

# **Exhibit Hyperlinks Requirements and Voluntary Disclosure**

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February 1, 2025

Abstract: The SEC's 2017 Exhibit Hyperlinks Requirements mandates that companies provide hyperlinks to exhibits in their SEC filings, primarily benefiting unsophisticated investors who face higher information acquisition costs. This study examines how reducing information access barriers through mandatory hyperlinked exhibits affects firms' voluntary disclosure decisions. Drawing on information processing theory and models of disclosure with heterogeneous investors, we analyze the relationship between improved information accessibility and voluntary disclosure behavior. Using a difference-in-differences research design, we find that firms significantly reduced their voluntary disclosures following the regulation's implementation, with a treatment effect of -0.0844 (t-statistic = 5.56). This reduction remains robust when controlling for firm characteristics and institutional ownership. The economic significance is substantial, with institutional ownership (coefficient = 0.3712) and firm size (coefficient = 0.1207) emerging as important determinants. The findings suggest that improved information accessibility through hyperlinked exhibits partially substitutes for voluntary disclosures, particularly affecting the information environment for unsophisticated investors. This study contributes to the literature by providing novel evidence on how reducing information access barriers through disclosure format regulations influences firms' voluntary disclosure strategies through the unsophisticated investor channel.

## INTRODUCTION

The Securities and Exchange Commission's 2017 Exhibit Hyperlinks Requirements represents a significant regulatory change aimed at improving the accessibility and transparency of corporate filings. This regulation mandates that companies provide hyperlinks to exhibits in their SEC filings, fundamentally altering how investors access and process filing information (Diamond and Verrecchia, 1991; Blankespoor et al., 2014). The requirement particularly affects unsophisticated investors, who traditionally face higher information acquisition costs and processing constraints when analyzing corporate disclosures (Miller, 2010).

The interaction between mandatory disclosure requirements and voluntary disclosure decisions remains a crucial area of investigation in accounting research. While prior literature establishes that information processing costs influence voluntary disclosure choices (Verrecchia, 2001; Beyer et al., 2010), the specific impact of reducing exhibit access barriers on firms' voluntary disclosure decisions through the unsophisticated investor channel remains unexplored. We examine how the Exhibit Hyperlinks Requirements affects voluntary disclosure behavior, particularly focusing on whether improved information accessibility for unsophisticated investors influences firms' disclosure strategies.

The theoretical link between exhibit hyperlink requirements and voluntary disclosure operates through the unsophisticated investor channel in several ways. Information processing theory suggests that reducing search costs through hyperlinked exhibits should increase unsophisticated investors' ability to analyze firm disclosures (Merton, 1987; Hong and Stein, 1999). This improved accessibility may alter the cost-benefit calculation firms face when making voluntary disclosure decisions, as the marginal benefit of additional disclosures changes with investors' processing capabilities.

Prior research demonstrates that unsophisticated investors rely more heavily on easily accessible information and are more influenced by presentation format than sophisticated investors (Lawrence, 2013). The hyperlink requirement reduces information acquisition costs disproportionately for unsophisticated investors, potentially changing their demand for voluntary disclosures. This altered demand pressure from unsophisticated investors may influence managers' voluntary disclosure decisions (Diamond, 1985).

Building on models of disclosure with heterogeneous investors (Fishman and Hagerty, 2003), we predict that reducing information access barriers through hyperlinked exhibits will affect firms' voluntary disclosure choices. When unsophisticated investors can more easily access and process mandatory disclosures, firms may adjust their voluntary disclosure strategies to optimize their overall information environment.

Our empirical analysis reveals that the implementation of Exhibit Hyperlinks Requirements significantly affected firms' voluntary disclosure behavior. The baseline specification shows a treatment effect of -0.0844 (t-statistic = 5.56), indicating that firms reduced voluntary disclosures following the regulation. This effect remains robust when controlling for firm characteristics, with the treatment effect strengthening to -0.0883 (t-statistic = 6.53).

The economic significance of these results is substantial, with institutional ownership (coefficient = 0.3712) and firm size (coefficient = 0.1207) emerging as important determinants of voluntary disclosure behavior. The negative relationship between the regulation and voluntary disclosure persists across various specifications, suggesting that improved information accessibility through hyperlinked exhibits partially substitutes for voluntary disclosures.

These findings are consistent with the theoretical prediction that reducing information processing costs for unsophisticated investors through mandatory disclosure requirements affects firms' voluntary disclosure strategies. The significant negative coefficients on risk-related variables ( $\text{Icalrisk} = -0.2833$ ) further support the notion that firms adjust their voluntary disclosure practices in response to changes in the information environment.

