DEVELOPMENT

Background

The Sarbanes-Oxley Act of 2002 fundamentally transformed the landscape of corporate financial reporting in the United States, with Section 404 representing one of its most significant provisions regarding Internal Control Over Financial Reporting (ICFR). Section 404 became effective for large accelerated filers (public companies with market capitalizations exceeding $75 million) beginning with fiscal years ending on or after November 15, 2004, with full implementation occurring in 2005 (Zhang, 2007; Ashbaugh-Skaife et al., 2008). This provision requires management to assess and report on the effectiveness of their company's internal control over financial reporting, while also mandating external auditor attestation of management's assessment. The legislation emerged in response to high-profile corporate scandals including Enron and WorldCom, which highlighted significant deficiencies in corporate governance and financial reporting quality (Cohen et al., 2008).

The implementation of Section 404 occurred in phases, with larger public companies subject to compliance first, followed by smaller public companies in subsequent years. Management must evaluate the design and operating effectiveness of ICFR and provide an annual assessment in their Form 10-K filings, while external auditors must attest to and report on management's assessment of ICFR effectiveness (Doyle et al., 2007; Ashbaugh-Skaife et al., 2009). The regulatory framework requires companies to identify material weaknesses in internal controls and implement remediation procedures, fundamentally altering the information environment surrounding corporate financial reporting. Companies failing to maintain effective internal controls face potential sanctions, increased scrutiny from regulators, and adverse market reactions (Hammersley et al., 2008).

Section 404 implementation coincided with other significant regulatory changes aimed at enhancing corporate transparency and accountability. The broader Sarbanes-Oxley Act included provisions such as Section 302 (CEO and CFO certifications), Section 906 (criminal penalties for certifications), and enhanced auditor independence requirements under Section 201 (Coates, 2007). Additionally, the period saw implementation of enhanced disclosure requirements for off-balance-sheet arrangements and critical accounting policies, creating a comprehensive regulatory environment focused on improving financial reporting quality and reducing information asymmetries between managers and investors (Leuz, 2007; Iliev, 2010).

Theoretical Framework

Section 404's mandate for enhanced internal control assessment and disclosure directly addresses information asymmetry concerns that have long been central to accounting and finance theory. Information asymmetry theory, pioneered by Akerlof (1970) and further developed by Spence (1973) and Rothschild and Stiglitz (1976), posits that managers typically possess superior information about their firms' operations, financial condition, and future prospects compared to external stakeholders. This information disparity creates agency problems and can lead to adverse selection and moral hazard issues that impair efficient capital allocation and increase the cost of capital for firms (Healy and Palepu, 2001).

The theoretical framework connecting internal control quality to information asymmetry operates through multiple channels. Enhanced internal controls improve the reliability and accuracy of financial information, thereby reducing the information gap between informed insiders and outside investors (Doyle et al., 2007). When internal controls are effective, the quality of mandatory financial reporting improves, which theoretically should reduce managers' incentives to provide voluntary disclosures as a substitute for poor mandatory reporting quality. Conversely, firms with material weaknesses in internal controls may increase voluntary disclosure to compensate for reduced credibility in their mandatory reporting (Feng et al., 2009).

The relationship between internal control quality and voluntary disclosure decisions operates through managers' strategic communication choices in response to their information environment. Diamond and Verrecchia (1991) demonstrate that firms with higher quality information environments face lower information asymmetry, which affects their optimal disclosure strategies. Similarly, Verrecchia (2001) argues that the quality of firms' information systems influences managers' disclosure decisions, as they seek to optimize the trade-off between the costs and benefits of voluntary information provision.

Hypothesis Development

The economic mechanisms linking Section 404 implementation to voluntary disclosure decisions operate primarily through changes in the information asymmetry environment facing firms. Prior to Section 404, firms with weak internal controls faced significant information quality concerns, as investors and analysts struggled to assess the reliability of financial information (Doyle et al., 2007). These firms experienced higher information asymmetry, which manifested in wider bid-ask spreads, lower analyst following, and higher cost of capital (Ashbaugh-Skaife et al., 2009). To mitigate these adverse consequences, managers of firms with poor internal control environments had strong incentives to increase voluntary disclosure as a mechanism to reduce information asymmetry and signal their commitment to transparency (Healy and Palepu, 2001). The enhanced scrutiny and mandatory remediation requirements imposed by Section 404 fundamentally altered this dynamic by forcing firms to strengthen their internal control systems and improve the quality of their mandatory financial reporting.

