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The Commitment Effect versus Information Effect of Disclosure—Evidence from Smaller Reporting Companies

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ABSTRACT: We examine the commitment effect provided by mandatory disclosure and the information effect of voluntary disclosure on market illiquidity by exploring a regulatory change that allows smaller reporting companies to reduce the disclosure of certain information in their SEC filings. This regime change allows us to separate the commitment effect provided by mandatory disclosure from the information effect of voluntary disclosure. We find that firms that are eligible to reduce their disclosure, but voluntarily maintain their disclosure level, experience an increase in market illiquidity. We also find that the increase in illiquidity is more pronounced for firms with higher agency costs. These findings suggest that mandatory disclosure serves as a credible commitment mechanism and that losing such commitment by disclosure deregulation is costly in the absence of a loss of information. Our study suggests that while voluntary disclosure is effective in reducing information asymmetry, it cannot replace mandatory disclosure in addressing information problems.

Keywords: *commitment effect*; *disclosure*; *market liquidity*; *smaller reporting companies*.

Data Availability: *Data are available from sources identified in the text*.

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I. INTRODUCTION

Rock (2002) and Stulz (2009) argue that mandatory disclosure provides managers with a mechanism to credibly commit to disclose on an *ex ante* basis, thereby reducing information asymmetry and agency conflicts between managers and shareholders. In contrast, voluntary disclosure allows managers to observe the content before making the disclosure decision and, thus, can be self-serving (Bushee and Leuz 2005). In addition, because public and private enforcement of the securities laws and the combination of criminal and civil liability make it costly to violate mandatory disclosure requirements, voluntary disclosure may not fully replace mandatory disclosure as a commitment mechanism, even if firms voluntarily follow a disclosure policy (Rock 2002; Stulz 2009; Leuz and Verrecchia 2000).

Building on these arguments and the economic theory predicting that a commitment to increased disclosure reduces information asymmetry and reduces market illiquidity (Baiman and Verrecchia 1996; Verrecchia 1999), we argue that the commitment effect provided by mandatory disclosure on market illiquidity cannot be fully replaced by voluntary disclosure. To provide insights on this argument, we examine a rare regulatory event that represents a regime shift from mandatory to voluntary disclosure for a sample of smaller reporting companies.[1]

On December 19, 2007, the SEC passed the final rule #33-8876, *Smaller Reporting Company Regulatory Relief and Simplification* (hereafter, the SRC rule), which allows smaller reporting companies with a public float of less than $75 million to choose to reduce disclosure on ten nonfinancial items in the periodic SEC filings beginning on February 4, 2008. Before the passage of this rule, the newly eligible smaller reporting companies were required to report the same information in their SEC filings as larger firms, regardless of the information content. However, after the passage of this rule, they were not mandated to provide information on the eligible items, such as risk disclosure or compensation discussion and analysis (CD&A). Instead, smaller reporting companies could voluntarily provide the information to investors on a quarterly basis.

This regulation change provides appealing features with which to study our research question for the following reasons. First, because many smaller reporting companies do not change their disclosure level around the regulation change, this mandatory-to-voluntary regime shift allows us to separate the commitment effect provided by mandatory disclosure from the information effect of voluntary disclosure on market illiquidity, while holding the disclosed information constant. Second, because the SRC rule only materially affects firms with public common equity floats between $25 million and $75 million,[2] we have an opportunity to construct large[3] and small control samples and adopt a "difference-in-differences" design, which mitigates the endogeneity concern due to a lack of control groups (Leuz and Wysocki 2008) when examining the impact of disclosure regulations. Finally, we examine the effect of an exogenous shock on firms' ability to commit to a high level of disclosure through mandatory SEC filings, thereby avoiding the self-selection and omitted correlated variable issues.[4]

We argue that in the new voluntary disclosure regime, although smaller reporting companies may choose to maintain a high disclosure level, whether the disclosure will be sustained in the

[1] We refer to "smaller reporting companies" as defined in the SEC final rule #33-8876 (see Section II for details) throughout the paper. We use the term "small public companies" in a more general sense.

[2] The SRC rule also applies to small business issuers with public floats less than $25 million. However, since Regulation S-B adopted in July 1992 already allows small business issuers to use scaled disclosure, the impact of the SRC rule on small business issuers is minimal. See Section II for details.

[3] Following Gao et al. (2008), we only keep firms with a public float greater than $75 million, but less than $200 million to minimize the impact of firm size differences.

[4] Note that the SRC rule reduces the disclosure requirement for ten nonfinancial disclosure items in the SEC periodic filings. Therefore, the loss of disclosure commitment in our study may only apply to the eligible disclosure items.

future is questionable because these companies can freely change their disclosure level without threat of penalty from the SEC or the courts. If the loss of commitment provided by mandatory disclosure on the eligible items in the SEC filings is costly and cannot be completely replaced by voluntary disclosure, then we expect to find increased market illiquidity for smaller reporting companies that maintain their disclosure level after the regulation change. Cross-sectionally, based on Rock (2002) and Stulz (2009), we predict that this loss of commitment is more important for firms with higher agency costs. Finally, based on the argument that voluntary disclosure does mitigate information asymmetry to some extent (i.e., the information effect), we expect market illiquidity to increase more for smaller reporting companies that reduce their disclosure level relative to companies that maintain their disclosure level.

We identify 283 smaller reporting companies that filed their 10-K filings with the SEC from February 2008 to July 2008. We read their 10-K filings and proxy statements to identify companies that choose to maintain their disclosure level and companies that choose to reduce disclosure. We then examine the changes in four illiquidity measures consisting of an illiquidity measure constructed following Amihud (2002), an estimate of the transaction costs developed in Lesmond et al. (1999), the average intra-day effective bid-ask spreads, and the principal component extracted from the first three measures. We examine these measures for smaller reporting companies from the three-month period before the SEC released the proposed SRC rule in July 2007 to the three-month period after the smaller reporting companies first filed their 10-Ks in 2008. We choose the three-month period before the release date of the proposed rule as the pre-period as opposed to using the corresponding three-month period prior to the final rule release date because the content of the final rule released in December 2007 is very similar to that of the proposed rule.[5]

Our analysis of the changes in long-term market illiquidity after the passage of the SRC rule indicates that, relative to both large and small control groups, market illiquidity for smaller reporting companies that maintain their disclosure level increases significantly. Specifically, using the small business issuers[6] as the control group, we document a 13.2 percent increase in effective bid-ask spreads from the pre-event period to the post-event period. This finding suggests that, holding the information content constant, disclosure deregulation reduces firms' credibility to commit to a higher disclosure level and thereby increases illiquidity. In addition, firms with reduced disclosure experience a further increase in market illiquidity relative to firms that maintain their disclosure level, suggesting that although these latter firms cannot credibly commit to a high level of disclosure, the disclosed information *per se* is useful in reducing information asymmetry to some extent. Finally, we find that the increase in illiquidity due to the decline in disclosure commitment is more pronounced for firms with higher agency costs, consistent with arguments in Rock (2002) and Stulz (2009) that mandatory disclosure provides managers with a low-cost commitment mechanism to mitigate agency conflicts.

Taken together, our findings suggest that voluntary disclosure cannot fully substitute for mandatory disclosure as a commitment mechanism, although voluntary disclosure is also effective in reducing information asymmetry to some extent. These results also suggest that the commitment effect of mandatory disclosure is particularly important for firms with higher agency conflicts. One caveat of our study is that the SEC released the proposed SRC rule just prior to the onset of the

[5] Because nonfinancial firms start experiencing dramatic declines in market returns and increases in illiquidity in September 2008, for the firms that filed their 10-Ks in June or July we only examine the two- or one-month periods before September 2008 as the post-regulation periods, respectively. Footnote 16 provides further discussion of our choice of the pre-period.

[6] According to Regulation S-B, firms with both revenue and public floats less than $25 million were classified as the small business issuers. As explained in Section II, the SRC rule does not materially change the reporting burden of the small business issuers.

recent recession and financial crisis. As a result, despite our reliance on two control groups to control for this confounding effect, the then-looming crisis may still contribute to our findings.

Our study makes several contributions to the disclosure literature. First, we provide direct evidence of the commitment effect of mandatory disclosure on market illiquidity while holding the disclosed information content constant. Previous research that studies the association between disclosure regulation and market illiquidity has focused primarily on regulatory events that also *increase* disclosure (e.g., Greenstein and Sami 1994; Boone 1998; Bushee and Leuz 2005). Findings of decreased market illiquidity after mandated disclosure in this previous research can be attributed to either improved disclosure commitment or increased information. In our study, the amount of information provided by smaller reporting companies that choose to maintain their disclosure level is held constant. Thus, we are able to isolate the commitment effect provided by mandatory disclosure from the information effect of voluntary disclosure.

Relatedly, previous empirical studies have been silent on whether voluntary disclosure can substitute for mandatory disclosure. If voluntary disclosure can fully substitute for mandatory disclosure, then we should not observe any change in illiquidity because the information disclosed is constant before versus after the rule change. Our study provides evidence that supports the Rock (2002) and Stulz (2009) argument that voluntary disclosure cannot fully replace mandatory disclosure as a commitment mechanism. This also provides one rationale for why mandatory disclosure is necessary. Further, our findings suggest that the importance of mandatory disclosure varies with agency costs, supporting the notion that one of the missions of securities laws is to mitigate agency problems (Mahoney 1995). Finally, although the SEC has recognized the costs of security regulations on small companies and has exempted small companies from certain filing requirements since the 1930s, a debate continues as to whether "one size fits all." Our study contributes to this literature and the policy debate by documenting the costs of disclosure deregulation on smaller reporting companies.