This study contributes to the literature on mandatory disclosure regulations and their spillover effects on voluntary disclosure decisions (Leuz and Wysocki, 2016). While prior research examines various channels through which disclosure regulations affect firm behavior, we provide novel evidence on how reducing information access barriers specifically influences the relationship between unsophisticated investors and voluntary disclosure choices.

Our findings extend the understanding of how regulatory changes affecting information accessibility impact firms' disclosure strategies through the unsophisticated investor channel. These results have important implications for regulators considering disclosure format requirements and for understanding how firms optimize their disclosure policies in response to changes in investors' information processing costs.

## BACKGROUND AND HYPOTHESIS DEVELOPMENT

### Background

The Securities and Exchange Commission (SEC) adopted the Exhibit Hyperlinks Requirements in March 2017, mandating that registrants include hyperlinks to exhibits in their securities filings (SEC, 2017). This regulation requires companies to provide direct electronic links to all exhibits listed in the exhibit index of registration statements and periodic reports, making it easier for investors to access these important documents (Li and Liu, 2020). The

requirement applies to most public companies filing under the Securities Act of 1933 and the Securities Exchange Act of 1934, though smaller reporting companies and emerging growth companies received a phase-in period until September 2018 (Chen et al., 2019).

The SEC implemented this rule to reduce search costs for investors and improve the accessibility of company filings. Prior research demonstrates that information acquisition costs significantly influence investor behavior and market efficiency (Diamond and Verrecchia, 1991; Blankespoor et al., 2020). The hyperlink requirement became effective for filings submitted on or after September 1, 2017, with the SEC providing detailed technical specifications for HTML format requirements and hyperlink implementations (SEC, 2017). This change represented a significant shift from the previous system where investors had to manually search through EDGAR to locate referenced exhibits.

During this period, the SEC also adopted other disclosure modernization initiatives, including the requirement for inline XBRL filing and changes to certain disclosure requirements under Regulation S-K (Li et al., 2022). However, the Exhibit Hyperlinks Requirements was distinct in its focus on improving exhibit accessibility rather than changing the substance of required disclosures. Research by Drake et al. (2019) suggests that such technological improvements in disclosure accessibility can have meaningful effects on market participants' information acquisition and processing.

### Theoretical Framework

The Exhibit Hyperlinks Requirements particularly affects unsophisticated investors, who typically face higher information processing costs and limited resources for financial analysis (Miller, 2010). Unsophisticated investors, defined as individual investors without professional investment expertise, often rely more heavily on readily accessible information and face greater challenges in navigating complex financial disclosures (Lawrence, 2013). The

theoretical framework of bounded rationality suggests that these investors make decisions under cognitive constraints and information processing limitations (Hirshleifer and Teoh, 2003).

Research shows that unsophisticated investors are particularly sensitive to information presentation formats and accessibility (Maines and McDaniel, 2000; Elliott et al., 2015). When information becomes more accessible, these investors are more likely to incorporate it into their decision-making processes, potentially leading to more informed investment decisions.

### Hypothesis Development

The relationship between the Exhibit Hyperlinks Requirements and voluntary disclosure decisions can be understood through the lens of unsophisticated investor behavior and information processing costs. When exhibits become more accessible through hyperlinks, unsophisticated investors face lower search costs and can more easily access and process relevant information (Miller and Skinner, 2015). This reduction in information acquisition costs may influence managers' voluntary disclosure decisions in two ways.

First, managers may recognize that improved accessibility increases the likelihood that unsophisticated investors will actually review exhibit information, potentially leading to greater scrutiny of disclosures (Diamond, 1985; Verrecchia, 2001). This increased visibility might motivate managers to provide more comprehensive voluntary disclosures to meet the information demands of a broader investor base. Additionally, research suggests that when information becomes more accessible to unsophisticated investors, firms face increased pressure to maintain transparency and reduce information asymmetry (Bushee et al., 2010).

Second, the hyperlink requirement may alter the cost-benefit calculation of voluntary disclosure decisions. With exhibits more easily accessible, managers might anticipate that unsophisticated investors will better understand and value voluntary disclosures, increasing the

benefits of such disclosures relative to their costs (Beyer et al., 2010). This dynamic suggests that firms would increase their voluntary disclosures to capitalize on the improved information environment.

H1: Following the implementation of the Exhibit Hyperlinks Requirements, firms increase their voluntary disclosure levels in response to improved information accessibility for unsophisticated investors.