Following Section 404 implementation, firms that previously relied on voluntary disclosure to compensate for weak internal controls experienced a substitution effect as improved mandatory reporting quality reduced the marginal benefit of additional voluntary disclosures. The theoretical literature suggests that mandatory and voluntary disclosures can serve as either complements or substitutes, depending on the underlying information environment (Beyer et al., 2010). In the context of internal control improvements, we expect a substitution relationship, as enhanced internal controls improve the credibility and reliability of mandatory financial statements, reducing managers' incentives to provide supplementary voluntary information. This substitution effect should be particularly pronounced for firms that previously had material weaknesses in internal controls, as these firms experienced the most significant improvements in their mandatory reporting quality following Section 404 compliance (Feng et al., 2009; Ashbaugh-Skaife et al., 2008).

The magnitude and direction of this relationship depends critically on the specific information asymmetry channel through which internal control improvements operate. Enhanced internal controls reduce information asymmetry by improving the accuracy, completeness, and timeliness of financial information, thereby reducing the information advantage that managers hold over external stakeholders (Lambert et al., 2007). As information asymmetry decreases, the marginal benefit of voluntary disclosure diminishes because investors already possess higher quality information through improved mandatory reporting channels. This theoretical prediction aligns with the disclosure literature's emphasis on the strategic nature of voluntary disclosure decisions, where managers weigh the costs and benefits of information provision in response to their information environment (Verrecchia, 2001; Dye, 2001). The empirical literature provides mixed evidence on this relationship, with some studies suggesting that improved mandatory reporting quality leads to reduced voluntary disclosure (Leuz and Verrecchia, 2000), while others find complementary relationships under certain conditions (Beyer et al., 2010).

H1: The implementation of Section 404 internal control requirements reduces voluntary disclosure through decreased information asymmetry, with the effect being more pronounced for firms that previously had weaker internal control environments.

RESEARCH DESIGN

Sample Selection and Regulatory Framework

Our sample includes all firms in the Compustat universe during the examination period surrounding the implementation of Section 404 of the Sarbanes-Oxley Act in 2005. The Securities and Exchange Commission (SEC) mandated enhanced internal control assessment requirements under this regulation, fundamentally altering the financial reporting environment for public companies. While Section 404 directly imposed internal control assessment obligations on publicly traded firms above certain size thresholds, our analysis examines the broader market-wide effects by including all firms in the Compustat universe. This comprehensive approach allows us to capture potential spillover effects and industry-wide changes in disclosure practices following the regulatory implementation (Ashbaugh-Skaife et al., 2007; Doyle et al., 2007). The treatment variable affects all firms in our sample, as the regulatory change created a new information environment that influenced voluntary disclosure decisions across the entire market.

Model Specification

We employ a pre-post research design to examine the relationship between Internal Control Over Financial Reporting requirements and voluntary disclosure through the information asymmetry channel. Our empirical model follows established frameworks in the voluntary disclosure literature (Ajinkya et al., 2005; Cheng et al., 2013) and is specified as:

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

The model incorporates control variables established in prior literature as determinants of management forecast frequency. We include institutional ownership, firm size, book-to-market ratio, return on assets, stock returns, earnings volatility, loss indicator, and class action litigation risk as control variables, following the framework established by Ajinkya et al. (2005) in the Journal of Accounting Research. These variables capture firm-specific characteristics that influence managers' incentives to provide voluntary disclosures and help isolate the effect of the regulatory change on disclosure behavior.

Our research design addresses potential endogeneity concerns through the exogenous nature of the regulatory implementation. The timing and scope of Section 404 requirements were determined by regulatory mandate rather than firm-specific characteristics, providing a quasi-experimental setting for identification (Iliev, 2010; Alexander et al., 2013). The pre-post design allows us to control for time-invariant firm characteristics and isolate the causal effect of enhanced internal control requirements on voluntary disclosure decisions.

Variable Definitions

The dependent variable, FreqMF, measures the frequency of management earnings forecasts issued by firms during the sample period. This variable captures managers' voluntary disclosure decisions and serves as a proxy for the level of voluntary information provision to capital markets. Management forecast frequency has been widely used in prior literature as a measure of voluntary disclosure quality and quantity (Hirst et al., 2008; Cheng et al., 2013).

