Minimum Stock Price Requirements and Voluntary Disclosure

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Abstract

This study examines the disclosure choices of firms that breach NASDAQ and NYSE minimum stock price requirements. I find that non-compliance with the requirements is associated with an increase in the volume of voluntary disclosure released in 8-K filings. This association is stronger in firms with a broader base of investors connecting the firms more strongly to listed markets, and extends to the use of forward looking statements in 8-K filings and press releases. I also examine the consequences of the disclosure response to non-compliance and find associated improvements in coverage by the media, broad measures of investor interest, stock liquidity, and prospects of remaining listed on the exchange. My results suggest that minimum price requirements alter the optimal disclosure policy of non-compliant firms, incentivizing greater voluntary release of information to investors, an important consideration for exchanges and regulators weighing the merits of such delisting standards.

I. Introduction

Since 2003, the equity securities of more than 1,000 firms have traded at prices lower than $1.00. While this valuation is otherwise unremarkable, both the National Association of Securities Dealers ("NASDAQ") and the New York Stock Exchange ("NYSE") maintain minimum price requirements ("MPR") permitting the exchange to delist ordinary equity securities with persistent per-share stock valuations below this level. Breach of MPRs ("non-compliance") occurs when a stock price remains below $1.00 for 30 consecutive days.[1] Such breaches are common, having occurred 1,957 times since 2003, and are actively enforced. Failure to comply with MPRs leads to 42% of mandatory exchange delistings, as non-compliant firms are forced to move listings to over-the-counter markets or alternative exchanges without such requirements, potentially causing permanent destruction of shareholder value (Macey et al., 2008)

To rectify non-compliance with MPRs, firms must achieve ten consecutive days of trading with closing prices above $1.00 within the six months that follow the breach event. MPRs, therefore, provide strong incentives for firms to intervene in the pricing of their stock. Firm often rectify stock prices using reverse splits, resulting in mechanical increases in stock prices that are attractive to firms looking to avoid delisting (Macey et al., 2008; Čornanič and Novak, 2015). Non-compliant firms may also engage in earnings management to influence stock prices (Čornanič and Novak, 2015). Alternatively, these firms may alter voluntary disclosure and investor relations policies.[2] Voluntary disclosure provides a medium for firms to release positive news and attract liquidity to their stock, reducing cost of capital or increasing expectations for future cash flow performance (Botosan, 1997; Aboody and Kasznik, 2000; Richardson et al., 2004). While non-compliant firms likely implement a portfolio of the above options to remedy their stock price deficiencies, the extent

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[1]MPRs are activated by trading prices on the NYSE and bid prices on the NASDAQ.

[2]For example, in 2012 Sutor Technology made a combined announcement of both a breach of the NASDAQ minimum bid price rule and the signing of an agreement with Equity Partners Inc. to act as investor relations consultant to assist the firm in regaining compliance with continuing listing rules. In this release, the firm asserted its objective to expand its disclosures and inform the market of its positive future prospects. Similarly, in 2003, SpaceHub Inc. retained IR Partners Inc. to assist it in recovering compliance. Actions taken by the IR firm included the considerable increasing of corporate disclosure (see http://www.irpartnersinc.com/news/).

to which such disclosures form part of their strategic stock price interventions is not clear.

This paper examines the determinants and consequences of the use voluntary disclosure as a response to non-compliance with MPRs. MPRs are employed both on major US exchanges and on several other exchanges around the world.[3] While prior studies emphasize the delisting of high tail-risk firms as motivation for the application of MPRs (Rhee and Wu, 2012), MPRs may also elicit positive responses from firms to avoid the delisting of their stock. Possible firm responses could include the release of additional voluntary disclosures, enhancing the market valuation of the firm while also decreasing information asymmetry and maintaining exchange quality and listing revenue. Given both the importance of stock listing and the widespread use of MPRs, understanding the responses of these firms to breaching MPRs is relevant to addressing the concerns of prior research that suggests these merits are based merely on 'popular perception' (Seguin and Smoller, 1997).

To provide evidence on the disclosure responses of firms to breach of MPR requirements, I first examine the characteristics associated with non-compliance by low stock price firms, identified using notices of delisting rule non-compliance sent by the exchange and filed on Form 8-K between 2003 and 2018 (hereafter "delisting notices"). Non-compliant firms typically release a lower volume of voluntary disclosure, and suffer from lower levels of media coverage and investor recognition. Consistent with Rhee and Wu (2012), my findings also show that non-compliance with MPRs is more prevalent in firms with poor accounting performance, and also that it is more prevalent in firms with more research-intensive operations. Collectively, these results suggest non-compliant firms may be both less recognized by investors, affecting their pricing in the market (Merton, 1987), and of lower fundamental quality.

Second, I examine the extent to which non-compliant firms respond to breaches of MPRs by altering

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[3]Rhee and Wu (2012) suggest that the South Korean and Indonesian stock exchanges maintain minimum pricing requirements. Further, in 2002, the Hong Kong Stock Exchange experimented with minimum pricing rules at lower price levels, before removing the rule after the market capitalization of stocks with values under HK$0.50 fell by as much as 88%. Additionally, the Toronto stock exchange maintains a flexible minimum pricing requirement (without nominated value) in Section 711 of its listing rules. Furthermore, the TSXV exchange maintains a minimum capital raising price of 0.05 per security. The Frankfurt General Standard also requires listing prices greater than 1 Euro.

their disclosure policies. I begin by investigating the the effect of non-compliance on the volume of disclosure. My findings are consistent with MPRs providing strong incentives for non-compliant firms to increase the volume of voluntary disclosure released to the market. Non-compliance is associated with a 3.25% increase in the volume of voluntary disclosure (1-2 disclosures) released by firms in the following 12-months. While research-intensive firms are more likely to be non-compliant with MPRs, there is no evidence that the disclosure response is conditional on proprietary costs of disclosure common in such firms. Rather, my results show that the disclosure response is more prevalent amongst firms with more diverse institutional shareholder bases focused on retail investors, suggesting that firms reliant on access to secondary markets are more likely to use voluntary disclosure as a means of retaining stock listing.

Several approaches are employed to confirm these findings. Making use of an exchange-intiated intervention in the enforcement of MPRs, I divide my sample between non-compliance and disclosure by examining the period between July 2008 and July 2009, where both the NASDAQ and NYSE suspended the application of MPRs. I find no evidence that firms continue engage in disclosure responses to pre-existing breaches of MPRs during the period of suspension. Instead, I find the disclosure response is conditional on active enforcement of MPRs. Using alternative measures of voluntary disclosure also supports the primary results. Non-compliance is associated with increased use of forward-looking content reported in 8-K filings, in addition to increased use of press releases. Both results for alternative disclosures measures suggest that incrementally greater volumes of disclosure released by non-compliant firms following breach.

The presence of explicit stock price targets such as those applied by MPRs may also incentivize managers to engage in stock hype, biasing the release of textual disclosures and quantitative information to encourage stock price appreciation (Aboody and Kasznik, 2000; Nagar et al., 2003; Richardson et al., 2004). However, contrary to methods used for stock hype, I find that tone in 8-K filings is negatively association non-compliance. Similarly, evidence from the stock returns surrounding 8-K filings no support for a stock hype response. Given my evidence that non-compliant

firms may under-disclose prior to non-compliance with MPRs, the absence of positive sentiment conveyed in 8-K filings suggests that MPRs may serve to motivate credible disclosures from non-compliant firms, alleviating under-disclosure in prior periods.

Third, I examine the extent to which the disclosure response of non-compliant firms may address the recognition deficiencies that typify non-compliance. Analysts, media, and investors may be attracted to cover or invest in companies with more extensive or more frequent disclosure, as this disclosure may reduce search costs and increase the market's awareness of smaller, less-visible firms (Botosan, 1997; Brennan and Tamarowski, 2000; Grullon et al., 2004; Graham et al., 2005; Bushee and Miller, 2012). Consistent with voluntary disclosure attracting both investors and coverage to the stock, I find a positive association between non-compliance and both media coverage and broad measures investor interest. However, there is no association between non-compliance and either coverage by financial analysts or ownership by institutional investors. To confirm that improvements in disclosure, media coverage and investor interest affect stock activity, I examine the impact of non-compliance on stock liquidity and find non-compliance is associated with improvements in liquidity. Further tests confirm that these consequences are postively associated with the magnitude of the disclosure response of non-compliant firm. These results suggest that coverage by the financial press may be an important channel through which non-compliant firms increase their recognition, potentially reducing capital costs through improvements in stock liquidity.

Finally, I examine whether the disclosure response of non-compliant firms is associated with the prospects of remaining listing. I regress delisting outcomes over the post-period against the change in the monthly volume of voluntary and mandatory disclosure between pre- and post-periods. I find that the change in the volume of voluntary disclosure is negatively associated with the probability of delisting in the following 12-month period. There is no evidence of such an association for non-MPR-based delisting, and a positive association between MPR-based delisting and mandatory disclosure. These differences are consistent with voluntary disclosure having a positive effect in meeting the requirements of MPRs.

The results of this study make several contributions. Primarily, the results may be of interest to policymakers overseeing stock exchanges and listing standards. This study complements previous work that suggests MPRs benefit market by permitting the removal of low-quality firms (Rhee and Wu, 2012). Rather than improving the quality of markets by the removal of securities with low stock valuations, my results suggest that MPRs may improve market efficiency by incentivizing voluntary disclosure, improving liquidity and decreasing information asymmetry. Furthermore, prior studies primarily focus on the role of exchange operated qualitative governance standards (Macey and O'Hara, 2002; Klein, 2003; Chemmanur and Fulghieri, 2006; Jiang and Wang, 2008). In this study, I providee evidence that MPRs, an exchange-based *quantitative* standard, may also serve as an important mechanism to incentivize greater transparency from low-exposure firms. As the disclosure response of non-compliant firms is not conditional on research-intensity or competitive forces, these results suggest that operational limitations on investor relations activity such as those identified by Hong and Huang (2005) and Bushee and Miller (2012) may impede transparency prior non-compliance (Hong and Huang, 2005; Bushee and Miller, 2012).

This study also directly contributes to research examining firm responses to non-compliance. Prior research has focused on the examination of stock splits and accrual-based earnings management (Macey et al., 2008; Čornanič and Novak, 2015). In contrast to the adverse effects of reverse stock splits on stock liquidity and investor returns, my findings that non-compliant firms issue larger volumes of disclosure giving rise to greater recognition and liquidity suggest that firms may respond to non-compliance by taking actions that improve the information environment in which the firm's securities exist.

Finally, my findings may provide novel evidence on the influence of stock price incentives on disclosure choices. Recent studies primarily use variation in stock price management incentives from compensation and stock issuance decisions (Aboody and Kasznik, 2000; Lang and Lundholm, 2000; Richardson et al., 2004; Kimbrough and Louis, 2011). In contrast, this study examines variation in stock price incentives introduced from external sources, and finds results consistent

with these incentives motivating unbiased disclosures, consistent with Nagar et al (2003).

The remainder of the paper proceeds as follows. Section II outlines the institutional background associated with MPRs. Section III discussed my data and variable construction. Section IV examines the determinants of non-compliance and my matching process. Section V reports the results of testing. Section VI presents robustness tests. Section VII concludes.

II. Institutional background

Both the NASDAQ and NYSE have a range of listing and delisting standards with which firms registered on the exchanges must comply. These standards play a significant role in the maintenance of orderly equity markets and promote corporate governance and disclosure objectives under the Securities Exchange Act of 1934. The origin of MPRs stems from the late 1980s, when the SEC became concerned about the increasing trend of penny-stock fraud (SEC, 2004).[4] Following the enactment of the Securities Enforcement Remedies and Penny Stock Reform Act of 1990 ("CER Act"), the NASDAQ and NYSE sought approval for the implementation of MPRs to prevent penny-stocks taking advantage of the absence of the enforcement of the CER Act on listed companies. The approval of MPRs traded off several competing interests. While many penny-stocks have genuine reasons to fund expansion using equity capital markets, both exchanges and regulators prioritized the need for the protection of the investors from fraud by low stock value companies, seeing stock price as indicative of high risk and poor governance.