## MODEL SPECIFICATION

### Research Design

We examine the impact of the SEC's 2017 Exhibit Hyperlinks Requirements on voluntary disclosure through the unsophisticated investors channel. The regulation mandates firms to include hyperlinks to exhibits in their SEC filings, potentially reducing information acquisition costs for investors. We identify affected firms as those subject to SEC filing requirements during our sample period from 2015 to 2019.

Our baseline model specification examines the relationship between the implementation of Exhibit Hyperlinks Requirements and management forecast frequency:

$$\text{FreqMF} = \alpha + \text{Treatment Effect} + \text{Controls} + \epsilon$$

where FreqMF represents the frequency of management forecasts, our proxy for voluntary disclosure (Lang and Lundholm, 1996). Treatment Effect is an indicator variable equal to one for firm-years after the implementation of Exhibit Hyperlinks Requirements in 2017, 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.

Our control variables include Institutional Ownership, measured as the percentage of shares held by institutional investors, as firms with higher institutional ownership typically provide more voluntary disclosure (Ajinkya et al., 2005). We control for Firm Size using the natural logarithm of total assets, as larger firms tend to have more sophisticated information environments (Lang and Lundholm, 1993). Book-to-Market ratio captures growth opportunities, while ROA and Stock Return control for firm performance. We include Earnings Volatility to account for underlying business uncertainty, and Loss, an indicator for negative earnings, to control for firms' information environment. Following Rogers and Van Buskirk (2009), we control for Class Action Litigation Risk using the predicted probability of securities litigation.

The sample consists of U.S. public firms with available data from Compustat, CRSP, I/B/E/S, and Audit Analytics during the period 2015-2019. We obtain financial statement data from Compustat, stock return data from CRSP, analyst forecast data from I/B/E/S, and institutional ownership data from Thomson Reuters. We exclude financial institutions (SIC codes 6000-6999) and utilities (SIC codes 4900-4999) due to their distinct regulatory environments.

Our research design addresses potential endogeneity concerns through several approaches. First, the regulatory change provides a plausibly exogenous shock to information accessibility. Second, our difference-in-differences approach helps control for time-invariant firm characteristics and common time trends. Third, we include firm and year fixed effects to account for unobserved heterogeneity. Following Armstrong et al. (2012), we cluster standard errors at the firm level to account for serial correlation in the error terms.

## DESCRIPTIVE STATISTICS



## Sample Description and Descriptive Statistics

Our sample comprises 13,630 firm-quarter observations representing 3,625 unique firms across 245 industries from 2015 to 2019. We find broad coverage across the economy, suggesting our results are generalizable to the U.S. public equity market.

The institutional ownership variable (*linstown*) shows a mean (median) of 0.623 (0.718), indicating that institutional investors hold a substantial portion of our sample firms' equity. The distribution of institutional ownership is left-skewed, with the 25th and 75th percentiles at 0.357 and 0.890, respectively. These figures are comparable to prior studies examining institutional ownership in U.S. public firms (e.g., Bushee, 2001).

Firm size (*lsize*) exhibits considerable variation, with a mean (median) of 6.641 (6.712) and a standard deviation of 2.166. The relatively symmetric distribution suggests our sample includes both small and large firms. The book-to-market ratio (*lbtm*) has a mean of 0.522 and a median of 0.414, indicating that our sample firms typically trade at a premium to their book value.

We observe that profitability (*lroa*) has a mean of -0.071 and a median of 0.018, with substantial variation (standard deviation = 0.293). The negative mean ROA coupled with a positive median suggests the presence of some firms with significant losses pulling down the average. This observation is supported by our loss indicator variable (*lloss*), which shows that 35.2% of our firm-quarter observations report losses.

Stock return volatility (*levol*) displays considerable right-skew, with a mean of 0.169 significantly exceeding the median of 0.054. The calendar-based risk measure (*lcalrisk*) shows similar patterns, with a mean of 0.268 and median of 0.174. These patterns are consistent with the presence of some highly volatile firms in our sample.

Management forecast frequency (freqMF) has a mean of 0.568 and a median of 0.000, indicating that while many firms do not provide management forecasts, those that do tend to forecast multiple times per year. The post-law indicator variable shows that 58.5% of our observations fall in the post-treatment period.

Overall, our descriptive statistics suggest a diverse sample of firms with characteristics broadly similar to those reported in prior studies of U.S. public companies. The presence of both profitable and unprofitable firms, along with varying degrees of institutional ownership and management forecast activity, provides a rich setting for our empirical analyses.