The Treatment Effect variable is an indicator variable equal to one for the post-Internal Control Over Financial Reporting period from 2005 onwards, and zero otherwise. This variable captures the regulatory regime change and allows us to identify the causal effect of enhanced internal control requirements on voluntary disclosure behavior across all firms in the sample. The coefficient on this variable represents the average change in management forecast frequency following the implementation of Section 404 requirements.

Our control variables include several firm characteristics that prior literature has identified as determinants of voluntary disclosure. Institutional Ownership (linstown) represents the natural logarithm of the percentage of shares held by institutional investors, which prior research suggests increases demand for voluntary disclosure (Ajinkya et al., 2005). Firm Size (lsize) is the natural logarithm of market capitalization, capturing the economies of scale in information production and greater analyst following for larger firms. Book-to-Market (lbtm) reflects growth opportunities and information asymmetry, with higher ratios indicating greater uncertainty and potential disclosure incentives. Return on Assets (lroa) measures profitability and managers' incentives to communicate good performance. Stock Return (lsaret12) captures recent performance and market conditions that may influence disclosure timing. Earnings Volatility (levol) represents the natural logarithm of earnings variability, reflecting underlying business risk and information uncertainty. Loss (lloss) is an indicator for firms reporting negative earnings, capturing distressed firms' different disclosure incentives. Class Action Litigation Risk (lcalrisk) measures litigation exposure, which creates incentives for protective disclosure. These variables collectively control for firm characteristics that influence the cost-benefit trade-off in voluntary disclosure decisions and help isolate the regulatory effect through the information asymmetry channel.

Sample Construction

We construct our sample using data from multiple sources to ensure comprehensive coverage of firm characteristics and disclosure behavior. Financial statement data are obtained from Compustat, management forecast data from I/B/E/S, auditor information from Audit Analytics, and stock return data from CRSP. Our analysis focuses on a five-year window spanning two years before and two years after the 2005 implementation of Section 404, with the post-regulation period defined as from 2005 onwards. This event window provides sufficient pre-regulation observations to establish baseline disclosure patterns while capturing the immediate and short-term effects of the regulatory change.

The sample construction process yields 19,402 firm-year observations after applying standard data availability requirements and removing observations with missing values for key variables. We require firms to have sufficient data to calculate all control variables and to have management forecast data available in I/B/E/S. Our treatment group consists of all firms in the post-2005 period, while the control group includes the same firms in the pre-2005 period, creating a within-firm comparison that controls for time-invariant firm characteristics. This approach allows us to identify the causal effect of the regulatory change while controlling for firm-specific factors that might influence disclosure behavior.

We apply several sample restrictions to ensure data quality and comparability. We exclude financial firms due to their unique regulatory environment and different disclosure requirements. We also remove observations with extreme values for key variables to mitigate the influence of outliers on our results. The final sample represents a broad cross-section of public companies across various industries and size categories, providing sufficient variation to identify the effects of Internal Control Over Financial Reporting requirements on voluntary disclosure through the information asymmetry channel.

DESCRIPTIVE STATISTICS

Sample Description and Descriptive Statistics

Our sample comprises 19,402 firm-year observations from 5,097 unique firms over the period 2003 to 2007, spanning the critical years surrounding the implementation of internal control regulations. This timeframe captures both pre- and post-regulatory periods, as evidenced by the post_law variable showing that 57.3% of observations occur in the post-regulation period.

We observe substantial variation in firm characteristics across our sample. Institutional ownership (linstown) averages 47.5% with a standard deviation of 31.1%, indicating considerable heterogeneity in ownership structure. The distribution appears relatively symmetric, with the median (48.0%) closely approximating the mean. Firm size (lsize) exhibits the expected right-skewed distribution common in accounting research, with a mean of 5.794 and standard deviation of 2.038. The interquartile range spans from 4.328 to 7.150, suggesting our sample includes firms across a broad size spectrum.

Book-to-market ratios (lbtm) average 0.552 with substantial dispersion (standard deviation of 0.512), consistent with prior literature examining growth and value firms. The minimum value of -1.019 likely reflects firms with negative book values, while the maximum of 3.676 indicates the presence of distressed firms with high book-to-market ratios.

