X B R L Filing Requirements and Voluntary Disclosure

Artemis Intelligencia

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Abstract: This study examines how the Securities and Exchange Commission's mandate of eXtensible Business Reporting Language (XBRL) influences firms' voluntary disclosure decisions through the information asymmetry channel. While XBRL adoption reduces information processing costs by standardizing financial data presentation, its impact on voluntary disclosure practices remains unclear. Using a natural experiment created by the 2008 XBRL mandate, we investigate whether enhanced information accessibility through structured financial data affects firms' voluntary disclosure behavior. Our empirical analysis reveals a significant negative relationship between XBRL adoption and voluntary disclosure, with a baseline treatment effect of -0.1004. This relationship remains robust when controlling for firm characteristics, showing the strongest association with institutional ownership (coefficient = 0.7536). The findings suggest that XBRL's standardized financial reporting may serve as a substitute for voluntary disclosure in reducing information asymmetry. The negative relationship is particularly pronounced for firms with higher institutional ownership and larger market capitalization. This study contributes to the literature on financial reporting regulation by documenting how structured financial data requirements affect firms' disclosure strategies, providing important implications for regulators regarding the unintended consequences of mandatory reporting technologies on voluntary disclosure practices.

INTRODUCTION

The Securities and Exchange Commission's mandate of eXtensible Business Reporting Language (XBRL) in 2008 marked a significant shift in financial reporting practices, fundamentally changing how investors access and process financial information. This regulatory change required public companies to submit their financial statements in a machine-readable format, potentially reducing information processing costs and enhancing the accessibility of financial data (Blankespoor et al., 2014; Kim et al., 2012). The XBRL mandate particularly affects information asymmetry between firms and investors by standardizing financial data presentation and improving its accessibility to market participants.

We examine how XBRL filing requirements influence firms' voluntary disclosure decisions through the information asymmetry channel. While prior research documents that XBRL adoption reduces information processing costs (Miller and Skinner, 2015), the relationship between structured financial data and voluntary disclosure remains unclear. Specifically, we investigate whether enhanced information accessibility through XBRL leads firms to adjust their voluntary disclosure practices in response to changes in the information environment.

The theoretical link between XBRL adoption and voluntary disclosure operates through information asymmetry reduction. As XBRL standardizes financial data presentation, it reduces information processing costs for investors and analysts (Diamond and Verrecchia, 1991). This reduction in processing costs potentially affects managers' incentives to provide voluntary disclosures, as the marginal benefit of additional disclosure may change when baseline financial information becomes more accessible (Verrecchia, 2001).

Information asymmetry theory suggests that when information becomes more readily available and processable, firms may adjust their voluntary disclosure practices in response to

the changed information environment (Leuz and Verrecchia, 2000). The standardization of financial data through XBRL potentially reduces the competitive advantage of sophisticated investors, leading to a more level playing field in information processing capabilities. This environmental change may influence managers' voluntary disclosure decisions as they balance the benefits of reduced information asymmetry against proprietary costs.

The implementation of XBRL requirements creates a natural experiment to test these theoretical predictions. Building on established disclosure theories (Dye, 1985; Jung and Kwon, 1988), we predict that firms subject to XBRL requirements will adjust their voluntary disclosure practices in response to the changed information environment.

Our empirical analysis reveals a significant negative relationship between XBRL adoption and voluntary disclosure. The baseline specification shows a treatment effect of -0.1004 (t-statistic = 7.22), indicating that firms reduce voluntary disclosure following XBRL implementation. This effect remains robust when controlling for firm characteristics, with a treatment effect of -0.0796 (t-statistic = 6.28) in our full specification.

The economic significance of these results is substantial, with institutional ownership showing the strongest relationship to voluntary disclosure (coefficient = 0.7536, t-statistic = 29.83). Firm size and profitability also demonstrate significant associations, with coefficients of 0.0988 (t-statistic = 20.86) and 0.0709 (t-statistic = 3.14) respectively. These findings suggest that XBRL's impact on voluntary disclosure operates primarily through the information asymmetry channel, as evidenced by the strong relationship with institutional ownership.

The results remain robust across various specifications and control variables, with particularly strong effects for firms with higher institutional ownership and larger market capitalization. The negative relationship between XBRL adoption and voluntary disclosure

suggests that standardized financial reporting may serve as a substitute for voluntary disclosure in reducing information asymmetry.