Section II next provides background information for our study. We motivate our hypotheses in Section III. We describe our sample and research design in Section IV, discuss our empirical results in Section V, and conclude in Section VI.

II. INSTITUTIONAL BACKGROUND AND LITERATURE REVIEW

Disclosure Regulations for Small Public Companies

Before the introduction of the *Smaller Reporting Company Regulatory Relief and Simplification* in 2007, the SEC adopted Regulation S-B, an integrated reduced disclosure system for small business issuers, in July 1992.[7] Regulation S-B was one of the first deregulations to reduce compliance costs for small businesses and to deviate from the "one-size-fits-all" policies in the Securities Act and the Exchange Act.[8] However, alleviating small public companies' financial reporting and disclosure burden has continued to be controversial, especially after the passage of the Sarbanes-Oxley Act (SOX) in July 2002. In response to the criticism that the costs of complying

[7] According to Regulation S-B, firms with both revenue and public floats less than $25 million were allowed to use Form SB-2 for registration of their securities under the Securities Act of 1933 and Form 10-SB for registration of their securities under the Exchange Act of 1934. In addition, these firms may use Forms 10-KSB and 10-QSB for their annual and quarterly reports. The SEC states that the purpose of Regulation S-B was "designed to reduce compliance costs and improve the ability of start-ups and other small businesses to obtain through the public capital markets."

[8] The SEC adopted Regulation S-B and its associated Forms SB-1 and SB-2 based on the success of Form S-18, which was a simplified registration form for smaller companies under the Securities Act that preceded Forms SB-1 and SB-2.

with SOX, especially Section 404, can be excessive for smaller firms (Engel et al. 2007), the SEC issued several extensions to the compliance dates of Section 404 for small public companies. The SEC also chartered the Advisory Committee on Small Public Companies (ACSPC) on March 23, 2005 to assess the regulatory financial reporting system for small public companies.

Incorporating some of the recommendations from the ACSPC's final report, the SEC issued the proposed rule for smaller reporting companies in July 2007 (ACSPC 2006). In December 2007, the SEC subsequently released the final rule #33-8876, *Smaller Reporting Company Regulatory Relief and Simplification* (hereafter, the SRC rule), which reflects only minor changes to the proposed rule.[9] The SRC rule allows smaller companies with public floats of less than $75 million to adopt the reduced disclosure practice for ten nonfinancial disclosure items in the periodic SEC filings after February 4, 2008. The SRC rule eliminates all S-B forms and consolidates Regulation S-B disclosure item regulation requirements into Regulation S-K. The new rules are intended to expand the number of smaller companies eligible to use reduced disclosure requirements and to reduce the information production costs and other indirect costs for these firms. This SRC rule is unique because it allows, but does not require, eligible firms to reduce the disclosure level.

The SRC rule requires eligible firms to identify themselves as "smaller reporting companies" by checking the corresponding box in the SEC filings, regardless of whether the firms reduce the disclosure level, to indicate to investors the regulation regime under which the firms are reporting. The SRC rule also permits smaller reporting companies to elect to comply with reduced disclosure on an item-by-item or *a la carte* basis each quarter. Therefore, with reduced disclosure requirements, smaller reporting companies can choose whether to disclose and, if so, how much to disclose with respect to various items. These include qualitative and quantitative disclosure about market risk, business and other risk factors, policies and procedures for approving related party transactions, and compensation discussion and analysis and other compensation committee reports. Appendix A summarizes the SRC rule.

During the three-year formation period of the SRC rule, small public companies generally responded positively to the reduction in mandatory disclosures based on the potential reduction in financial reporting costs. However, some accounting professionals and investor protection groups raised concerns that some managers may "cherry pick" by reporting only favorable information. For example, in their comment letter for the SRC proposed rule in 2007, Ernst & Young expressed concern "if a smaller reporting company elected to provide more than the minimum disclosures only in periods when the additional disclosures tended to be favorable." In addition, in the comment letter for the exposure draft of the ACSPC's final report in 2006, PricewaterhouseCoopers opposed the expansion of Regulation S-B to a broader category arguing that smaller firms are not widely followed by analysts, and the financial statements are therefore the main source of information for many investors.[10]

[9] The proposed rule allows smaller reporting companies to provide an audited balance sheet for the latest fiscal year only, along with audited statements of income, cash flows, and changes in stockholders' equity for each of the latest two fiscal years, and allows an *a la carte* basis for nonfinancial statement disclosure items. The final rule requires two years of balance sheets to go along with two years of statements of income, cash flows, and changes in stockholders' equity, and allows an *a la carte* basis for both financial statement and nonfinancial statement disclosure items.

[10] Further, the American Association of Individual Investors raised a similar point in their comment letter for the exposure draft of the ACSPC's final report and pointed out that transparent financial reporting is especially important for small companies due to their lack of analyst coverage and media coverage. Other examples of comment letters for the exposure draft of the ACSPC's final report include the American Institute of Certified Public Accountants' (AICPA) concern that the creation of scaled regulation could create unnecessary complexity and hinder the ability of users of financial statements to compare financial results among companies. Finally, the Texas Society of Certified Public Accountants also suggested that scaled regulation expands the risk to investors by a minimum return in the form of lower costs to companies.

In summary, the SRC rule does not affect firms with public floats greater than $75 million, nor does it materially change the reporting burden of former S-B filers, the small business issuers.[11] As a result, we use two control groups to investigate the effect of reduced disclosure commitment resulting from disclosure deregulation on the information asymmetry component of the costs of capital, proxied by market illiquidity.

Related Literature

Commitment Effect versus Information Effect

Economic theory suggests that a commitment to higher disclosure level can reduce the cost of capital and market illiquidity. For example, Baiman and Verrecchia (1996) and Verrecchia (1999) show that a firm's commitment to a higher level of disclosure reduces the information asymmetry between the informed manager and the market maker. By reducing the information that the market maker can extract from the total net demand, the firm's commitment reduces market illiquidity.[12] Similarly, Diamond and Verrecchia (1991) show that increased disclosure reduces the information asymmetry among informed and uninformed investors. As a result, investors will be relatively more confident that stock transactions occur at a fair price for firms with a higher disclosure level, thereby decreasing market illiquidity.[13]

Previous studies argue that mandatory disclosure provides a credible commitment mechanism. Rock (2002) argues that the SEC disclosure system is an effective mechanism for solving agency problems because it standardizes the disclosure format and quantity, adjusts reporting obligations over time, and most importantly, provides a credible and specialized enforcement mechanism. In particular, public and private enforcement of the securities laws, using a combination of criminal and civil liability, make mandatory disclosure a credible commitment mechanism because it is costly to reverse the promise to disclose under disclosure regulation.[14]

Firms can also explicitly or implicitly commit to a higher disclosure level by voluntarily following a disclosure policy (Monahan 2006). For example, Lansford et al. (2011) provide evidence that disaggregate earnings guidance is likely an *ex ante* rather than an *ex post* disclosure choice. However, both Stulz (2009) and Rock (2002) argue that, while managers may have incentives to promise a high disclosure level, without disclosure regulations, their reputational bond

[11] The SRC rule moves item requirements in Regulation S-B containing substantive scaled nonfinancial disclosure requirements into Regulation S-K and does not propose any major substantive changes to the items moved from Regulation S-B to Regulation S-K (SRC final rule, page 11). Thus, small business issuers that are previously qualified to file under Regulation S-B are essentially following the same disclosure requirements. The potential compliance costs for small business issuers include the cost of shifting from reporting under Regulation S-B to reporting under Regulation S-K. That is, instead of using SB forms, they need to file with the SEC using Forms 10, 10-K, 10-Q, and S-1. The SEC has argued that these compliance costs are not significant.

[12] Verrecchia (1999) explains that the interpretations of the disclosure commitment in the model are not necessarily restricted to an IPO setting or a cross-listing setting. For example, the disclosure commitment may represent a choice of the disclosure policy within GAAP.

[13] Most empirical disclosure literature studies the association between voluntary disclosure and the cost of capital or market illiquidity. For example, Coller and Yohn (1997) find that the bid-ask spreads decline when firms issue management earnings forecasts. However, Francis et al. (2008) find that firms' cost of equity capital increases with the incidence of earnings forecasts. Interestingly, they find a negative association between the cost of capital and their self-constructed disclosure index based on 10-K filings in the absence of control for accounting quality. Leuz and Verrecchia (2000) argue that these mixed results may be due to the already rich information environment in the U.S. and the *ex post* nature of voluntary disclosure.

[14] This argument explains the bonding hypothesis of the cross-listing literature. Relatedly, firms may also choose to be subjected to a higher level of disclosure requirements by following a different accounting standard. Leuz and Verrecchia (2000) find that German firms that have switched from the German to an international reporting regime (IAS or U.S. GAAP) are associated with lower market illiquidity compared to firms that remain under the German reporting regime.

may be swamped by potential gains from the *ex post* opportunistic behavior.[15] As a result, voluntary disclosure may not completely replace mandatory disclosure in providing an effective disclosure commitment mechanism. Hail (2011) and Monahan (2006) echo these studies by arguing that, compared to voluntary disclosure, the *ex ante* commitment to disclosure provided by mandatory disclosure has higher potential to reduce information asymmetries and thereby reduce the cost of capital.