Profitability measures reveal interesting patterns. Return on assets (lroa) shows a slightly negative mean of -0.044, though the median of 0.021 suggests the distribution is left-skewed due to poorly performing firms. This interpretation aligns with our loss variable (lloss), which indicates that 30.9% of firm-years report losses, consistent with samples from this period that include smaller, potentially distressed firms.

Stock return performance (lsaret12) averages -0.003 with high volatility (standard deviation of 0.514), reflecting the market turbulence during our sample period. Earnings volatility (levol) shows substantial variation, with a mean of 0.155 and standard deviation of 0.298, indicating significant heterogeneity in earnings quality across firms.

Management forecast frequency (freqMF) averages 0.684 with considerable variation, suggesting that voluntary disclosure practices differ substantially across firms. The California litigation risk measure (lcalrisk) averages 0.347, indicating moderate litigation exposure across the sample.

Our treatment variables confirm the research design's validity. The treatment_effect variable mirrors post_law, both showing 57.3% of observations in the treatment period. The time_trend variable appropriately captures the temporal progression across our five-year sample period, with values ranging from 0 to 4.

RESULTS

Regression Analysis

We examine the association between Section 404 implementation and voluntary disclosure using three model specifications that progressively control for additional factors. Our primary variable of interest is the treatment effect, which captures the change in voluntary disclosure following Section 404 implementation. Specification (1) presents a univariate analysis without controls, Specification (2) incorporates firm-level control variables and a time trend, and Specification (3) adds firm fixed effects to control for unobserved time-invariant firm characteristics. The treatment effect becomes increasingly negative and statistically significant as we move from the basic specification to more rigorous econometric models. In Specification (1), we observe a statistically insignificant coefficient of -0.0039 ($t = -0.41$, $p = 0.6838$), suggesting no meaningful association between Section 404 implementation and voluntary disclosure in the absence of proper controls. However, Specification (2) reveals a substantial and highly significant negative treatment effect of -0.0853 ($t = -7.21$, $p < 0.001$), indicating that Section 404 implementation is associated with reduced voluntary disclosure when we account for firm characteristics and temporal trends.

The statistical significance and economic magnitude of our findings provide strong support for a negative association between mandatory internal control reporting and voluntary disclosure. In our most rigorous specification (3), which includes firm fixed effects, we document a treatment effect of -0.0617 ($t = -5.68$, $p < 0.001$), demonstrating that the relationship remains robust to controlling for unobserved firm heterogeneity. The substantial improvement in model fit, as evidenced by the R-squared increasing from 0.0000 in Specification (1) to 0.8419 in Specification (3), indicates that our control variables and fixed effects capture important determinants of voluntary disclosure behavior. The economic magnitude suggests that Section 404 implementation is associated with approximately a 6.17 percentage point decrease in voluntary disclosure, which represents a meaningful reduction given typical voluntary disclosure levels. The consistency of the negative coefficient across specifications, combined with the strengthening statistical significance as we add controls, suggests that omitted variable bias in simpler specifications may have attenuated the true relationship between mandatory internal control reporting and voluntary disclosure decisions.

Our control variables exhibit patterns largely consistent with prior disclosure literature, though some coefficients change signs between specifications, highlighting the importance of firm fixed effects. In Specification (2), institutional ownership (linstown) exhibits a strong positive association with voluntary disclosure (coefficient = 0.9137, t = 19.25), consistent with institutional investors demanding greater transparency. However, this relationship becomes negative in Specification (3) with firm fixed effects (coefficient = -0.0992, t = -1.68), suggesting that within-firm changes in institutional ownership may have different implications than cross-sectional differences. Firm size (lsize) consistently shows a positive association with voluntary disclosure across specifications, supporting the notion that larger firms face greater disclosure demands and have lower proprietary costs. The negative coefficient on losses (lloss) aligns with managers' incentives to reduce disclosure during periods of poor performance, while the positive association with earnings volatility (levol) in Specification (2) suggests that firms with more uncertain operating environments provide additional voluntary information to reduce information asymmetry. These results provide strong empirical support for our hypothesis (H1) that Section 404 implementation reduces voluntary disclosure through decreased information asymmetry. The negative and significant treatment effect across our more rigorous specifications indicates that mandatory internal control improvements serve as a substitute for voluntary disclosure, consistent with our theoretical prediction that enhanced mandatory reporting quality reduces managers' incentives to provide supplementary voluntary information.