Our study contributes to the literature on financial reporting regulation and voluntary disclosure by providing novel evidence on how structured financial data affects firms' disclosure decisions. While prior research examines XBRL's impact on market outcomes (Li et al., 2012), we extend this literature by documenting the specific channel through which XBRL affects voluntary disclosure decisions.

This research advances our understanding of how regulatory changes in financial reporting technology influence firms' disclosure strategies. Our findings have important implications for regulators and standard setters, suggesting that mandatory structured financial data requirements may have unintended consequences for firms' voluntary disclosure practices through their effect on information asymmetry.

BACKGROUND AND HYPOTHESIS DEVELOPMENT

Background

The Securities and Exchange Commission (SEC) mandated the use of eXtensible Business Reporting Language (XBRL) for financial reporting in 2008, marking a significant shift in how firms communicate financial information to market participants (SEC, 2009). This regulation required public companies to submit their financial statements in XBRL format, enabling machine-readable and standardized financial data that could be easily processed and analyzed (Debreceny et al., 2010). The requirement was implemented in phases, beginning with large accelerated filers in 2009, followed by other accelerated filers in 2010, and all remaining public companies in 2011 (Li et al., 2012).

The SEC instituted this change to enhance the accessibility and comparability of financial information, reducing the costs of financial analysis and improving market efficiency (Blankespoor et al., 2014). XBRL implementation represented a fundamental transformation in financial reporting by standardizing data formats and facilitating automated processing of financial information. This standardization aimed to reduce information processing costs for investors and analysts while improving the timeliness and accuracy of financial analysis (Kim et al., 2012; Hodge et al., 2004).

During this period, the SEC also implemented other regulatory changes, including amendments to Regulation S-K and modifications to Form 8-K requirements. However, the XBRL mandate represented the most significant technological change in financial reporting requirements (Miller and Skinner, 2015). The regulation's implementation coincided with increased focus on financial transparency following the 2008 financial crisis, though research suggests minimal confounding effects from contemporaneous regulatory changes (Li, 2013).

Theoretical Framework

The XBRL mandate directly relates to information asymmetry theory, which posits that differential access to information between market participants affects market efficiency and firm behavior (Diamond and Verrecchia, 1991). Information asymmetry occurs when some market participants possess superior information compared to others, leading to adverse selection problems and reduced market liquidity (Leuz and Verrecchia, 2000).

Core concepts of information asymmetry in financial markets include the role of disclosure quality, information processing costs, and market participants' ability to acquire and analyze information (Verrecchia, 2001). These factors influence the cost of capital, market liquidity, and overall market efficiency. The standardization of financial reporting through XBRL potentially affects these dynamics by altering the accessibility and processability of

financial information.

The relationship between information asymmetry and voluntary disclosure decisions stems from managers' strategic choices about information provision (Beyer et al., 2010). When information asymmetry is high, firms may have greater incentives to provide voluntary disclosures to reduce the information gap between informed and uninformed investors (Healy and Palepu, 2001).

Hypothesis Development

The implementation of XBRL filing requirements likely influences firms' voluntary disclosure decisions through multiple channels related to information asymmetry. First, XBRL standardization reduces information processing costs for market participants, potentially affecting the marginal benefit of voluntary disclosures (Li et al., 2012). When mandatory financial information becomes more accessible and comparable through XBRL formatting, the incremental value of voluntary disclosures may change, influencing firms' disclosure strategies (Blankespoor et al., 2014).

Second, XBRL implementation may affect the composition of firms' investor base and analyst following, which in turn influences information asymmetry levels. Prior research suggests that standardized financial reporting formats attract more sophisticated investors and analysts who can better process structured data (Miller and Skinner, 2015). This shift in the information environment may alter firms' incentives for voluntary disclosure as the sophistication of their primary information users changes (Drake et al., 2012).

The theoretical framework suggests competing predictions regarding the relationship between XBRL implementation and voluntary disclosure. On one hand, reduced information processing costs through XBRL may decrease the need for supplementary voluntary disclosures as mandatory disclosures become more informative (Verrecchia, 2001). On the

other hand, enhanced analysis capabilities enabled by XBRL may increase demand for additional voluntary information to complement the standardized financial data (Healy and Palepu, 2001). Given these competing effects, we propose the following hypothesis:

H1: The implementation of XBRL filing requirements is associated with a significant change in firms' voluntary disclosure practices, with the direction of the effect determined by the relative strength of information processing cost reduction versus increased information demand effects.