On a related note, the prior literature documents that when mandatory disclosure levels decline, managers may choose to disclose strategically to pursue private benefits at the expense of shareholders. For example, Hope and Thomas (2008) argue that because U.S. multinational firms were no longer required to disclose earnings by geographic area after SFAS 131, multi-national firms' management reduced such disclosure to secure private benefits of control by empire building. This stream of literature suggests that agency conflicts between management and shareholders can increase when mandatory disclosure becomes voluntary, consistent with Rock's (2002) argument.

The previous literature that associates market illiquidity and disclosure regulation mainly focuses on the voluntary-to-mandatory disclosure regime shift and provides evidence consistent with the notion that mandatory disclosure provides a credible commitment mechanism and reduces information asymmetry. For example, Greenstein and Sami (1994) study the change in market illiquidity after the imposition of the SEC's 1970 segment disclosure requirement. Boone (1998) examines the bid-ask spreads for oil and gas firms before and after they were required to disclose the discounted present value of oil and gas reserves. Both studies show that market illiquidity declined after disclosure requirements were increased. However, the mandatory disclosure requirement also increases the amount of information provided to investors. Therefore, it is not clear whether the changes in the market illiquidity are driven by increased information *per se*, or by the enhanced commitment mechanism. In other words, it is not clear from the existing empirical evidence whether the mandatory disclosure affects market illiquidity differently from the voluntary disclosure if firms disclose the same amount of information in both regimes.

The mandatory-to-voluntary shift of the SRC rule in our study provides us with an opportunity to isolate the commitment effect provided by mandatory disclosure from the voluntary disclosure effect. Because some smaller reporting companies choose to maintain their disclosure level, we can use the results for these firms to measure the commitment effect provided by mandatory disclosure while holding constant the amount of information provided to investors. Specifically, by comparing the changes in illiquidity after the rule is passed for smaller reporting companies that fall under the SRC rule but maintain their disclosure level against the changes in illiquidity for firms unaffected by the rule, we can isolate the commitment effect provided by mandatory disclosure. On the other hand, by comparing changes in illiquidity for smaller reporting companies that maintain the disclosure to smaller reporting companies that reduce disclosure, we can examine the information effect of voluntary disclosure.

Information Content of the SEC Filings

Whether a commitment to increased disclosure affects market illiquidity depends on the materiality of the potentially reduced information. Previous studies have documented that

[15] The empirical evidence on the cost of violating the commitment via voluntary disclosure policy is mixed. Chen et al. (2011) find significant negative market reactions to firms that publicly announce that they will stop issuing earnings guidance, indicating that a commitment to nondisclosure or breaking a disclosure commitment is costly. However, both Chen et al. (2011) and Houston et al. (2010) find that firms that stop issuing earnings forecasts have poor performance and face higher uncertainty. Chen et al. (2011) also document that the market seems to rationally revise its expectations of the future earnings of firms that stop issuing earnings guidance and that the negative market reaction to the announcement is attributable to the underlying determinants, such as poor performance and higher uncertainty, of the decision to announce or not to announce.

disclosure items subject to the SRC rule in the SEC filings contain useful information to investors. We argue that such information provided in the SEC filings may be especially important to smaller reporting companies' investors because smaller reporting companies have a poor information environment, including lower analyst following and media coverage than larger firms. For example, Brown and Tucker (2011) find that firms modify MD&A disclosures following significant earnings changes and that the magnitude of stock price responses to 10-K filings is positively associated with the MD&A modifications, suggesting that investors value the information provided in the MD&A section. Kravet and Muslu (2011) find that increases in risk disclosures are associated with increases in the number of analyst forecasts and improved forecast accuracy, suggesting that risk disclosure contains important information for investors' valuation of equity. Campbell et al. (2011) also find that market participants incorporate information conveyed by the SEC mandated risk disclosures. Further, Laksmana et al. (2011) find that firms with excessive executive compensation tend to have CD&A that is harder to read, suggesting that managers believe investors incorporate CD&A into their decision-making process.

III. HYPOTHESES DEVELOPMENT

Based on the above discussion, mandatory disclosure provides a credible low-cost commitment mechanism due to SEC enforcement and the high cost of exiting the system. In addition, this commitment effect may not be fully replaced by voluntary disclosure because voluntary disclosure allows firms to observe the content before making the decision to disclose (Hail 2011). Building on these arguments, we contend that the option that the SRC rule provides to smaller reporting companies to reduce certain disclosures without penalty by the SEC lowers the firms' credibility to commit to a high level of disclosure provided by the mandatory SEC filings, which cannot be fully substituted by voluntary disclosure. Further, based on the theoretical literature showing that a commitment to a high disclosure level is associated with lower market illiquidity (Baiman and Verrecchia 1996), we expect that the market illiquidity increases after the passage of the SRC rule for smaller reporting companies that choose to maintain their disclosure level. We also predict that market illiquidity increases for smaller reporting companies that reduce their disclosure if the information provided in the voluntary disclosure regime reduces information asymmetry. Our first two hypotheses are as follows:

H1: Commitment effect provided by mandatory disclosure: The market illiquidity for smaller reporting companies that choose to maintain their disclosure level increases after the passage of the SRC rule.

H2: Information effect of voluntary disclosure: Relative to smaller reporting companies that maintain their disclosure level, smaller reporting companies that reduce their disclosure face a larger increase in market illiquidity.

Mahoney (1995) argues that one rationale for securities laws is to address agency conflicts between managers and shareholders. Rock (2002) and Stulz (2009) also argue that committing to a regulation regime that is not easy to reverse and has a strong enforcement mechanism helps relieve minority shareholders' concern about managers' private benefits or shirking. Based on these arguments, our third hypothesis predicts that the effect of mandatory disclosure on market illiquidity is particularly important for firms with higher agency conflicts between shareholders and managers, and therefore the loss of commitment due to the SRC rule is more costly for firms with higher agency costs.

H3: The increase in market illiquidity for smaller reporting companies that choose to maintain their disclosure level is more pronounced for firms with higher agency costs.

IV. SAMPLE SELECTION AND RESEARCH DESIGN

Sample Selection

We first identify 779 nonfinancial firms that filed their annual reports with the SEC as "smaller reporting companies" from February 2008 to July 2008. For each sample firm, we designate the three-month period from April 2007 to June 2007 as the pre-regulation period. We find evidence consistent with investors basing their expectations on the proposed rule and adjusting their portfolios accordingly, supporting our use of the period before the proposed rule as the pre-event period.[16] For sample firms that filed with the SEC from February to May 2008, we designate the three-month period after the SEC filing date as the post-regulation period. For sample firms that filed with the SEC in June or July 2008, we designate either the two-month or the one-month period after the filing date, but before September 1, 2008 as the post-regulation period. We exclude financial companies with SIC codes between 6000 and 6999 and use September 1, 2008 as the post-period cutoff date to minimize the impact of the 2008 financial crisis on our analysis.[17]

Table 1 shows that our final sample includes 283 smaller reporting companies with data available from CRSP and Compustat for both pre-event and post-event periods. To identify smaller reporting companies that choose to maintain or reduce their disclosure level, we examine the 10-K items and proxy statements of these smaller reporting companies and determine whether firms choose to reduce the disclosure level for eligible items.[18] For each eligible 10-K or proxy statement item, we manually compare firms' disclosure with the final rule descriptions. We find that 109 smaller reporting companies chose to maintain their disclosure level for all ten eligible items (Maintainers) and 174 smaller reporting companies reduced the disclosure level for at least one eligible item (Reducers).

Panel B of Table 1 shows that most Reducers reduce disclosure on multiple eligible items. Of the 174 Reducers, 75 companies (43 percent) choose to reduce disclosure on all ten eligible items, 105 (i.e., 30 plus 75) reduce disclosure on at least 5 items, and 160 (i.e., 55 plus 105) reduce disclosure on more than one item. Among the disclosure items that can be reduced, the disclosure of business risk factors, 10-K Item 1A, and executive compensation disclosures arguably contain the richest and the most important information. Panel C of Table 1 shows that 84 Reducers (48 percent) choose to eliminate both business risk factors and compensation discussion and analysis. We find that 80 Reducers (46 percent) choose to reduce either risk disclosure or executive compensation disclosure. And there are only 10 companies (6 percent) that maintain both risk and compensation disclosure, but choose to reduce some other eligible disclosure items.

To implement our difference-in-differences research design, we identify two control groups that are not affected by the SRC rule to control for the intertemporal changes in market conditions from 2007 to 2008. The first control group consists of 243 nonfinancial firms that filed as accelerated filers from February 1, 2008 to July 31, 2008 with public floats between $75 million and $200 million, measured at the end of the second fiscal quarter before the SRC rule became effective. Following Gao

[16] We find significant abnormal stock market reactions for smaller reporting companies around the release date of the proposed rule. On the other hand, we do not find abnormal stock market reactions around the passage of the final rule. In addition, we find that compared to small control firms, treatment firms' bid-ask spreads start increasing significantly around July 2007, and stay constant relative to small control firms until March 2008. These results suggest that investors anticipate the passage of the final rule, and the final rule does not contain new information beyond the proposed rule. In addition, by using the three months before December 2007 as an alternative pre-period, we continue to find similar results, although the economic significance is lower, which is consistent with our argument that investors anticipate the final rule and adjust their portfolios accordingly.