Both exchanges adopt similar approaches to MPRs.[5] NYSE regulations state that a firm is non-compliant 'if the average closing price of a security as reported on the consolidated tape is less than

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[4]Consistent with the concern prevalent at the time, in 1990, Congress enacted the Securities Enforcement Remedies and Penny Stock Reform Act of 1990. This act increased the regulation and supervision of low-priced stocks in over-the-counter markets. Stocks listed on the NASDAQ and NYSE were exempt from many of the requirements. Consequently, the SEC lobbied the NASDAQ to raise governance standards for low priced stocks in the interest of investor protection. In 1991, the NASDAQ successfully implemented and received approval for its minimum price maintenance requirement, soon followed by the NYSE. The purpose of these rules was to prevent penny-stocks from taking advantage of the absence of enforcement of the Penny Stock Reform Act enforcement against listed firms.

[5]NYSE requirements for MPRs can are located in section 802.01C of the Listed Company Manual. NASDAQ requirements can are located in the NASDAQ Continuing Listing Guide in Rule 5450(a).

$1.00 over a consecutive 30 trading-day period'. The NASDAQ enforces a similar requirement, but base it on the bid price of the securities. While the NYSE is viewed to retain some discretion in its application of MPRs, the NASDAQ applies the rules universally (Macey et al., 2008) Following 30 consecutive days of sub-$1.00 stock price activity, exchanges send a notice of non-compliance to non-compliant firms. The rules require non-compliant firms to file this notice on form 8-K with the SEC.[6]

Following notification by the exchange, non-compliant firms are at risk of delisting and must rectify stock price deficiencies to remain listed. These firms then make one of several choices. Non-compliant firms may seek immediately delisting, opting for alternative trading venues without MPRs with which they would be non-compliant (Macey et al., 2008). Most commonly, this venue is an over-the-counter market. Alternatively, firms on both exchanges have a six-month window in which to achieve rectification, during which time the exchange encourages these firms to take actions to rectify stock prices.[7] Non-compliant firms achieve rectification by attaining stock prices greater than $1.00 for ten consecutive days. Following the expiration of these six months, there are several possible outcomes. The exchange may use its discretion to allow for the continued listing of the security. Non-compliant firms may also appeal delisting. For firms with plans to rectify stock prices, appeals may result in extended grace periods allowing for shareholder voting or other actions to facilitate those plans. In the absence of reasons to allow for a prolonged listing, non-compliant securities delist from the exchange.

III. Research Design

Data sources

To examine the response of non-compliant firms to breaches of MPRs, I gather notices issued by the NASDAQ and NYSE from 8-K regulatory filings lodged with the SEC and available on SEC

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[6]Figure 1 provides a graphical representation of the timeline for delisitng as a result of minimum price requirements.
[7]Firms listed on the NYSE are required to provide notice to the NYSE of intent to rectify or to delist.

EDGAR between 2004 to 2017. These notices are reported under Item 3.01, and contain data including the exchange of listing, the nature of listing or delisting requirement non-compliance, and information on time frame for rectification. I gather all notices referencing MPRs related to the notification of non-compliance, resulting in 1,957 firm-breach observations, concentrated on the NASDAQ with only 198 occurring on the NYSE.

These observations are then matched to data from additional sources. To examine the disclosure activity of firms, I rely primarily on data extracted from 8-K filings also gathered from the SEC's EDGAR database. For additional tests of voluntary disclosure, data on press releases comes from RavenPack PR and data on conference calls from Thomson Reuters StreetEvents.[8]

For variables related to coverage and recognition, I utilize RavenPack Dow Jones Edition for media coverage, the International Brokerage Estimates System (IBES) for analyst coverage and the SEC's server log database for broad investor recognition. Stock prices, returns, and share counts are obtained from the Center for Research into Security Prices ("CRSP"). Data on stock price, returns, and market liquidity measures for firms listed on both the NYSE and NASDAQ comes from the Center for Research into Security Prices ("CRSP"). As CRSP does not provide data on firms listed on OTC markets, this limits my sample observations to those periods where the firms maintain primary exchange listings. Finally, I gather financial reporting information from the Compustat annual fundamentals file.

Variable measurement

Measurement of disclosure

This paper employs several measures of disclosure. The first set of measures relates to volume or frequency. My primary measure is the monthly volume or number of 8-K filing items. The SEC requires 8-K filings to identify the subject matter to which their content relates using five

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[8]RavenPack contains press releases from over 28,000 issuers, including more than 5,000 publicly listed US firms (Shroff et al., 2013; Drake et al., 2014). StreetEvents provides a comprehensive dataset of conference calls.

different headings and 31 different categorizations. Each categorization has a heading and item number ("item"). Cooper et al. (2016) provide guidance to separate 8-K disclosures into those that are voluntary in nature, $VOLITEMS$, and mandatory in nature, $MANITEMS$. In an extensive analysis, the authors suggest that Items 2.02 (Results of Operations and Financial Condition), 7.01 (Regulation FD) and 8.01 (Voluntary Disclosures) relate to the voluntary disclosure activity of firms.[9] The remaining 29 filing items are asserted to be mandatory disclosures. While this measure may appear to conflate the disclosure of an event with the occurrence of that event, recent studies provide considerable evidence that voluntarily disclosed items, as identified by Cooper et al. (2016), provide a robust proxy for voluntary disclosure measured using alternative approaches (Bao et al., 2018; Bouvreau et al., 2018; Nagar et al., 2019).

The second set of measures relates to the tone or sentiment of these disclosures. I measure $TONE$ following the approach of Loughran and McDonald (2011). This measure of $TONE$ is constructed for both voluntary disclosures and for mandatory disclosures, and computed as the difference between positive and negative words divided by the sum of positive and negative words. To parse $TONE$ between voluntary and mandatory disclosure, $TONE_{MAN}$ contains the tone of 8-K filings where there are no voluntarily disclosed items. $TONE_{MAN}$ measures the tone of 8-K filings where there is at least one voluntarily disclosed items. While this approach limits the ability to exactly identify the tone of individual parts of 8-K filings, precisely measuring the tone contained in exhibits and attachments referenced within items in 8-K filings and allocating them to specific items is frequently not plausible, as many such attachments relate to or are referenced by multiple 8-K filing items.

Measurement of coverage and recognition

This paper also employs a number of measures relating to securities coverage and recognition. There are two measures of stock coverage. Coverage provided by professional financial analysts is measured by $LNCOV$, the logarithm of the number of analysts providing earnings forecasts for the

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[9]A full list of SEC 8-K item numbers is located at https://www.sec.gov/fast-answers/answersform8khtm.html.

security of interest. Coverage by the financial press or media is measured using *LNMEDIACOV*, calculated following Bushee et al. (2010) using RavenPack Dow Jones Edition. This measure of media coverage captures the volume of media articles released by covering press. To ensure the relevance of media articles, all releases with a relevance score provided by RavenPack of less than 75 are removed.

There are also several measures of the breadth of investor interest and recognition of firm securities. Interest in firm securities from institutional investors is measured by *BREADTH*, the proportion of 13-F filers holding positions in the security (Lehavy and Sloan, 2008; Richardson et al., 2012). While this captures the level of interest from sophisticated institutional holders, it does not measure interest from 13-F filing investors who may hold positions in non-compliant firms. Broad investor interest in firm securities is measured using data from the server access logs of the SEC. The SEC records each download of disclosure housed on the SEC website. The SEC publicly discloses the logs of these downloads, which are complete with both masked internet protocal ("IP") addresses, time stamps, Central Index Keys ("CIKs"), and filing links.[10] In recent work, Drake et al. (2019) suggest that these server logs provide a reasonable proxy for the recognition of a broad set of investors, who access SEC filings for the firm following newfound awareness of the stock. The variable *IPS* measures the breadth of this interest by taking the logarithm of the monthly count of unique IP addresses accessing the filings.[11,12]

Sample construction

The construction of the non-compliance (or "treatment") sample begins with the 1,957 instances of non-compliance. These observations represent 1,101 individual firms, with many firms receiving

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[10]While the explanation above is focused on brevity, a more thorough explanation can be found in novel research by Drake et al. (2015) and Lee et al. (2015).

[11]Prior to measuring *IPS*, the data is cleaned to remove the effect of web crawlers following Lee et al. (2015), who restrict the data to include only those downloads by IP addresses with less than 50 requested CIKs each day.

[12]Unlike *BREADTH*, *IPS* is not scaled by the total access to server logs as the total number of IP addresses displays considerably greater volatility that the number of 13-F filers, creating noise in the measure. The unscaled measure, therefore, captures the number of IP addresses accessing firm filings, which I suggest represents the breadth of ownership, as more IP addresses should be strongly related to more investors or other stock followers.

multiple notices from the exchanges for repeated failures to maintain stock prices above requirements, as shown in Table 1 Panel B. Taking advantage of the 560 separate dates on which firms are non-compliant, I adopt a sample design approach similar to that used for identification in research leveraging the staggered adoption of regulatory events (eg. Christensen et al., 2016). For each instance, I identify the month of non-compliance. I then match each treatment observation to potential control observations drawn from the complete CRSP universe in the month of non-compliance. The control observations are restricted to firms listed on the NYSE or NASDAQ with stock prices higher than $1.00 and no history of non-compliance.[13] These design choices restrict unobserved market-wide time-correlated or exchange-correlated variation between samples. The non-compliance and control samples are combined and create a window of observation from 12 months before breach to 12 months post-breach, producing a complete sample window of 25 monthly observations. The resulting data is aligned in "cohorts", defined as all firm-month observations in the sample centered on the same month.[14]

For the purposes of empirical testing, I then apply further restrictions. I remove firm-months missing SIC codes or other necessary financial data. Both treatment and control firms must contain 12 months of data before (pseudo) non-compliance, and I also remove firms without at least one monthly observation after breaching MPRs, excluding firms that opt to immediately delist upon non-compliance. To finalize the sample, all continuous variables are winsorized at the 1% level. The resulting sample is denoted as the "Cohort Sample".

The Cohort Sample contains 3,633,719 firm-month-cohort observations, including 143 distinct cohorts and 690 non-compliant firms. Consistent with the raw data, several firms in this sample become non-compliant on more than one occasion, with a total of 1,095 instances of non-compliance. Overall, despite the attrition instances of non-compliance due to data availability, this sample is

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[13]All control firms also have a stock price of less than $10 in the month of matching. I apply this restriction purely for computational purposes. This restriction likely has little impact on the results as firms with stock prices of more than $10 are not expected to match on the remaining firm characteristics.

[14]A cohort contains a set of non-compliant and time-matched control firms. For example, if there are five firms that are identified as non-compliant in January, 2008, these firms are linked to January, 2008 observations for all control potential control firms. These firm-month observations (made up of five non-compliant and a much larger sample of compliant firms) form a cohort. A similar process is then repeated for firms identified as non-compliant in other months.

notably larger than those used in prior studies of the consequences of MPRs (Čornanič and Novak, 2015).

Descriptive statistics

Figure 2 presents the distribution of non-compliance across time from 2004 to 2017, with non-compliance occuring on 560 unique dates. The figure shows a concentration of non-compliance during 2008 and 2009, as would be expected given the considerable drawdowns in stock prices that occured during the period, increase the likelihood of non-compliance. A similar, but smaller, concentration also exists in the years following the recession, indicating continued devaluation of many securities.

Figure 3 presents the distribution of non-compliance by industry sector. This distribution shows a concentration of non-compliance in technology and intellectual property intensive firms. Specifically, the manufacture of hardware and software and chemicals and pharmaceuticals represent the largest concentrations of non-compliance. These sectors are both characterized by large investments in research and development and considerable recognized and unrecognized intangible value, possibly suggestive of high levels of research-driven competition and proprietary costs of incremental disclosure.

Table 1 presents the descriptive statistics of the Cohort Sample. The sample contains firms with financial lower performance. Firms in the sample produce mean *ROA* of -9%, with 52.6% of firms loss-making, with considerable variation in the profitability of the sample. However, despite low profitability, these firms do not carry untoward levels of financial debt. Consistent with Figure 3, which suggests that non-compliance is prevalent amongst research-intensive industry sectors, Table 1 indicates the sample contains firms with substantial research and development expenses, equivalent to 7.2% of revenue.

