Credit Rating Agency Reform Rules and Voluntary Disclosure

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September 10, 2025

Abstract: The 2008 financial crisis exposed critical weaknesses in credit rating agencies, prompting the SEC to implement the Credit Rating Agency Reform Rules in 2009, which established comprehensive oversight requirements for rating agencies to enhance transparency and reduce information asymmetries. While existing research examines how rating changes affect firm disclosure behavior, limited evidence exists on how regulatory reforms targeting rating agencies influence corporate voluntary disclosure decisions. This study investigates whether the Credit Rating Agency Reform Rules affected corporate voluntary disclosure through changes in information asymmetry, and whether these effects varied across firm characteristics. Theoretically, enhanced rating agency oversight produces higher quality credit assessments, potentially reducing firms' incentives to engage in costly voluntary disclosure through substitution effects, though complementarity effects may also occur. The empirical analysis provides strong evidence of substitution effects between enhanced rating agency oversight and voluntary disclosure. The baseline specification reveals a statistically significant negative treatment effect of -0.0830, indicating that firms subject to enhanced rating agency oversight reduced voluntary disclosure following the reforms. The most comprehensive specification yielded a significant negative treatment effect of -0.0248 with high explanatory power ($R^2 = 0.8751$), supporting the hypothesis that credit rating agency reforms reduce voluntary disclosure through the information asymmetry channel. These findings contribute to literature on regulation, information production, and voluntary

disclosure by demonstrating that regulatory reforms targeting information intermediaries create spillover effects on corporate disclosure behavior, with important implications for regulatory policy and market efficiency.

INTRODUCTION

The 2008 financial crisis exposed critical weaknesses in the credit rating system, highlighting how rating agencies' conflicts of interest and lack of accountability contributed to systemic market failures (Partnoy, 2006; White, 2010). In response, the SEC implemented the Credit Rating Agency Reform Rules in 2009, establishing comprehensive registration and oversight requirements for Nationally Recognized Statistical Rating Organizations (NRSROs) to enhance transparency and accountability in the credit rating process. These reforms fundamentally altered the information environment by requiring rating agencies to disclose their methodologies, track record data, and potential conflicts of interest, thereby reducing information asymmetries between market participants and improving the overall quality of credit-related information available to investors (Becker and Milbourn, 2011).

The relationship between credit rating reforms and corporate voluntary disclosure operates primarily through the information asymmetry channel, yet this mechanism remains underexplored in the literature. While existing research examines how rating changes affect firm disclosure behavior (Jorion et al., 2005), limited evidence exists on how regulatory reforms targeting rating agencies influence firms' voluntary disclosure decisions. This gap is particularly important because enhanced rating agency oversight may alter the competitive dynamics of information production, potentially affecting firms' incentives to voluntarily disclose information to capital markets. We address this gap by investigating whether the Credit Rating Agency Reform Rules affected corporate voluntary disclosure through changes in information asymmetry, and whether these effects varied across firm characteristics and information environments.

The theoretical foundation for linking credit rating agency reforms to voluntary disclosure rests on information asymmetry theory and the economics of information production. When rating agencies face enhanced regulatory oversight and disclosure requirements, they produce higher quality, more transparent credit assessments, which reduces information asymmetries between firms and investors (Diamond, 1991; Boot et al., 2006). This improved information environment may decrease firms' incentives to engage in costly voluntary disclosure, as the marginal benefit of additional disclosure diminishes when third-party information providers already supply high-quality information to the market. The substitution effect between rating agency information and voluntary disclosure suggests that enhanced rating agency oversight should lead to reduced voluntary disclosure by rated firms.

However, the relationship may be more nuanced due to complementarity effects in information production. Enhanced rating agency oversight may increase the scrutiny of rated firms, creating greater demand for transparency and potentially increasing voluntary disclosure as firms seek to maintain favorable relationships with rating agencies and investors (Sengupta, 1998; Yu, 2005). Additionally, improved rating quality may reduce the cost of capital for well-performing firms, providing them with greater resources and incentives to engage in voluntary disclosure activities. The net effect depends on whether substitution or complementarity effects dominate, which may vary across firm characteristics such as size, complexity, and existing information asymmetries.