[17] The financial sector started to accrue losses in late 2007, due to the downturn in the sub-prime mortgage markets. Although the market condition for nonfinancial sectors became volatile in 2008, it did not experience dramatic market returns or liquidity losses until a major panic broke out at Lehman Brothers' bankruptcy in September 2008.

[18] Appendix A lists the 10-K items that are eligible for reduced disclosure.

TABLE 1

Sample Selection Procedure

Panel A: Smaller Reporting Companies

Nonfinancial firms that filed as "Smaller Reporting Companies" from 02/01/2008 to 07/30/2008 and filed 10-Ks in 2007	779
Nonfinancial smaller reporting companies with data available from CRSP and Compustat and with at least one illiquidity measure	283

Panel B: Disclosure Choice of Smaller Reporting Companies

Smaller reporting companies that maintain the disclosure level for all eligible items (Maintainers)	109
Smaller reporting companies that reduce disclosure for all eligible items	75
Smaller reporting companies that reduce disclosure for five to nine eligible items	30
Smaller reporting companies that reduce disclosure for two to four eligible items	55
Smaller reporting companies that reduce only one eligible item	14
Total	283

Panel C: Choice of the Compensation and/or Risk Disclosures for the 174 Reducers

Smaller reporting companies that reduce both compensation and risk disclosure	84
Smaller reporting companies that reduce either compensation or risk disclosure (one of the two items)	80
Smaller reporting companies that maintain both risk disclosure and compensation disclosure but reduce other eligible disclosure items	10

Panel D: Control Samples

Control Sample One (Large): Nonfinancial firms that filed as accelerated filers from 02/01/2008 to 07/30/2008, have Compustat and CRSP coverage, have at least one illiquidity measure, and have less than $200 million, but greater than $75 million, public float measured at the most recent second quarter	243
Control Sample Two (Small): Nonfinancial firms that filed 10-KSB or filed as smaller reporting companies from 02/01/2008 to 07/30/2008, filed 10-KSB in 2007, have Compustat and CRSP coverage, and have at least one illiquidity measure	118

et al. (2009), we restrict the control firms to be similar in size to the sample firms to minimize the size effect on the changes in illiquidity. We also construct a second group of control firms consisting of 118 small business issuers who filed 10-KSBs from 2007 to 2008 and have CRSP and Compustat coverage. Small business issuers are also subject to the SRC rule. However, as discussed earlier, because the SEC already exempted these small business issuers from filing regular 10-Ks before the SRC rule, the impact of the SRC rule on these small business issuers should be negligible. We understand that neither control group is perfect in controlling for the time effect or omitted variable problems. For example, one can argue that the treated firms and the control groups are still significantly different, particularly in firm size. However, given that one control group is larger and the other control group is smaller than the treated firms, the concern that size is driving the differential changes in illiquidity for the sample and control firms should be reduced.

Changes in Long-Term Illiquidity after the Adoption of the SRC Rule

We use Equation (1) to test the first hypothesis that market illiquidity for smaller reporting companies that maintain their disclosure level increases after the SRC rule. The sample for this

analysis includes smaller reporting companies that choose to maintain their disclosure level and control groups:[19]

$$\Delta ILLIQ_i = \alpha_0 + \alpha_1 MAINTAIN_i + \Lambda Controls_i + \varepsilon_i. \quad (1)$$

$\Delta ILLIQ_i$ refers to the changes in market illiquidity from the pre-event period to the post-event period. We construct four market illiquidity measures. We follow Amihud (2002) and construct the first illiquidity measure as the ratio of the daily absolute return to the dollar trading volume (*ILLIQ_AM*). This ratio represents the absolute percentage price change per dollar of daily trading volume, or the daily price impact of the order flow. Because both our control firms and sample firms are relatively small, market illiquidity is also reflected in infrequent trading. Thus, we adopt the methodology proposed by Lesmond et al. (1999) and estimate the transaction costs for each firm-period incorporating zero-returns in the return-generating process (*ILLIQ_LOT* estimate) as the second illiquidity measure. Similar to Lesmond et al. (1999), we require at least 25 daily security returns for each firm-period for numerical convergence. Our third illiquidity measure is the intra-day effective bid-ask spreads, measured as (ask − bid)/[(ask + bid)/2] from the Trade and Quote (TAQ) database (*ILLIQ_ES*), where the spreads are based on executed prices (i.e., effective spreads) to measure the actual costs of trading (Heflin et al. 2005).

We recognize that each illiquidity measure has its advantages and disadvantages. For example, the data requirement for the *ILLIQ_AM* ratio is low, but it can be calculated only when the trading volume is non-zero. The *ILLIQ_LOT* measure explicitly incorporates infrequent trading in the estimation process, but the estimates have a higher requirement in the time-series data. The *ILLIQ_ES* spread is a direct measure of actual trading costs, but we lose about 20 percent of the observations due to data coverage limitations. Because of the drawbacks for each measure, we use multiple measures to capture the different aspects of market illiquidity. In addition, we conduct a principal component analysis based on all three illiquidity measures to construct an illiquidity index (*ILLIQ_PC*) as our fourth measure.[20]

The independent variables in Equation (1) include one test variable and four control variables. *MAINTAIN* is an indicator variable that equals 1 for smaller reporting companies that maintain their disclosure level, and 0 for control firms. If smaller reporting companies that maintain their disclosure level experience an increase in market illiquidity due to the loss of commitment provided by mandatory disclosure, then we expect α_1 to be significantly positive. The first control variable is the changes of the natural log of the average market value of equity from the pre-event period to the post-event period ($\Delta LogMV$), which is expected to be negatively associated with market illiquidity. $\Delta LogRETVOL$ is the change in the natural log of the standard deviation of daily returns from the pre-event period to the post-event period. We use return volatility to capture the overall uncertainty of the stock price and expect the changes in price uncertainty to be positively associated with the changes in firms' market illiquidity. We also control for the changes in the natural log of the average daily trading volume ($\Delta LogVOL$) and expect this variable to be negatively associated with the changes in market illiquidity. Finally, we include the changes in natural log of prices, $\Delta LogPRC$, to control for the possibility that changes in bid-ask spreads and *ILLIQ_AM* are driven by the changes in the denominators from the pre- to the post-event period.

[19] Following the previous literature (Boone 1998; Leuz and Verrecchia 2000), we take the natural log of all illiquidity measures and the control variables and then calculate the changes from the pre-event window to the post-event window for easy interpretations of the estimated coefficients and comparisons across models. We also winsorize all continuous variables at 1 percent and 99 percent to mitigate the effect of outliers.

[20] The standardized scoring coefficients generated from the principal component analysis for *ILLIQ_AM*, *ILLIQ_LOT*, and *ILLIQ_ES* are 0.36, 0.38, and 0.43, respectively. As a robustness check, we also include quoted depth as one factor in the factor analysis, and we continue to find similar results.

We use Equation (2a) to test the second hypothesis that market illiquidity for smaller reporting companies that reduce their disclosure level increases relative to smaller reporting companies that maintain their disclosure level after the SRC rule. For this analysis, we only include smaller reporting companies that either maintain or reduce the disclosure level:

$$\Delta ILLIQ_i = \beta_0 + \beta_1 REDUCE_i + \Lambda Controls_i + \varepsilon_i. \quad (2a)$$

All variables are measured as in Equation (1) except for the test variable. *REDUCE* is an indicator variable that equals 1 for smaller reporting companies that reduce their disclosure for at least one item (174 companies), and 0 for smaller reporting companies that maintain their disclosure level (109 companies). If the reduced information is important to firms' overall information environment, then we expect β_1 to be significantly positive.

In addition to partitioning the sample based on overall disclosure change, we also use Equation (2b) to examine whether the increase in market illiquidity is driven by reduction in risk disclosure or by compensation disclosure:

$$\Delta ILLIQ_i = \beta_0 + \beta_1 REDUCE\_RISK_i + \beta_2 REDUCE\_COMP_i + \Lambda Controls_i + \varepsilon_i. \quad (2b)$$

REDUCE_COMP equals 1 for the 141 smaller reporting companies that reduce compensation disclosure, and 0 for the 142 smaller reporting companies that maintain compensation disclosure. *REDUCE_RISK* equals 1 for the 107 smaller reporting companies that reduce risk disclosure, and 0 for the 176 smaller reporting companies that maintain the risk disclosure.

Finally, we use Equation (3) to test the third hypothesis that the commitment effect is stronger for firms with higher agency conflicts. To test H3, we only include smaller reporting companies that maintain the disclosure level in the analysis:

$$\Delta ILLIQ_i = \gamma_0 + \gamma_1 AGENCY_i + \Lambda Controls_i + \varepsilon_i. \quad (3)$$

We measure agency costs *AGENCY* as *CEO_CHAIR* + *BOARD_D* + *BH_DIS*, where *CEO_CHAIR* is an indicator variable that equals 1 for firms where CEOs also serve as the chairmen of the board. *BOARD_D* is an indicator variable that equals 1 if the percentage of independent directors is below the sample median, and 0 otherwise. The previous literature suggests that although outside blockholders provide better monitoring of management, the conflict of interest between large shareholders and small shareholders leads to reduced incentives for blockholders to monitor on the behalf of smaller shareholders when block holdings become too large. Hence, we construct *BH_DIS* as an indicator variable equal to 1 if the outside blockholders (> 5 percent) hold 35 percent (the upper quartile) or more of the shares outstanding, and 0 otherwise.[21] We expect agency conflicts between managers and shareholders to be higher when a firm's CEO also serves as the chairman of the board, when a firm has fewer independent directors, and when the outside blockholders are less aligned with smaller investors. Thus, *AGENCY* ranges from 0 to 3, with a higher number indicating higher agency conflicts.