Table 1 also shows that firms in the sample frequently use 8-K filing items as a mechanism of disclosure. For ease of interpretation, descriptive statistics of *VOLITEMS* and *MANITEMS* are

shown in relation to the underlying count variables, rather than the log transformations. The mean disclosure of *VOLITEMS* is 1.547 per month, indicating that firms in the sample release an average of 38.675 voluntary 8-K filing items across the 25 month window period. This suggests that while *VOLITEMS* represent a substantial disclosure mechanism for firms in the sample, there is also a meaningful volume of mandatory disclosures. The mean *MANITEMS* is 2.407, amounting to 60.175 disclosures across the sample window. Unsurprisingly given the considerable number of mandatory items compared to voluntary items as defined by Cooper et al. (2016), this result suggests that mandatory disclosure represent the majority of 8-K filing items. Finally, Table 1 shows the tone of 8-K filings is unequivocally negative, with only 36.3% of the words used positive rather than negative, consistent with non-compliant firms reporting bad news prior to falling below required minimum stock price levels.

V. Determinants and Matching

Determinants

To investigate the disclosure responses of firms to breaches of MPRs, I first examine the firm characteristics associated with that non-compliance. This analysis should provide insight into potential motivating factors that non-compliant firm responses to breach of MPRs.[15] To examine these characteristics, I reduce the monthly observations in the Cohort Sample down to one observation per firm-cohort – that is, one observation per firm for each potential matched non-compliance date. For clarity, for each of the 143 unique months of non-compliance in the sample, a sub-data set is formed containing the non-compliant firms breaching MPRs in that month, and the complete sample of control firms from that same period. Therefore, while control firms may repeat within the data set, firm-cohort observations are unique. The resulting sample comprises of 103,624 firm-cohort

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[15]I also investigate the associated determinants for the purposes of constructing a matched sample used in following testing. The use of propensity score matching requires a model of associated determinants for non-compliance from which propensity scores are predicted or constructed. Therefore, in addition to provide evidence on the ex-ante characteristics that are associated with non-compliants, my analysis facilitates the propensity score matching process that follows.

observations, with each non-compliant firm and the full cohort of time-matched potential control firms.

Using the data described above, I regress the following model using a logistic regression to analyze the determinants of non-compliance:

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\begin{aligned}
Pr(TREAT = 1) = \ & VOLITEMS + MANITEMS + LNOPENPRC + LNMKTCAP \\
& + CASH + DEBT + ROA + RND + LOSS + LNSEGNO \\
& + BM + NEGBM + LNCOV + LNMEDIACOV + BREADTH \quad (1) \\
& + IOR + IPS + P12RET + P12VOL + P12BIDASK + P12VOLUME \\
& + COHORTFE + INDUSTRYFE
\end{aligned}
$$

The dependent variable is $TREAT$, an indicator for a firm being non-compliant. Explanatory variables are derived from three potential theories for non-compliance. Non-compliance may derive from under-disclosure, reducing firm transparency, raising investors' required return and depressing stock valuations. I use $VOLITEMS$ and $MANITEMS$ to measure the voluntary and mandatory volume of disclosure released by the firm. Non-compliance may also be negatively associated with recognition and coverage, as under-recognition may increased cost of capital and decrease stock prices (Merton, 1987). I use $LNCOV$ and $LNMEDIACOV$ to measure analyst and media coverage, respectively, and $BREATH$, IOR and IPS to measure different aspects of stock recognition. Finally, explanatory variables are augmented by firm financial fundamentals, including the initial stock price in the sample window, $LNOPENPRC$, as past stock prices are likely significant determinants of stock valuations falling below \$1.00, and including $CASH$ and $DEBT$ addressing the potential that non-compliant firms are enroute to bankruptcy (Rhee and Wu, 2012).[16] Additional control variables include measure of price trend, which may increase the probability of non-compliance,

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[16]In an interview with Reuters, Richard Ketchum, then Chief Executive of NYSE Regulation, suggests that the rule protects investors from 'companies (that) are falling like a rock to bankruptcy'. Jonathan Spicer and Jonathan Stempel, *UPDATE2-NYSE in talks to ease minimum-price listing rule*, Reuters, available at https://www.reuters.com/article/nyseeuronext-idUSN2441589520090224.

using prior stock returns in *P12RET*, liquidity using *P12VOLUME* and *P12BIDASK*, and stock price volatility in *P12VOL*. The model includes fixed effects for both the cohort of observation and the firm industry using Standard Industry Classification two-digit codes ("SIC2").

Table 2 reports my analysis of the characteristics associated with non-compliance. Column (1) examines a reduced model with only disclosure measures as explanatory variables. While non-compliance is more common in firms with higher *MANITEMS* (t = 13.544), results show that non-compliance also more frequently observed in firms with lower *VOLITEMS* (t = -6.972). To ensure that this relation does not derive from firm financial characteristics being disclosed asymmetrically through mandatory and voluntary disclosures, Column (2) includes a range of firm and market characteristics. Consistent with Rhee and Wu (2012), I find that non-compliance concentrates in loss-making firms and firms with higher levels of stock return volatility in the prior 12-month period in *P12VOL* (t = 4.229). After controlling for firm financial characteristics, both forms of disclosure remain significant determinants of delisting. Finally, in Column (3), I include coverage and recognition measures in addition to other explanatory variables. After including these measures, the volume of voluntary disclosure is no longer a significant determinant of non-compliance, the t statistic falling just outside conventional limits despite similar coefficient size to previous tests *VOLITEMS* (t = -0.965). I find instead that non-compliance concentrates in firms with lower *BREADTH* and *LNMEDIACOV* (t = -6.53 and -3.637 respectively). Collectively, this evidence suggests that non-compliant firms are under-recognized in the market, as they have lower levels of media coverage and breadth in institutional investor holdings. Further, this under-recognition may be associated with sub-optimal disclosure, as, before controlling for recognition and coverage, non-compliance was positively association with lower voluntary disclosure. Consistent with Merton (1987), these factors may combine in this setting to produce lower stock valuation and contribute to non-compliance.

Propensity-score matched sample

In the sections that follow, I examine the response of non-compliant firms to breaches of MPRs. Given the non-standard characteristics of non-compliant firms, I match my non-compliance and control samples using propensity-score matching ("PSM"). The effect of matching should reduce the impact of unaligned samples on my inferences. I choose a PSM approach, instead of alternative approaches, such as Coarsened Exact Matching ("CEM") or Cardinality Matching ("CM"), as there is potential for limited overlap between non-compliant firms and control firms across some variables.

The process employed to match the samples is as follows. Observations are matched using the propensity computed from the determinants regression reported in Column (3) of Table 2 using Model (1). Several parameters are specified for the match.[17] First, the match is conducted on a one-to-one basis, with each non-compliant firm matched to one control firm drawn from the same time period.[18] Second, the matched control firm must come from the same cohort and same industry, to limit the influence of industry and time-correlated omitted variables on inferences. Once the matching process is completed, I finalize the construction of the sample by including only months common to both the non-compliant and control firms, further limiting the impact of time-correlated omitted variables.

Table 4 presents covariate balance statistics for the resulting sample (hereafter "Testing Sample"). The quality of the matching process appears high, despite the unusual nature of the non-compliant firms. The Testing Sample has 500 non-compliant firms. The PSM process eliminates statistically identifiable differences for the majority of matched characteristics. There remain imbalances at the 10% level for ROA and $P12VOLUME$, with non-compliant firms characterized by marginally lower accounting return on assets and higher stock trading volumes than non-compliant firms.

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[17]The caliper used for the match is set at 0.18. While this level of matching accuracy limits the potential differences between covariates, it also allows for sufficient sample size for the tests following.

[18]Firm-cohort (or firm-"breach") observations are used only once within the sample. However, firms may be repeated within the sample matching across different time periods.

While strengthening the caliper further eliminates these differences, untabulated robustness tests indicate that my primary results are not sensitive to doing so, but that tightening the caliper results in a material reduction in sample size. To further ensure that this design choice does not affect my inferences, I conduct robustness tests (see section VII) using entropy balancing to remove observable differences between the covariate means for the treatment and control observations.

VI. Results

Do non-compliant firms increase voluntary disclosure?

This section addresses the primary tests of this paper. Specifically, I now examine whether non-compliance with MPRs motivates firms to increase the volume of disclosure they release to the market. To maintain stock listing, non-compliant firms may be motivated to take actions that increased stock valuations. As 8-K voluntary disclosure provides a mechanism for firms to communicate information about future performance and risk (Carter and Soo, 1999; Lerman and Livnat, 2010), these disclosures may result in increased stock valuations due to investor upgrading of cash flows expectations, or increased stock valuations due to reductions in cost of capital due to reduced information asymmetry (Merton, 1987; Diamond and Verrecchia, 1991; Botosan 1997; Easley and O'Hara, 2004). To the extent that disclosure can materially affect stock prices, and while disclosure incentives exist prior to breach of MPRs, breach provides a discontinuity that may materially increase the benefits of incremental disclosure for non-compliant firms.

To examine the association between non-compliance and disclosure, I estimate the following model using the Testing Sample:

$$LNDISC = TREAT \times POST + TREAT + POST + RSPLIT + DELISTED$$

$$+ LNMKTCAP + ROA + LOSS + CASH$$

$$+ DEBT + LNSEGNO + RND + LNCOV + IOR + BM + BNEG \qquad (2)$$

$$+ P12RET + P12VOL + P12BIDASK + P12VOLUME$$

$$+ INDUSTRYFE + YEARFE$$

The dependent variable is $LNDISC$. To better understand the potential drivers of disclosure in this setting, I parse, and test separately, disclosure in 8-K filing into voluntary and mandatory forms. My primary focus in on voluntary disclosure, where $LNDISC$ is measured by $VOLITEMS$, capturing the volume of voluntarily disclosed 8-K filing items. I also compare these results to those for mandatory items, which may similarly increase due to an enhanced level of underlying firm activities following non-compliance. For the examination of mandatory disclosures, $LNDISC$ takes the value of $MANITEMS$. The model also includes several explanatory variables that may influence disclosure practices. I include $RSPLIT$, which captures monthly observations following reverse splits, as non-compliant firms frequently engage in reverse stock splits and may have disclosures associated with these actions (Han, 1995; Čornanič and Novak, 2015). As non-compliant firms may also be compelled to make a range of disclosures leading up to stock delisting, or conversely have disclosure constrained by delisting, I include $DELISTED$ as an indicator variable for months where stocks delist. To differentiate the effects of non-compliance from those of firm characteristics that may be associated with variation in disclosure, there are also included a range of firm fundamentals found in prior studies to be associated with voluntary disclosure (see eg. Frankel et al., 1999; Bourveau et al., 2018). Addressing the potential for capital markets to demand information, I augment the model with $LNCOV$ and IOR. Finally, given the association between non-compliance and market pricing, I include several measures of stock market activity in prior 12-month stock returns, $P12RET$, return volatility, $P12VOL$, bid-ask spreads $P12BIDASK$ and volume, $P12VOLUME$.

Table 4 reports the results of testing the association between non-compliance and disclosure.

Columns (1) and (2) report results where the dependent variable is $VOLITEMS$. In the base model, the coefficient on non-compliance, as measured by $TREAT \times POST$, is positive and statistically significant, indicating a 3.25% increase in the volume of voluntary disclosure following non-compliance ($t = 2.737$). This finding is robust to the inclusion of controls, where disclosure volume increased by 4.39% ($t = 3.382$). Columns (3) and (4) report results for mandatory disclosure in 8-K filings in $MANITEMS$, and provide consistent results suggesting increases in the level of disclosure. Overall, while the effect of non-compliance on voluntary disclosure is modest, these results suggest that, in addition to the use of reverse stock splits, non-compliant firms increase their disclosure volume in 8-K filings. As Table 2 reports the lower volumes of voluntary disclosure by non-compliant firms relative to control firms, the positive association shown in Table 4 may also suggest that non-compliance serves to correct deficient disclosure volumes in these firms.[19]

Does the response vary with the strength of stock price management incentives?