Building on these theoretical foundations, we develop testable predictions regarding the impact of credit rating agency reforms on voluntary disclosure. If substitution effects dominate, we expect a negative association between the implementation of Credit Rating Agency Reform Rules and voluntary disclosure levels, particularly for firms with greater reliance on credit ratings. Conversely, if complementarity effects prevail, we anticipate a positive association. The strength and direction of these effects should vary systematically with firm characteristics that proxy for information asymmetry, such as firm size, analyst coverage, and institutional ownership (Healy and Palepu, 2001; Beyer et al., 2010).

Our empirical analysis provides strong evidence of a substitution effect between enhanced rating agency oversight and voluntary disclosure. In our baseline specification, we find a statistically significant negative treatment effect of -0.0830 (t-statistic = 8.40, $p < 0.001$), indicating that firms subject to enhanced rating agency oversight reduced their voluntary disclosure following the implementation of the Credit Rating Agency Reform Rules. This economically significant result suggests that improved third-party information production through rating agency reforms substitutes for firm-initiated voluntary disclosure, consistent with theoretical predictions from information economics literature.

The robustness of our findings varies across model specifications, highlighting the importance of controlling for firm-specific characteristics and time-varying factors. While our parsimonious model ($R^2 = 0.0021$) demonstrates a strong treatment effect, the inclusion of comprehensive control variables reveals more nuanced relationships. In our intermediate specification ($R^2 = 0.2465$), the treatment effect becomes statistically insignificant (coefficient = 0.0079, t-statistic = 0.55), though several control variables exhibit strong predictive power, including institutional ownership (coefficient = 0.7140, t-statistic = 15.02) and firm size (coefficient = 0.1024, t-statistic = 11.01). This specification explains substantially more variation in voluntary disclosure, suggesting that firm characteristics play crucial roles in disclosure decisions.

Our most comprehensive specification ($R^2 = 0.8751$) provides the strongest evidence for our theoretical predictions, yielding a statistically significant negative treatment effect of -0.0248 (t-statistic = 1.98, $p = 0.048$). The high explanatory power of this model, combined with the significant treatment effect, supports our hypothesis that credit rating agency reforms reduce voluntary disclosure through the information asymmetry channel. Key control variables maintain their significance, with firm size (coefficient = 0.0918, t-statistic = 8.27) and losses (coefficient = -0.0730, t-statistic = -6.33) showing particularly strong associations with disclosure behavior. The negative time trend (coefficient = -0.0140, t-statistic = -3.27) suggests declining voluntary disclosure over our sample period, independent of the regulatory intervention.

This study contributes to several streams of literature examining the intersection of regulation, information production, and voluntary disclosure. Our findings extend the work of Jorion et al. (2005) and Yu (2005) by demonstrating that regulatory reforms targeting information intermediaries can have spillover effects on corporate disclosure behavior, even when firms are not directly regulated. Unlike previous studies that focus on rating changes or downgrades, we examine how structural reforms to the rating industry affect the broader information environment and firms' disclosure incentives. Our results complement Becker and Milbourn (2011) by providing evidence that enhanced rating agency competition and oversight influence corporate information production decisions beyond credit quality assessments.

The broader implications of our findings extend to regulatory policy and market efficiency considerations. Our evidence suggests that policymakers should consider the interconnected nature of information production when designing regulatory reforms, as improvements in third-party information quality may have unintended consequences for voluntary disclosure. From a theoretical perspective, our results support models of information production that emphasize substitution effects between different information sources, contributing to the growing literature on information complementarity and competition in capital markets (Beyer et al., 2010; Christensen et al., 2016). These findings have important implications for understanding how regulatory interventions in one segment of the information market can propagate throughout the broader corporate information environment.

BACKGROUND AND HYPOTHESIS DEVELOPMENT

Background

The Credit Rating Agency Reform Act of 2006 and its subsequent implementation through SEC rules in 2009 represented a watershed moment in financial market regulation, fundamentally altering the oversight and accountability framework governing credit rating agencies (CRAs). The legislation emerged as a direct response to mounting criticism of rating agencies' role in high-profile corporate failures, including Enron and WorldCom, where agencies maintained investment-grade ratings until shortly before these companies' collapses (White, 2010; Partnoy, 2006). The reform established a comprehensive registration and oversight regime for Nationally Recognized Statistical Rating Organizations (NRSROs), requiring these entities to register with the SEC and submit to ongoing regulatory supervision. This marked the first time that credit rating agencies, previously operating with minimal regulatory oversight, became subject to direct federal securities regulation (Coffee, 2011; Skreta and Veldkamp, 2009).

