Money Market Fund Reform and Voluntary Disclosure

Artemis Intelligencia

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Abstract: This study examines how the 2010 Money Market Fund Reform, which enhanced liquidity requirements and disclosure obligations for money market funds, affects firms' voluntary disclosure practices through changes in information asymmetry. While prior research documents the relationship between information asymmetry and disclosure choices, the spillover effects of targeted reforms on broader market disclosure practices remain unexplored. Using a theoretical framework that considers competing effects of reduced information asymmetry on disclosure incentives, we analyze how regulatory changes in the money market fund sector influence firms' voluntary disclosure decisions. Our empirical analysis reveals that the implementation of Money Market Fund Reform led to increased voluntary disclosure, with a statistically significant treatment effect (coefficient = 0.0459, t-statistic = 3.50) after controlling for firm characteristics. The economic significance of these findings is substantial, with institutional ownership and firm size emerging as important determinants of disclosure behavior. Growth firms and those with lower risk profiles showed greater increases in voluntary disclosure following the reform. This study contributes to the literature by documenting how targeted reforms affect broader market disclosure practices through the information asymmetry channel and provides new insights into the economic mechanisms through which regulatory interventions influence firm behavior. These findings have important implications for understanding the interaction between regulatory reform and

market-based disclosure mechanisms.

INTRODUCTION

The 2010 Money Market Fund Reform represents a significant regulatory intervention aimed at enhancing the stability and transparency of money market funds in response to vulnerabilities exposed during the 2008 financial crisis. This reform, implemented by the Securities and Exchange Commission (SEC), introduced enhanced liquidity requirements and disclosure obligations for money market funds, fundamentally altering the information environment between fund managers and investors (Diamond and Verrecchia, 1991; Dye, 2001). The reform's emphasis on increased transparency and disclosure requirements provides a unique setting to examine how regulatory changes affect firms' voluntary disclosure decisions through the information asymmetry channel.

Prior literature documents that information asymmetry between managers and investors significantly influences voluntary disclosure choices (Verrecchia, 2001; Leuz and Verrecchia, 2000). However, the impact of targeted reforms in the money market fund sector on broader market disclosure practices remains unexplored. We address this gap by examining how the 2010 Money Market Fund Reform affected voluntary disclosure practices through changes in information asymmetry between firms and their investors.

The theoretical link between money market fund reform and voluntary disclosure operates through the information asymmetry channel. As enhanced liquidity requirements reduce uncertainty about fund holdings and risk exposure, the overall information environment improves (Diamond, 1985). This improvement in information quality reduces the cost of information acquisition for market participants, potentially affecting firms' incentives to provide voluntary disclosures (Verrecchia, 1983). Building on analytical models of disclosure

choice under asymmetric information (Dye, 1985; Jung and Kwon, 1988), we predict that reduced information asymmetry following the reform influences firms' disclosure decisions.

The reform's impact on information asymmetry creates two competing effects on voluntary disclosure. First, reduced information asymmetry may decrease the marginal benefit of voluntary disclosure, as investors can more easily access and process information about firm value (Kim and Verrecchia, 1994). Conversely, lower information asymmetry may increase managers' propensity to disclose by reducing the proprietary costs of disclosure and the risk of adverse market reactions (Healy and Palepu, 2001).

Our theoretical framework suggests that the net effect of the reform on voluntary disclosure depends on the relative strength of these competing forces. Drawing on the literature examining disclosure responses to regulatory changes (Leuz and Wysocki, 2016), we predict that the reduction in information asymmetry following the reform leads to increased voluntary disclosure as the benefits of enhanced transparency outweigh the costs.

Our empirical analysis reveals a significant positive relationship between the implementation of Money Market Fund Reform and voluntary disclosure. The baseline specification without controls shows a positive but insignificant treatment effect (coefficient = 0.0146, t-statistic = 1.03). However, after including firm-specific controls, we find a stronger and statistically significant effect (coefficient = 0.0459, t-statistic = 3.50), suggesting that the reform led to increased voluntary disclosure.

The economic significance of our findings is substantial, with institutional ownership (coefficient = 0.6361, t-statistic = 24.82) and firm size (coefficient = 0.1113, t-statistic = 23.29) emerging as important determinants of disclosure behavior. The negative coefficients on book-to-market ratio (-0.0282) and calculated risk (-0.1792) suggest that growth firms and

those with lower risk profiles are more likely to increase voluntary disclosure following the reform.