To confirm that my main results derive from the prospect of delisting, I next examine whether this disclosure response varies with the strength of the incentives for stock price management. I use two approaches to introduce variation in the strength of the incentives provided by MPRs. First, from October 2008 to July 2009, the NASDAQ and NYSE suspended the requirement that firms maintain stock prices greater than $1.00.[20] This suspension represents external intervention in the application of MPRs, removing the incentives for firms to engage in active stock price management. I examine the effect of this intervention on the disclosure response of non-compliant firms by comparing the magnitude of the disclosure response during the normal application of MPRs to that during the period of suspension, partitioning the Testing Sample by the application of MPRs. The 2,760

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[19] An potential alternative explanation for these results may be that as stock prices have fallen, there is a greater volume of hitherto unreleased information that is subsequently released to the market, not in response to treatment, but because this information is now considered to be "good news" relative to current deflated expectations (Verrecchia, 2001). However, as Model (2) contains controls for prior 12-month stock returns, and as non-compliant and control firms are matched on the basis of prior 12-month stock returns, there are strong grounds to rule out this alternative explanation for the results shown in Table (4).

[20] No new non-compliance notifications were issued during this period. Firms non-compliant before the suspension remain non-compliant but received extensions to their rectification periods.

monthly observations during the suspension period are denoted by *SUSP*, and 25,450 remaining observations are denoted by *RULE*.

Second, the rectification of non-compliance requires firms to achieve stock prices above $1.00, where the ex-ante probability of doing so provides variation to the necessary of the firm to engage in active stock price managment. As stock price variability increases the chances of firms achieving stock price greater than $1.00, this variability provides a meaningful form of cross-sectional variation to incentives for price management. To examine the impact of this variation, I partition the Testing Sample by median split of stock volatility in the month of non-compliance.

Table 5 reports the results of testing these variations to the strength of incentives to engage in disclosure as a response to MPR non-compliance. Panel A reports the results partitioned by the enforcement of MPRs. As shown in Column (1), when the requirements are enforced, *TREAT* × *POST* is strongly associated with increases in the volume of *VOLITEMS* ($t = 3.738$). However, in Column (2), when MPRs are suspended, *TREAT* × *POST* has a negative coefficient coefficient of -0.037 ($t = $ -0.908). The difference between the coefficients is statistically different from zero ($F = 4.168$). Similarly, in Columns (3) and (4), I find evidence consistent with suspension of MPRs reducing the incentives for incremental disclosure as measured by *MANITEMS* ($F = 7.398$). These results suggest that active enforcement by the exchanges is required for these incentives to motivate management to increase their disclosure activity.

Panel B reports the results for the sample partitioned by stock return volatility. Column (1) reports the results of the low volatility sub-sample. For these firms, non-compliance with MPRs is strongly associated with increases in *VOLITEMS*. The magnitude of this effect is 0.049 ($t = 3.025$), marginally larger than that of the high volatility sub-sample contained in Column (2), where the association is 0.035 ($t = 1.696$). The difference in the coefficients is not statistically different from zero ($F = 0.217$). In Columns (3) and (4), repeating this analysis for *MANITEMS* reveals little difference between the sub-samples ($F = 0.296$). Given the limited difference in the magnitude of the coefficients for my tests of *VOLITEMS*, these results do not indicate that voluntary disclosure

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responses are conditional on the volatility of the stock price leading to non-compliance.

Does the response vary with the benefits and costs of disclosure?

I next examine whether the disclosure response of non-compliant firms is associated with the potential benefits derived from changes in disclosure policy and mainted stock listing. This analysis provides insight into the possible causes of abnormally low disclosure identified in Table 2, and further evidence on the circumstances in which firms adopt disclosure as a response to breach of MPRs. First, to the extent that non-compliant firms are of lower fundamental quality as described by Rhee and Wu (2012), it may be costly for managers to increase transparency, as such transparency would allow investors to more efficiently identify low-type firms. Second, non-compliant firms may exist in industries with high-proprietary costs, as indicated in Table 2, where non-compliance is shown to be strongly associated with R&D activities, increasing the costs of disclosure for these firms (Verrechia, 2001; Dye 2001; Healy and Palepu 2001). Third, non-compliant firms may have heterogenous level of incentive to remain listed (Čornanič and Novak, 2015). The shareholder value of remaining listed are likely a positive function of the breadth of the investor base, with firms possessing wider investor bases more likely to require liquid markets for the exchange of those securities. Finally, non-compliant firms may have fewer resources to dedicate to investor relations and communication, resulting in under-disclosure to markets (Hong and Huang, 2005; Bushee and Miller, 2012).

To examine whether the disclosure response is conditional on the quality of firm fundamentals, I partition the Testing Sample by the level of profitability and financial leverage.. Specifically, this test uses median splits based on *ROA* and *ZSCORE* computed based on the mean observed values of the measures using the observations from the quarter prior to (pseudo) non-compliance, reproducing the earlier analysis using Model (2). Panel A of Table 6 reports these results. There is no evidence that the disclosure response of non-compliant firms is conditional on their financial characteristics. Examining Columns (1) and (2), the disclosure response is present in both the high

and low *ROA* sub-samples, with no statistical difference in the response between these samples (F = 0.06). Similarly, Columns (3) and (4) show no difference between sub-samples partitioned by *ZSCORE* (F = 0.132).

To examine proprietary costs as an explanation for the disclosure response, I follow an approach similar to Ellis et al. (2012). The Testing Sample is partitioned according to a median split of *RND* to capture differences in research-intensity, and then also paritioned by *HHI* to capture differences between the competitiveness of the industry in which the non-compliant firms operate, as adapted by Hoberg & Phillips (2016). These results are shown in Panel B of Table 6. Again, these results suggest minimal differences between the disclosure response of non-compliant firm conditional on proprietary costs of disclosure. In Columns (1) and (2), the coefficient on $TREAT \times POST$ is not significantly different between the high and low R&D sub-samples (F = 0.216). Columns (3) and (4) also provide no evidence of statistically significant differences in the response based on the competitiveness of the industry (F = 0.35). While R&D intensity is a significant determinant of non-compliance, these results suggest that such proprietary costs may not drive the under-disclsosure of non-compliant firms relative to firms that are compliant with MPRs.

To examine whether listing incentives influence the magnitude of the disclosure response, I partition the sample according to *BREADTH* and *IOR*, capturing both the breadth of instituional holders and the degree to which the stock is owned by less-concentrated investments from retail investors. Non-compliant firms with a greater number of investors are more likely engage in costly measures, such as disclosure, to retain listing (Cornanic and Novak, 2016). The results of these tests are shown in Panel C of Table 6. In Columns (1) and (2), results for the sub-samples partitioned by *BREADTH*, the association between $TREAT \times POST$ and *VOLITEMS* is not significantly different between the sub-samples (F = 2.674). However, in Columns (3) and (4), paritioned by *IOR*, the association is stronger for firms with more retail investors present in their shareholder register (F = 4.356). This result suggest that the disclosure response of non-compliant firms is more prevalent where shareholder bases are more concentrated on retail investors.

Finally, to examine whether the disclosure response compensates for otherwise inadequate investor relations relations activities, I partition the sample according to *VOLITEMS* and *BM* in the pre-period. Firms with fewer voluntary disclosures may respond by increasing their volume of *VOLITEMS* in the post-breach period. Furthermore, following non-compliance, firms with lower valuations may engage in higher levels of disclosure correct undervaluation (Bushee and Miller, 2012). Results from these test are shown in Panel D of Table 6. In Columns (1) and (2), results show that both high and low *VOLITEMS* sub-samples statistically similar disclosure responses ($F = 0.893$). Similar results are found in Columns (3) and (4), which show that the disclosure response is not different between sub-samples based on book-to-market ratios ($F = 0.265$).

Do non-compliant firms increase other forms of disclosure?

While 8-K filings provide a useful means of disclosure between firms and investors, firms frequently make use many other disclosure channels. To ensure the robustness of my main results, this section examines whether firms incrementally enhance their voluntary disclosure in other channels.

I examine several additional measures of (voluntary) disclosure as substitutes for the dependent variable in Model (2). First, press releases are an important and frequently used medium through which firms can voluntarily release information to markets (Dai et al., 2015). To investigate disclosure through this channel, *PRESSR* is measured using the logarithm of the monthly volume of press releases delivered by the firm. To ensure that these press releases are unique and issued by the firm, I restrict RavenPack data to include only those with ENS score of 100 and a relevance score of 100.[21] Second, conference calls are frequently used for earnings releases and other major firm events to provide additional information to investors and analysts. *CALLS* is measured using the logarithm of the monthly number of conference calls as reported by the StreetEvents database,

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[21]RavenPack provides a range of metrics alongside press release data. RavenPack's ENS metric measures the originality of the press release. I include only original releases to reduce the extent to which repeat releases of news influence my volume measure. While this may reduce the extent to which my measure captures efforts by the firm to expand its recognition, it ensures that my measure captures the release of potentially information news to the market. RavenPack's Relevance score provides a rating of how directly the press release refers to the firm and its activities. My approach takes only those press releases that strongly relate to firm activities.

after removing shareholder meetings, as these are not disclosure-oriented events, company visits, syndicated roadshows, other brokerage events, and merger-related calls, as the volume of such events is unlikely to be sensitive to stock price management incentives. Third, capturing the volume of information released in 8-K filings, I measure $LENGTH$ as the logarithm of the number of words contained in 8-K filings with at least one voluntary filing item. Finally, within the text of 8-K filings, firms frequently provide "soft guidance" in the form of textual information related to future firm activities or expectations.[22] Capturing the volume of these forward-looking disclosures, FLS is measured as the logarithm of the monthly number of sentences containing forward-looking statements following the keyword list of Li (2010).[23]

Table 7 reports the results of alternative measures of disclosure volume. Column (1) examines the effect of non-compliance on disclosure in press releases.[24] Results show a positive association between non-compliance and press release disclosure, with the coefficient on $TREAT \times POST$ of 0.03 positive and significant ($t = 1.897$). Column (2) examines the effect of non-compliance on disclosure in conference calls. There is no association with the use of conference calls ($t = 0.658$), unsurprising given the limited professional analyst coverage of non-compliant firms.. Column (3) examines the effect on the length of disclosure. Similarly, there is no evidence that firms release longer disclosures in 8-K following non-compliance ($t = 0.74$). Finally, Column (4) specifically examines volume of soft-guiding disclosures using the number of forward-looking statements contained in 8-K filings. Consistent with my main results, there is a strong positive association between non-compliance and the number of such statements ($t = 2.807$), suggesting that non-compliant firms provide incrementally more forward-looking information following non-

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[22]As mentioned, the sample used in this study provides limited scope to investigate the use of quantitative guidance due to minimal inclusion in guidance databases such as IBES. This likely results from the minimal release of quantitative guidance by such firms as they have relatively low levels of financial analyst coverage compared to the broader market.

[23]This study focuses on the volume rather than intensity or tone of forward-looking sentences (Li, 2010; Muslu et al., 2014). The volume of forward-looking statements is important as a measure of the extent of information provided to investors, rather than the manner in which disclosure is prepared, or the positivity of those disclosures. To provide further clarity on the manner in which the disclosure is constructed, in untabulated results, I control for the length of the disclosures as a determinant of FLS. While the length of disclosures is statistically significant in determining the number of forward-looking sentences used in the disclosures, the inclusion makes no alteration to my inferences with respect to non-compliance.

[24]Several observations are omitteed due to non-inclusion in the RavenPack dataset during the pre-period.

compliance. Overall, my results suggest that non-compliance provides incentives for firms to adopt more transparent disclosure policies.

Do non-compliant firms release more positive disclosure?

I now examine whether non-compliant firms also make changes to nature of information released in 8-K filings. Specifically, while incentives for stock price management can promote changes in the volume of voluntary disclosure, such incentives may also influence the tone or bias in that information. This tone may reflect fundamental improvements in the firm or underlying financial quality, or may reflect the opportunistic activities of management to disclose good news (Aboody and Kasznik, 2000; Richardson et al., 2004), thereby rectifying stock prices.