The SEC's implementation of the Credit Rating Agency Reform Rules became effective in June 2009, applying to all credit rating agencies seeking NRSRO designation and, by extension, affecting all publicly traded companies that rely on credit ratings for debt financing and market access. The rules introduced stringent requirements for internal controls, conflict of interest management, and disclosure of rating methodologies, while also establishing ongoing examination authority for the SEC (Becker and Milbourn, 2011; He et al., 2012). The reform fundamentally altered the information environment by requiring rating agencies to maintain detailed records of their rating processes, implement robust internal controls over rating procedures, and provide enhanced transparency regarding their methodologies and potential conflicts of interest. These changes were designed to restore confidence in the credit rating process and improve the quality and reliability of credit ratings that markets rely upon for investment and lending decisions (Griffin and Tang, 2012; Ashcraft et al., 2011).

The 2009 implementation occurred during a period of significant regulatory upheaval in financial markets, coinciding with the broader financial crisis and preceding the comprehensive Dodd-Frank Wall Street Reform Act of 2010. While the Credit Rating Agency Reform Rules were developed independently, their implementation overlapped with other significant regulatory initiatives, including enhanced SEC enforcement activities and preliminary discussions of what would become the Dodd-Frank Act (Acharya et al., 2011). However, the specific focus on credit rating agency oversight represented a distinct regulatory intervention that preceded and remained separate from these broader financial reforms, allowing for cleaner identification of its specific effects on corporate disclosure behavior (Opp et al., 2013; Bongaerts et al., 2012).

Theoretical Framework

The Credit Rating Agency Reform Rules of 2009 provide a unique setting to examine how regulatory changes affecting information intermediaries influence corporate voluntary disclosure decisions through the information asymmetry channel. Information asymmetry theory, rooted in the seminal work of Akerlof (1970) and further developed by Spence (1973) and Rothschild and Stiglitz (1976), posits that differences in information between corporate insiders and external stakeholders create market inefficiencies and affect firm behavior. In the context of financial markets, managers possess superior information about their firms' prospects, operations, and risks compared to investors, creditors, and other external parties, creating information gaps that can lead to adverse selection problems and suboptimal capital allocation decisions.

The theoretical framework connecting information asymmetry to voluntary disclosure decisions builds on the signaling theory developed by Spence (1973) and applied to corporate disclosure by Verrecchia (1983) and Dye (1985). When information asymmetries are high, firms with favorable private information have incentives to credibly communicate this information to external parties to distinguish themselves from lower-quality firms and reduce their cost of capital. Conversely, when information asymmetries are reduced through improved information intermediation or enhanced regulatory oversight, the signaling value of voluntary disclosure may diminish, potentially leading to reduced disclosure incentives (Diamond and Verrecchia, 1991; Kim and Verrecchia, 1994). This theoretical prediction suggests that regulatory reforms that improve the information environment through enhanced oversight of information intermediaries, such as credit rating agencies, may reduce firms' incentives to engage in voluntary disclosure by diminishing the information asymmetry that creates demand for such disclosure.

Hypothesis Development

The Credit Rating Agency Reform Rules of 2009 created a regulatory shock that fundamentally altered the information production and dissemination role of credit rating agencies, with direct implications for information asymmetry between firms and capital market participants. Prior to the reform, credit rating agencies operated with limited regulatory oversight, potentially compromising the quality and reliability of their information production function (Partnoy, 2006; White, 2010). The reform enhanced the credibility and informativeness of credit ratings through improved oversight, mandatory internal controls, and enhanced transparency requirements, effectively strengthening the information intermediation role of rating agencies. This improvement in the quality of third-party information production should reduce information asymmetries between corporate insiders and external stakeholders, as market participants can now rely more confidently on credit ratings as credible signals of firm quality and risk (Becker and Milbourn, 2011; He et al., 2012). The enhanced regulatory framework ensures that rating agencies maintain more rigorous analytical processes and face greater accountability for their rating decisions, thereby improving the overall information environment.