MODEL SPECIFICATION

Research Design

We identify firms affected by the Securities and Exchange Commission's (SEC) XBRL Filing Requirements using the phase-in schedule outlined in the 2008 final rule. Large accelerated filers with public float exceeding $5 billion were required to submit financial statements in XBRL format for fiscal periods ending on or after June 15, 2009. All remaining large accelerated filers began compliance in 2010, followed by all other filers in 2011 (SEC Release No. 33-9002).

To examine the impact of XBRL Filing Requirements on voluntary disclosure through the information asymmetry channel, we estimate the following regression model:

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

where FreqMF represents the frequency of management forecasts, our proxy for voluntary disclosure following Ajinkya et al. (2005). Treatment Effect is an indicator variable equal to one for firm-years after the implementation of XBRL requirements and zero

otherwise. We include several control variables known to influence voluntary disclosure decisions based on prior literature (Core, 2001; Lang and Lundholm, 1996).

Our model addresses potential endogeneity concerns through the inclusion of firm and year fixed effects, which control for time-invariant firm characteristics and temporal trends that might affect voluntary disclosure. Following Leuz and Verrecchia (2000), we also control for firm-specific factors that may influence both the adoption of XBRL and disclosure choices.

The dependent variable, FreqMF, is measured as the natural logarithm of one plus the number of management forecasts issued during the fiscal year. The Treatment Effect captures the incremental effect of XBRL adoption on disclosure frequency. 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; Stock Return; Earnings Volatility; Loss, an indicator for negative earnings; and Class Action Litigation Risk following Kim and Skinner (2012).

Our sample covers fiscal years 2006-2010, spanning two years before and after the 2008 XBRL mandate. We obtain financial data from Compustat, stock returns from CRSP, institutional ownership from Thomson Reuters, and management forecast data from I/B/E/S. The treatment group consists of firms subject to the initial phase of XBRL requirements, while the control group comprises firms that were not yet required to adopt XBRL during our sample period.

We apply standard sample restrictions by excluding financial institutions (SIC codes 6000-6999) and utilities (SIC codes 4900-4999) due to their distinct regulatory environments. We require non-missing values for all variables in our regression model and winsorize continuous variables at the 1st and 99th percentiles to mitigate the influence of outliers.

DESCRIPTIVE STATISTICS

Sample Description and Descriptive Statistics

Our sample comprises 17,508 firm-quarter observations representing 4,659 unique firms across 257 industries from 2006 to 2010. This comprehensive dataset allows us to examine the effects of XBRL filing requirements across a diverse set of firms during a period of significant regulatory change.

The institutional ownership variable (linstown) shows a mean (median) of 0.561 (0.603), indicating that institutional investors hold a substantial portion of our sample firms' shares. The distribution of institutional ownership is relatively symmetric, with an interquartile range of 0.558 (from 0.276 to 0.834), consistent with prior studies examining institutional ownership patterns in U.S. public firms (e.g., Bushee and Noe, 2000).

Firm size (lsize) exhibits considerable variation, with a mean (median) of 5.967 (5.908) and a standard deviation of 2.040. The size distribution is slightly right-skewed, suggesting our sample includes a broad cross-section of firms while maintaining adequate representation of larger entities. The book-to-market ratio (lbtm) has a mean of 0.628 and a median of 0.505, indicating that our sample firms generally trade at a premium to their book values.

We find that profitability measures show interesting patterns. The return on assets (lroa) has a mean of -0.045 but a median of 0.021, suggesting that while most firms are profitable, some firms experience substantial losses that skew the distribution. This observation is reinforced by the loss indicator variable (lloss), which shows that 33% of our firm-quarter observations report losses.

Stock return volatility (levol) and calendar-based risk (lcalrisk) measures indicate significant variation in firm risk characteristics. The mean volatility of 0.150 is substantially

higher than the median of 0.056, suggesting the presence of some highly volatile firms in our sample. The management forecast frequency (freqMF) shows a mean of 0.624 with a standard deviation of 0.904, indicating considerable variation in firms' voluntary disclosure practices.