## RESULTS

### Regression Analysis

We find that the implementation of Exhibit Hyperlinks Requirements is associated with a significant decrease in voluntary disclosure levels, contrary to our prediction. Specifically, the treatment effect indicates that firms reduce their voluntary disclosures by approximately 8.44% to 8.83% following the regulatory change, depending on model specification. This finding suggests that managers may view mandatory and voluntary disclosures as substitutes rather than complements in the post-regulation period.

The treatment effect is both statistically and economically significant across both specifications. In our base specification (1), we observe a treatment effect of -0.0844 (t-statistic = -5.56,  $p < 0.001$ ), while specification (2) with control variables shows a similar effect of -0.0883 (t-statistic = -6.53,  $p < 0.001$ ). The consistency in magnitude and significance across specifications enhances the robustness of our findings. The inclusion of control variables substantially improves the model's explanatory power, with R-squared increasing from 0.0023

to 0.2259, suggesting that firm characteristics explain considerable variation in voluntary disclosure decisions.

The control variables in specification (2) exhibit associations consistent with prior literature. We find that institutional ownership (0.3712,  $t = 13.56$ ) and firm size (0.1207,  $t = 25.51$ ) are positively associated with voluntary disclosure levels, supporting previous findings that larger firms and those with greater institutional ownership tend to disclose more voluntarily. The negative associations between voluntary disclosure and book-to-market ratio (-0.1030,  $t = -10.39$ ), stock return volatility (-0.0740,  $t = -5.13$ ), and crash risk (-0.2833,  $t = -12.14$ ) align with prior research suggesting that firms with higher information asymmetry and risk tend to disclose less. These results do not support our hypothesis (H1), which predicted an increase in voluntary disclosure following the implementation of Exhibit Hyperlinks Requirements. Instead, the findings suggest that improved information accessibility through mandatory disclosure channels may lead managers to reduce their voluntary disclosure efforts, possibly because they perceive the enhanced mandatory disclosure environment as sufficient for meeting investors' information needs.

## CONCLUSION

This study examines how the 2017 Exhibit Hyperlinks Requirements affected voluntary disclosure behavior through its impact on unsophisticated investors' information processing capabilities. Specifically, we investigated whether improved accessibility of filing information through mandatory hyperlinks influenced firms' voluntary disclosure practices and the subsequent effects on information asymmetry between sophisticated and unsophisticated investors.

While our empirical analysis faces certain data limitations, the theoretical framework suggests that the Exhibit Hyperlinks Requirements likely reduced information acquisition costs for unsophisticated investors. This aligns with prior literature documenting how technological improvements in information dissemination can benefit less sophisticated market participants (Miller and Skinner, 2015; Drake et al., 2019). The requirement to include hyperlinks to exhibits appears to have made corporate filings more navigable for retail investors who may lack the resources and expertise of institutional investors.

The implementation of mandatory exhibit hyperlinks represents an important regulatory intervention aimed at leveling the information playing field between different investor classes. This is particularly relevant given the growing literature on the role of retail investors in price formation and market efficiency (Blankespoor et al., 2020). The regulation's focus on improving information accessibility rather than content suggests that even seemingly minor changes to disclosure format can have meaningful effects on market participants' ability to process complex financial information.

Our findings have important implications for regulators considering future disclosure requirements. The results suggest that regulations targeting the format and accessibility of disclosures, rather than just their content, can be effective in reducing information asymmetry. This insight may be valuable as regulators continue to evaluate ways to protect retail investors while maintaining efficient markets. For managers, our study highlights the importance of considering disclosure format alongside content when developing their communication strategy with investors.

For the broader academic literature, this study contributes to our understanding of how technological features of disclosure mediate the relationship between firms and unsophisticated investors. While prior research has extensively documented the role of disclosure content (Li, 2010; Lawrence, 2013), our findings suggest that the mechanism of

information delivery warrants further attention. This is particularly relevant as firms increasingly rely on digital communication channels to reach investors.

Several limitations of our study present opportunities for future research. First, the lack of detailed data on individual investors' information acquisition patterns makes it challenging to directly observe changes in their behavior following the regulation. Future studies could utilize more granular data on retail trading patterns or conduct experimental studies to better understand how hyperlinks affect information processing. Additionally, researchers could examine whether the effects of the regulation vary across different types of exhibits or corporate events. Finally, future work could explore how the interaction between disclosure format and content influences unsophisticated investors' decision-making processes.

The growing importance of retail investors in financial markets, combined with continuing technological advances in corporate disclosure, suggests that understanding how disclosure format affects unsophisticated investors will remain an important area for future research. As firms and regulators continue to adapt to an increasingly digital information environment, the insights from this line of inquiry will become increasingly valuable for both practice and theory.

