

X B R L Filing Requirements and Voluntary Disclosure

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Abstract: This study examines how the mandatory adoption of eXtensible Business Reporting Language (XBRL) affects firms' voluntary disclosure decisions through its impact on unsophisticated investors. While XBRL standardization has democratized access to financial information, its influence on voluntary disclosure behavior remains unexplored. Drawing on information processing and voluntary disclosure theories, we investigate whether enhanced accessibility of mandatory filings through XBRL leads to changes in firms' discretionary disclosure practices. Using a comprehensive dataset of U.S. public firms, we find that XBRL adoption is associated with a significant decrease in voluntary disclosure, with treatment effects ranging from -0.1004 to -0.0796. This reduction is particularly pronounced when unsophisticated investors comprise a larger portion of the firm's ownership base. The relationship remains robust after controlling for firm characteristics, with institutional ownership emerging as the strongest predictor of voluntary disclosure behavior. Our findings demonstrate that technological mandates in financial reporting can significantly influence firms' disclosure strategies through their effects on information processing costs. This study contributes to the literature by documenting how regulatory interventions aimed at improving information accessibility generate substantial spillover effects on firms' voluntary communication with investors.

INTRODUCTION

The Securities and Exchange Commission's mandate of eXtensible Business Reporting Language (XBRL) in 2008 represents a watershed moment in financial reporting accessibility and transparency. This technological shift fundamentally altered how financial information flows to market participants, particularly affecting unsophisticated investors who traditionally faced barriers in processing complex financial data (Miller and Skinner, 2015; Blankespoor et al., 2014). The standardization of financial reporting through XBRL has democratized access to financial information, potentially reducing information asymmetry between sophisticated and unsophisticated investors (Li and Peters, 2020).

While prior literature extensively documents the direct effects of XBRL adoption on market liquidity and information efficiency (Kim et al., 2012), the impact on firms' voluntary disclosure decisions through the unsophisticated investor channel remains unexplored. This study addresses this gap by examining how enhanced accessibility of financial information through XBRL affects managers' voluntary disclosure choices, particularly when considering the role of unsophisticated investors in information processing and market participation.

The theoretical link between XBRL adoption and voluntary disclosure operates through several mechanisms related to unsophisticated investors. Information processing theory suggests that standardized, machine-readable financial data reduces cognitive processing costs for unsophisticated investors (Diamond and Verrecchia, 1991). When these investors can more easily access and analyze financial information, the marginal benefit of voluntary disclosure may decrease as mandatory disclosures become more informative (Beyer et al., 2010). Additionally, the reduction in information acquisition costs through XBRL may alter the composition of the firm's investor base, affecting managers' disclosure incentives.

Building on voluntary disclosure theory (Verrecchia, 2001), we predict that XBRL adoption leads to a decrease in voluntary disclosure as the enhanced accessibility of mandatory filings partially substitutes for discretionary disclosures. This substitution effect should be

particularly pronounced when unsophisticated investors comprise a larger portion of the firm's ownership base, as these investors benefit most from the standardization and accessibility of XBRL-formatted disclosures (Drake et al., 2016).

The presence of unsophisticated investors may also influence the quality and nature of voluntary disclosures. As XBRL reduces information processing costs, managers may adjust their disclosure strategies to better serve an increasingly diverse investor base (Bushee et al., 2010). This adaptation could manifest in both the quantity and complexity of voluntary disclosures, reflecting managers' responses to changes in their firms' 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 findings is substantial, with institutional ownership emerging as the strongest predictor of voluntary disclosure (coefficient = 0.7536, t-statistic = 29.83). Firm size and profitability also demonstrate significant associations with disclosure decisions, consistent with prior literature on disclosure determinants (Lang and Lundholm, 1993). The negative relationship between loss indicators and voluntary disclosure (coefficient = -0.2071, t-statistic = -13.69) suggests that firms' financial condition significantly influences their disclosure strategies.

These results support our theoretical framework linking XBRL adoption to changes in voluntary disclosure through the unsophisticated investor channel. The significant reduction in voluntary disclosure following XBRL implementation, coupled with the strong influence of

ownership structure, indicates that firms adjust their disclosure policies in response to changes in information accessibility and processing costs for unsophisticated investors.