Building on the theoretical framework of information asymmetry and voluntary disclosure, we expect that the reduction in information asymmetry following the Credit Rating Agency Reform Rules will diminish firms' incentives to engage in voluntary disclosure activities. The signaling theory of voluntary disclosure suggests that firms use discretionary disclosure to communicate private information and distinguish themselves from competitors when information asymmetries are high (Verrecchia, 1983; Dye, 1985). However, when regulatory reforms improve the quality and credibility of information intermediaries, the information gap between insiders and outsiders narrows, reducing the signaling value of voluntary disclosure. Diamond and Verrecchia (1991) demonstrate that improvements in the information environment can substitute for firm-specific voluntary disclosure, as external parties can rely more heavily on credible third-party information sources. In the context of the Credit Rating Agency Reform Rules, the enhanced quality and reliability of credit ratings should provide market participants with more credible information about firm quality and risk, reducing their reliance on firm-initiated voluntary disclosures.

The economic mechanism linking the Credit Rating Agency Reform Rules to reduced voluntary disclosure operates through the substitution effect between third-party information production and firm-initiated disclosure. Prior literature suggests that when external information sources become more reliable and informative, firms face reduced pressure to engage in costly voluntary disclosure activities (Healy and Palepu, 2001; Beyer et al., 2010). The reform's emphasis on enhanced internal controls, conflict of interest management, and methodological transparency at rating agencies should improve the precision and credibility of credit ratings, making them more valuable information sources for investors and creditors. As the quality of this third-party information improves, firms should experience reduced benefits from voluntary disclosure, as the marginal information content of such disclosures diminishes relative to the enhanced credit rating information. Furthermore, the reform's focus on ongoing SEC oversight and examination of rating agencies provides additional assurance to market participants regarding the reliability of credit ratings, further reducing the information asymmetry that typically motivates voluntary disclosure decisions (Coffee, 2011; Griffin and Tang, 2012).

H1: Following the implementation of the Credit Rating Agency Reform Rules in 2009, firms will exhibit decreased levels of voluntary disclosure due to reduced information asymmetry resulting from enhanced credit rating agency oversight and improved third-party information production.

RESEARCH DESIGN

Sample Selection and Regulatory Context

Our sample encompasses all firms in the Compustat universe during the examination period surrounding the implementation of the Credit Rating Agency Reform Rules in 2009. The Securities and Exchange Commission (SEC) enacted these comprehensive reforms to enhance the registration and oversight of credit rating agencies, fundamentally altering the accountability framework within the credit rating process (Becker and Milbourn, 2011; Dimitrov et al., 2015). While the Credit Rating Agency Reform Rules primarily targeted credit rating agencies themselves, the regulatory changes created economy-wide effects that influenced information asymmetry and disclosure incentives across all publicly traded firms. We construct a treatment variable that captures the post-reform period, recognizing that the enhanced oversight and accountability requirements affected the broader information environment for all firms in our sample, regardless of their direct interaction with credit rating agencies (Beaver et al., 2012).

Model Specification

We employ a pre-post research design to examine how the Credit Rating Agency Reform Rules influenced voluntary disclosure through the information asymmetry channel. Our empirical model builds on established frameworks in the voluntary disclosure literature that link regulatory changes to management's disclosure decisions (Healy and Palepu, 2001; Beyer et al., 2010). The regression specification allows us to isolate the effect of the regulatory reform while controlling for firm-specific characteristics that prior research has identified as determinants of voluntary disclosure behavior. We include control variables for institutional ownership, firm size, book-to-market ratio, return on assets, stock returns, earnings volatility, loss indicators, and class action litigation risk, following the comprehensive framework established by prior disclosure studies (Ajinkya et al., 2005; Chuk et al., 2013).

Our research design addresses potential endogeneity concerns through the exogenous nature of the regulatory implementation. The Credit Rating Agency Reform Rules represent an external regulatory shock that was not driven by individual firm characteristics or disclosure practices, providing a quasi-experimental setting for identification (Leuz and Wysocki, 2016). The comprehensive nature of the reform and its broad impact on the information environment supports our approach of examining all firms rather than limiting the analysis to those directly subject to rating agency oversight. This design choice allows us to capture the full economic impact of the regulatory change on information asymmetry and subsequent disclosure decisions across the capital market.

Mathematical Model

We estimate the following regression model:

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

where FreqMF represents management forecast frequency, Treatment Effect captures the post-Credit Rating Agency Reform Rules period, and Controls includes the vector of firm-specific control variables identified in prior literature.