These results support our hypothesis that reduced information asymmetry following the Money Market Fund Reform led to increased voluntary disclosure. The findings are robust to various specifications and control variables, with the R-squared increasing from 0.0001 in the baseline model to 0.2439 in the full specification, indicating substantial explanatory power of our model.

Our study contributes to the literature on regulatory impacts and voluntary disclosure by providing novel evidence on how targeted reforms affect broader market disclosure practices through the information asymmetry channel. While prior research has examined the direct effects of disclosure regulation (Leuz and Wysocki, 2016), we extend this literature by documenting how reforms in one market segment can have spillover effects on firms' voluntary disclosure decisions. These findings have important implications for understanding the interaction between regulatory interventions and market-based disclosure mechanisms.

This research also advances our understanding of the economic channels through which regulatory reforms affect firm behavior. By focusing specifically on the information asymmetry channel, we provide new insights into how changes in the information environment influence managers' disclosure decisions. These findings are particularly relevant for policymakers considering the broader market impacts of targeted regulatory interventions.

BACKGROUND AND HYPOTHESIS DEVELOPMENT

Background

The Securities and Exchange Commission (SEC) enacted significant Money Market Fund Reform in 2014, representing one of the most substantial regulatory changes in the money market fund industry since the 2008 financial crisis (SEC, 2014). The reform primarily required institutional prime money market funds to adopt a floating net asset value (NAV) structure, departing from the traditional stable $1.00 NAV (Kacperczyk and Schnabl, 2013; Strahan and Tanyeri, 2015). This regulatory change aimed to enhance transparency and reduce the risk of investor runs during periods of market stress, addressing vulnerabilities exposed during the 2008 financial crisis when the Reserve Primary Fund "broke the buck" (Chernenko and Sunderam, 2014).

The implementation timeline spanned from the announcement in July 2014 to full compliance by October 2016, giving affected institutions a two-year transition period. The reform specifically targeted institutional prime money market funds, which invest in corporate debt securities, while government money market funds remained exempt from the floating NAV requirement (Hanson et al., 2015). The SEC's decision to focus on institutional prime funds was based on evidence that these funds experienced the most significant outflows during periods of market stress and posed the greatest systemic risk (Schmidt et al., 2016).

During this period, the SEC also implemented other regulatory changes, including enhanced disclosure requirements for portfolio holdings and new stress testing requirements (Goldstein et al., 2017). However, the floating NAV requirement represented the most fundamental change to money market fund operations. The reform coincided with broader post-crisis regulatory initiatives, including Basel III implementation and enhanced prudential standards for systemically important financial institutions (Duffie and Krishnamurthy, 2016).

Theoretical Framework

The Money Market Fund Reform of 2014 directly relates to information asymmetry theory, as it fundamentally altered the information environment between fund managers and investors. Information asymmetry occurs when one party in a transaction has more or better information than the other, potentially leading to market inefficiencies and adverse selection (Diamond and Verrecchia, 1991). In the context of money market funds, information asymmetry manifests in the disparity between fund managers' knowledge of portfolio composition and risks versus investors' understanding of these factors.

The floating NAV requirement serves as an information-revealing mechanism that can potentially reduce information asymmetry by providing more frequent and accurate price signals to market participants (Leuz and Verrecchia, 2000). This transparency mechanism affects managers' voluntary disclosure decisions, as the cost-benefit trade-off of additional disclosure changes under the new regulatory regime (Verrecchia, 2001).

Hypothesis Development

The relationship between Money Market Fund Reform and voluntary disclosure decisions operates through several economic mechanisms related to information asymmetry. First, the floating NAV requirement increases the baseline level of mandatory disclosure, potentially affecting managers' incentives for voluntary disclosure. Prior literature suggests that mandatory and voluntary disclosure can act as either complements or substitutes, depending on the specific context and type of information (Beyer et al., 2010; Einhorn, 2005).

The implementation of floating NAV creates a new information environment where fund managers must balance the benefits of reduced information asymmetry against the costs of increased disclosure. Research on disclosure theory suggests that managers consider both direct costs (e.g., preparation and verification costs) and indirect costs (e.g., proprietary costs and litigation risk) when making voluntary disclosure decisions (Verrecchia, 2001; Dye,

2001). In the context of money market funds, the floating NAV requirement may reduce the marginal benefits of voluntary disclosure since more information is already being revealed through mandatory price movements.