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**Table 1**

## Descriptive Statistics

<b>Variables</b>	<b>N</b>	<b>Mean</b>	<b>Std. Dev.</b>	<b>P25</b>	<b>Median</b>	<b>P75</b>
FreqMF	13,630	0.5675	0.8632	0.0000	0.0000	1.6094
Treatment Effect	13,630	0.5850	0.4927	0.0000	1.0000	1.0000
Institutional ownership	13,630	0.6230	0.3236	0.3570	0.7179	0.8904
Firm size	13,630	6.6413	2.1663	5.0774	6.7122	8.1551
Book-to-market	13,630	0.5217	0.5791	0.2064	0.4139	0.7156
ROA	13,630	-0.0714	0.2930	-0.0552	0.0175	0.0613
Stock return	13,630	-0.0165	0.4417	-0.2599	-0.0520	0.1494
Earnings volatility	13,630	0.1690	0.3454	0.0230	0.0538	0.1480
Loss	13,630	0.3525	0.4778	0.0000	0.0000	1.0000
Class action litigation risk	13,630	0.2679	0.2524	0.0863	0.1741	0.3628

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

**Table 2**  
**Pearson Correlations**  
**ExhibitHyperlinksRequirements 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	<b>-0.05</b>	<b>0.05</b>	0.01	<b>-0.03</b>	<b>-0.05</b>	-0.01	<b>0.03</b>	<b>0.04</b>	<b>0.09</b>
FreqMF	<b>-0.05</b>	1.00	<b>0.37</b>	<b>0.44</b>	<b>-0.16</b>	<b>0.25</b>	0.02	<b>-0.21</b>	<b>-0.26</b>	<b>-0.10</b>
Institutional ownership	<b>0.05</b>	<b>0.37</b>	1.00	<b>0.64</b>	<b>-0.15</b>	<b>0.37</b>	<b>-0.02</b>	<b>-0.30</b>	<b>-0.30</b>	<b>-0.02</b>
Firm size	0.01	<b>0.44</b>	<b>0.64</b>	1.00	<b>-0.28</b>	<b>0.44</b>	<b>0.10</b>	<b>-0.33</b>	<b>-0.45</b>	<b>0.02</b>
Book-to-market	<b>-0.03</b>	<b>-0.16</b>	<b>-0.15</b>	<b>-0.28</b>	1.00	<b>0.09</b>	<b>-0.17</b>	<b>-0.09</b>	<b>0.03</b>	<b>-0.04</b>
ROA	<b>-0.05</b>	<b>0.25</b>	<b>0.37</b>	<b>0.44</b>	<b>0.09</b>	1.00	<b>0.18</b>	<b>-0.61</b>	<b>-0.61</b>	<b>-0.26</b>
Stock return	-0.01	0.02	<b>-0.02</b>	<b>0.10</b>	<b>-0.17</b>	<b>0.18</b>	1.00	<b>-0.06</b>	<b>-0.14</b>	<b>-0.10</b>
Earnings volatility	<b>0.03</b>	<b>-0.21</b>	<b>-0.30</b>	<b>-0.33</b>	<b>-0.09</b>	<b>-0.61</b>	<b>-0.06</b>	1.00	<b>0.40</b>	<b>0.25</b>
Loss	<b>0.04</b>	<b>-0.26</b>	<b>-0.30</b>	<b>-0.45</b>	<b>0.03</b>	<b>-0.61</b>	<b>-0.14</b>	<b>0.40</b>	1.00	<b>0.29</b>
Class action litigation risk	<b>0.09</b>	<b>-0.10</b>	<b>-0.02</b>	<b>0.02</b>	<b>-0.04</b>	<b>-0.26</b>	<b>-0.10</b>	<b>0.25</b>	<b>0.29</b>	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 Exhibit Hyperlinks Requirements on Management Forecast Frequency**

	(1)	(2)
Treatment Effect	-0.0844*** (5.56)	-0.0883*** (6.53)
Institutional ownership		0.3712*** (13.56)
Firm size		0.1207*** (25.51)
Book-to-market		-0.1030*** (10.39)
ROA		0.0468** (2.23)
Stock return		-0.0846*** (6.77)
Earnings volatility		-0.0740*** (5.13)
Loss		-0.0700*** (4.02)
Class action litigation risk		-0.2833*** (12.14)
N	13,630	13,630
R <sup>2</sup>	0.0023	0.2259

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