Should firms attempt to manage stock prices by increasing the tone of disclosures, I expect a positive association between non-compliance and the positivity of language used in the disclosures (Price et al., 2012; Solomon, 2012; Huang et al., 2013). This is examined using Model (2), substituting the dependent variable $LNDISC$ with my measure of textual tone, $TONE$. Furthermore, may also release more positive quantitative or non-tonal information. To the extent that firm disclosures contain positive information, investors are likely to respond to that news by bidding up stock prices. The following model is used to examine the association between non-compliance and 8-K filing stock returns:

$$
\begin{aligned}
FRET = TREAT \times POST &+ TREAT + POST + RSPLIT + DELISTED \\
&+ LNMKTCAP + ROA + LOSS + RND + DEBT \\
&+ LNCOV + BM + NEGBM + IOR + VOL \\
&+ INDUSTRYFE + YEARFE
\end{aligned}
\tag{3}
$$

The dependent variable is $FRET$, which captures the three-day raw and size-adjusted stock returns

surrounding the release of the filing (Aboody and Kasznik, 2000; Solomon, 2012).[25] For consistency with previous analyses, these returns are condensed into monthly averages. Explanatory variables in the model include *RSPLIT* and *DELISTED* to address the impact of disclosures related to either reverse splits or stock delisting. As with previous models, I also include a range of firm fundamentals, including the firm-specific stock return volatility in the month, and measures of stock coverage and 13-F filer holdings (Solomon, 2012). Finally, the model includes industry and year fixed effects.

Table 8 reports the results for the examination of 8-K filing tone. Column (1) examines the tone of 8-Ks containing only mandatory disclosures as the dependent variable. Contrary to expectations of incrementally more positive tone within 8-K filings, there is strong evidence that $TONE_{MAN}$ is negatively associated with non-compliance ($t = -3.333$). Column (2) examines tone for the sub-sample of 8-K filings containing at least one voluntary 8-K filing item, reflecting the tone of voluntary disclosure. The coefficient on $TREAT \times POST$ is not statistically different from zero ($t = -0.891$).[26] In Column (3), I further control for $TONE_{MAN}$, and the results are similar. In contrast to prior studies examining the use of tone to manage stock prices (eg. Huang et al., 2013), there is no evidence that non-compliant firms increase the tone of their disclosures in response to stock price management incentives. Despite the short-term benefits of achieving compliance, the absence of an association may reflect management's reticence to bias the tone of disclosure as a future correction in market prices on realization of the underlying events may simply result in repeated non-compliance.

Table 9 reports the results of my examination of stock returns surrounding the filing of 8-Ks. Columns (1) and (2) examine raw stock returns. The base model in Column (1) reveals that filing returns in the pre-period are negative for non-compliant firms ($F = 4.067$), consistent with these firms falling into non-compliance. Filing returns following non-compliance are notably more positive than those before non-compliance ($t = 2.158$). This suggests the discontinuity in the

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[25]Alternative specifications are clearly identified in Table 9.
[26]Untabulated findings show qualitatively similar results for the tone of press releases.

pattern of disclosure news before and after non-compliance consistent with relatively more positive disclosure from non-compliant firms. However, as the association between filing release and stock returns before non-compliance is strongly negative, the overall impact of filing releases following non-compliance is not statistically different from zero ($F = 1.76$). Across columns (2)-(5), there is similar evidence after controlling for size-adjusted returns and a range of firm determinants of stock returns including size, stock volatility, and prior stock returns. The results in Table 9 provide little evidence that non-compliant firms employ 8-K disclosures as part of a strategy of releasing positive information to rectify stock price deficiencies. The evidence from Table 9 confirms that of Table 8, and shows little evidence that non-compliant firms bring forward positive news to rectify stock prices before the end of the grace period for rectification. Overall, these results suggest that increases in the volume of disclosure associated with non-compliance does not form part of a strategy to hype the stock price of non-compliant firms, contrasting prior settings examining the relationship between stock price management incentives derived from managerial compensation or stock issuance and voluntary disclosure (eg. Aboody and Kasznik, 2000).

What are the consequences of MPR breach for coverage and recognition?

Previous sections provide extensive evidence of a positive association between non-compliance with MPRs and the volume of voluntary firm disclosure. The sections that follow now examine the consequences of this disclosure response.

Foremost, disclosure may have significant effects on the coverage and recognition of non-compliant firms. As shown in Table 2, non-compliant firms release significantly lower volumes of voluntary disclosure. Further, Table 2 suggests that the effect of limited disclosure on the likelihood of non-compliance operates through limited levels of press coverage and investor recognition. To the extent that non-compliance acts as a corrective mechanism on firm managers with respect to their disclosure and transparency, this disclosure may drive an increase in coverage and recognition of firm securities in the market. Recent studies examining the consequences of disclosure find that increased

volumes of disclosure can increase the newsflow to investors and information intermediaries, and reduce the search costs of information, attracting coverage of the stock (Botosan, 1997; Brennan and Tamarowski, 2000; Bushee and Miller, 2012).

To provide evidence on the nature of the association between non-compliance and coverage and recognition, I estimate the following model:

$$
\begin{aligned}
COVERAGE/RECOG = {} & TREAT \times POST + TREAT + POST \\
& + POSTRSPLIT + DELISTED + LNMKTCAP \\
& + ROA + LOSS + DEBT \\
& + LNCOV + BM + EARNVOL \\
& + P12RET + P12VOL + P12BIDASK \\
& + P12VOLUME + LAGGEDDV + INDUSTRYFE + YEARFE
\end{aligned}
\tag{4}
$$

The dependent variable takes the form of either coverage or stock recognition variables. Coverage is measured using both the number of analysts providing earnings forecasts, $LNCOV$, and the number of articles written about the firm, $LNMEDIACOV$. From the perspective of institutional investors, recognition is measured using the proportion of stock held by 13-F holders, IOR, and the proportion of 13-F holders holding the stock, $BREADTH$. Given the small size of non-compliant firms, the consequences of responses to non-compliance have a greater marginal impact on less sophisticated investors. To ensure that my measures of recognition address the potential for increased retail investor interest, and increased interest without increasing investment, I measure broader recognition using the number of unique IP addresses accessing firm filings on the SEC website, IPS. Control variables in the model include the non-compliance interaction, firm financial characteristics, stock market activity over the prior 12 months, and industry and year fixed effects. I also include lagged values of recognition or coverage, $LAGGEDDV$, to address the absorb consistency in the variables

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between months.[27]

Table 10 reports my analysis of coverage and recognition. Columns (1) and (2) examines the consequences of non-compliance for stock coverage. After controlling for lagged analyst coverage, Column (1) reveals no evidence of an association between non-compliance and analyst coverage (t = -1.32). This result is consistent with Tables 1 and 2, which show both limited analyst interest in non-compliant and matched control firms. Furthermore, this result suggests that the increased disclosure and decreased costs of information discovery are insufficient to motivate analysts to make time and effort investments in covering non-compliant firms. In contrast to analyst coverage, Column (2) reveals a strong positive association between non-compliance and media coverage. Non-compliance is associated with an increase in media coverage of 14.7% (t = 5.107). This association holds after controlling for the increased media coverage associated with reverse stock splits and the level of debt in the firm. In untabulated results, I also find that the association strengthens when restricting media coverage to articles released in the three days following 8-K filings, providing stronger evidence of a link between disclosure and news coverage, and when excluding the month of non-compliance, ensuring the coverage is not directly associated with the release of that information on form 8-K. These results suggest that reducing the search costs of information and increasing the news flow from the firm only has an effect on the level of coverage received from the media, potentially reflecting the extent of long-term investment required to provide financial analyst coverage compared to the relatively short-term investment required for individual news articles. Furthermore, these results are consistent with Table 2, suggesting that, through incentivizing disclosure, MPRs serve to correct the level of media exposure received by non-compliant firms.

Columns (3) to (5) examine the consequences for investor recognition. Columns (3) and (4) provide no evidence of an association between non-compliance and institutional investor holdings. As $TREAT \times POST$ is significant and negative, there is a marginal reduction in the breadth of

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[27]In untabulated results, I examine whether the inferences are dependent on the presence of the lagged variable dependent variable. Reproducing the results does not alter inferences drawn.

institutional holders following non-compliance (t = -1.872). Column (4) reveals no association between the proportion of firm shares held by institutional investors (t = -0.908). Together, these results provide little evidence to suggest an adjustment to the balance of costs and benefits of investment in non-compliant firms for institutional investors. However, Column (5) shows a positive association between $TREAT \times POST$ and IPS, indicating that non-compliance is positively associated with stock recognition amongst the general population of potential investors. Specifically, the number of unique IP addresses accessing filings increases by 5.35% (t = 3.16). This finding is consistent with Engleberg and Parsons (2011), who suggest that media coverage resonates more heavily with retail investors. Furthermore, these results are consistent with the earlier results indicating that disclosure is a more common response amongst firms with greater proportions of retail investors, and suggest that the incremental disclosures of non-compliant firms are focused at these investors.

What are the consequences MPR breach for stock liquidity?

I next examine whether the improvements in media coverage and recognition found in the previous section translate to improvements in stock liquidity. For under-recognized securities such as those subject to MPRs, improvements in recogntion by the general population of investors resulting from additional disclosure may increase the volume of investors transacting in the stock, reducing capital costs (Merton, 1987). To examine this potential association, the following model is estimated:

$$
\begin{aligned}
LIQUIDTY = {} & TREAT \times POST + TREAT + POST + RSPLIT \\
& + DELISTED + LNMKTCAP + ROA + LOSS \\
& + DEBT + BM + LAGGEDDV + INDUSTRYFE + YEARFE
\end{aligned} \tag{5}
$$

I use several measures of stock liquidity. The first measure is the logarithm of the monthly average daily closing bid-ask spread, $BIDASK$ (Bushee et al., 2010; Armstrong et al., 2011), which may also capture the extent of information asymmetry for the securities. Second, Amihud's (2002)

stock illiquidity ratio, *ILLIQ*, computed as the monthly average of the daily absolute stock return divided by stock transaction volume. Third, the monthly average daily stock volume divided by total shares outstanding, *VOLUME*. Finally, to address concerns that some firms in the sample may not transact on days within the month, the mean monthly non-trading days, *NONTRADE* (Han, 1995). Explantory variables include *RSPLIT*, as reverse stock splits have profound effects on the liquidity of transactions (Han, 1995), and a range of firm controls common to prior studies. There is also a control for lagged values of the dependent variable, *LAGGEDDV*, which captures a range of other factors that may be correlated with both treatment and liquidity.[28] All models include industry and year fixed effects.[29]

Table 11 reports the results of tests of liquidity. In Column (1), there is no evidence of an association with bid-ask spreads (t = -0.344). In Columns (2) to (4), there is a negative association with Amihud's (2002) illiquidity measure and *NONTRADE*, and a positive association with stock transaction volumes (t = -2.577, -2.008 and 3.274 respectively as described), providing evidence that investors increase their interest in transacting in non-compliant firms. These results indicate an improvement in trading conditions associated with breaching MPRs, consistent with the effects of media coverage on stock liquidity (Engleberg and Parsons, 2011). Specifically, the overall findings suggest that the disclosure response may motivate increased media coverage of firm activities, which the results shown previously in Table 10 suggest may aid the development of broad investor interest in the stock and increases in stock transactions and liquidity.

Are these consequences driven by incemental disclosure?

As non-compliance incentivizes both voluntary and non-voluntary disclosure, and MPR breach may encourage firms to engage in a range of activities, whether the firms voluntary disclosure choices are

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[28]In untabulated results, I include additional controls including stock returns, volatility, analyst coverage, institutional holdings and cash holdings. In Model (5), many of these variables would likely be subsumed in the lagged dependent variable. Consistently with the lagged dependent variable absorbing many of these effects, controlling for these effects does not alter inferences.