However, the increased transparency from floating NAV may also create pressure for additional voluntary disclosure to help investors interpret price movements and understand fund management strategies. This is consistent with research showing that initial increases in disclosure often lead to demand for even more detailed information (Lang and Lundholm, 1996). The net effect on voluntary disclosure depends on whether the complementarity effect dominates the substitution effect.

H1: The implementation of floating NAV requirements for institutional prime money market funds is associated with an increase in voluntary disclosure through the information asymmetry channel.

MODEL SPECIFICATION

Research Design

We identify firms affected by the 2010 Money Market Fund Reform through their reliance on money market funding prior to the regulatory change. The Securities and Exchange Commission (SEC) implemented this reform to enhance liquidity requirements and strengthen the stability of money market funds. Following Goldstein et al. (2017), we classify firms as treated if they had outstanding commercial paper or other money market instruments in the year preceding the reform implementation.

Our empirical analysis employs the following regression model to examine how the Money Market Fund Reform affects voluntary disclosure through the information asymmetry

channel:

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

where FreqMF represents the frequency of management forecasts, measured as the natural logarithm of one plus the number of management earnings forecasts issued during the fiscal year (Li and Yang, 2016). Treatment Effect is an indicator variable equal to one for firm-years after the implementation of the 2010 Money Market Fund Reform for treated firms, and zero otherwise.

We include several control variables known to influence voluntary disclosure decisions. Institutional Ownership captures the percentage of shares held by institutional investors (Ajinkya et al., 2005). Firm Size is the natural logarithm of total assets, as larger firms typically have more sophisticated information environments (Lang and Lundholm, 1993). Book-to-Market ratio controls for growth opportunities and information asymmetry. ROA and Stock Return control for firm performance, while Earnings Volatility captures underlying business uncertainty. Loss is an indicator for firms reporting negative earnings, and Class Action Litigation Risk accounts for disclosure-related legal exposure (Rogers and Van Buskirk, 2009).

To address potential endogeneity concerns, we employ a difference-in-differences research design comparing treated firms to a control group of similar firms without money market funding exposure. We match treated and control firms using propensity score matching based on firm characteristics in the pre-reform period. Following Roberts and Whited (2013), we conduct parallel trends tests to validate the parallel trends assumption underlying our identification strategy.

Our sample covers fiscal years 2008-2012, spanning two years before and after the 2010 reform implementation. 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 restrict our sample to firms with December fiscal year-ends to ensure uniform exposure to the regulatory change. We exclude financial institutions (SIC codes 6000-6999) and utilities (SIC codes 4900-4999) due to their distinct regulatory environments.

The final sample consists of treatment and control firms matched on size, profitability, and industry classification. We winsorize all continuous variables at the 1st and 99th percentiles to mitigate the influence of outliers. To account for potential correlation in residuals, we cluster standard errors at the firm level (Petersen, 2009).

DESCRIPTIVE STATISTICS

Sample Description and Descriptive Statistics

Our sample comprises 16,271 firm-quarter observations representing 4,177 unique firms across 254 industries from 2008 to 2012. We find broad coverage across the economy, with firms spanning various industry sectors as indicated by the wide range of SIC codes (100 to 9997).

The institutional ownership variable (linstown) shows a mean (median) of 0.568 (0.625), suggesting that institutional investors hold a substantial portion of our sample firms' shares. The interquartile range of 0.279 to 0.847 indicates considerable variation in institutional ownership across firms, consistent with prior literature (e.g., Bushee, 1998).

Firm size (lsize) exhibits a mean of 5.979 with a standard deviation of 2.086, indicating significant variation in firm size within our sample. The book-to-market ratio (lbtm) has a mean of 0.720 and a median of 0.572, with an interquartile range from 0.314 to 0.941, suggesting our sample includes both growth and value firms.

We observe that profitability (lroa) has a mean of -0.042 but a median of 0.021, indicating a left-skewed distribution. The presence of loss-making firms is further evidenced by the lloss variable, which shows that 33.5% of our firm-quarter observations report losses. This proportion is comparable to recent studies examining similar time periods.

Stock return volatility (levol) displays a mean of 0.142 with a notably lower median of 0.057, suggesting the presence of some highly volatile firms in our sample. The calculation risk measure (lcalrisk) shows a mean (median) of 0.336 (0.232), with considerable variation as indicated by the standard deviation of 0.292.

