

X B R L Filing Requirements and Voluntary Disclosure

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Abstract: This study examines how the Securities and Exchange Commission's mandatory eXtensible Business Reporting Language (XBRL) filing requirements affect firms' voluntary disclosure decisions through the proprietary costs channel. While XBRL requirements enhance financial information accessibility and comparability, they may also increase proprietary costs by making detailed financial information more readily available to competitors. Using a difference-in-differences research design, we analyze the relationship between XBRL adoption and voluntary disclosure practices. Results indicate that firms significantly reduce voluntary disclosures following XBRL implementation, with a treatment effect of -0.1004 that remains robust when controlling for firm characteristics. This reduction is particularly pronounced for firms with higher proprietary costs, as evidenced by significant coefficients on return volatility (0.0557) and loss indicators (-0.2071). The findings suggest that enhanced information accessibility through XBRL requirements leads firms to strategically limit voluntary disclosures to protect their competitive advantages. This study contributes to the literature by documenting how technological mandates in financial reporting influence firms' strategic disclosure decisions and highlights potential unintended consequences of regulatory changes aimed at improving information transparency in capital markets.

INTRODUCTION

The Securities and Exchange Commission's mandate of eXtensible Business Reporting Language (XBRL) filing requirements in 2008 marked a significant shift in financial reporting accessibility and transparency. This regulatory change required public companies to submit their financial statements in a standardized, machine-readable format, fundamentally altering how financial information is processed and disseminated in capital markets (Blankespoor et al., 2014; Kim et al., 2020). The XBRL mandate's impact on information accessibility raises important questions about firms' voluntary disclosure practices, particularly through the lens of proprietary costs. As information becomes more readily accessible and comparable across firms, the competitive implications of detailed financial disclosures become increasingly salient.

The relationship between mandatory XBRL adoption and voluntary disclosure decisions presents a compelling empirical puzzle. While enhanced information accessibility could theoretically promote greater transparency, the proprietary costs channel suggests that firms might strategically reduce voluntary disclosures to protect competitive advantages (Li, 2020; Chen et al., 2018). This tension motivates our primary research question: How does the standardization of financial information through XBRL requirements affect firms' voluntary disclosure decisions when considering proprietary costs?

The theoretical link between XBRL adoption and voluntary disclosure operates primarily through the proprietary costs channel. As XBRL formatting makes financial information more accessible and comparable, competitors can more easily extract and analyze detailed financial data, potentially increasing the proprietary costs of disclosure (Verrecchia, 1983; Dye, 1986). This increased accessibility reduces the information acquisition costs for competitors, making previously disclosed information more immediately actionable for strategic decision-making.

The proprietary costs theory suggests that firms face a trade-off between the benefits of voluntary disclosure and the competitive costs of revealing sensitive information (Verrecchia, 2001). When XBRL requirements reduce information processing costs, this trade-off shifts as the potential competitive damage from disclosed information increases. Prior literature demonstrates that firms reduce voluntary disclosure when proprietary costs are high (Bernard, 2016) and when information is more easily accessible to competitors (Li et al., 2018).

Building on these theoretical foundations, we predict that firms subject to XBRL requirements will reduce their voluntary disclosures, particularly when operating in industries with high proprietary costs. This prediction reflects the increased competitive threats arising from enhanced information accessibility and the strategic response of firms to protect their competitive advantages.

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 disclosures 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 (coefficient = 0.7536) and firm size (coefficient = 0.0988) emerging as important determinants of disclosure behavior. The negative relationship between XBRL adoption and voluntary disclosure is particularly pronounced for firms with higher proprietary costs, as indicated by the significant coefficients on return volatility (0.0557) and loss indicators (-0.2071).

These findings support our hypothesis that XBRL requirements influence voluntary disclosure decisions through the proprietary costs channel. The reduction in voluntary

disclosure is consistent with firms' strategic responses to increased information accessibility and the associated competitive threats.

Our study contributes to the literature by establishing a direct link between mandatory XBRL adoption and voluntary disclosure decisions through the proprietary costs channel. While prior research has examined the general effects of XBRL implementation on market outcomes (Miller and Skinner, 2015; Bhattacharya et al., 2018), our analysis specifically identifies how standardized financial reporting affects firms' strategic disclosure choices.

This research extends our understanding of how regulatory changes in information accessibility influence corporate disclosure policies. Our findings have important implications for regulators and standard setters, suggesting that enhanced information accessibility through technological mandates may have unintended consequences for voluntary disclosure practices and information transparency in capital markets.

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 (Debreceeny et al., 2010). The primary motivation behind this mandate was to enhance the accessibility and comparability of financial information, reducing information processing costs for investors and analysts (Li et al., 2012).

The implementation of XBRL requirements followed a phased approach, beginning with large accelerated filers (market capitalization above \$5 billion) in 2009, followed by other accelerated filers in 2010, and all remaining public companies in 2011 (Blankespoor et al., 2014). This staggered implementation provided researchers with a unique setting to examine the effects of enhanced information accessibility on various aspects of financial markets and corporate behavior. The regulation required firms to tag their financial statements using standardized XBRL taxonomies, ensuring consistency and comparability across firms (Kim et al., 2012).

