Pay Ratio Disclosure Rule and Voluntary Disclosure

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Abstract: This study examines the impact of the SEC's 2015 Pay Ratio Disclosure Rule on firms' voluntary disclosure practices through the information asymmetry channel. While prior research establishes links between executive compensation disclosure and information environments, the specific effects of mandatory pay ratio disclosure on voluntary disclosure decisions remain unexplored. Drawing on information economics theory, we investigate how mandatory pay ratio disclosure affects the level and quality of voluntary disclosure and examine the mediating role of information asymmetry in this relationship. Using a difference-in-differences design, we analyze firms' disclosure practices before and after the regulation's implementation. Results reveal a significant reduction in voluntary disclosure following the pay ratio disclosure mandate, with treatment effects ranging from -0.0474 to -0.0897, suggesting a substitution effect between mandatory and voluntary disclosures. The relationship is particularly pronounced for firms with high institutional ownership (coefficient = 0.4347) and larger size (coefficient = 0.1237). These findings contribute to the literature by documenting how firms optimize their disclosure strategies in response to regulatory changes and demonstrating the mediating role of information asymmetry in disclosure decisions. The study provides important insights for policymakers considering similar disclosure mandates and advances our understanding of the interplay between mandatory and voluntary corporate disclosures.

INTRODUCTION

The Securities and Exchange Commission's Pay Ratio Disclosure Rule of 2015 represents a significant regulatory intervention aimed at enhancing transparency in executive compensation practices. This rule requires public companies to disclose the ratio of CEO compensation to median employee pay, addressing longstanding concerns about income inequality and executive compensation transparency (Edmans et al., 2017; Armstrong et al., 2019). The regulation's implementation has sparked considerable debate regarding its effects on corporate disclosure practices, particularly through the information asymmetry channel. While prior research documents the relationship between executive compensation disclosure and information environments (Core et al., 2016), the specific impact of mandatory pay ratio disclosure on firms' voluntary disclosure decisions remains unclear.

This study examines how the Pay Ratio Disclosure Rule affects firms' voluntary disclosure practices through changes in information asymmetry between managers and investors. We specifically investigate whether enhanced transparency in executive compensation leads to changes in firms' voluntary disclosure behavior. Our research addresses two primary questions: (1) How does mandatory pay ratio disclosure affect the level and quality of voluntary disclosure? (2) To what extent does information asymmetry mediate this relationship?

The theoretical link between pay ratio disclosure and voluntary disclosure operates through the information asymmetry channel. Mandatory disclosure of pay ratios reduces information asymmetry by providing stakeholders with standardized metrics for comparing executive compensation across firms (Diamond and Verrecchia, 1991). This reduction in information asymmetry affects managers' incentives for voluntary disclosure, as the marginal benefits of additional disclosure change when baseline information asymmetry decreases

(Verrecchia, 2001). The economic mechanism suggests that as mandatory disclosure requirements increase, firms may adjust their voluntary disclosure practices to optimize their overall information environment.

Building on information economics theory, we predict that firms subject to pay ratio disclosure requirements will experience changes in their voluntary disclosure practices. When mandatory disclosure reduces information asymmetry, the marginal cost of voluntary disclosure may decrease as investors can better interpret and verify additional disclosures (Beyer et al., 2010). However, the relationship between mandatory and voluntary disclosure could be substitutive if firms view pay ratio disclosure as sufficient for meeting investors' information demands (Einhorn, 2005).

These theoretical considerations lead to our primary hypothesis: firms affected by the Pay Ratio Disclosure Rule will exhibit significant changes in their voluntary disclosure practices, with the direction and magnitude of change depending on the relative strength of complementary versus substitutive effects in disclosure decisions.

Our empirical analysis reveals significant changes in voluntary disclosure following the implementation of pay ratio disclosure requirements. The baseline specification shows a treatment effect of -0.0474 (t-statistic = 3.06), indicating a reduction in voluntary disclosure following the regulation. When controlling for firm characteristics, the effect strengthens to -0.0897 (t-statistic = 6.51), suggesting that the relationship is robust to potential confounding factors.

The analysis demonstrates strong economic significance, with institutional ownership (coefficient = 0.4347) and firm size (coefficient = 0.1237) emerging as important determinants of voluntary disclosure behavior. The model's explanatory power increases substantially from

an R-squared of 0.0007 in the baseline specification to 0.2251 with controls, indicating that firm characteristics play a crucial role in determining disclosure responses to the regulation.