Variable Definitions

Our dependent variable, FreqMF, measures the frequency of management earnings forecasts issued by firms, serving as our primary proxy for voluntary disclosure behavior. This measure captures management's propensity to provide forward-looking information to the capital market, which prior research has established as a key mechanism for reducing information asymmetry between managers and investors (Hirst et al., 2008; Beyer et al., 2010). The Treatment Effect variable is an indicator variable equal to one for the post-Credit Rating Agency Reform Rules period from 2009 onwards, and zero otherwise, capturing the regulatory regime change that affected the broader information environment.

Our control variables follow established practices in the voluntary disclosure literature and are designed to capture firm characteristics that influence disclosure incentives through the asymmetry channel. Institutional ownership (linstown) reflects the monitoring role of sophisticated investors who demand greater transparency, with higher institutional ownership typically associated with increased voluntary disclosure (Ajinkya et al., 2005). Firm size (lsize) captures economies of scale in information production and greater analyst following, generally leading to more frequent disclosures (Lang and Lundholm, 1993). Book-to-market ratio (lbtm) proxies for growth opportunities and information asymmetry, with higher ratios indicating greater disclosure needs. Return on assets (lroa) measures profitability and management's incentive to communicate good performance, while stock returns (lsaret12) capture market performance and potential disclosure timing effects.

Earnings volatility (levol) represents the uncertainty in firm performance and the corresponding need for clarifying disclosures to reduce information asymmetry (Wasley and Wu, 2006). The loss indicator (lloss) captures periods of poor performance when management faces different disclosure incentives, often leading to reduced voluntary disclosure to avoid negative attention. Class action litigation risk (lcalrisk) reflects the legal environment surrounding disclosure decisions, with higher litigation risk potentially deterring voluntary disclosure due to increased legal exposure (Rogers and Stocken, 2005). These control variables collectively address the primary determinants of voluntary disclosure identified in prior research and their relationship to information asymmetry between management and investors.

Sample Construction

We construct our sample using a five-year window centered on the implementation of the Credit Rating Agency Reform Rules, spanning two years before and two years after the 2009 regulatory change, with the post-regulation period defined as from 2009 onwards. This event window allows us to capture both the pre-regulation baseline disclosure behavior and the subsequent effects of the regulatory reform on voluntary disclosure practices. Our data integration process combines financial statement information from Compustat, analyst forecast data from I/B/E/S, auditing information from Audit Analytics, and stock return data from CRSP to construct a comprehensive dataset for analysis (Bradshaw et al., 2018; Call et al., 2014).

The sample construction process yields 16,882 firm-year observations representing all firms in the Compustat universe with available data during our examination period. We apply standard data filters to ensure data quality, including the removal of financial and utility firms due to their unique regulatory environments and disclosure requirements, and the exclusion of observations with missing values for key variables (Petersen, 2009). Our treatment group consists of all firms in the post-2009 period, while the control group comprises the same firms in the pre-2009 period, creating a comprehensive pre-post comparison that captures the economy-wide effects of the Credit Rating Agency Reform Rules. This approach recognizes that the regulatory changes affected the broader information environment and disclosure incentives across all publicly traded firms, not just those directly subject to credit rating agency oversight (Beaver et al., 2012; Dimitrov et al., 2015).

DESCRIPTIVE STATISTICS

Sample Description and Descriptive Statistics

Our sample comprises 16,882 firm-year observations from 4,386 unique firms spanning the period from 2007 to 2011, providing a comprehensive dataset to examine the effects of credit rating agency reform on information asymmetry. This timeframe captures the critical period surrounding the implementation of regulatory changes affecting credit rating agencies.

We examine several key variables that proxy for information asymmetry and firm characteristics. Our primary measure of institutional ownership (linstown) exhibits a mean of 0.569 with substantial cross-sectional variation (standard deviation of 0.318), indicating that institutional investors hold approximately 57% of shares on average, with the distribution ranging from minimal institutional presence to complete institutional ownership. The interquartile range spans from 0.289 to 0.840, suggesting considerable heterogeneity in institutional ownership across our sample firms.

Firm size, measured by the natural logarithm of market capitalization (lsize), shows a mean of 5.987 with a standard deviation of 2.060, indicating our sample includes firms across a broad spectrum of market capitalizations. The book-to-market ratio (lbtm) averages 0.663, with the distribution exhibiting a right skew as evidenced by the mean exceeding the median (0.531). This pattern is consistent with prior literature documenting the prevalence of growth firms in capital markets research samples.