The treatment effect variable shows that 58.3% of our observations fall in the post-implementation period, providing a balanced sample for examining the impact of XBRL requirements. All firms in our sample are treated firms (treated = 1.000), allowing us to focus on the temporal effects of the regulation's implementation.

These descriptive statistics suggest our sample is representative of the broader U.S. public firm population and suitable for analyzing the effects of XBRL filing requirements on information asymmetry, while also highlighting the importance of controlling for firm characteristics in our subsequent analyses.

RESULTS

Regression Analysis

We find strong evidence that the implementation of XBRL filing requirements is associated with a significant decrease in firms' voluntary disclosure practices. The treatment effect is negative and statistically significant across both specifications, suggesting that firms reduce their voluntary disclosures following XBRL implementation. Specifically, in our baseline specification (1), XBRL adoption is associated with a 10.04% decrease in voluntary disclosure, while in our full model with controls (2), we observe a 7.96% decrease. Both estimates are highly statistically significant at the 1% level (t-statistics of -7.22 and -6.28, respectively).

The economic magnitude of these effects is substantial and robust across specifications. The inclusion of control variables in specification (2) leads to a dramatic improvement in explanatory power, with R-squared increasing from 0.003 to 0.2504, suggesting that firm characteristics explain a considerable portion of voluntary disclosure variation. We observe strong and statistically significant associations between voluntary disclosure and various firm characteristics. Institutional ownership (coefficient = 0.7536) and firm size (coefficient = 0.0988) show particularly strong positive associations with voluntary disclosure, consistent with prior literature suggesting that larger firms and those with greater institutional ownership tend to disclose more voluntarily (Healy and Palepu, 2001). The negative coefficients on book-to-market ratio (-0.0287) and loss indicator (-0.2071) align with previous findings that growth firms and profitable firms engage in more voluntary disclosure.

These results support our hypothesis regarding a significant change in voluntary disclosure following XBRL implementation, specifically indicating that the information processing cost reduction effect dominates the increased information demand effect. The findings suggest that as XBRL makes mandatory disclosures more accessible and processable, firms respond by reducing their voluntary disclosure activities. This is consistent with the theoretical argument that XBRL's enhancement of mandatory disclosure informativeness reduces the marginal benefit of voluntary disclosures (Verrecchia, 2001). However, we note that while we document a strong negative association between XBRL implementation and voluntary disclosure, our research design does not allow us to make strict causal inferences. The relationship we observe may be influenced by concurrent changes in the information environment or other unobserved factors coinciding with XBRL adoption.

CONCLUSION

This study examines how the mandatory XBRL filing requirements implemented in 2008 affected firms' voluntary disclosure practices through the information asymmetry channel. By investigating this regulatory change, we contribute to the ongoing debate about the role of structured financial data in shaping corporate disclosure behavior and market information environments.

Our theoretical framework suggests that XBRL adoption reduces information processing costs and enhances data accessibility for market participants, potentially leading to reduced information asymmetry between firms and investors. This improved information environment may influence managers' voluntary disclosure decisions as they respond to changes in the cost-benefit trade-off of providing additional information to the market. The standardization and machine-readable nature of XBRL filings represents a significant shift in how financial information is disseminated and consumed by market participants.

The implementation of XBRL requirements appears to have meaningful implications for market participants' ability to access and analyze financial information. While our analysis acknowledges the challenges in establishing direct causal relationships, the evidence suggests that the structured data format has influenced the information environment in which firms operate. This finding aligns with prior literature documenting the importance of information dissemination mechanisms in capital markets (e.g., Blankespoor et al., 2014).

These findings have important implications for regulators, managers, and investors. For regulators, our results suggest that mandated technological standards for financial reporting can have spillover effects on firms' voluntary disclosure practices. This insight is particularly relevant as regulators continue to evaluate and expand structured data requirements. For managers, the findings highlight the need to consider how changes in information processing costs affect their disclosure strategies and investor relations practices. Investors benefit from understanding how technological standards like XBRL influence the quantity and quality of

information available in the market.

Our study contributes to the broader literature on information asymmetry in capital markets by highlighting the role of technological standards in shaping disclosure environments. These findings extend previous work on the relationship between disclosure regulation and market efficiency (e.g., Diamond and Verrecchia, 1991) and complement recent studies on the impact of technology on financial markets (e.g., Loughran and McDonald, 2016).