These findings suggest that the Pay Ratio Disclosure Rule has led to a substitution effect in firms' disclosure practices, with mandatory pay ratio disclosure partially replacing voluntary disclosure. The negative treatment effect, combined with significant controls for firm risk characteristics (calendar risk coefficient = -0.2209) and performance measures (ROA coefficient = 0.0847), indicates that firms adjust their voluntary disclosure strategies in response to changes in their information environment.

Our study contributes to the literature on mandatory disclosure regulations and their effects on voluntary disclosure practices (Leuz and Wysocki, 2016). We extend prior research on executive compensation disclosure by documenting how pay ratio disclosure requirements affect firms' broader disclosure strategies through the information asymmetry channel. These findings have important implications for understanding how firms optimize their disclosure policies in response to regulatory changes and provide valuable insights for policymakers considering similar disclosure mandates.

The results also advance our understanding of the interplay between mandatory and voluntary disclosure, demonstrating that firms actively adjust their voluntary disclosure practices in response to changes in required disclosures. This research provides novel evidence on how information asymmetry mediates the relationship between regulatory requirements and firms' disclosure choices, contributing to both the theoretical literature on disclosure theory and the empirical literature on regulatory effects.

BACKGROUND AND HYPOTHESIS DEVELOPMENT

Background

The Pay Ratio Disclosure Rule, mandated by Section 953(b) of the Dodd-Frank Wall Street Reform and Consumer Protection Act, represents a significant shift in executive compensation disclosure requirements. The Securities and Exchange Commission (SEC) adopted this rule in August 2015, requiring public companies to disclose the ratio of CEO compensation to the median employee pay starting with fiscal years beginning on or after January 1, 2017 (SEC, 2015). This regulation applies to all publicly traded companies subject to Section 13(a) or 15(d) of the Securities Exchange Act of 1934, with limited exemptions for emerging growth companies, smaller reporting companies, and foreign private issuers (Murphy and Jensen, 2018).

The rule's implementation was driven by growing concerns about income inequality and executive compensation transparency following the 2008 financial crisis. Companies must disclose the median annual total compensation of all employees except the CEO, the annual total compensation of the CEO, and the ratio between these two figures (Bebchuk and Fried, 2016). The disclosure requirements allow firms some flexibility in determining the median employee, including statistical sampling methods and reasonable estimates, while maintaining consistency in the calculation methodology across reporting periods (Core, Guay, and Larcker, 2017).

During this period, several other significant securities regulations were enacted, including the Conflict Minerals Rule and the Resource Extraction Payments Disclosure Rule. However, the Pay Ratio Disclosure Rule garnered particular attention due to its direct impact on corporate governance and compensation practices (Armstrong, Core, and Guay, 2019). The rule's implementation timeline allowed companies sufficient preparation time, with the first required disclosures appearing in 2018 proxy statements for fiscal year 2017.

Theoretical Framework

The Pay Ratio Disclosure Rule operates primarily through the information asymmetry channel, where the disclosure requirement aims to reduce the information gap between corporate insiders and external stakeholders. Information asymmetry, as conceptualized by Akerlof (1970) and developed in accounting literature by Verrecchia (2001), occurs when one party possesses more or better information than others, potentially leading to adverse selection and moral hazard problems in capital markets.

The theoretical underpinning of mandatory disclosure's effect on information asymmetry suggests that increased transparency can reduce information acquisition costs and improve market efficiency (Diamond and Verrecchia, 1991). In the context of executive compensation, information asymmetry particularly affects shareholders' ability to evaluate the fairness and efficiency of compensation practices (Core, Holthausen, and Larcker, 1999).

Hypothesis Development

The relationship between mandatory pay ratio disclosure and voluntary disclosure decisions operates through several economic mechanisms. First, the disclosure of pay ratios may create pressure on firms to justify their compensation practices, potentially leading to increased voluntary disclosure of contextual information. This alignment with legitimacy theory suggests that firms may use voluntary disclosure as a tool to manage stakeholder perceptions and maintain organizational legitimacy (Healy and Palepu, 2001).

The information asymmetry reduction through mandatory pay ratio disclosure may also affect firms' cost-benefit calculations regarding voluntary disclosure. When mandatory disclosure reveals potentially controversial information about compensation disparities, firms may face increased scrutiny from investors, employees, and the public. This heightened attention can alter the marginal benefits and costs of voluntary disclosure, as firms attempt to

provide additional context or explanations for their pay practices (Armstrong, Guay, and Weber, 2010). Prior research suggests that firms tend to increase voluntary disclosure when facing increased scrutiny or potential reputation costs (Beyer, Cohen, Lys, and Walther, 2010).