[29]In untabulated results, I remove the control for lagged measures of the dependent liquidity variables. Inferences remain unchanged.

associated with the previously reported improvements in media coverage, broad investor recognition and stock liquidity may be uncertain. In this section, I provide evidence that these changes are directly associated with the voluntary disclosure channel. To the extent that voluntary disclosure motivated by non-compliance with MPRs assists in increasing coverage, recognition and liquidity, the changes in disclosure policy should be associated with changes in these consequence measures after accounting for the release of mandatory disclosures.

To examine this effect of the disclosure channel, I reproduce Model (5), introducing interaction effects between $TREAT \times POST$ and disclosure policies. To differentiate the associated effects between voluntary and mandatory disclosure, I construct measures for the mean monthly $VOLITEMS$ and $MANITEMS$ in the pre- and post-periods for each firm. I then measure the change in the volume of disclosure in these two periods, $\Delta VOLITEMS$ and $\Delta MANITEMS$. As these tests aim to differentiate the potential effects of voluntary and mandatory disclosure, both $\Delta VOLITEMS$ and $\Delta MANITEMS$ are included in two-way and three-way interactions with $TREAT$ and $POST$.[30] While this represents a noisy measure of the changes in disclosure policies associated with minimum pricing requirements, it provides some insight into the mechanism of disclosure volume and improvements in stock liquidity.

Table 12 reports the results of these tests. In Panel A, I examine the association between $\Delta VOLITEMS$ and $\Delta ITEMS$ for the sub-sample containing only non-compliant firms, and therefore the variable of interest is $\Delta VOLITEMS \times POST$. In Columns (1) and (2), results show a strong association between $\Delta VOLITEMS \times POST$ and both media coverage and broad investor interest (t = 4.627 and 2.531 respectively). These results suggest that the act of altering the volume of disclosure released by the firm has meaningful associations with the interest shown in the stock by the media and investors. In Columns (3) to (6), there is an association between $\Delta VOLITEMS \times POST$ and improvements in bid-ask spreads (t = -2.518), and no such association

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[30]While it is possible that non-compliant firms have marginally larger associations between voluntary disclosure and the consequences outlined in this study than those of the sample control firms, this is not a pre-requisite for non-compliant firms to benefit from the incremental provision of voluntary disclosure. Consequently, I examine the association between $\Delta VOLITEMS$ and $\Delta MANITEMS$ on the non-compliant sample separately and also then in three-way interactions on the whole sample.

is found for disclosure contained in *MANITEMS*. There is no evidence of an association with *VOLUME*, *ILLIQ* or *NONTRADE* (t = -1.304, 0.77 and -0.801).

In Panel B, I examine the association between $\Delta VOLITEMS$ and $\Delta ITEMS$ for the full sample of observations, with the variable of interest $\Delta VOLITEMS \times TREAT \times POST$. These results show that $\Delta VOLITEMS \times TREAT \times POST$ is associated with incremental improvements in bid-ask spreads, illiquidity and non-trading days (t = -1.681, -2.34, -2.398). As these coefficients on $\Delta VOLITEMS \times TREAT$ are positive for all three measures liquitiy (and significant for *ILLIQ* and *NONTRADE*, these results suggest, not only does incremental disclosure surrounding MPR breach provide incremental liquidity benefits to non-compliant firms, but that the disclosure may address pre-period deficiencies in liquidity found in firms with considerable changes in disclosure volume. Collectively, the results in both Panel A and Panel B suggest the associations between voluntary disclosure and stock coverage and recognition reported in earlier in Table 11 likely originate from the voluntary disclosure decisions of non-compliant firms consistent with prior studies linking voluntary disclosure and stock coverage or recognition (Brennan and Tamarowski, 2000; Grullon et al., 2004; Graham et al., 2005; Bushee and Miller, 2012).

Disclosure response and likelihood of delisting

In this final section, I examine whether the disclosure response improves the likelihood of maintaining stock listing status. To the extent that improvements in coverage and recognition translate to increased retail investor holdings and stock liquidity, costs of capital may decline, increasing stock valuation (Merton, 1987). Therefore, it is expected that firms undertaking more substantial improvements in the volume of the disclosure should have a reduced likelihood of stock delisting.

To provide evidence on the association between the disclosure response and delisting, I use the following model, having first restricted the Testing Sample to only non-compliant firms:

$$Pr(DELIST = 1) = \Delta VOLITEMS + \Delta MANITEMS + LNOPENPRC + RSPLIT + LNMKTCAP$$
$$+ ROA + LOSS + RND + DEBT + CASH + LNSEGNO$$
$$+ LNCOV + IOR + EARNVOL + BM$$
$$+ P12RET + P12VOL + COHORTFE + INDUSTRYFE$$

$$(6)$$

The dependent variable is $DELIST$, an indicator variable identifying firms that delist from the either the NASDAQ or the NYSE. To better identify the impact of disclosure on delisting, I adopt two measures of $DELIST$ that capture both price-based and non-price-based reasons for stock delisting, resulting in three partitions within the sample. Price-based delisting is denoted by $DELISTPRICE$, and captures firms that delist specifically for reasons associated with failed compliance with MPRs or firms that move to exchanges without MPRs.[31] Firms that delist for other reasons are denoted by $DELISTOTHER$. Finally, firms without delisting codes remain listed, and have delisting measures set to zero. To the extent that the voluntary disclosure activities of non-compliance firms assist in the rectification of stock prices, there should be a postive association between disclosure activities and $DELISTPRICE$, but not with $DELISTOTHER$. I include a range of firm control variables to separately identify the effects associated with firm performance, cash holdings and debt, coverage and risk, as these may all impact the ability of the firm to achieve stock prices greater than \$1.00 and achieve rectification.

To examine the effect of the disclosure response of non-compliance firms, I measure the change in the volume of disclosure using the difference between pre-period and post-period mean $VOLITEMS$ and $MANITEMS$ measured as $\Delta VOLITEMS$ and $\Delta MANITEMS$ respectively. Model (6) includes a range of controls to address associated firm decisions or characteristics that may influence listing

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[31]For each non-compliant firm, I identify the listing status at the end of the 12-month post-period using CRSP. CRSP provides a range of delisting codes related to the reason for a stock delisting from an exchange. To identify firms that delist for reasons associated with MPRs, I include delisting code 552, which is specific to delisting for breach of MPRs, codes between 510 and 520, representing firms that move to exchanges other than the NASDAQ and NYSE, and code 502, representing companies that move to the NYSE MKT exchange, an exchange also without MPRs.

status. Specifically related to the prospects of delisting, I include the opening price of the post-period, *LNOPENPRC*, to control for the distance required for non-compliant firms to rectify their stock prices, and *RSPLIT* to control for reverse split activity, which is likely to improve chances of remaining listed considerably. Finally, I include fixed effects for industry and for the month of non-compliance with MPRs (cohort).

Table 12 reports the results of tests of delisting status. Results for price-based stock delisting are shown in Columns (1) and (2). As would be expected, *RSPLIT* is negatively associated with price-based delisting (t = -3.523 and -3.099), consistent with prior studies that suggest firms frequently resort to reverse splits to avoid non-compliance (Macey et al., 2008). *LNOPENPRC* is also negatively associated with delisitng (t = -3.376 and -1.454), confirming that firms with stock prices closer to $1.00 are more likely to achieve rectification. With respect to firm disclosure policies, Column (1) reveals a negative and significant association between $\Delta VOLITEMS$ and *DELISTPRICE* (t = -2.534). After controlling for firm characteristics and fixed effects in Column (2) this association remains positive and significant, indicating that voluntary disclosure provides a signal of continued listing (t = -2.557). Importantly, the association with voluntary disclosure contrasts the positive association between $\Delta MANITEMS$ and *DELISTPRICE* (t = 2.947 and 1.524), suggesting that these two forms of disclosure contain different information or provide news that has different effects on delisting outcomes, and that voluntary disclosure potentially reflects underlying firm prospects. The results in Columns (3) and (4) show the results for *DELISTOTHER*. There is no significant association between $\Delta VOLITEMS$ and *DELISTOTHER*. This suggests that voluntary disclosure practices are only associated with improving the prospects of remaining listed where delisting is dependent on stock prices. These results are consistent with firms using a variety of complementary methods to stay listed, and while reverse stock splits are highly effective in reducing the probability of delisting, my findings suggest that voluntary disclosure may form an important part of a portfolio of options used by non-compliant firms to manage stock prices.

VII. Robustness Tests

I perform several additional analyses to confirm the robustness of my results, specifically those shown in Table 4 establishing the association between non-compliance and voluntary disclosure activity. First, as shown in Table 3, the Testing Sample has residual differences between covariates in the treatment and control samples. To address this concern, I take the Testing Sample and adjust it using weights based on an Entropy Balancing procedure to limit the differences between the mean values of the covariates. After performing balancing, there are no longer any statistically identifiable differences between the means of the characteristics shown in Table 3. Reproducing Table 4 with the entropy weighted sample yields no alteration to my inferences.

Second, I address the possibility that the association between non-compliance and disclosure volume derives from some unobserved firm effect not controlled for in regression specifications. To address this issue, I drop industry fixed effects from the models and replace them with firm fixed-effects. Reproducing Table 4 with firm fixed effects yields no alteration to my inferences.

Third, I address the possibility that my results are driven by pre-non-compliance trends in the disclosure from non-compliant firms. It is not possible to explicitly test for non-parallel trends. However, I regress both $VOLITEMS$ and $MANITEMS$ against $TREAT$ and indicator variables capturing the quarter relative to the month of non-compliance ranging from $t-4$ to $t+4$. In untabulated findings, the resulting analysis reports a time series with four quarters prior to the month of non-compliance, the month of non-compliance, and four quarters following non-compliance. For $VOLITEMS$, I find little evidence of increasing disclosure in the pre-period, with the exception of a statistically significant higher disclosure level in quarter $t-1$, indicative of some anticipation of breach of MPRs. Following non-compliance, all four quarters have strong, positive coefficients, with the strongest coefficients in quarters $t+2$ and $t+4$, before the expiry of MPR grace periods. Similar, but stronger, results are shown for $MANITEMS$.

Fourth, I address whether my main results derive from model misspecification biases derived from the treatment of $VOLITEMS$ as a continuous variable. Ordinary least squares ("OLS") regressions

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may project values below zero, which cannot hold in the sample of count data. To ensure my inferences are not affected by the use of OLS, I reproduce Table 4 using alternative models: Poisson, negative binomial, logistic (making disclosure a monthly binary variable), zero-inflated Poisson, and zero-inflated negative binomial. In untabulated results, using these alternative models does not alter inferences and provides of evidence of economically larger associations between $TREAT \times POST$ and disclosure activities than those derived from using OLS. Further, I test to see if my model is misspecified due to due omitted cohort effects that may impact firms within certain event-windows. Controlling for cohort fixed effects and reproducing my main test does not alter inferences.

Finally, I address whether average stock returns outlined in this study are indicative of firms with substantial changes in their voluntary disclosure policies. To examine this question, in untabulated results, the dependent variable is the logarithm of the closing price for the stock for the month t. $\Delta VOLITEMS$ and $\Delta MANITEMS$ are interacted with the month count relative to $t = 0$ (the month of breach) for the non-compliance sub-sample of firms. After controlling for a range of firm-specific controls consistent with those used in prior tests, these results show that $\Delta VOLITEMS$ is positively associated with the closing price of the stock, where as $\Delta MANITEMS$ is negatively associated with this price. Similar results are found where size-adjusted stock returns are used as the dependent variable. Using $POST$ as the variable with which $\Delta VOLITEMS$ and $\Delta MANITEMS$ are interacted results in qualitatively similar results where the closing price is the dependent variable, but non-significant reuslts where size-adjusted returns are the dependent variable.

VIII. Conclusion

This study examines the association between non-compliance with MPRs and non-compliant firm disclosure. There is strong evidence of a postive association between non-compliance and voluntary disclosure. In contrast, there is ittle evidence of an association between non-compliance and either the tone of or the stock returns surrounding these disclosures. This result is surprising given the substantial incentives management may have to bring forward positive news or to hype stock prices

to rectify deficient stock prices temporarily. However, while I find little evidence of bias introduced to the disclosures of non-compliant firms, there is substantial evidence of improvements in media coverage, investor recognition, and stock liquidity. Furthermore, I find that changes in the volume of disclosure are positively associated with maintaining stock listing. Collectively, these results provide relevant evidence on the potential effects of minimum price requirements, which are responsible for much of the mandatory delisting activity on major US stock exchanges. In contrast to claims that MPRs improve the operation of markets by delisting firms, these results suggest that MPRs support exchange requirements for good governance by incentivizing firms to improve their disclosure, providing more information to investors trading in these securities.