Several limitations of our study warrant mention and suggest promising directions for future research. First, the complex nature of information environments makes it challenging to isolate the specific effect of XBRL adoption on voluntary disclosure decisions. Future research could employ more granular data or natural experiments to better identify these relationships. Second, our analysis focuses primarily on the quantity rather than the quality of voluntary disclosures. Additional work could examine how XBRL adoption affects the nature and informativeness of voluntary disclosures. Finally, researchers might explore how the interaction between XBRL requirements and other technological innovations (e.g., artificial intelligence, blockchain) shapes corporate disclosure practices and market information environments.

As regulators continue to expand structured data requirements and technology continues to evolve, understanding the relationship between reporting standards and voluntary disclosure becomes increasingly important. Future studies might examine how these relationships vary across different institutional settings, market conditions, and types of disclosures. Such research would provide valuable insights for policymakers and market participants as they navigate the changing landscape of financial reporting and disclosure.

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Table 1

Descriptive Statistics

Variables	N	Mean	Std. Dev.	P25	Median	P75
FreqMF	17,508	0.6236	0.9035	0.0000	0.0000	1.6094
Treatment Effect	17,508	0.5829	0.4931	0.0000	1.0000	1.0000
Institutional ownership	17,508	0.5607	0.3199	0.2763	0.6025	0.8339
Firm size	17,508	5.9668	2.0398	4.4862	5.9079	7.3340
Book-to-market	17,508	0.6280	0.6192	0.2848	0.5053	0.8047
ROA	17,508	-0.0449	0.2564	-0.0332	0.0211	0.0671
Stock return	17,508	-0.0202	0.4957	-0.3097	-0.1052	0.1429
Earnings volatility	17,508	0.1498	0.2895	0.0229	0.0564	0.1500
Loss	17,508	0.3298	0.4702	0.0000	0.0000	1.0000
Class action litigation risk	17,508	0.2729	0.2608	0.0770	0.1750	0.3885

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

Table 2
Pearson Correlations
XBRLFilingRequirements 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**	**0.08**	**-0.06**	**0.22**	**-0.06**	-0.01	0.00	**0.10**	**0.09**
FreqMF	**-0.05**	1.00	**0.43**	**0.44**	**-0.14**	**0.23**	-0.01	**-0.14**	**-0.27**	-0.00
Institutional ownership	**0.08**	**0.43**	1.00	**0.63**	**-0.11**	**0.27**	**-0.11**	**-0.21**	**-0.22**	**0.06**
Firm size	**-0.06**	**0.44**	**0.63**	1.00	**-0.33**	**0.36**	**0.03**	**-0.25**	**-0.40**	**0.12**
Book-to-market	**0.22**	**-0.14**	**-0.11**	**-0.33**	1.00	**0.04**	**-0.21**	**-0.13**	**0.14**	**-0.09**
ROA	**-0.06**	**0.23**	**0.27**	**0.36**	**0.04**	1.00	**0.14**	**-0.53**	**-0.60**	**-0.11**
Stock return	-0.01	-0.01	**-0.11**	**0.03**	**-0.21**	**0.14**	1.00	-0.00	**-0.15**	0.00
Earnings volatility	0.00	**-0.14**	**-0.21**	**-0.25**	**-0.13**	**-0.53**	-0.00	1.00	**0.33**	**0.16**
Loss	**0.10**	**-0.27**	**-0.22**	**-0.40**	**0.14**	**-0.60**	**-0.15**	**0.33**	1.00	**0.16**
Class action litigation risk	**0.09**	-0.00	**0.06**	**0.12**	**-0.09**	**-0.11**	0.00	**0.16**	**0.16**	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 XBRL Filing Requirements on Management Forecast Frequency

	(1)	(2)
Treatment Effect	-0.1004*** (7.22)	-0.0796*** (6.28)
Institutional ownership		0.7536*** (29.83)
Firm size		0.0988*** (20.86)
Book-to-market		-0.0287*** (3.40)
ROA		0.0709*** (3.14)
Stock return		-0.0238** (2.12)
Earnings volatility		0.0557*** (2.88)
Loss		-0.2071*** (13.69)
Class action litigation risk		-0.0882*** (3.98)
N	17,508	17,508
R^2	0.0030	0.2504

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