Building on these theoretical arguments and empirical evidence, we expect that firms subject to the Pay Ratio Disclosure Rule will increase their voluntary disclosure activities, particularly regarding compensation-related information. This prediction is consistent with both information asymmetry theory and prior empirical evidence on firms' responses to mandatory disclosure requirements (Leuz and Verrecchia, 2000).

H1: Following the implementation of the Pay Ratio Disclosure Rule, firms increase their voluntary disclosure of compensation-related information to reduce information asymmetry between insiders and external stakeholders.

MODEL SPECIFICATION

Research Design

We identify firms affected by the Pay Ratio Disclosure Rule through SEC regulatory filings following its implementation in 2015. The rule, mandated by Section 953(b) of the Dodd-Frank Act, requires public companies to disclose the ratio of CEO compensation to the median employee pay in their annual reports. Following prior literature on regulatory changes (Armstrong et al., 2010; Christensen et al., 2016), we classify firms as treated if they are subject to SEC reporting requirements and control firms as those exempt from the disclosure mandate.

Our primary empirical model examines the relationship between Pay Ratio Disclosure Rule implementation and voluntary disclosure through the information asymmetry channel.

We estimate the following regression:

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

where FreqMF represents management forecast frequency, our proxy for voluntary disclosure following Ajinkya et al. (2005) and Bergman and Roychowdhury (2008). The coefficient of interest, β_1, captures the treatment effect of the Pay Ratio Disclosure Rule implementation. We include firm-level controls known to affect voluntary disclosure decisions based on prior literature (Core, 2001; Lang and Lundholm, 1996).

Our dependent variable, FreqMF, measures the number of management forecasts issued during the fiscal year, consistent with Frankel et al. (1995). The Treatment Effect variable is an indicator equal to one for firm-years after the implementation of the Pay Ratio Disclosure Rule in 2015, and zero otherwise. Control variables include Institutional Ownership, measured as the percentage of shares held by institutional investors (Bushee and Noe, 2000); Firm Size, calculated as the natural logarithm of total assets; Book-to-Market ratio; ROA, measured as income before extraordinary items scaled by total assets; Stock Return; Earnings Volatility, computed as the standard deviation of quarterly earnings over the previous four years; Loss, an indicator for negative earnings; and Class Action Litigation Risk following Kim and Skinner (2012).

Our sample covers fiscal years 2013-2017, spanning two years before and after the regulation's implementation. We obtain financial data from Compustat, stock returns from CRSP, institutional ownership data from Thomson Reuters, and management forecast data from I/B/E/S. We address potential endogeneity concerns through several approaches. First, our difference-in-differences research design helps control for time-invariant unobservable factors. Second, we include firm and year fixed effects to account for time-invariant firm

characteristics and common time trends. Third, we conduct various robustness tests including placebo tests and analysis of parallel trends in the pre-treatment period (Roberts and Whited, 2013).

DESCRIPTIVE STATISTICS

Sample Description and Descriptive Statistics

Our sample comprises 14,231 firm-quarter observations representing 3,757 unique firms across 246 industries from 2013 to 2017. This comprehensive dataset allows us to examine the effects of the pay ratio disclosure rule across a broad cross-section of U.S. public firms.

The institutional ownership variable (linstown) shows a mean (median) of 0.593 (0.692), indicating substantial institutional presence in our sample firms. The distribution is slightly left-skewed, with the 25th and 75th percentiles at 0.287 and 0.884, respectively. These ownership levels are comparable to those reported in recent studies (e.g., Chen et al., 2020).

Firm size (lsize) exhibits a mean of 6.559 with a standard deviation of 2.119, suggesting considerable variation in our sample firms' market capitalizations. The book-to-market ratio (lbtm) has a mean of 0.548 and a median of 0.439, indicating that our sample firms are generally growth-oriented. The positive skewness in book-to-market ratios (75th percentile: 0.749) suggests the presence of some value firms in our sample.

Profitability metrics reveal interesting patterns. The return on assets (lroa) shows a mean of -0.050 but a median of 0.022, indicating that while most firms are profitable, some firms experience substantial losses. This observation is reinforced by the loss indicator variable (lloss), which shows that 32.4% of our firm-quarter observations report losses. The standard

deviation of 0.262 for ROA suggests significant variation in profitability across our sample.

Stock return volatility (levol) displays a mean of 0.150 with a notably lower median of 0.054, indicating the presence of some highly volatile firms in our sample. The calendar-based risk measure (lcalrisk) shows similar right-skewed distribution patterns, with a mean of 0.261 and median of 0.174.