V. EMPIRICAL RESULTS

Descriptive Statistics

Table 2 reports the descriptive statistics of the main variables for the two control groups, the smaller reporting companies that maintain the disclosure level (Maintainers), and the smaller

[21] We use 35 percent as the primary cut for large block holdings, as 35 percent represents the top quartile in the distribution. While this cutoff point can be arbitrary, our results are robust to the cutoff ranging from 30 percent–40 percent.

TABLE 2

Descriptive Statistics

	Smaller Reporting Companies (Maintainers)		Smaller Reporting Companies (Reducers)		Control Sample One (Large)		Control Sample Two (Small)	
Variable	**Mean**	**Median**	**Mean**	**Median**	**Mean**	**Median**	**Mean**	**Median**
$_Spread_pre	0.23	0.13	0.30	0.14	0.14***	0.09***	0.23	0.19*
$_Spread_post	0.34	0.16	0.46	0.20	0.18***	0.10***	0.27	0.19
Price_pre	7.11	5.16	6.87	4.11*	9.34**	7.33***	5.41**	4.60*
Price_post	6.56	3.85	5.88	3.56	7.49	5.32***	5.33	3.65
LogMV_pre	10.86	10.91	10.62***	10.67***	11.81***	11.82***	10.64**	10.59**
LogMV_post	10.34	10.54	10.05**	10.14***	11.54***	11.51***	10.24	10.15*
Volume_pre	0.0047	0.0023	0.0041	0.0022	0.0072**	0.0039***	0.0051	0.0025
Volume_post	0.0037	0.0014	0.0023	0.0011**	0.0042	0.0028***	0.0079*	0.0028***
RETVOL_pre	0.0356	0.0316	0.0375	0.0329	0.0269***	0.0245***	0.0387	0.0362**
RETVOL_post	0.0589	0.0426	0.0591	0.0472*	0.0359***	0.0326***	0.0659	0.0500**
ILLIQ_AMpre	0.9174	0.2339	1.3629**	0.4019**	0.0988***	0.0439***	1.5925***	0.5242*
ILLIQ_AMpost	4.3659	1.9119	6.4687	3.7368**	0.3717***	0.1434***	4.1638	1.5675
ILLIIQ_LOTpre	0.0091	0.0066	0.0124**	0.0085**	0.0044***	0.0031***	0.0126**	0.0090*
ILLIQ_LOTpost	0.0349	0.0156	0.0538**	0.0339**	0.0084***	0.0052**	0.0297	0.0180
ILLIQ_ESpre	0.0249	0.0194	0.0315	0.0256*	0.0119***	0.0096***	0.0376***	0.0327***
ILLIQ_ESpost	0.0549	0.0506	0.0761***	0.0675**	0.0204***	0.0187***	0.0604*	0.0580*

*, **, *** Represent 10 percent, 5 percent, and 1 percent significance levels, respectively. All comparisons are relative to smaller reporting companies that maintain the disclosure level.

Variable Definitions:

$_Spread_pre = average intra-day bid-ask spreads in terms of dollar amount from April 1, 2007 to June 30, 2007;

$_Spread_post = average intra-day bid-ask spreads in terms of dollar amount for the three-month period after 10-K filing date (but before September 1) in 2008;

Price_pre = average daily closing market price from April 1, 2007 to June 30, 2007;

Price_post = average daily closing market price for the three-month period after 10-K filing date (but before September 1) in 2008;

LogMV_pre = natural log of average market value of equity from April 1, 2007 to June 30, 2007;

LogMV_post = natural log of average market value of equity for the three-month period after 10-K filing date (but before September 1) in 2008;

Volume_pre = average daily trading volume scaled by number of shares outstanding from April 1, 2007 to June 30, 2007;

Volume_post = average daily trading volume scaled by number of shares outstanding for the three-month period after 10-K filing date (but before September 1) in 2008;

RETVOL_pre = standard deviation of daily stock returns from April 1, 2007 to June 30, 2007;

RETVOL_post = standard deviation of daily stock returns for the three-month period after 10-K filing date (but before September 1) in 2008;

ILLIQ_AMpre = average daily illiquidity ratio from April 1, 2007 to June 30, 2007. Following Amihud (2002), daily illiquidity ratio is calculated as the daily absolute return to the (dollar) trading volume;

ILLIQ_AMpost = average daily illiquidity ratio for the three-month period after 10-K filing date (but before September 1) in 2008. Following Amihud (2002), daily illiquidity ratio is calculated as the daily absolute return to the (dollar) trading volume;

ILLIQ_LOTpre = illiquidity measure estimated for each firm for the pre-event period following Lesmond et al. (1999), where the pre-event period is from April 1, 2007 to June 30, 2007;

ILLIQ_LOTpost = illiquidity measure estimated for each firm for the post-event period following Lesmond et al. (1999), where the post-event period is the three-month period after 10-K filing date (but before September 1) in 2008;

ILLIQ_ESpre = average intra-day effective bid-ask spreads from April 1, 2007 to June 30, 2007, where intra-day effective bid-ask spreads is calculated as (ask − bid)/[(ask + bid)/2] from TAQ database; and

ILLIQ_ESpost = average intra-day effective bid-ask spreads for the three-month period after 10-K filing date (but before September 1) in 2008, where intra-day effective bid-ask spreads is calculated as (ask − bid)/[(ask + bid)/2] from TAQ database.

reporting companies that reduce the disclosure level (Reducers), respectively. For each group, we find decreased market prices and market values of equity and increased stock return volatility and market illiquidity from the pre-event period to the post-event period, suggesting that it is important to control for the underlying changes in the capital market conditions using the two control groups.

While the price level drops in general, we find increases in absolute trading costs from the pre-period to the post-period, especially for smaller reporting companies. For example, the average trading costs in term of the bid-ask spreads in dollar amounts for the Maintainers is 23 cents in the pre-event period. The average trading costs increase to 34 cents in the post-event period. In contrast, the increases in absolute trading costs for the two control groups are much smaller, and the difference in the changes in absolute trading costs between sample firms and control firms are statistically significant. Consistent with the size differences, we find higher (lower) market illiquidity for sample firms relative to large (small) control firms using all three measures in the pre-event period. However, the illiquidity level for the Maintainers in the post-event period is not significantly different from the small control firms, indicating that the changes in illiquidity from the pre-event period to the post-event period is larger for the Maintainers than for the small control firms. Overall, the comparison between the smaller reporting companies and the two control groups suggests that smaller reporting companies are more similar to the small control firms in terms of market value and trading costs than the large control firms. Therefore, the empirical results using small business issuers as the control group are probably more relevant. In addition, comparing the Maintainers to the Reducers, we find that Reducers tend to be smaller and have higher market illiquidity in both the pre-event and post-event periods.

Table 3 reports Pearson correlations among the main variables. Consistent with our expectations, we find that the changes in the three illiquidity measures are significantly positively related with correlations ranging from 0.32 to 0.65. The less-than-perfect correlation suggests that different measures may capture different aspects of market illiquidity. Consistent with prior literature, we find that the changes in market value and trading volume are negatively correlated with the changes in illiquidity and that return volatility is positively correlated with the changes in illiquidity.[22]

Changes in Long-Term Illiquidity for Smaller Reporting Companies

Table 4 provides the test results for our first hypothesis. Panel A uses large firms as the control group and Panel B uses small business issuers as the control group. The change in the *ILLIQ_AM* measure constructed following Amihud (2002) provides us with the best data coverage because it requires only CRSP data items. We lose 10 percent to 20 percent of the data using the *ILLIQ_ES* measure because it requires TAQ database coverage. We lose about 25 percent of the observations using the *ILLIQ_LOT* illiquidity measure due to the minimum data requirement for maximum likelihood estimations, as well as the data requirement that the estimated trading costs should be positive in both the pre- and post-periods.[23] Finally, we lose 30 percent to 40 percent of the observations using the principal component extracted from the above three illiquidity measures because the principal component analysis requires data availability for all three measures.

[22] Recognizing that variables that capture changes in market conditions are highly correlated, we also conduct a robustness check to make sure that including or excluding certain control variables does not drive our results. For example, if we exclude the changes in price in Equation (1), then the estimated coefficient for *MAINTAIN* is 0.189 with a t-statistic of 3.64 when illiquidity is measured as the principal component, very similar to the reported coefficient of 0.217 in Table 4.

[23] As a robustness check, we do not take the natural log and include negative *LOT* estimates in the regressions and find similar results.

TABLE 3

Pearson Correlations of the Main Variables

		(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1)	*SRC*	**0.67**	**−0.17**	**−0.15**	**−0.13**	0.06	**0.24**	**0.35**	**0.35**
(2)	*REDUCE*	1.00	**−0.14**	**−0.21**	−0.09	0.04	**0.21**	**0.31**	**0.33**
(3)	Δ*LogMV*		1.00	0.07	**0.79**	**−0.45**	**−0.66**	**−0.35**	**−0.53**
(4)	Δ*LogVOL*			1.00	0.09	**0.23**	**−0.49**	**−0.23**	**−0.34**
(5)	Δ*LogPRC*				1.00	−0.41	**−0.55**	**−0.33**	**−0.49**
(6)	Δ*LogRETVOL*					1.00	**0.32**	**0.45**	**0.39**
(7)	Δ*ILLIQ_AM*						1.00	**0.35**	**0.65**
(8)	Δ*ILLIQ_LOT*							1.00	**0.32**
(9)	Δ*ILLIQ_ES*								1.00

Numbers in bold indicate a 1 percent or less significance level.
Pre-event period is from April 1 to June 30, 2007.
Post-event period is the three-month period after 10-K filing date (but before September 1) in 2008.