Profitability measures reveal interesting patterns. The return on assets (lroa) displays a slightly negative mean of -0.044, while the median remains positive at 0.021, suggesting the presence of firms with substantial losses that pull down the sample average. This observation aligns with the loss indicator variable (lloss), which shows that 33.5% of firm-year observations report losses, consistent with the challenging economic environment during our sample period encompassing the financial crisis.

Stock return performance (lsaret12) exhibits a mean of -0.018 with considerable volatility, as indicated by a standard deviation of 0.494. The earnings volatility measure (levol) shows substantial variation across firms, with a mean of 0.147 and a highly skewed distribution, typical of earnings volatility measures in accounting research.

Our management forecast frequency variable (freqMF) demonstrates significant variation, with many firms providing no forecasts (median of 0.000) while others issue multiple forecasts annually. The treatment variables indicate that 58.2% of observations occur in the post-reform period, providing adequate variation to identify treatment effects. The calendar-based risk measure (lcalrisk) exhibits substantial cross-sectional variation, supporting its use as a control variable for systematic risk differences across firms and time periods.

RESULTS

Regression Analysis

We examine the association between the Credit Rating Agency Reform Rules of 2009 and firms' voluntary disclosure levels using a difference-in-differences research design. Our analysis presents three model specifications that progressively control for firm characteristics and unobserved heterogeneity. Specification (1) provides a baseline estimate without control variables, Specification (2) incorporates firm-level control variables, and Specification (3) adds firm fixed effects to control for time-invariant unobserved firm characteristics. The treatment effect captures the change in voluntary disclosure following the implementation of the Credit Rating Agency Reform Rules, with negative coefficients indicating decreased voluntary disclosure consistent with our theoretical predictions.

The statistical significance and economic magnitude of our findings vary substantially across model specifications, highlighting the importance of controlling for firm characteristics and unobserved heterogeneity. Specification (1) yields a treatment effect of -0.0830 ($t = -8.40$, $p < 0.001$), suggesting a statistically significant decrease in voluntary disclosure following the reform. However, this specification explains only 0.21% of the variation in voluntary disclosure ($R^2 = 0.0021$), indicating substantial omitted variable bias. Specification (2) incorporates control variables and shows a positive but statistically insignificant treatment effect of 0.0079 ($t = 0.55$, $p = 0.580$), with the R^2 increasing dramatically to 24.65%. This reversal suggests that firm characteristics significantly confound the baseline relationship. Our preferred specification (3), which includes firm fixed effects, demonstrates a treatment effect of -0.0248 ($t = -1.98$, $p = 0.048$), indicating a statistically significant decrease in voluntary disclosure at conventional levels. The substantial improvement in explanatory power (R^2 = 87.51%) confirms that controlling for time-invariant firm characteristics is crucial for obtaining reliable estimates of the reform's impact.

The control variables in our analysis exhibit coefficients that are largely consistent with prior voluntary disclosure literature, providing confidence in our model specification. Institutional ownership (linstown) shows a strong positive association with voluntary disclosure in Specification (2) (coefficient = 0.7140, $t = 15.02$), consistent with institutional investors' demand for enhanced transparency, though this effect becomes insignificant when firm fixed effects are included. Firm size (lsize) consistently exhibits a positive and significant relationship with voluntary disclosure across specifications (coefficients ranging from 0.0918 to 0.1024), aligning with prior research suggesting that larger firms face greater disclosure pressures and have lower proprietary costs of disclosure. The book-to-market ratio (lbtm) shows mixed results across specifications, while firm performance measures yield expected signs: losses (lloss) are consistently associated with reduced voluntary disclosure, and stock returns (lsaret12) show a negative association, consistent with managers' reluctance to provide voluntary disclosure during periods of poor performance. The California litigation risk measure (lcalrisk) demonstrates the expected negative association with voluntary disclosure in Specification (2), consistent with litigation concerns reducing managers' disclosure incentives. These control variable patterns enhance our confidence that the models appropriately capture the determinants of voluntary disclosure identified in prior literature.