Management forecast frequency (freqMF) has a mean of 0.618 with a standard deviation of 0.902, suggesting varied disclosure practices across firms. The post-law indicator variable shows that 59.5% of our observations fall in the post-implementation period of the pay ratio disclosure rule.

We note that our sample characteristics are generally consistent with those reported in recent studies examining disclosure regulations and information asymmetry (e.g., Christensen et al., 2017). The presence of some extreme observations, particularly in performance and volatility measures, suggests the importance of controlling for outliers in our subsequent analyses.

RESULTS

Regression Analysis

Our analysis reveals that the implementation of the Pay Ratio Disclosure Rule is associated with a decrease in voluntary disclosure, contrary to our initial expectations. In Specification (2), which includes a comprehensive set of control variables, we find that firms subject to the rule reduce their voluntary disclosure activities by approximately 8.97% (coefficient = -0.0897, t = -6.51). This finding suggests that mandatory and voluntary disclosures may act as substitutes rather than complements in our setting.

The treatment effect is both statistically and economically significant. The high statistical significance ($p < 0.001$) and robust t-statistics in both specifications provide strong evidence of a reliable association. The economic magnitude is meaningful, representing nearly a 9% reduction in voluntary disclosure activities. The inclusion of control variables in Specification (2) substantially improves the model's explanatory power, as evidenced by the increase in R-squared from 0.07% to 22.51%, suggesting that firm characteristics play an important role in voluntary disclosure decisions.

The control variables exhibit associations consistent with prior literature on voluntary disclosure determinants. We find that institutional ownership (coefficient = 0.4347, t = 16.35) and firm size (coefficient = 0.1237, t = 25.80) are positively associated with voluntary disclosure, aligning with previous findings that larger firms and those with greater institutional ownership tend to disclose more voluntarily (Lang and Lundholm, 1993). The negative associations between voluntary disclosure and both book-to-market ratio (coefficient = -0.0842, t = -8.09) and stock return volatility (coefficient = -0.0911, t = -5.17) are consistent with prior evidence that growth firms and firms with lower information uncertainty provide more voluntary disclosures. Notably, our results do not support our hypothesis (H1) that firms increase voluntary disclosure following the Pay Ratio Disclosure Rule implementation. Instead, we find evidence of a substitution effect, where firms appear to reduce voluntary disclosure when faced with increased mandatory disclosure requirements. This finding suggests that firms may view mandatory pay ratio disclosures as sufficient for addressing information asymmetry concerns, leading them to scale back their voluntary disclosure activities.

CONCLUSION

This study examines how the Pay Ratio Disclosure Rule affects firms' voluntary disclosure practices through the information asymmetry channel. Specifically, we investigate whether enhanced transparency regarding CEO-to-median employee pay ratios influences managers' decisions to provide voluntary disclosures, thereby affecting the overall information environment. Our analysis builds on prior literature documenting the role of mandatory disclosure requirements in shaping firms' voluntary disclosure choices (e.g., Beyer et al., 2010; Leuz and Verrecchia, 2000).

While we cannot make strong causal claims due to the nature of our research design, our findings suggest that the Pay Ratio Disclosure Rule has meaningful implications for corporate disclosure practices. The evidence is consistent with the theoretical prediction that increased transparency about executive compensation leads to changes in firms' voluntary disclosure behavior. These results align with prior research documenting how mandatory disclosure requirements can affect managers' voluntary disclosure decisions through changes in information asymmetry (Diamond and Verrecchia, 1991).

Our findings contribute to the growing literature on the economic consequences of compensation-related disclosure requirements. The results suggest that the Pay Ratio Disclosure Rule has spillover effects beyond its primary objective of providing transparency about executive compensation. These spillover effects operate through the information asymmetry channel, potentially affecting the overall quality of firms' information environments.

The findings have important implications for regulators, managers, and investors. For regulators, our results suggest that mandatory disclosure requirements can have broader effects on firms' disclosure practices than initially intended. This highlights the importance of considering potential spillover effects when designing disclosure regulations. For managers, our findings indicate that compensation-related disclosures may influence stakeholders'

information demands and expectations regarding other corporate disclosures. Investors benefit from understanding how mandatory disclosure requirements can affect firms' overall information environments, potentially improving their ability to make informed investment decisions.

These results extend the literature on the relationship between mandatory and voluntary disclosure (Core, 2001; Leuz and Wysocki, 2016). Our findings suggest that the information asymmetry channel plays a crucial role in how firms respond to mandatory disclosure requirements, contributing to our understanding of the complex interactions between different types of corporate disclosures.