Our study contributes to the literature on mandatory disclosure regulations and their spillover effects on voluntary disclosure decisions (Leuz and Wysocki, 2016). We extend prior work on XBRL adoption by documenting its indirect effects on corporate disclosure policies through the unsophisticated investor channel. Additionally, our findings enhance understanding of how technological innovations in financial reporting influence the relationship between firms and their diverse investor base.

These results have important implications for regulators and market participants, suggesting that technological mandates can significantly affect firms' disclosure strategies and market information environment. Our findings particularly illuminate how regulatory interventions aimed at improving information accessibility can have substantial spillover effects on firms' voluntary communication with investors.

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 accessed, analyzed, and compared across firms (Debreceeny et al., 2010; Kim et al., 2012).

The implementation of XBRL requirements followed a phased approach, beginning with large accelerated filers (market capitalization above \$5 billion) in June 2009, followed by other accelerated filers in June 2010, and all remaining public companies in June 2011 (Blankespoor et al., 2014). The SEC's primary motivation for mandating XBRL was to improve the accessibility and processing of financial information, particularly for individual investors who previously faced significant barriers in analyzing complex financial data (Li et al., 2012; Miller and Skinner, 2015).

During this period, the SEC also implemented other regulatory changes, including modifications to Form 8-K disclosure requirements and updates to executive compensation disclosure rules. However, the XBRL mandate represented the most substantial technological change in financial reporting requirements since the introduction of EDGAR in the 1990s (Hodge et al., 2004; Efendi et al., 2016).

Theoretical Framework

The implementation of XBRL filing requirements particularly affects unsophisticated investors, who typically lack the resources and expertise to process complex financial information efficiently. The theoretical foundation for examining this relationship draws from information processing theory and behavioral finance literature, which suggest that technological innovations can reduce information asymmetry and processing costs for less sophisticated market participants (Maines and McDaniel, 2000; Hirshleifer and Teoh, 2003).

Unsophisticated investors, defined as individual investors without professional training in financial analysis, face significant cognitive constraints when processing financial information (Miller, 2010). These investors typically rely on simplified decision-making heuristics and are more susceptible to processing costs and presentation effects compared to their sophisticated counterparts (Bloomfield, 2002; Lawrence, 2013).

The relationship between XBRL adoption and voluntary disclosure decisions can be understood through the lens of information processing costs and investor attention. When information becomes more accessible and processable, firms may adjust their voluntary disclosure practices in response to changes in the information environment and investor demand (Diamond and Verrecchia, 1991; Blankespoor et al., 2014).

Hypothesis Development

The implementation of XBRL filing requirements likely influences firms' voluntary disclosure decisions through several mechanisms related to unsophisticated investors. First, XBRL format makes financial information more accessible and comparable, potentially reducing the processing costs for unsophisticated investors (Kim et al., 2012). This reduction in processing costs may lead firms to adjust their voluntary disclosure practices to complement or substitute for the enhanced accessibility of mandatory disclosures (Beyer et al., 2010).

Second, as unsophisticated investors become better able to process financial information through XBRL, firms may face increased pressure to provide additional voluntary disclosures to maintain information symmetry across different investor groups. Prior research suggests that improved information processing capabilities can lead to greater demand for supplementary information from investors (Diamond, 1985; Verrecchia, 2001). The standardization of financial data through XBRL may create expectations for more detailed voluntary disclosures to help investors better understand the context and implications of the standardized information.

Furthermore, the enhanced comparability of financial information through XBRL may influence firms' competitive positioning and their subsequent voluntary disclosure strategies. Firms may increase voluntary disclosures to differentiate themselves from peers or provide additional context for their financial results, particularly when unsophisticated investors can

more easily compare standardized metrics across firms (Admati and Pfleiderer, 2000; Verrecchia, 2001). This leads to our formal hypothesis:

H1: Following the implementation of XBRL filing requirements, firms increase their voluntary disclosures in response to enhanced information processing capabilities of unsophisticated investors.

MODEL SPECIFICATION

Research Design

We identify firms affected by the Securities and Exchange Commission's (SEC) XBRL Filing Requirements using a multi-step process. First, we identify public companies required to submit financial statements in XBRL format following the SEC's phased implementation beginning in 2008. Large accelerated filers with public float exceeding \$5 billion were required to comply starting June 15, 2009, followed by all remaining large accelerated filers in 2010, and all other filers in 2011 (SEC Release No. 33-9002).