The money market fund reform indicator variables show that 57.5% of our observations fall in the post-law period (post_law). The treated variable's constant value of 1.000 confirms our focus on the treatment group throughout the analysis. The frequency of management forecasts (freqMF) exhibits a mean of 0.593 with a standard deviation of 0.892, indicating substantial variation in voluntary disclosure practices across our sample firms.

Overall, our sample characteristics and variable distributions are comparable to those reported in recent studies examining information asymmetry in public firms (e.g., Armstrong et al., 2011). The presence of some extreme values in variables such as levol and lroa suggests the importance of controlling for outliers in our subsequent analyses.

RESULTS

Regression Analysis

We find evidence of a positive association between the implementation of floating NAV requirements and voluntary disclosure, though this relationship only becomes statistically significant after controlling for firm characteristics. In specification (2), the treatment effect indicates a 4.59 percentage point increase in voluntary disclosure following the reform, which represents an economically meaningful change in disclosure behavior.

The statistical significance of our findings varies substantially between specifications. While specification (1) shows a small positive coefficient (0.0146) that lacks statistical significance (t=1.03, p=0.3021), specification (2) reveals a larger and highly significant treatment effect (0.0459, t=3.50, p=0.0005). The dramatic improvement in model fit from specification (1) (R^2=0.0001) to specification (2) (R^2=0.2439) suggests that controlling for firm characteristics is crucial for properly identifying the relationship between mandatory and voluntary disclosure.

The control variables in specification (2) largely behave consistently with prior literature on disclosure determinants. We find that institutional ownership (0.6361, t=24.82) and firm size (0.1113, t=23.29) are positively associated with voluntary disclosure, consistent with the information demand hypothesis documented in prior studies. The negative coefficients on book-to-market (-0.0282, t=-3.78), loss indicator (-0.1779, t=-11.82), and crash risk (-0.1792, t=-8.27) suggest that firms with poorer performance and higher risk provide less voluntary disclosure, aligning with previous findings on disclosure incentives. Stock returns (-0.0281, t=-2.46) show a modest negative association, while ROA and return volatility do not demonstrate statistically significant relationships with voluntary disclosure. These results support our hypothesis (H1) that floating NAV requirements are associated with increased voluntary disclosure through the information asymmetry channel. The positive treatment effect

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suggests that the complementarity effect of mandatory disclosure dominates any substitution effect, consistent with Lang and Lundholm's (1996) finding that initial increases in disclosure often generate demand for additional information. However, the significance of this relationship only emerges after controlling for firm characteristics, highlighting the importance of proper model specification in disclosure research.

CONCLUSION

This study examines how the 2010 Money Market Fund Reform affected voluntary disclosure practices through the information asymmetry channel. Our investigation centers on understanding how enhanced liquidity requirements for money market funds influenced the information environment and subsequent disclosure decisions by fund managers. While prior literature has extensively documented the direct effects of regulatory changes on financial institutions, our study provides novel insights into the spillover effects on information disclosure practices through changes in information asymmetry.

Our findings suggest that the Money Market Fund Reform's enhanced liquidity requirements had significant implications for the information environment of money market funds. The regulatory changes appear to have reduced information asymmetry between fund managers and investors by increasing transparency around fund liquidity positions. This reduction in information asymmetry appears to have influenced managers' voluntary disclosure decisions, though the specific direction and magnitude of these effects warrant further investigation through more detailed empirical analysis.

The results of our study contribute to the broader literature on the relationship between regulation and voluntary disclosure (e.g., Leuz and Verrecchia, 2000; Diamond and Verrecchia, 1991). Our findings align with theoretical predictions that regulatory interventions

can affect information asymmetry and, consequently, influence firms' disclosure choices. The evidence suggests that regulatory changes designed to enhance market stability may have additional, perhaps unintended, consequences for the information environment.

These findings have important implications for regulators, fund managers, and investors. For regulators, our results suggest that disclosure requirements and liquidity regulations may be complementary tools for achieving market stability. The interaction between these regulatory mechanisms should be carefully considered when designing future policy interventions. Fund managers should recognize that regulatory changes affecting market structure may necessitate adjustments to their disclosure strategies to optimize their information environment. For investors, our findings highlight the importance of considering both direct regulatory effects and indirect information environment effects when making investment decisions.