While my documented association between non-compliance and disclosure is robust to the deployment of many alternative specifications and measures, my results should nevertheless be viewed with caution. Despite the use of a matching process to minimize the observed difference between compliant and non-compliant firms, neither notifications of non-compliance nor stock prices are determined by random assignment. Cross-sectional evidence from the suspension of MPRs in 2008 and 2009 supports a causal effect, but this intervention, similarly, is the result of non-random actions, given its temporal proximity to the global recession. Consequently, future research on the impacts of MPRs or other value-based delisting requirements may choose to focus on the identification of as-if random interventions to provide stronger evidence of causal effect.

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Appendix A

Variable	Definition
TREAT	an indicator variable for treatment firms, equal to one for observations from firms that breach MPRs and zero otherwise.
POST	an indicator variable for the period following month $t = 0$, equal to one for observations following breach or pseudo-breach and zero otherwise.
VOLITEMS	the monthly number of 2.02, 7.01 and 8.01 8-K items.
MANITEMS	the monthly number of 8-K items excluding Item 2.02, 7.01 or 8.01.
TONE	the difference between the number of positive and negative words divided by the total positive and negative words, measured according to Loughran and McDonald (2011).
LENGTH	the average monthly 8-K filing length for 8-Ks disclosing voluntary items., measured using the number of words
FLS	the average monthly number of forward-looking sentences in 8-K filings.
CALLS	the monthly number of conference calls and analyst days, excluding M&A related conference calls.
PRESSR	the monthly number of press releases issued by the firm.
FRET	size-adjusted stock returns surrounding 8-K release.
LNMEDIACOV	the logarithm of 1 plus the number of media articles related to the firm released in the month.
BREADTH	the number of 13-F filers holding shares in the stock, divided by the total number of 13-F filers.
HIΔ	the difference in mean monthly voluntary items or non-voluntary items between the pre-and post-periods.
RSPLIT	an indicator variable for months following reverse stock splits.
DELISTED	an indicator variable for month of delisting.
DELIST	an indicator variable for firms that delist.
LNOPENPRC	the logarithm of 1 plus the opening stock price for the month.
LNMKTCAP	the log of market capitalization at the end of the most recent quarter.
ROA	return on assets at the most recent quarter.
ZSCORE	the Altman Z Score in the most recent quarter.
LOSS	indicator variable for loss-making firms.
RND	research and development expenses divided by total assets
DEBT	the ratio of total debt to total assets.
CASH	the ratio of total cash to total assets.
LNSEGNO	the logarithm of 1 plus the number of business segments.
LNCOV	the logarithm of the number of analysis covering the stock.
IOR	the proportion of shares held by 13-F filers.

(continued)

Variable	Definition
IPS	the logarithm of the number of unique IP addresses accessing the firm filings on the SEC.
BM	the ratio of total equity to market capitalization.
NEGBM	an indicator variable for firms with negative equity.
EARNVOL	the five-year standard deviation of earnings.
P12RET	the average monthly stock return across the previous 12 months.
P12VOL	the average monthly standard deviation of stock returns across the previous 12 months.
BIDASK	the monthly average of daily closing bid-ask spreads.
P12BIDASK	the 12 month mean of monthly average bid-ask spread.
VOLUME	the monthly average of daily stock trade volume divided by shares outstanding.
P12VOLUME	the 12 month mean of monthly average stock volume divided by shares outstanding.
ILLIQ	the monthly average illiquidy of the stock according to Amihud (2002).
NONTRADE	the monthly average proportion of trading days with zero volume.
LNFILERS	1 plus the number of 13-F filers in the reporting period.
DELISTPRICE	an indicator variable for delisting due to price-based reasons.
OTHERPRICE	an indicator variable for delisting due to non-price-based reasons.
HHI	Hoberg and Phillips (2016) measure of industry competitiveness.
1.01	Material Definitive Agreement
1.02	Termination of a Material Definitive Agreement
1.03	Bankruptcy or Receivership
2.01	Completion of Acquisition or Disposition of Assets
2.02	Results of Operations and Financial Condition
3.01	Notice of Delisting or Failure to Satisfy a Continued Listing Rule or Standard; Transfer of Listing
3.03	Material Modification to Rights of Security Holders
5.02	Appointment, Departure or Compensation of Directors or Officers
5.03	Amendments to Articles of Incorporation or Bylaws; Change in Fiscal Year
5.07	Submission of Matters to a Vote of Security Holders
7.01	Regulation FD
8.01	Voluntary Disclosures
9.01	Financial Statements and Exhibits

Appendix B

Provides Share Repurchase Update Retains The Equity Group To Provide Investor Relations Services

Sutor Technology Group Limited (the "Company" or "Sutor") (Nasdaq: SUTR), a leading China-based non-state-owned manufacturer and distributor of high-end fine finished steel products and welded steel pipes used by a variety of downstream applications, today announced that on June 25, 2012 it received a letter from the staff of the Listing Qualification of the NASDAQ Stock Market LLC (the "Staff"), indicating that the Company is not in compliance with the $1.00 minimum closing bid price requirement under the NASDAQ Listing Rules (the "Listing Rules").

The Listing Rules require listed securities to maintain a minimum bid price of $1.00 per share. If a NASDAQ-listed company trades below the minimum bid price requirement for 30 consecutive business days, it will be notified of the deficiency. Based upon the Staff's review, the Company no longer meets this requirement. However, the Listing Rules provide the Company with a compliance period of 180 calendar days, or until December 24, 2012 in which to regain compliance with this requirement.

To regain compliance with the minimum bid price requirement, the Company must have a closing bid price of $1.00 per share or more for a minimum of ten consecutive business days during this compliance period.

In the event that the Company does not regain compliance within this period, it may be eligible for additional time to regain compliance by satisfying certain requirements. However, if it appears to the Staff that the Company will not be able to cure the deficiency, or if the Company is otherwise not eligible, the Staff will notify the Company that its securities will be delisted from the NASDAQ Capital Market. However, the Company may still appeal the Staff's determination to delist its securities to a Hearing Panel. During any appeal process, the Company's common stock would continue to trade on the NASDAQ Capital Market.

The NASDAQ notification letter has no immediate effect on the listing or trading of the Company's common stock on the NASDAQ Capital Market. The Company is currently looking at all of the options available with respect to regaining such compliance.

Share Repurchase Update

Since the start of the share buyback program, the Company has repurchased a total of 553,900 shares of its common stock at the average purchase price of $1.12 per share. Since March 31, 2012, the Company has repurchased 94,128 shares at the average purchase price of $0.92 per share. The repurchase program is on-going.

Retains The Equity Group

Sutor also announces that it has retained The Equity Group Inc. to provide investor relations services. Founded in 1974, The Equity Group is a full service, New York-based investor relations and financial communications firm specializing in micro- through mid-cap public companies.

Lifang Chen, Sutor's Chairwoman and CEO, commented, "We have known the senior staff of The Equity Group for several years, and believe that now is the right time to intensify our investor communication efforts by engaging the firm. The Equity Group has a solid, long-term track record as a respected, experienced, results-driven investor relations firm. We are pleased that a highly experienced team of IR professionals will assist us in better communicating our Company's accomplishments, strategy and outlook to a larger and more diverse group of investment professionals."

"We are committed to Nasdaq listing. We have been actively pursuing various opportunities to strengthen our market position and seek long-term sustainable growth," concluded Ms. Chen.

(emphasis added)

Figure 1: Indication of steps to delisting

Notice of Breach Issued

Rectification, Delisting Notice or Appeal

0   50   100   150

Notice of Breach Announced
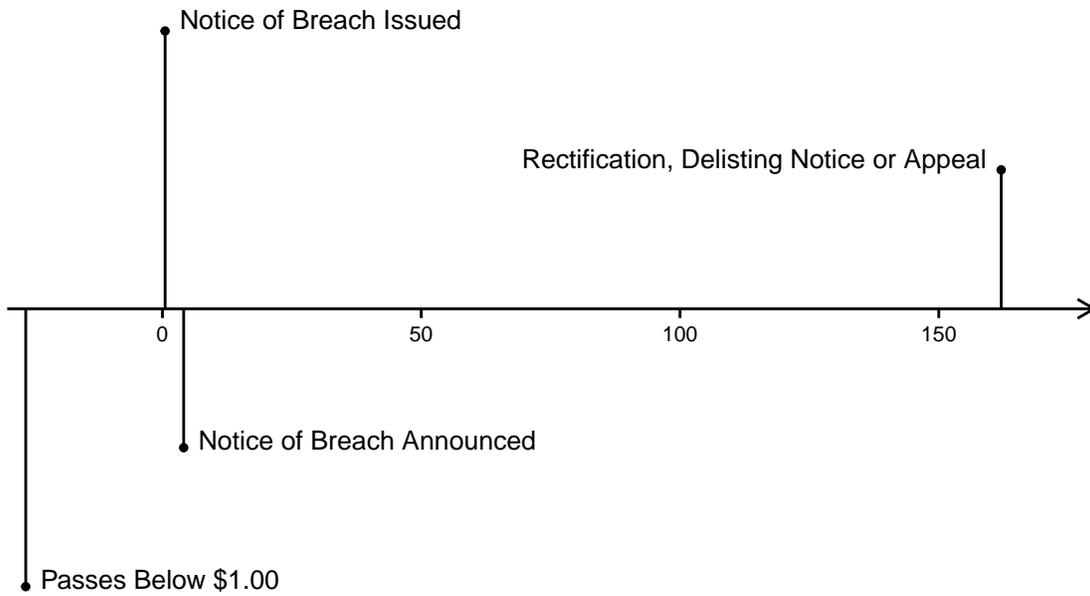
Passes Below $1.00

Figure 1 depicts a typical timeline associated with breach of minimum price rules. This occurs in 4 stages. First, a firm passes below $1.00. Second, if it must remain there, after 30 consecutive days, a notice of breach will be issued by the exchange. Firms will disclose these notices to the market within 4 days. Last, should firms fail to rectify the price deficiency, they will be subject to delisting. Right to appeal may follow.