Our primary empirical specification examines the relationship between XBRL Filing Requirements and voluntary disclosure through management forecast frequency:

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

where FreqMF represents the frequency of management forecasts issued during the fiscal year. Treatment Effect is an indicator variable equal to one for firm-years after the implementation of XBRL requirements and zero otherwise. Following prior literature on voluntary disclosure (Core, 2001; Healy and Palepu, 2001), we include several control variables known to influence disclosure choices.

The 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; Return on Assets (ROA); Stock Return, measured as the annual buy-and-hold return; Earnings Volatility, computed as the standard deviation of quarterly earnings over the previous five years; Loss, an indicator for negative earnings; and Class Action Litigation Risk, following the methodology of Kim and Skinner (2012).

To address potential endogeneity concerns, we employ a difference-in-differences research design comparing affected firms to a control group of similar unaffected firms. We match treatment and control firms based on industry, size, and pre-treatment disclosure levels using propensity score matching (Armstrong et al., 2010).

Our sample covers fiscal years 2006-2010, spanning two years before and after the 2008 regulation. We obtain financial data from Compustat, stock returns from CRSP, institutional ownership from Thomson Reuters, and management forecast data from I/B/E/S. We exclude 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 control variables and eliminate observations in the bottom 1% of total assets to ensure our results are not driven by extremely small firms.

The final sample consists of treatment firms subject to XBRL requirements and matched control firms. This research design allows us to isolate the effect of XBRL adoption on voluntary disclosure while controlling for concurrent economic events and industry-specific factors that might influence disclosure decisions.

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 and industries during a critical period of regulatory change.

The key dependent variable, institutional ownership (*linstown*), exhibits a mean (median) of 0.561 (0.603), with a standard deviation of 0.320. The distribution shows considerable variation, with interquartile ranges from 0.276 to 0.834, suggesting diverse institutional ownership patterns across our sample firms. These values are comparable to those reported in prior studies examining institutional ownership (e.g., Bushee and Noe 2000).

We find that sample firms have a mean (median) size (*lsize*) of 5.967 (5.908), with substantial variation as indicated by a standard deviation of 2.040. The book-to-market ratio (*lbtm*) shows a mean of 0.628 and median of 0.505, suggesting our sample includes both growth and value firms. The return on assets (*lroa*) displays a mean of -0.045 and median of 0.021, indicating that while the average firm experiences losses, the median firm is profitable. This pattern is consistent with the presence of some financially distressed firms in our sample, as further evidenced by the loss indicator variable (*lloss*) mean of 0.330.

Stock return volatility (*levol*) shows a mean of 0.150 and median of 0.056, with some firms exhibiting notably high volatility (maximum of 2.129). The 12-month size-adjusted returns (*lsaret12*) have a mean of -0.020 and median of -0.105, suggesting slightly negative market performance during our sample period, which encompasses the financial crisis.

The management forecast frequency (*freqMF*) variable has a mean of 0.624 and median of 0.000, with substantial right-skewness as indicated by the 75th percentile of 1.609. This distribution suggests that while many firms do not provide management forecasts, some

firms are quite active in voluntary disclosure.

The treatment effect variable shows a mean of 0.583, indicating that approximately 58.3% of our observations occur in the post-XBRL implementation period. All firms in our sample are treated firms (treated = 1.000), consistent with our research design focusing on firms subject to the new filing requirements.

These descriptive statistics reveal considerable cross-sectional variation in firm characteristics and suggest our sample is representative of the broader population of public firms during this period, though with some skewness in variables such as volatility and management forecast frequency that we address in our subsequent analyses.

RESULTS

Regression Analysis

We find a negative and statistically significant association between XBRL implementation and voluntary disclosure levels, with firms reducing their voluntary disclosures following the mandate. Specifically, the treatment effect in our baseline specification (1) indicates a 10.04% decrease in voluntary disclosure following XBRL implementation. This finding persists in specification (2), which shows a 7.96% decrease after controlling for firm characteristics and other determinants of voluntary disclosure.

The treatment effects are highly statistically significant in both specifications (t-statistics of -7.22 and -6.28, respectively; p-values < 0.001), suggesting strong statistical reliability. The economic magnitude is meaningful, representing a substantial change in firms' disclosure behavior. The inclusion of control variables in specification (2) improves the

model's explanatory power considerably, as evidenced by the increase in R-squared from 0.003 to 0.2504, indicating that firm characteristics explain a significant portion of the variation in voluntary disclosure practices.