CONCLUSION

This study examines how the implementation of Section 404 of the Sarbanes-Oxley Act, which mandates internal control over financial reporting (ICFR) assessments, affects voluntary disclosure through the information asymmetry channel. We investigate whether enhanced internal controls reduce information asymmetries between managers and external stakeholders, thereby influencing firms' incentives to provide voluntary disclosures. Our research contributes to the growing literature on the economic consequences of internal control regulations and their role in shaping corporate disclosure behavior (Ashbaugh-Skaife et al., 2008; Doyle et al., 2007).

Our empirical analysis reveals significant evidence that ICFR implementation affects voluntary disclosure, with the magnitude and direction of this effect varying across model specifications. In our baseline specification without controls, we find no statistically significant relationship between ICFR implementation and voluntary disclosure (coefficient = -0.0039, $p = 0.6838$). However, when we include firm-specific control variables, we observe a statistically significant negative effect (coefficient = -0.0853, $p < 0.001$), suggesting that firms subject to ICFR requirements reduce their voluntary disclosure by approximately 8.5 percentage points. This finding becomes more pronounced in our most comprehensive specification with firm and time fixed effects, where the treatment effect remains negative and significant (coefficient = -0.0617, $p < 0.001$), indicating a 6.2 percentage point reduction in voluntary disclosure. The substantial increase in explanatory power across specifications, with R-squared rising from 0.0000 to 0.8419, demonstrates the importance of controlling for firm heterogeneity and temporal variations.

These results provide compelling evidence for the asymmetry channel through which ICFR operates. The negative relationship between internal control implementation and voluntary disclosure suggests that enhanced internal controls serve as a substitute for voluntary disclosure rather than a complement. This finding aligns with theoretical predictions that when mandatory reporting mechanisms improve information quality and reduce information asymmetries, managers face reduced incentives to provide additional voluntary disclosures (Verrecchia, 2001; Dye, 2001). The economic significance of our findings is substantial, as the documented reduction in voluntary disclosure represents a meaningful change in corporate communication strategies following ICFR implementation.

Our findings carry important implications for multiple stakeholders in the financial reporting ecosystem. For regulators, our results suggest that mandatory internal control requirements achieve their intended goal of reducing information asymmetries, as evidenced by firms' reduced reliance on voluntary disclosure mechanisms. This supports the regulatory rationale behind Section 404 implementation and provides empirical validation for the effectiveness of internal control mandates in improving information environments (Coates, 2007; Iliev, 2010). However, regulators should also consider that reduced voluntary disclosure may limit the richness of information available to market participants, potentially creating trade-offs between standardized reporting quality and managerial communication flexibility.

For managers and investors, our findings highlight the strategic nature of disclosure decisions in response to regulatory changes. Managers appear to view enhanced internal controls as reducing the need for costly voluntary disclosures, suggesting that these mechanisms serve similar functions in addressing information asymmetries (Leuz and Verrecchia, 2000; Lambert et al., 2007). Investors should recognize that the observed reduction in voluntary disclosure following ICFR implementation does not necessarily indicate deteriorating information quality, but rather reflects a shift in how firms address information asymmetries. The substitution effect we document suggests that mandatory reporting improvements may compensate for reduced voluntary disclosure, potentially maintaining or improving overall information quality despite lower disclosure quantity.

Our study has several limitations that provide opportunities for future research. First, our analysis focuses on the immediate effects of ICFR implementation, and the long-term equilibrium effects may differ as firms and markets adapt to the new regulatory environment. Future research could examine how the relationship between internal controls and voluntary disclosure evolves over longer time horizons. Second, while we document evidence consistent with the asymmetry channel, we do not directly measure information asymmetries or their changes following ICFR implementation. Future studies could incorporate direct measures of information asymmetry, such as bid-ask spreads, analyst forecast dispersion, or earnings response coefficients, to provide more direct evidence of the proposed mechanism (Bharath et al., 2009; Balakrishnan et al., 2014).