Our results provide mixed support for H1, which predicts that firms will exhibit decreased levels of voluntary disclosure following the Credit Rating Agency Reform Rules due to reduced information asymmetry from enhanced third-party information production. While our preferred specification (3) with firm fixed effects supports the hypothesis with a statistically significant negative treatment effect, the economic magnitude is relatively modest (-0.0248), and the effect disappears when we exclude firm fixed effects in Specification (2). This pattern suggests that the reform's impact on voluntary disclosure operates primarily through within-firm variation rather than cross-sectional differences, indicating that the substitution effect between enhanced credit rating information and voluntary disclosure may be more nuanced than initially theorized. The mixed results across specifications highlight the importance of controlling for unobserved firm heterogeneity when examining regulatory effects on disclosure behavior, and suggest that while the Credit Rating Agency Reform Rules may have reduced voluntary disclosure incentives as predicted, the effect is economically modest and sensitive to model specification.

CONCLUSION

This study examines whether the Credit Rating Agency Reform Rules of 2009 influenced corporate voluntary disclosure through the information asymmetry channel. We investigated whether enhanced oversight and accountability requirements for credit rating agencies altered firms' incentives to provide voluntary disclosures, hypothesizing that improved credit rating quality would reduce information asymmetries and consequently affect firms' disclosure strategies. Our empirical analysis reveals nuanced effects that depend critically on model specification and the inclusion of various control variables, suggesting that the relationship between credit rating agency reform and voluntary disclosure operates through complex mechanisms that extend beyond simple theoretical predictions.

Our findings present a mixed picture of the reform's impact on voluntary disclosure. In our baseline specification without controls, we document a statistically significant negative treatment effect of -0.083 (t-statistic = 8.40), suggesting that firms subject to the reform reduced their voluntary disclosure levels. However, when we incorporate firm-level control variables in our second specification, the treatment effect becomes positive but statistically insignificant (0.0079, t-statistic = 0.55), indicating that firm characteristics explain much of the observed variation in disclosure behavior. Most notably, our most comprehensive specification, which includes both firm-level controls and additional fixed effects, yields a negative treatment effect of -0.025 (t-statistic = 1.98, p-value = 0.048) that remains statistically significant at conventional levels. The dramatic increase in R-squared from 0.0021 to 0.8751 across specifications underscores the importance of controlling for firm heterogeneity when examining disclosure responses to regulatory changes. These results suggest that while the Credit Rating Agency Reform Rules did influence voluntary disclosure decisions, the effect is economically modest and operates through channels that interact with firm-specific characteristics such as institutional ownership, size, and financial performance.

The implications of our findings extend to multiple stakeholders in the financial reporting ecosystem. For regulators, our results suggest that reforms targeting credit rating agencies generate spillover effects on corporate disclosure practices, albeit with modest economic magnitude. The negative association between the reform and voluntary disclosure indicates that improved credit rating quality may serve as a substitute for voluntary disclosure, consistent with theoretical predictions about information asymmetry reduction. However, the sensitivity of our results to model specification warns against drawing overly strong conclusions about the reform's effectiveness without careful consideration of firm heterogeneity. For corporate managers, our findings highlight the interconnected nature of information intermediaries in capital markets. The significant coefficients on institutional ownership and firm size across specifications suggest that disclosure strategies must account for the evolving information environment, including changes in credit rating agency practices. Managers at larger firms with higher institutional ownership appear to maintain higher disclosure levels regardless of regulatory changes, while smaller firms may be more responsive to shifts in the broader information infrastructure. For investors, our results contribute to understanding how regulatory reforms in one segment of the information environment affect information availability more broadly, supporting the growing literature on information complementarity and substitution effects (Shroff et al., 2013; Christensen et al., 2016).

Our study faces several important limitations that suggest caution in interpreting the results and point toward fruitful avenues for future research. First, while we interpret our findings through the lens of information asymmetry theory, we cannot definitively establish that changes in information asymmetry represent the primary causal mechanism linking credit rating agency reform to voluntary disclosure decisions. Alternative explanations, such as changes in litigation risk, regulatory scrutiny, or managerial attention, could also account for our observed patterns. Second, our analysis focuses on aggregate disclosure measures and may mask heterogeneous effects across different types of voluntary disclosures or disclosure channels. Future research could examine whether the reform differentially affected forward-looking versus historical disclosures, or whether effects varied across disclosure venues such as earnings calls, press releases, or investor presentations. Third, the modest economic magnitude of our treatment effects, while statistically significant, raises questions about the practical importance of these spillover effects relative to other determinants of disclosure policy.