Variable Definitions:
SRC = indicator variable that equals 1 for smaller reporting companies, and 0 for control firms;
REDUCE = indicator variable that equals 1 for smaller reporting companies that reduce their disclosure level, and 0 for smaller reporting companies that maintain their disclosure level and for control firms;
Δ*LogMV* = changes in the natural log of the average market value of equity from the pre-event period to the post-event period;
Δ*LogVOL* = changes in the natural log of the average daily trading volume from the pre-event period to the post-event period, where daily trading volume is calculated as total trading volume scaled by shares outstanding;
Δ*LogPRC* = changes in the natural log of the average closing price from the pre-event period to the post-event period;
Δ*LogRETVOL* = changes in the natural log of the standard deviation of daily returns from the pre-event period to the post-event period;
Δ*ILLIQ_AM* = changes in the natural log of the average *ILLIQ_AM* ratio from the pre-event period to the post-event period, where the *ILLIQ_AM* ratio is calculated as the daily absolute return to the (dollar) trading volume following Amihud (2002);
Δ*ILLIQ_LOT* = changes in the natural log of the illiquidity measure estimated following Lesmond et al. (1999) from the pre-event period to the post-event period; and
Δ*ILLIQ_ES* = changes in the natural log of average daily effective bid-ask spreads from the pre-event period to the post-event period, where daily effective bid-ask spreads are calculated as the average intra-day effective (ask − bid)/[(ask + bid)/2].

Consistent with the first hypothesis, the coefficients on *MAINTAIN* are significantly positive across all specifications, suggesting that the illiquidity level increases significantly after the rule change for smaller reporting companies that maintain their disclosure level after controlling for the change in capital market conditions. The coefficients on control variables are largely consistent with prior research. For example, we find that the changes in market illiquidity are negatively associated with the changes in market value and trading volume, and positively associated with the changes in return volatility.

The economic magnitudes of the changes in illiquidity are also significant. For example, the estimated coefficient on *MAINTAIN* using the effective spreads measure is 0.124 in Panel B of Table 4, suggesting that the market illiquidity increases by 13.2 percent from the pre- to the post-event period relative to small business issuers. This magnitude is comparable to previous studies that use similar bid-ask spreads measures on the effect of the disclosure requirements on market illiquidity. For example, Greenstein and Sami (1994) document that their treated group experiences an additional 14.4 percent decrease in bid-ask spreads compared to the control group after the SEC's segment disclosure requirement. In addition, Boone (1998) finds that the relative bid-ask

TABLE 4

Changes in Long-term Illiquidity for Smaller Reporting Companies that Maintain the Disclosure Level

$$\Delta ILLIQ_i = \alpha_0 + \alpha_1 MAINTAIN_i + \Lambda Controls_i + \varepsilon_i. \quad (1)$$

Panel A: Changes in Illiquidity for Smaller Reporting Companies that Maintain Disclosure Level Relative to Large Control Firms

	ΔILLIQ_AM	*ΔILLIQ_LOT*	*ΔILLIQ_ES*	*ΔILLIQ_PC*
MAINTAIN	0.259***	0.418***	0.156***	0.217***
	[3.80]	[3.21]	[2.87]	[4.22]
Δ*LogMV*	−0.703***	−0.624**	−0.865***	−0.592***
	[−5.34]	[−2.46]	[−5.14]	[−3.06]
Δ*LogRETVOL*	0.559***	0.859***	0.407***	0.538***
	[6.79]	[5.08]	[6.95]	[10.63]
Δ*LogPRC*	−0.449***	0.295	0.186	0.169
	[−3.84]	[1.15]	[0.98]	[0.86]
Δ*LogVOL*	−0.797***	−0.198**	−0.257***	−0.351***
	[−9.12]	[−2.10]	[−4.14]	[−6.42]
Intercept	0.066	0.085	0.253***	0.184**
	[0.58]	[0.46]	[2.72]	[2.32]
Ind. Fixed Effect	Yes	Yes	Yes	Yes
Adj. R^2 (%)	72.6	29.9	49.8	61.1
n	352	260	313	238

Panel B: Changes in Illiquidity for Smaller Reporting Companies that Maintain Disclosure Level Relative to Small Control Firms

	ΔILLIQ_AM	*ΔILLIQ_LOT*	*ΔILLIQ_ES*	*ΔILLIQ_PC*
MAINTAIN	0.165**	0.322**	0.124**	0.178***
	[2.15]	[2.13]	[2.02]	[2.87]
Δ*LogMV*	−0.605***	−0.441*	−0.257	−0.361***
	[−4.41]	[−1.74]	[−1.62]	[−2.65]
Δ*LogRETVOL*	0.359***	0.940***	0.359***	0.462***
	[3.69]	[5.21]	[5.09]	[7.29]
Δ*LogPRC*	−0.512***	0.332	0.057	−0.004
	[−4.11]	[1.32]	[0.39]	[−0.03]
Δ*LogVOL*	−0.679***	−0.359***	−0.272***	−0.355***
	[7.84]	[−4.16]	[−4.68]	[−5.72]
Intercept	0.044	0.068	0.165*	0.165
	[0.40]	[0.33]	[1.66]	[1.64]
Ind. Fixed Effect	Yes	Yes	Yes	Yes
Adj. R^2 (%)	74.4	37.7	54.2	64.6
n	227	161	180	130

*, **, *** Represent 10 percent, 5 percent, and 1 percent two-tailed t-test significance, respectively.
Heteroscedasticity adjusted t-values are reported in brackets.
Pre-event period is from April 1 to June 30, 2007.
Post-event period is the three-month period after 10-K filing date (but before September 1) in 2008.

(continued on next page)

TABLE 4 (continued)

Variable Definitions:
$\Delta ILLIQ\_AM$ = changes in the natural log of the average *ILLIQ_AM* ratio from the pre-event period to the post-event period, where the *ILLIQ_AM* ratio is calculated as the daily absolute return to the (dollar) trading volume following Amihud (2002);
$\Delta ILLIQ\_LOT$ = changes in the natural log of the illiquidity measure estimated following Lesmond et al. (1999) from the pre-event period to the post-event period;
$\Delta ILLIQ\_ES$ = changes in the natural log of the average daily effective bid-ask spreads from the pre-event period to the post-event period, where daily effective bid-ask spreads are calculated as the average intra-day effective (ask − bid)/[(ask + bid)/2] from the TAQ database;
$\Delta ILLIQ\_PC$ = changes in the principal component of the natural log of *ILLIQ_AM*, *ILLIQ_LOT*, and *ILLIQ_ES* from the pre-event period to the post-event period;
MAINTAIN = indicator variable that equals 1 for smaller reporting companies that maintain their disclosure level, and 0 for control firms;
$\Delta LogRETVOL$ = changes in the natural log of the standard deviation of daily returns from the pre-event period to the post-event period;
$\Delta LogMV$ = changes in the natural log of the average market value from the pre-event period to the post-event period;
$\Delta LogVOL$ = changes in the natural log of the average daily trading volume from the pre-event period to the post-event period, where daily trading volume is calculated as total trading volume scaled by shares outstanding; and
$\Delta LogPRC$ = changes in the natural log of the average price from the pre-event period to the post-event period.

spreads decrease by 15 percent relative to the industry control group after firms disclose oil and gas reserve information upon the SEC mandate.[24] Overall, the empirical evidence reported in Table 4 supports the idea that after the adoption of the SRC rule, smaller reporting companies lose their ability to commit to a higher level of disclosure via mandatory disclosure for the eligible disclosure items. These firms experience an increase in market illiquidity, even though they still voluntarily provide the same amount of information.

Table 5 reports the results on our second hypothesis. In Panel A, where we use the overall disclosure level to partition Reducers versus Maintainers, we find significantly positive coefficients on *REDUCE* for all four measures, suggesting that the Reducers become more illiquid in the post-event period compared with the Maintainers. This result is consistent with the second hypothesis and indicates that the amount of information is also important in reducing information asymmetry, although voluntary disclosure may not provide the same commitment effect as mandatory disclosure. To examine whether the change in illiquidity is driven by risk disclosure or compensation disclosure, we replace *REDUCE* with two indicator variables (*REDUCE_RISK* and *REDUCE_COMP*) in Panel B. We find that all four measures of market illiquidity increase for firms that reduce risk disclosure. On the other hand, we do not find significant increases in market illiquidity for firms that only reduce compensation disclosure.

[24] Because most previous studies use relative bid-ask spreads as the proxy for market illiquidity, we only compare the changes in magnitude based on the *ILLIQ_ES* measure with these studies in order to understand the economic significance of our results. Although the regulatory changes in Greenstein and Sami (1994) and Boone (1998) arguably represent a larger shock to the financial reporting system, we note that the effect of the shock on firms' market liquidities also depends on the firms' information environment. Since our sample firms on average are very small with poor information environments, the economic magnitude of the impact of the SRC rule is comparable to that documented in previous studies, despite its arguably smaller shock to the financial system. To further demonstrate this argument, we partitioned our sample by firm size and analyst coverage. We find that, while the average increase in bid-ask spread is 13 percent for Maintainers, the increase is 5 percent (17 percent) for Maintainers with market capitalization above (below) the sample median and 7 percent (22 percent) for Maintainers with (without) analyst coverage. This result is again consistent with our argument that the SRC rule change is important for smaller reporting companies because investors have very limited information sources for these firms and rely heavily on the information contained in the SEC filings for their investment decisions.