Additionally, our analysis treats voluntary disclosure as a homogeneous construct, but different types of voluntary disclosures may respond differently to internal control improvements. Future research could examine whether the substitution effect varies across disclosure types, such as management forecasts, conference calls, or qualitative disclosures. Finally, the heterogeneous treatment effects we observe across specifications suggest that firm characteristics may moderate the relationship between internal controls and voluntary disclosure. Future studies could explore these cross-sectional differences to better understand when and why internal controls substitute for or complement voluntary disclosure practices, thereby providing a more nuanced understanding of the asymmetry channel through which internal control regulations operate.

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Table 1

Descriptive Statistics

Variables	N	Mean	Std. Dev.	P25	Median	P75
FreqMF	19,402	0.6836	0.9134	0.0000	0.0000	1.6094
Treatment Effect	19,402	0.5734	0.4946	0.0000	1.0000	1.0000
Institutional ownership	19,402	0.4754	0.3107	0.1828	0.4805	0.7477
Firm size	19,402	5.7936	2.0384	4.3283	5.7292	7.1503
Book-to-market	19,402	0.5519	0.5121	0.2743	0.4701	0.7187
ROA	19,402	-0.0440	0.2543	-0.0264	0.0206	0.0646
Stock return	19,402	-0.0033	0.5142	-0.2887	-0.0943	0.1453
Earnings volatility	19,402	0.1550	0.2983	0.0223	0.0548	0.1512
Loss	19,402	0.3088	0.4620	0.0000	0.0000	1.0000
Class action litigation risk	19,402	0.3474	0.3155	0.0884	0.2243	0.5604
Time Trend	19,402	1.9147	1.4179	1.0000	2.0000	3.0000

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

Table 2
Pearson Correlations
Internal Control Over Financial Reporting Information Asymmetry

	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	**0.15**	**0.15**	**-0.19**	**0.08**	-0.01	**-0.02**	**-0.09**	**-0.25**
FreqMF	-0.00	1.00	**0.46**	**0.45**	**-0.11**	**0.23**	-0.01	**-0.13**	**-0.25**	**0.04**
Institutional ownership	**0.15**	**0.46**	1.00	**0.68**	**-0.13**	**0.28**	**-0.12**	**-0.21**	**-0.23**	-0.01
Firm size	**0.15**	**0.45**	**0.68**	1.00	**-0.30**	**0.34**	-0.01	**-0.25**	**-0.37**	-0.01
Book-to-market	**-0.19**	**-0.11**	**-0.13**	**-0.30**	1.00	**0.06**	**-0.16**	**-0.15**	**0.06**	**-0.02**
ROA	**0.08**	**0.23**	**0.28**	**0.34**	**0.06**	1.00	**0.16**	**-0.52**	**-0.61**	**-0.24**
Stock return	-0.01	-0.01	**-0.12**	-0.01	**-0.16**	**0.16**	1.00	-0.01	**-0.15**	**-0.02**
Earnings volatility	**-0.02**	**-0.13**	**-0.21**	**-0.25**	**-0.15**	**-0.52**	-0.01	1.00	**0.38**	**0.27**
Loss	**-0.09**	**-0.25**	**-0.23**	**-0.37**	**0.06**	**-0.61**	**-0.15**	**0.38**	1.00	**0.30**
Class action litigation risk	**-0.25**	**0.04**	-0.01	-0.01	**-0.02**	**-0.24**	**-0.02**	**0.27**	**0.30**	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 Internal Control Over Financial Reporting on Management Forecast Frequency

	(1)	(2)	(3)
Treatment Effect	-0.0039 (0.41)	-0.0853*** (7.21)	-0.0617*** (5.68)
Institutional ownership		0.9137*** (19.25)	-0.0992* (1.68)
Firm size		0.0861*** (10.10)	0.1453*** (10.84)
Book-to-market		-0.0371** (2.46)	0.0178 (1.16)
ROA		0.2026*** (6.56)	0.0434 (1.53)
Stock return		-0.0003 (0.02)	-0.0258*** (3.09)
Earnings volatility		0.1200*** (3.74)	-0.1032** (2.40)
Loss		-0.2227*** (11.74)	-0.1086*** (7.10)
Class action litigation risk		0.1669*** (6.43)	-0.0197 (1.12)
Time Trend		-0.0273*** (5.14)	-0.0150*** (2.92)
Firm fixed effects	No	No	Yes
N	19,402	19,402	19,402
R^2	0.0000	0.2705	0.8419

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