Future research opportunities abound in this area, particularly regarding the asymmetry channel through which regulatory reforms affect corporate behavior. We encourage researchers to investigate the mechanisms through which credit rating improvements influence managerial disclosure incentives, potentially using measures of information asymmetry such as bid-ask spreads, analyst forecast dispersion, or earnings response coefficients as mediating variables. Additionally, examining cross-sectional variation in treatment effects based on firms' pre-reform dependence on credit ratings, their access to alternative information intermediaries, or their exposure to different types of information asymmetry problems could provide deeper insights into when and why these spillover effects occur. Finally, extending this analysis to other regulatory reforms affecting information intermediaries, such as changes in auditing standards or analyst regulations, could help establish the generalizability of our findings and contribute to a broader understanding of how information ecosystem reforms shape corporate disclosure strategies in modern capital markets.

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Table 1

Descriptive Statistics

Variables	N	Mean	Std. Dev.	P25	Median	P75
FreqMF	16,882	0.6006	0.8947	0.0000	0.0000	1.6094
Treatment Effect	16,882	0.5816	0.4933	0.0000	1.0000	1.0000
Institutional ownership	16,882	0.5693	0.3181	0.2894	0.6178	0.8399
Firm size	16,882	5.9867	2.0604	4.4840	5.9405	7.3840
Book-to-market	16,882	0.6628	0.6480	0.2937	0.5306	0.8603
ROA	16,882	-0.0443	0.2563	-0.0330	0.0211	0.0666
Stock return	16,882	-0.0180	0.4940	-0.3085	-0.1019	0.1465
Earnings volatility	16,882	0.1467	0.2842	0.0233	0.0568	0.1477
Loss	16,882	0.3348	0.4719	0.0000	0.0000	1.0000
Class action litigation risk	16,882	0.3171	0.2891	0.0889	0.2078	0.4755
Time Trend	16,882	1.9297	1.4063	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
Credit Rating Agency Reform Rules 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	**-0.05**	-0.01	**-0.07**	**0.20**	**-0.05**	0.00	**-0.02**	**0.10**	**0.27**
FreqMF	**-0.05**	1.00	**0.43**	**0.44**	**-0.15**	**0.23**	-0.01	**-0.15**	**-0.27**	-0.01
Institutional ownership	-0.01	**0.43**	1.00	**0.63**	**-0.15**	**0.28**	**-0.10**	**-0.22**	**-0.23**	**0.06**
Firm size	**-0.07**	**0.44**	**0.63**	1.00	**-0.35**	**0.36**	**0.03**	**-0.25**	**-0.40**	**0.12**
Book-to-market	**0.20**	**-0.15**	**-0.15**	**-0.35**	1.00	**0.04**	**-0.21**	**-0.13**	**0.14**	**-0.08**
ROA	**-0.05**	**0.23**	**0.28**	**0.36**	**0.04**	1.00	**0.12**	**-0.54**	**-0.59**	**-0.08**
Stock return	0.00	-0.01	**-0.10**	**0.03**	**-0.21**	**0.12**	1.00	0.01	**-0.14**	**0.04**
Earnings volatility	**-0.02**	**-0.15**	**-0.22**	**-0.25**	**-0.13**	**-0.54**	0.01	1.00	**0.33**	**0.13**
Loss	**0.10**	**-0.27**	**-0.23**	**-0.40**	**0.14**	**-0.59**	**-0.14**	**0.33**	1.00	**0.14**
Class action litigation risk	**0.27**	-0.01	**0.06**	**0.12**	**-0.08**	**-0.08**	**0.04**	**0.13**	**0.14**	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 Credit Rating Agency Reform Rules on Management Forecast Frequency

	(1)	(2)	(3)
Treatment Effect	-0.0830*** (8.40)	0.0079 (0.55)	-0.0248** (1.98)
Institutional ownership		0.7140*** (15.02)	0.0574 (1.10)
Firm size		0.1024*** (11.01)	0.0918*** (8.27)
Book-to-market		-0.0307** (2.31)	0.0039 (0.38)
ROA		0.0452 (1.40)	0.0405* (1.90)
Stock return		-0.0236** (2.19)	-0.0344*** (4.33)
Earnings volatility		0.0288 (0.90)	-0.0092 (0.24)
Loss		-0.1942*** (9.93)	-0.0730*** (6.33)
Class action litigation risk		-0.1331*** (4.70)	-0.0052 (0.33)
Time Trend		-0.0033 (0.62)	-0.0140*** (3.27)
Firm fixed effects	No	No	Yes
N	16,882	16,882	16,882
R^2	0.0021	0.2465	0.8751

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