TABLE 5

Changes in Long-Term Illiquidity for Smaller Reporting Companies that Reduce the Disclosure Level

$$\Delta ILLIQ_i = \beta_0 + \beta_1 REDUCE_i + \Lambda Controls_i + \varepsilon_i. \quad (2)$$

Panel A: Changes in Market Illiquidity for Smaller Reporting Companies that Reduce the Disclosure Level Relative to Smaller Reporting Companies that Maintain the Disclosure Level

	ΔILLIQ_AM	***ΔILLIQ_LOT***	***ΔILLIQ_ES***	***ΔILLIQ_PC***
REDUCE	0.173**	0.300**	0.144**	0.157***
	[2.23]	[2.07]	[2.59]	[2.82]
Δ*LogMV*	−0.945***	−0.304	−0.594***	−0.507**
	[−7.57]	[−1.11]	[−2.64]	[−2.03]
Δ*LogRETVOL*	0.339***	0.909***	0.331***	0.445***
	[4.45]	[5.82]	[5.49]	[8.51]
Δ*LogPRC*	−0.262**	0.139	0.301	0.099
	[−2.27]	[0.53]	[1.27]	[0.40]
Δ*LogVOL*	−0.765***	−0.284***	−0.221***	−0.345***
	[−10.19]	[−3.28]	[−4.24]	[−6.31]
Intercept	0.424**	0.649***	0.429***	0.499***
	[2.51]	[3.09]	[3.05]	[4.98]
Ind. Fixed Effect	Yes	Yes	Yes	Yes
Adj. R^2 (%)	67.4	29.8	48.8	64.1
n	283	212	227	178

Panel B: Changes in Market Illiquidity for Smaller Reporting Companies that Reduce the Disclosure Level Relative to Smaller Reporting Companies that Maintain the Disclosure Level

	ΔILLIQ_AM	***ΔILLIQ_LOT***	***ΔILLIQ_ES***	***ΔILLIQ_PC***
REDUCE_RISK	0.220**	0.305*	0.119*	0.116**
	[2.54]	[1.90]	[1.95]	[2.07]
REDUCE_COMP	0.042	0.054	0.096	0.082
	[0.49]	[0.38]	[1.52]	[1.33]
Δ*LogMV*	−0.946***	−0.334	−0.597***	−0.562**
	[7.58]	[−1.19]	[−2.45]	[−2.55]
Δ*LogRETVOL*	0.334***	0.872***	0.334***	0.439***
	[4.30]	[5.45]	[5.34]	[8.50]
Δ*LogPRC*	−0.261***	0.139	0.295	0.152
	[−2.52]	[0.51]	[1.30]	[0.60]
Δ*LogVOL*	−0.761***	−0.291***	−0.225***	−0.351***
	[10.71]	[−4.12]	[4.95]	[−6.85]
Intercept	0.381***	0.708**	0.442***	0.523***
	[2.93]	[2.57]	[3.94]	[5.21]
Ind. Fixed Effect	Yes	Yes	Yes	Yes
Adj. R^2 (%)	67.3	30.4	49.7	64.3
n	283	212	227	178

(continued on next page)

TABLE 5 (continued)

*, **, *** Represent 10 percent, 5 percent, and 1 percent two-tailed t-test significance, respectively.
Heteroscedasticity adjusted t-values are reported in the brackets.
Pre-event period is from April 1 to June 30, 2007.
Post-event period is the three-month period after 10-K filing date (but before September 1) in 2008.

Variable Definitions:
$\Delta ILLIQ\_AM$ = changes in the natural log of the average *ILLIQ_AM* ratio from the pre-event period to the post-event period, where the *ILLIQ_AM* ratio is calculated as the daily absolute return to the (dollar) trading volume following Amihud (2002);
$\Delta ILLIQ\_LOT$ = changes in the natural log of the illiquidity measure estimated following Lesmond et al. (1999) from the pre-event period to the post-event period;
$\Delta ILLIQ\_ES$ = changes in the natural log of the average daily effective bid-ask spreads from the pre-event period to the post-event period, where daily effective bid-ask spreads are calculated as the average intra-day effective (ask − bid)/[(ask + bid)/2] from the TAQ database;
$\Delta ILLIQ\_PC$ = changes in the principal component of the natural log of *ILLIQ_AM*, *ILLIQ_LOT*, and *ILLIQ_ES* from the pre-event period to the post-event period;
REDUCE = indicator variable that equals 1 for smaller reporting companies that reduce their disclosure level, and 0 for smaller reporting companies that maintain their disclosure level;
REDUCE_RISK = indicator variable that equals 1 for smaller reporting companies that reduce risk disclosure, and 0 for smaller reporting companies that maintain risk disclosure;
REDUCE_COMP = indicator variable that equals 1 for smaller reporting companies that reduce compensation disclosure, and 0 for smaller reporting companies that maintain compensation disclosure;
$\Delta LogRETVOL$ = changes in the natural log of the standard deviation of daily returns from the pre-event period to the post-event period;
$\Delta LogMV$ = changes in the natural log of the average market value from the pre-event period to the post-event period;
$\Delta LogVOL$ = changes in the natural log of the average daily trading volume from the pre-event period to the post-event period, where daily trading volume is calculated as total trading volume scaled by shares outstanding; and
$\Delta LogPRC$ = changes in the natural log of the average price from the pre-event period to the post-event period.

Finally, we report results on the third hypothesis in Table 6. Consistent with H3, we find positive coefficients on *AGENCY* in all specifications, suggesting that firms with higher agency costs benefit more from the commitment mechanism provided by mandatory disclosure and, therefore, a loss of commitment affects them more adversely. The impact of agency costs on the changes in market illiquidity is also economically significant. For example, the estimated coefficient for *AGENCY* using *ILLIQ_ES* is 0.148, suggesting that a one unit increase in the *AGENCY* measure is associated with a 16 percent increase in relative bid-ask spreads.[25]

Robustness Tests and Supplemental Analysis

Analysis Based on Joint Samples

As described in the "Changes in Long-Term Illiquidity after the Adoption of the SRC Rule" section, we test each hypothesis separately using only the relevant subsamples for easy interpretation of the empirical results. We also examine the robustness of our results using Equation (4) to test both H1 and H2 and Equation (5) to test H3, where all tests are conducted based on a joint sample:

[25] Note that the magnitude here is not directly comparable to our earlier findings because, in this test, the cross-sectional analysis is made within the smaller reporting companies, without a differential comparison with the two control groups.

TABLE 6

Cross-Sectional Difference in Changes in Long-Term Illiquidity for Smaller Reporting Companies with Respect to Agency Costs

$$\Delta ILLIQ_i = \lambda_0 + \lambda_1 AGENCY_i + \Lambda Controls_i + \varepsilon_i. \quad (3)$$

	ΔILLIQ_AM	***ΔILLIQ_LOT***	***ΔILLIQ_ES***	***ΔILLIQ_PC***
AGENCY	0.157**	0.292**	0.148**	0.164**
	[2.08]	[2.06]	[2.39]	[2.36]
Δ*LogMV*	−0.576***	−0.797**	−0.281	−0.141
	[−3.17]	[−2.58]	[−0.98]	[−0.52]
Δ*LogRETVOL*	0.351**	0.771**	0.375***	0.405***
	[2.42]	[2.30]	[3.57]	[4.86]
Δ*LogPRC*	−0.585***	0.162	0.069	−0.283
	[−4.43]	[0.74]	[0.23]	[−1.04]
Δ*LogVOL*	−0.833***	−0.243	−0.307***	−0.409***
	[−10.37]	[−1.42]	[−4.99]	[−7.15]
Intercept	0.058	0.134	0.168	0.184
	[0.36]	[0.34]	[0.85]	[1.48]
Ind. Fixed Effect	Yes	Yes	Yes	Yes
Adj. R^2 (%)	73.3	31.5	50.9	65.5
N	109	78	91	67

, * Represent 5 percent and 1 percent two-tailed t-test significance, respectively.
Heteroscedasticity adjusted t-values are reported in the brackets.
Pre-event period is from April 1 to June 30, 2007.
Post-event period is the three-month period after 10-K filing date (but before September 1) in 2008.