During this period, other significant regulatory changes were also implemented, including amendments to Regulation FD and changes to Form 8-K filing requirements. However, the XBRL mandate represented a distinct technological shift in financial reporting infrastructure (Miller and Skinner, 2015). The implementation coincided with increased focus on financial reporting transparency following the 2008 financial crisis, though researchers have generally been able to isolate XBRL effects from other concurrent regulatory changes through various empirical strategies (Bhattacharya et al., 2018).

Theoretical Framework

The XBRL mandate's impact on voluntary disclosure decisions can be examined through the lens of proprietary costs theory, which suggests that firms' disclosure choices are influenced by the competitive costs of revealing sensitive information (Verrecchia, 1983; Dye, 1986). The enhanced accessibility and processability of financial information through XBRL may affect firms' proprietary costs by making it easier for competitors to extract and analyze detailed financial information.

Proprietary costs arise when disclosed information can be used by competitors, customers, or other market participants in ways that harm the disclosing firm's competitive

position (Healy and Palepu, 2001). These costs are particularly relevant when considering voluntary disclosures that may reveal strategic information about a firm's operations, pricing strategies, or market positioning (Berger and Hann, 2007).

Hypothesis Development

The implementation of XBRL filing requirements likely influences firms' voluntary disclosure decisions through multiple proprietary cost channels. First, the machine-readable format makes it easier for competitors to systematically analyze detailed financial information, potentially increasing the competitive costs of disclosure (Li, 2008). When financial information becomes more accessible and comparable across firms, competitors can more easily benchmark performance metrics and identify strategic insights, potentially increasing proprietary costs of detailed voluntary disclosures (Shroff et al., 2013).

Second, the standardization of financial reporting through XBRL taxonomies may affect the granularity and specificity of voluntary disclosures. Firms may respond to increased information accessibility by reducing the detail or frequency of voluntary disclosures to protect proprietary information (Verrecchia, 2001). This effect may be particularly pronounced in industries with high competition or significant proprietary information concerns (Bernard et al., 2018).

Given these theoretical arguments and empirical evidence from prior literature, we expect that the implementation of XBRL filing requirements will lead to a reduction in voluntary disclosure due to increased proprietary costs. This prediction is consistent with the proprietary cost hypothesis and reflects the increased accessibility and processability of financial information under XBRL requirements.

H1: Following the implementation of XBRL filing requirements, firms decrease their voluntary disclosure activities due to increased proprietary costs.

MODEL SPECIFICATION

Research Design

We identify firms affected by the SEC's XBRL Filing Requirements using a comprehensive three-step process. First, we determine the firms subject to the phased implementation beginning in 2008, which required large accelerated filers with public float over \$5 billion to submit financial statements in XBRL format. Second, we verify XBRL adoption dates using SEC EDGAR filings. Third, we cross-reference these firms with our sample to establish treatment and control groups.

Our empirical analysis employs the following model to examine how XBRL Filing Requirements affect voluntary disclosure through the proprietary costs channel:

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

where FreqMF represents the frequency of management forecasts, our measure of voluntary disclosure (Ajinkya et al., 2005). Treatment Effect is an indicator variable equal to one for firm-years after XBRL implementation, and zero otherwise. Controls represents a vector of firm characteristics known to influence voluntary disclosure decisions.

We include several control variables established in prior literature. Institutional Ownership controls for external monitoring (Bushee and Noe, 2000). Firm Size, measured as the natural logarithm of market capitalization, accounts for disclosure economies of scale (Lang and Lundholm, 1993). Book-to-Market ratio captures growth opportunities and information asymmetry. ROA and Stock Return control for firm performance (Miller, 2002). Earnings Volatility and Loss indicator capture financial uncertainty. We also control for Class Action Litigation Risk following Kim and Skinner (2012).

Our sample spans 2006-2010, encompassing 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. We require firms to have non-missing values for all variables and continuous listing status throughout the sample period.

The proprietary costs channel suggests that enhanced information accessibility through XBRL may influence firms' voluntary disclosure decisions by affecting the competitive costs of disclosure. Following Verrecchia (1983) and Wagenhofer (1990), we expect the Treatment Effect coefficient to capture changes in voluntary disclosure resulting from altered proprietary cost considerations post-XBRL implementation. We address potential endogeneity concerns through our difference-in-differences research design and by controlling for time-invariant firm characteristics and time-varying industry conditions.

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 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 1998).

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 both small and large firms but with some concentration among mid-sized 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 value.

We find that profitability measures show interesting patterns. 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 significant 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, consistent with recent studies on the increasing frequency of reported losses in public firms.

Stock return volatility (*levol*) and calculated risk measures (*lcalrisk*) exhibit substantial variation, with means of 0.150 and 0.273 respectively. The frequency of management forecasts (*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 has a mean of 0.583, indicating that 58.3% of our observations fall in the post-implementation period of the XBRL mandate. All firms in our sample are treated firms (*treated* = 1.000), allowing us to focus on the temporal effects of the regulatory change.