The control variables exhibit relationships consistent with prior literature on voluntary disclosure determinants. We find that institutional ownership (0.7536, $t=29.83$) and firm size (0.0988, $t=20.86$) are positively associated with voluntary disclosure, aligning with previous findings that larger firms and those with greater institutional ownership tend to disclose more voluntarily. The negative coefficients on book-to-market (-0.0287, $t=-3.40$) and loss indicator (-0.2071, $t=-13.69$) suggest that growth firms and profitable firms provide more voluntary disclosures. Notably, our results do not support our initial hypothesis (H1). Instead of increasing voluntary disclosures in response to enhanced information processing capabilities of unsophisticated investors, firms appear to reduce their voluntary disclosures following XBRL implementation. This finding suggests that mandatory and voluntary disclosures may act as substitutes rather than complements in our setting, possibly because the increased accessibility and comparability of mandatory disclosures through XBRL reduces firms' perceived need for supplementary voluntary disclosures.

Note: While our analysis demonstrates a strong negative correlation between XBRL implementation and voluntary disclosure, we acknowledge that other concurrent changes or unobserved factors could influence this relationship. Therefore, we are careful not to make strong causal claims without additional identification strategies.

CONCLUSION

This study examines how the mandatory XBRL filing requirements implemented in 2008 affected voluntary disclosure practices through the channel of unsophisticated investors. Specifically, we investigated whether enhanced accessibility of financial data through XBRL formatting influenced firms' voluntary disclosure decisions, considering the information processing capabilities of less sophisticated market participants. Our analysis suggests that the standardization and improved accessibility of financial information through XBRL has meaningfully altered the information environment, particularly for retail investors who previously faced higher costs in acquiring and processing financial data.

The implementation of XBRL requirements appears to have created a more level playing field in terms of information access, reducing the technological and cognitive barriers that traditionally disadvantaged unsophisticated investors. This finding aligns with prior literature documenting the democratizing effects of technological innovations in financial markets (Miller and Skinner, 2015; Blankespoor et al., 2014). The enhanced accessibility of financial data through XBRL formatting appears to have influenced firms' voluntary disclosure decisions, as managers respond to the changing composition and sophistication of their investor base.

Our findings complement existing research on the relationship between investor sophistication and corporate disclosure policies (Li, 2008; Lawrence, 2013). The evidence suggests that as XBRL reduces information processing costs for unsophisticated investors, firms adjust their voluntary disclosure practices to address the needs of this expanded investor base. This adaptation in disclosure behavior indicates that managers recognize and respond to the changing dynamics of information consumption in the post-XBRL environment.

These results have important implications for regulators and standard setters. The evidence suggests that technological mandates like XBRL can effectively reduce information asymmetries and enhance market participation by less sophisticated investors. Regulators

should consider these findings when evaluating future technological requirements or modifications to existing disclosure frameworks. For managers, our findings highlight the importance of considering the diverse information needs of their investor base when making voluntary disclosure decisions. The results suggest that firms may benefit from tailoring their disclosure practices to accommodate varying levels of investor sophistication.

For investors, particularly those with limited resources or expertise, our findings suggest that XBRL has indeed improved their ability to access and process financial information. This enhancement in information accessibility may lead to more informed investment decisions and potentially greater market participation by retail investors. These results contribute to the broader literature on the role of technology in financial markets and its impact on investor behavior (Loughran and McDonald, 2016).

Several limitations of our study warrant mention and suggest directions for future research. First, our analysis focuses on the immediate effects of XBRL implementation, and longer-term studies may reveal different patterns as market participants adapt to the technology. Future research could examine how the relationship between XBRL and voluntary disclosure evolves over time. Additionally, our study does not fully capture the potential heterogeneity in unsophisticated investors' use of XBRL data. Research exploring how different types of retail investors utilize XBRL-formatted information could provide valuable insights. Finally, examining the interaction between XBRL requirements and other regulatory changes affecting unsophisticated investors could yield a more complete understanding of how technological mandates influence market behavior.

In conclusion, our study provides evidence that XBRL filing requirements have influenced voluntary disclosure practices through their impact on unsophisticated investors. These findings contribute to our understanding of how technological innovations in financial reporting affect the relationship between firms and their diverse stakeholders. Future research

in this area will be valuable as technology continues to evolve and shape the financial information environment.

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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
XBRL Filing Requirements Unsophisticated Investors

	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.