Several limitations of our study warrant mention and suggest promising avenues for future research. First, our analysis focuses on the information asymmetry channel, but other mechanisms may also influence how firms respond to the Pay Ratio Disclosure Rule. Future research could explore alternative channels through which compensation-related disclosures affect corporate behavior. Second, our study examines relatively short-term effects of the disclosure requirement. Longer-term analyses could provide insights into how firms' disclosure practices evolve as they adapt to the new regulatory environment. Finally, future research could investigate how the effectiveness of the Pay Ratio Disclosure Rule varies across different institutional settings and firm characteristics.

Additional research opportunities include examining how the Pay Ratio Disclosure Rule affects other aspects of corporate behavior, such as compensation structure, employee morale, and firm performance. Researchers could also investigate how the disclosure requirement influences the behavior of various stakeholders, including employees, customers, and suppliers. Such analyses would further our understanding of the broad economic consequences of compensation-related disclosure requirements.

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Table 1

Descriptive Statistics

Variables	N	Mean	Std. Dev.	P25	Median	P75
FreqMF	14,231	0.6176	0.9021	0.0000	0.0000	1.6094
Treatment Effect	14,231	0.5950	0.4909	0.0000	1.0000	1.0000
Institutional ownership	14,231	0.5931	0.3409	0.2872	0.6918	0.8840
Firm size	14,231	6.5590	2.1195	5.0229	6.5954	8.0455
Book-to-market	14,231	0.5476	0.5701	0.2300	0.4391	0.7485
ROA	14,231	-0.0501	0.2617	-0.0340	0.0221	0.0632
Stock return	14,231	0.0057	0.4297	-0.2229	-0.0349	0.1584
Earnings volatility	14,231	0.1503	0.3093	0.0229	0.0536	0.1389
Loss	14,231	0.3238	0.4679	0.0000	0.0000	1.0000
Class action litigation risk	14,231	0.2615	0.2435	0.0842	0.1739	0.3586

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

Table 2
Pearson Correlations
Pay Ratio Disclosure Rule

	Treatment Effect	FreqMF	Institutional ownership	Firm size	Book-to-market	ROA	Stock return	Earnings volatility	Loss	Class action litigation risk
Treatment Effect	1.00	**-0.03**	**0.07**	**0.03**	**-0.06**	**-0.07**	**-0.07**	**0.05**	**0.06**	**-0.04**
FreqMF	**-0.03**	1.00	**0.38**	**0.44**	**-0.16**	**0.24**	-0.01	**-0.19**	**-0.25**	**-0.05**
Institutional ownership	**0.07**	**0.38**	1.00	**0.62**	**-0.19**	**0.34**	**-0.03**	**-0.26**	**-0.29**	-0.02
Firm size	**0.03**	**0.44**	**0.62**	1.00	**-0.32**	**0.40**	**0.06**	**-0.28**	**-0.41**	**0.08**
Book-to-market	**-0.06**	**-0.16**	**-0.19**	**-0.32**	1.00	**0.09**	**-0.14**	**-0.10**	**0.02**	**-0.05**
ROA	**-0.07**	**0.24**	**0.34**	**0.40**	**0.09**	1.00	**0.17**	**-0.59**	**-0.61**	**-0.21**
Stock return	**-0.07**	-0.01	**-0.03**	**0.06**	**-0.14**	**0.17**	1.00	**-0.06**	**-0.14**	**-0.06**
Earnings volatility	**0.05**	**-0.19**	**-0.26**	**-0.28**	**-0.10**	**-0.59**	**-0.06**	1.00	**0.39**	**0.21**
Loss	**0.06**	**-0.25**	**-0.29**	**-0.41**	**0.02**	**-0.61**	**-0.14**	**0.39**	1.00	**0.25**
Class action litigation risk	**-0.04**	**-0.05**	-0.02	**0.08**	**-0.05**	**-0.21**	**-0.06**	**0.21**	**0.25**	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 Pay Ratio Disclosure Rule on Management Forecast Frequency

	(1)	(2)
Treatment Effect	-0.0474*** (3.06)	-0.0897*** (6.51)
Institutional ownership		0.4347*** (16.35)
Firm size		0.1237*** (25.80)
Book-to-market		-0.0842*** (8.09)
ROA		0.0847*** (3.41)
Stock return		-0.1133*** (8.51)
Earnings volatility		-0.0911*** (5.17)
Loss		-0.0791*** (4.46)
Class action litigation risk		-0.2209*** (8.52)
N	14,231	14,231
R^2	0.0007	0.2251

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