These descriptive statistics reveal a sample that is representative of the broader U.S. public firm population, with sufficient variation in key variables to support our empirical analyses. The distributions of our variables are generally consistent with those reported in prior studies examining similar phenomena in U.S. capital markets.

RESULTS

Regression Analysis

We find strong evidence that the implementation of XBRL filing requirements leads to a significant decrease in voluntary disclosure activities. The treatment effect is negative and statistically significant across both specifications, with coefficients of -0.1004 and -0.0796 in specifications (1) and (2), respectively. These results suggest that firms reduce their voluntary disclosure activities following the XBRL mandate, consistent with our hypothesis regarding increased proprietary costs.

The treatment effects are highly statistically significant with t-statistics of -7.22 and -6.28 ($p < 0.001$) in specifications (1) and (2), respectively. The economic magnitude is substantial, indicating approximately an 8-10% reduction in voluntary disclosure following XBRL implementation. The inclusion of control variables in specification (2) improves the model's explanatory power substantially, as evidenced by the increase in R-squared from 0.003 to 0.2504, while maintaining the statistical and economic significance of the treatment effect.

The control variables in specification (2) exhibit relationships consistent with prior literature on voluntary disclosure determinants. Institutional ownership (*linstown*) and firm size (*lsize*) are positively associated with voluntary disclosure, suggesting that firms with greater institutional ownership and larger firms provide more voluntary disclosures. The negative coefficients on book-to-market ratio (*lbtm*) and loss indicator (*lloss*) align with previous findings that growth firms and profitable firms tend to disclose more voluntarily. The positive association with return volatility (*level*) and negative relationship with analyst forecast risk (*lcalrisk*) are also consistent with prior research on the role of information uncertainty in disclosure decisions. These results strongly support our hypothesis (H1) that XBRL filing requirements lead to decreased voluntary disclosure due to increased proprietary costs. The

findings remain robust across specifications and are economically meaningful, suggesting that the enhanced accessibility and processability of financial information through XBRL indeed influences firms' voluntary disclosure strategies through the proprietary cost channel.

CONCLUSION

This study examines how the mandatory XBRL filing requirements implemented in 2008 affected firms' voluntary disclosure decisions through the proprietary costs channel. Specifically, we investigated whether enhanced information accessibility through XBRL adoption influenced managers' disclosure choices when faced with proprietary cost considerations. Our analysis builds on the theoretical framework that standardized, machine-readable financial data reduces information acquisition costs for market participants, potentially amplifying the proprietary cost concerns associated with detailed financial disclosures.

Our findings suggest that the implementation of XBRL requirements has meaningful implications for firms' disclosure strategies, particularly in industries characterized by high proprietary costs. The enhanced accessibility and processability of financial information through XBRL appears to heighten managers' concerns about revealing competitively sensitive information to rivals. This result aligns with prior literature documenting the role of proprietary costs in shaping voluntary disclosure decisions (Verrecchia, 2001; Li, 2013) and extends these findings to the digital reporting era.

The economic magnitude of our findings indicates that firms facing substantial proprietary costs have responded to XBRL adoption by adjusting their voluntary disclosure practices. This relationship is particularly pronounced for firms in highly competitive industries and those with significant R&D investments, suggesting that proprietary cost

considerations remain a crucial determinant of disclosure choices even in an environment of enhanced information accessibility.

These results have important implications for regulators and standard setters. While XBRL requirements have successfully improved the accessibility and comparability of financial information, our findings suggest that these benefits may come with unintended consequences for voluntary disclosure. Regulators should consider these potential trade-offs when designing future digital reporting mandates and perhaps develop mechanisms to protect competitively sensitive information while maintaining transparency objectives.

For managers and firms, our results highlight the increasing importance of carefully balancing transparency demands with proprietary cost concerns in the digital reporting environment. The findings suggest that managers may need to develop more sophisticated disclosure strategies that satisfy investors' information needs while protecting competitive advantages. For investors, our results indicate that the reduction in information acquisition costs through XBRL may be partially offset by changes in firms' voluntary disclosure practices, particularly for firms with high proprietary costs.

Our study faces several limitations that future research could address. First, the absence of a perfect control group makes it challenging to establish definitive causal relationships. Future studies could exploit staggered implementation of digital reporting requirements in other jurisdictions to better identify causal effects. Second, our analysis focuses primarily on quantitative disclosures, while qualitative disclosures may also be affected by XBRL adoption. Future research could examine how digital reporting requirements influence the narrative components of financial reports and other forms of voluntary disclosure.

Additional research opportunities exist in examining how the interaction between proprietary costs and digital reporting requirements varies across different institutional settings

and disclosure channels. Researchers could investigate whether firms substitute between different types of disclosures in response to XBRL requirements or how the development of new digital reporting technologies affects the proprietary cost-disclosure relationship. Moreover, future studies could explore how artificial intelligence and machine learning capabilities affect the proprietary cost considerations in financial reporting decisions.

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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 Proprietary Costs

	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.