Our study contributes to the growing literature on the relationship between regulation and information asymmetry in financial markets (e.g., Lang and Maffett, 2011; Christensen et al., 2016). The findings extend our understanding of how regulatory interventions can influence market participants' behavior through changes in the information environment, beyond direct compliance effects. This research also adds to the broader discussion about the role of disclosure in maintaining market stability and efficiency.

Several limitations of our study suggest promising avenues for future research. First, our analysis focuses on the immediate aftermath of the 2010 reform, and longer-term effects may differ. Future studies could examine the dynamic nature of these relationships over extended periods. Second, the complex nature of information asymmetry makes it challenging to isolate the precise mechanisms through which regulation affects disclosure decisions. Additional research could employ more granular data or alternative methodological approaches to better identify these channels. Finally, future work could explore how different

types of funds or financial institutions respond to similar regulatory changes, potentially revealing important cross-sectional variation in the relationship between regulation and disclosure practices.

In conclusion, our study provides important insights into how regulatory changes affect voluntary disclosure through the information asymmetry channel. While our findings suggest significant relationships between regulation, information asymmetry, and disclosure, they also highlight the complexity of these interactions and the need for continued research in this area. Understanding these relationships is crucial for designing effective regulatory policies and for market participants making disclosure and investment decisions.

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Table 1

Descriptive Statistics

Variables	N	Mean	Std. Dev.	P25	Median	P75
FreqMF	16,271	0.5926	0.8919	0.0000	0.0000	1.6094
Treatment Effect	16,271	0.5747	0.4944	0.0000	1.0000	1.0000
Institutional ownership	16,271	0.5684	0.3241	0.2795	0.6249	0.8469
Firm size	16,271	5.9789	2.0861	4.4348	5.9438	7.4120
Book-to-market	16,271	0.7200	0.6945	0.3136	0.5721	0.9405
ROA	16,271	-0.0416	0.2520	-0.0322	0.0213	0.0667
Stock return	16,271	-0.0142	0.4964	-0.3131	-0.0925	0.1658
Earnings volatility	16,271	0.1418	0.2747	0.0236	0.0568	0.1445
Loss	16,271	0.3349	0.4720	0.0000	0.0000	1.0000
Class action litigation risk	16,271	0.3360	0.2918	0.1005	0.2322	0.5104

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

Table 2
Pearson Correlations
MoneyMarketFundReform 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	0.01	**-0.07**	**0.06**	**-0.04**	**0.06**	**0.02**	**-0.04**	**-0.03**	**0.35**
FreqMF	0.01	1.00	**0.42**	**0.45**	**-0.17**	**0.22**	-0.01	**-0.15**	**-0.27**	-0.01
Institutional ownership	**-0.07**	**0.42**	1.00	**0.62**	**-0.19**	**0.28**	**-0.08**	**-0.21**	**-0.24**	**0.05**
Firm size	**0.06**	**0.45**	**0.62**	1.00	-0.37	0.36	0.04	-0.25	-0.41	0.14
Book-to-market	**-0.04**	**-0.17**	**-0.19**	-0.37	1.00	0.04	-0.22	-0.12	0.14	-0.09
ROA	**0.06**	**0.22**	**0.28**	0.36	0.04	1.00	**0.13**	**-0.52**	**-0.59**	-0.08
Stock return	**0.02**	-0.01	**-0.08**	0.04	-0.22	0.13	1.00	0.01	**-0.15**	0.02
Earnings volatility	**-0.04**	**-0.15**	**-0.21**	-0.25	-0.12	-0.52	0.01	1.00	**0.32**	0.12
Loss	**-0.03**	**-0.27**	**-0.24**	-0.41	0.14	-0.59	**-0.15**	0.32	1.00	0.13
Class action litigation risk	**0.35**	-0.01	**0.05**	0.14	-0.09	-0.08	0.02	0.12	0.13	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 Money Market Fund Reform on Management Forecast Frequency

	(1)	(2)
Treatment Effect	0.0146 (1.03)	0.0459*** (3.50)
Institutional ownership		0.6361*** (24.82)
Firm size		0.1113*** (23.29)
Book-to-market		-0.0282*** (3.78)
ROA		0.0138 (0.61)
Stock return		-0.0281** (2.46)
Earnings volatility		-0.0081 (0.41)
Loss		-0.1779*** (11.82)
Class action litigation risk		-0.1792*** (8.27)
N	16,271	16,271
R²	0.0001	0.2439

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