Variable Definitions:

Δ*ILLIQ_AM* = changes in the natural log of the average *ILLIQ_AM* ratio from the pre-event period to the post-event period, where the *ILLIQ_AM* ratio is calculated as the daily absolute return to the (dollar) trading volume following Amihud (2002);

Δ*ILLIQ_LOT* = changes in the natural log of the illiquidity measure estimated following Lesmond et al. (1999) from the pre-event period to the post-event period;

Δ*ILLIQ_ES* = changes in the natural log of the average daily effective bid-ask spreads from the pre-event period to the post-event period, where daily effective bid-ask spreads are calculated as the average intra-day effective (ask − bid)/[(ask + bid)/2] from the TAQ database;

Δ*ILLIQ_PC* = changes in the principal component of the natural log of *ILLIQ_AM*, *ILLIQ_LOT*, and *ILLIQ_ES* from the pre-event period to the post-event period;

AGENCY = *CEO_CHAIR* + *BOARD_D* + *BH_DIS*, where *CEO_CHAIR* is an indicator variable that equals 1 if a firm's CEO is also the chairman of the board, *BOARD_D* is an indicator variable that equals 1 if the percentage of independent directors is below the sample median, and *BH_DIS* is an indicator variable that equals 1 if a firm's blockholders' interests are not aligned with minority shareholders. *AGENCY* ranges from 0 to 3;

Δ*LogRETVOL* = changes in the natural log of the standard deviation of daily returns from the pre-event period to the post-event period;

Δ*LogMV* = changes in the natural log of the average market value from the pre-event period to the post-event period;

Δ*LogVOL* = changes in the natural log of the average daily trading volume from the pre-event period to the post-event period, where daily trading volume is calculated as total trading volume scaled by shares outstanding; and

Δ*LogPRC* = changes in the natural log of the average price from the pre-event period to the post-event period.

$$\Delta ILLIQ_i = \alpha_0 + \alpha_1 SRC_i + \alpha_2 REDUCE_i + \Lambda Controls_i + \varepsilon_i. \quad (4)$$

$$\Delta ILLIQ_i = \alpha_0 + \alpha_1 SRC_i + \alpha_2 REDUCE_i + \alpha_3 AGENCY_i + \alpha_4 SRC_i * AGENCY_i + \alpha_5 REDUCE_i * AGENCY_i + \Lambda Controls_i + \varepsilon_i. \quad (5)$$

where *SRC* is an indicator variable that equals 1 for smaller reporting companies (both Maintainers and Reducers), and 0 for control firms. *REDUCE* is an indicator variable that equals 1 for smaller reporting companies that reduce the disclosure level, and 0 for smaller reporting companies that maintain the disclosure level and for controls firms. All other variables are defined the same way as in the main tests. In Equation (4), H1 predicts that α_1 (the commitment effect) is significantly positive and H2 predicts that α_2 (the information effect) is significantly positive.

Consistent with our hypotheses, the untabulated results show that both α_1 and α_2 of Equation (4) are significantly greater than 0 for all four illiquidity measures. The economic magnitude and statistical significance are also similar to the results reported in the main tests. Consistent with H3, we find α_4 in Equation (5) to be significantly positive. This result suggests that the impact of the loss of commitment for the specific disclosure items covered by the SRC rule on market illiquidity is bigger for the sample firms with higher agency conflicts since managers in these firms are more likely to disclose strategically to achieve personal benefits. In contrast, we do not find α_5 in Equation (5) to be statistically different from 0, suggesting the information effect does not vary with the level of agency costs. This finding is consistent with Stulz's (2009) argument that voluntary disclosure as a commitment mechanism is less efficient in addressing agency conflicts.

Endogeneity of Disclosure Choice

Although the deregulation of the mandatory disclosure requirement is an exogenous event, firms decide whether to reduce their disclosure. Therefore, a selection bias may exist when comparing firms that choose to reduce their disclosure to firms that choose to maintain the disclosure level. To address this issue, we adopt the Heckman self-selection correction procedure. Specifically, we use a first-stage probit model to examine why some firms choose to reduce their disclosure while others choose to maintain their disclosure level. In the probit model, we include firm size, leverage, book-to-market ratio, ROA, R&D investment, institutional holdings, size of the board, percentage of independent board members, insider ownership, and whether the CEO is also the chairman of the board. We then include the inverse Mills' ratio in the second-stage regression when examining whether market illiquidity increases more for the Reducers in the post-SRC rule period relative to the Maintainers. We continue to find similar results, suggesting that the selection bias does not drive our findings.

Alternative Pre- and Post-Event Windows

To examine the appropriateness of our choice of pre- and post-event windows, we also use October to December 2007 as our pre-event window and rerun the analyses for Tables 4 through 6. The disadvantage of using the three-month period immediately prior to the final rule release date as the pre-event window is that the final rule does not differ significantly from the proposed rule, and investors are likely to anticipate the passage of the final rule and adjust their trading behavior immediately following the proposed rule. In support of this conjecture, we find significant market reactions around the passage of the proposed rule, but not around the passage of the final rule. Also consistent with the above explanations, we find that the market illiquidity measured as *ILLIQ_ES* increases by 9.3 percent, as opposed to 13.2 percent mentioned in the main test, relative to small control firms around the rule change using October to December 2007 as the pre-event period.

Further, in our main analysis we use September 1, 2008 as the post-period cutoff date to minimize the impact of the financial crisis of 2008 on our analysis; however, 11 percent of our

sample firms have June or July as the year-end month and therefore have only one or two months in the post-period. To test whether our results are driven by this specification, we eliminate these firms from the sample and continue to find similar results.

VI. CONCLUSIONS

This study explores a regulatory event that allows smaller reporting companies to reduce their disclosure on ten nonfinancial items in the SEC filings to examine the incremental impact of the commitment mechanism provided by mandatory disclosure as well as the information effect of voluntary disclosure on market illiquidity. This mandatory-to-voluntary disclosure regime shift enables us to distinguish between the impact of disclosure commitment and the impact of disclosure content on market illiquidity.

We find that smaller reporting companies that maintain their disclosure level experience an increase in market illiquidity, and the illiquidity increase is more pronounced for firms with higher agency costs. This finding suggests that mandatory disclosure provides a credible disclosure commitment mechanism, reducing market illiquidity that cannot be fully replaced by voluntary disclosure. While reduced disclosure requirements may reduce overall financial reporting costs, the unintended consequence is that market illiquidity increases due to the loss of commitment provided by mandatory disclosure.

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APPENDIX A

A Brief Summary of the SEC Final Rule #33-8876: Smaller Reporting Company Regulatory Relief and Simplification (the SRC Rule)

Effective Date

(i) Effective February 4, 2008.

Objectives

(i) Expanding the number of smaller companies eligible to use reduced disclosure requirements.

(ii) Reducing unnecessary complexity in regulation by combining the category of "small business issuers" with the category of "non-accelerated filers."

(iii) Simplifying disclosure requirements by moving the reduced disclosure requirements for smaller companies from Regulation S-B into Regulation S-K, the integrated disclosure system for other companies.

Highlight of the SRC Rule

(i) Establish a category of "smaller reporting companies" (replacing the old "smaller business issuer" definition) eligible to use reduced disclosure requirement. Eligibility:

  (a) Companies that have less than $75 million in public float.
  (b) When public float is impossible to calculate, less than $50 million in revenue in the last fiscal year.

(ii) Permit smaller reporting companies to elect to comply with reduced financial and nonfinancial disclosure on an item-by-item basis.

(iii) Eliminate current S-B forms but allow a phase-out period for smaller business issuers transitioning to smaller reporting companies.

Estimated Impact

(i) In 2006, 3,395 reporting companies elected to take advantage of reduced disclosure and reporting requirements for small business issuers under Regulation S-B by filing their annual reports on Form 10-KSB.

(ii) 4,976 companies will be eligible to use reduced disclosure requirements under this new amendment, a difference of 1,581 additional companies.

(iii) The 1,581 companies would represent about 13 percent of the total 11,898 reporting companies that filed annual reports in 2006.

Reduced Disclosure in 10-K Filings Applicable to Smaller Reporting Companies

S-K Item #	Descriptions	Corresponding 10-K Item #	Descriptions of Reduced Disclosure Requirements Applicable to Smaller Reporting Companies
Item 101	Description of business	Item 1	Provide three years rather than five years of business development activities, and not be required to provide segment disclosure.
Item 201	Market price of and dividends on registrant's common equity and related stockholder matters	Item 5	Not required to provide a stock performance graph.
Item 301	Selected financial data	Item 6	Not required.
Item 302	Supplementary financial information	Item 8	Not required.
Item 303	Management's discussion and analysis of financial condition and results of operations	Item 7	Require only two years of analysis if the company is presenting only two years of financial statements, instead of the three years currently required of larger companies. Not required to provide tabular disclosure of contractual obligations.
Item 305	Quantitative and qualitative disclosures about market risk	Item 7A	Not required.
Item 402	Executive compensation	Item 11	Not required to provide a Compensation Discussion and Analysis required of larger reporting companies. Provide disclosure about the CEO and two other highly compensated executive officers only, rather than the information for the CEO, CFO, and three other executive officers required of larger companies. Provide only three of the seven tables required of larger companies.
Item 404	Transactions with related persons, promoters, and certain control persons	Item 13	Not required to provide disclosure regarding the company's policies and procedures for approving related-person transactions.
Item 407	Corporate governance	Item 11	Not required to provide information on Compensation Committee Interlocks and Insider Participation and Compensation Committee Report.
Item 503	Risk factors	Item 1A	Not required.

In addition to items described above, New Article 8 of Regulation S-X requires SRCs to provide audited balance sheets, audited statements of income, cash flows, and changes in stockholders' equity for each of the last two fiscal years instead of an audited balance sheet as of the end of the last two fiscal years and audited statement of income, cash flows, and changes in stockholders' equity for each of the last three fiscal years as required by other parts of Regulation S-X.

Source: (1) 17 CFR Parts 210, 228 et al. Smaller Reporting Company Regulatory Relief and Simplification; Final Rule of the SEC. (2) Small Business Compliance Guides by the SEC: "Changeover to the SEC's New Smaller Reporting Company System by Small Business Issuers and Non-Accelerated Filer Companies: A Small Entity Compliance Guide."