Figure 2: Distribution of Notice Dates
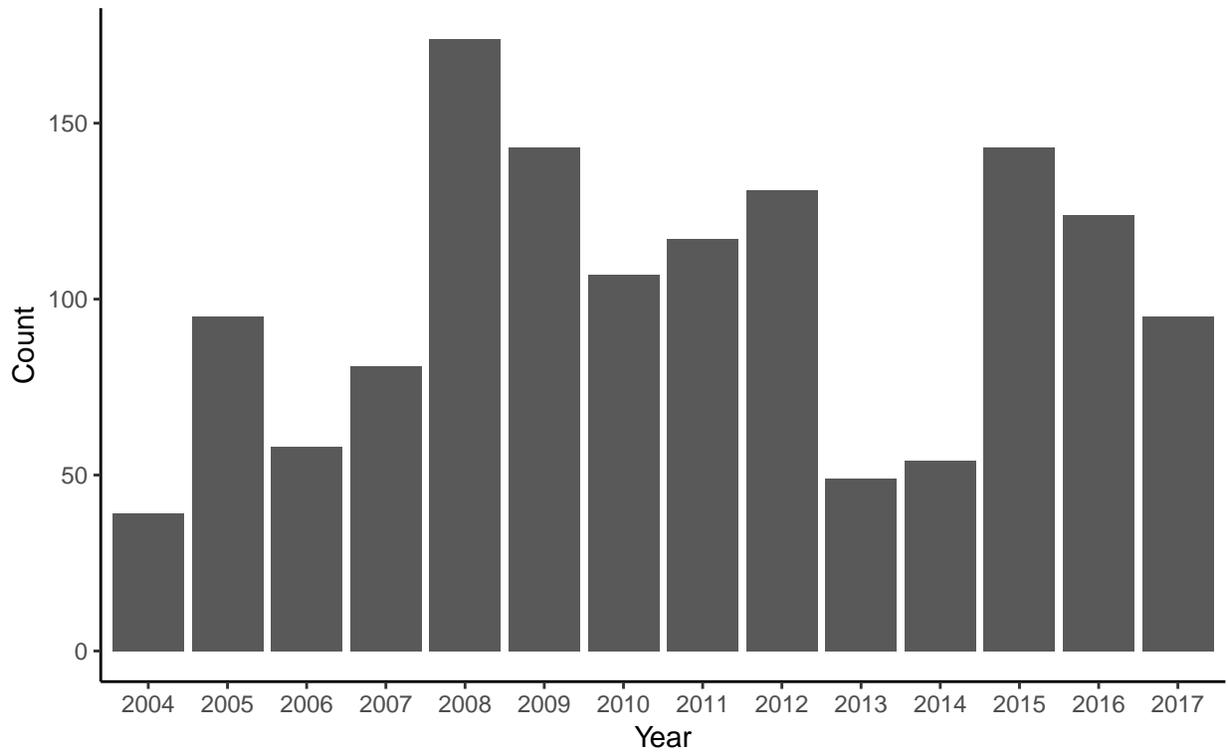
Figure 3: Distribution of Industries
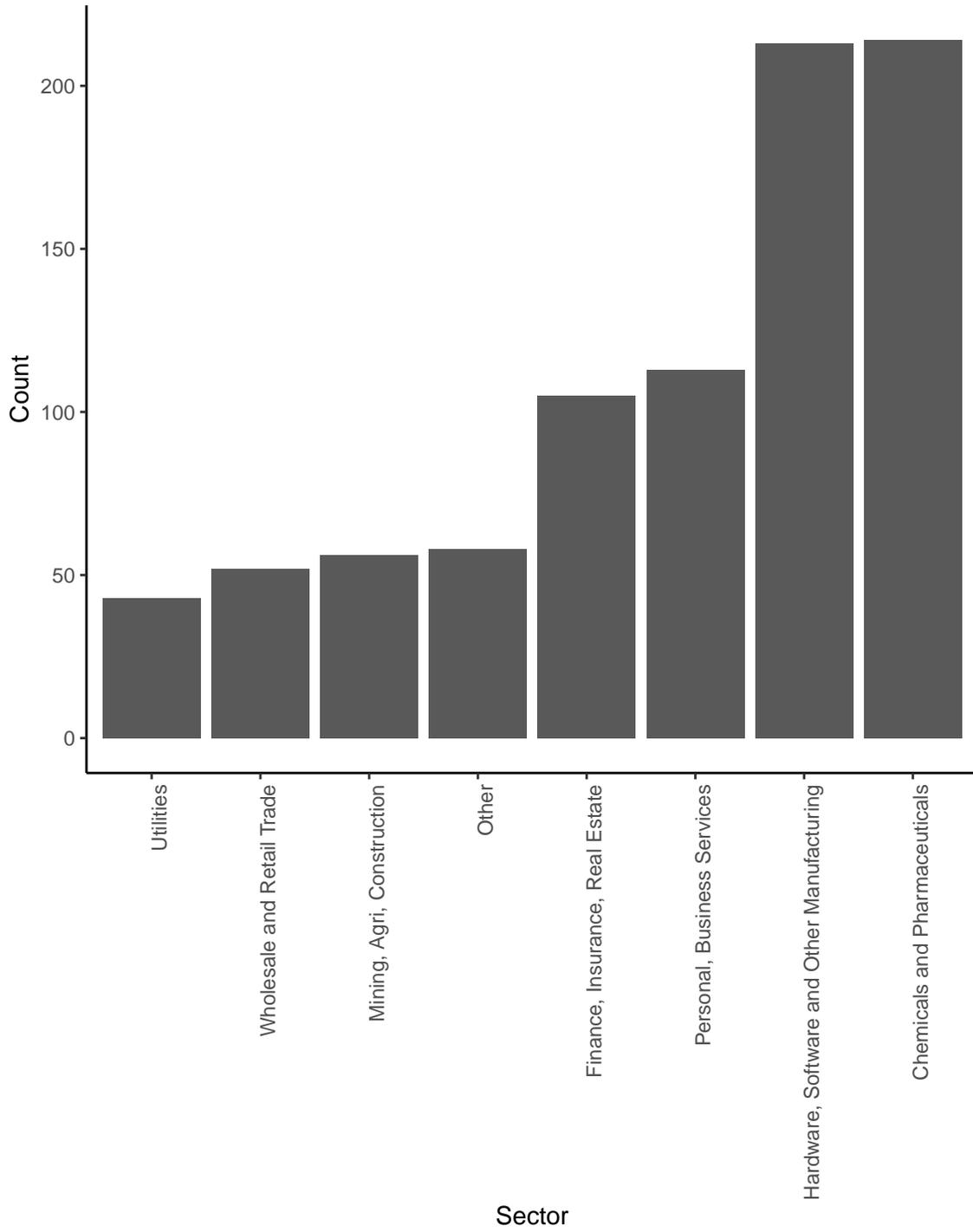
Table 1 Panel A: Summary Statistics for Cohort Sample

Variable	Mean	25%	Median	75%	SD
TREAT	0.010	0.000	0.000	0.000	0.097
POST	0.504	0.000	1.000	1.000	0.500
VOLITEMS	1.547	1.000	1.000	2.000	0.943
MANITEMS	2.407	1.000	2.000	3.000	1.916
TONE	0.363	-0.067	0.333	1.000	0.567
LNMEDIACOV	2.469	2.079	2.565	3.045	0.942
LNMKTCAP	5.149	4.211	5.134	6.014	1.343
BM	0.816	0.325	0.675	1.122	0.845
ROA	-0.090	-0.109	-0.004	0.025	0.250
LOSS	0.526	0.000	1.000	1.000	0.499
RND	0.072	0.000	0.000	0.089	0.140
DEBT	0.224	0.004	0.132	0.362	0.254
CASH	0.243	0.037	0.125	0.376	0.266
LNSEGNO	1.669	1.000	1.000	2.000	1.273
LNCOV	5.790	1.000	4.000	8.000	6.189
IOR	0.443	0.185	0.437	0.687	0.293
BREADTH	0.082	0.019	0.058	0.118	0.094
IPS	4.188	3.584	4.220	4.905	1.184
P12RET	0.116	-0.398	-0.076	0.285	0.995
P12VOL	0.036	0.025	0.032	0.043	0.016
P12BIDASK	0.012	0.002	0.005	0.014	0.017
P12VOLUME	1.813	1.159	1.793	2.402	0.848
N	1,098,798				

This table panel reports descriptive statistics complete sample of firms. VOLITEMS is the number of voluntary 8-K items. MANITEMS is the number of mandatory 8-K items. TREAT is an indicator variable for treatment firms, equal to one for observations from firms that breach MPRs and zero otherwise. POST is an indicator variable for the period following month $t = 0$, equal to one for observations following breach or pseudo-breach and zero otherwise. VOLITEMS is the number of voluntary 8-K items. MANITEMS is the number of mandatory 8-K items. TONE is the tone of 8-K filings. BREADTH is investor breadth. LNMKTCAP is market capitalization. ROA is return on assets. LOSS is an indicator variable for loss firms. RND is research and development expense. DEBT is the ratio of debt to assets. CASH is the ratio of cash to assets. LNSEGNO is business segments. LNCOV is analyst coverage. IOR is institutional investor holdings. IPS is the volume of IP addresses accessing firm filings. BM is book-to-market ratio. P12RET is 12-month average stock returns. P12VOL is 12-month average return volatility. P12BIDASK is 12-month average bid-ask spread. P12VOLUME is 12-month average stock volume.

Table 1 Panel B: Breach frequency

Breaches	N	Proportion
1	513	0.601
2	217	0.254
3	71	0.083
4	27	0.032
5	19	0.022
6	5	0.006
8	1	0.001
9	1	0.001
Total Breaches	1,410	1.000

This table panel reports the frequency with which firms in the sample of breach minimum price requirements.

Table 2: The association between disclosure, coverage and recognition and non-compliance with minimum price requirements

	(1)	(2)	(3)
		Pr(TREAT = 1)	
VOLITEMS	−1.748***	−0.537*	−0.296
	[−6.972]	[−1.721]	[−0.965]
MANITEMS	2.429***	1.544***	1.601***
	[13.544]	[6.598]	[6.651]
LNOPENPRC		−2.647***	−2.341***
		[−18.035]	[−15.914]
LNMKTCAP		−0.110	0.103
		[−1.579]	[1.137]
CASH		0.211	0.179
		[0.724]	[0.618]
DEBT		0.177	0.246
		[0.514]	[0.698]
ROA		−0.613***	−0.359
		[−2.603]	[−1.500]
LOSS		0.143	0.310**
		[1.026]	[2.197]
RND		0.421	0.876
		[0.829]	[1.611]
LNSEGNO		−0.210	−0.314
		[−0.992]	[−1.405]
BM		−0.046	−0.002
		[−0.646]	[−0.025]
NEGBM		−0.381	−0.145
		[−1.486]	[−0.557]
LNCOV			0.078
			[0.624]
LNMEDIACOV			−0.365***
			[−3.637]
IOR			−1.100***
			[−2.987]
BREADTH			−0.016***
			[−6.530]
IPS			0.171
			[1.175]
P12RET		−0.022	−0.023
		[−0.402]	[−0.437]
P12VOL		19.609***	15.853***
		[4.229]	[3.529]
P12BIDASK		−1.391	−5.054
		[−0.289]	[−0.984]
P12VOLUME		0.111	0.199**
		[1.131]	[1.975]
Industry FE	NO	YES	YES
Cohort FE	NO	YES	YES
Observations	103,624	103,624	103,624
Pseudo-R^2	0.03	0.34	0.37

This table reports the association between treatment and a range of firm characteristics. TREAT is an indicator variable for treatment firms, equal to one for observations from firms that breach MPRs and zero otherwise. VOLITEMS is the number of voluntary 8-K items. MANITEMS is the number of mandatory 8-K items. LNMEDIACOV is media coverage. BREADTH is investor breadth. LNOPENPRC is the opening stock price. LNMKTCAP is market capitalization. ROA is return on assets. LOSS is an indicator variable for loss firms. RND is research and development expense. DEBT is the ratio of debt to assets. CASH is the ratio of cash to assets. LNSEGNO is business segments. LNCOV is analyst coverage. IOR is institutional investor holdings. IPS is the volume of IP addresses accessing firm filings. BM is book-to-market ratio. NEGBM is an indicator variable for negative equity. P12RET is 12-month average stock returns. P12VOL is 12-month average return volatility. P12BIDASK is 12-month average bid-ask spread. P12VOLUME is 12-month average stock volume. All regressions use standard errors clustered by firm and cohort.

Table 3: Testing Sample Statistics

	Variable	Treatment		Control		Difference	Non-Matched	
		Mean	Std. Dev.	Mean	Std. Dev.	T	Mean	Std. Dev.
1	VOLITEMS	0.755	0.547	0.73	0.475	0.906	0.737	0.496
2	MANITEMS	1.68	0.911	1.641	0.85	0.838	1.367	0.819
3	LNOPENPRC	2.818	2.368	2.923	2.75	-0.768	7.295	5.567
4	LNMKTCAP	4.244	1.236	4.258	1.28	-0.219	5.053	1.411
5	CASH	0.374	0.319	0.361	0.313	0.783	0.249	0.267
6	DEBT	0.195	0.249	0.192	0.229	0.201	0.206	0.241
7	ROA	-0.352	0.43	-0.311	0.409	-1.817^*	-0.081	0.242
8	LOSS	0.814	0.39	0.808	0.394	0.272	0.506	0.5
9	RND	0.183	0.227	0.169	0.23	1.187	0.069	0.132
10	LNSEGNO	0.83	0.293	0.828	0.308	0.117	0.899	0.366
11	BM	0.744	0.959	0.809	1.016	-1.227	0.8	0.809
12	LNCOV	1.279	0.695	1.295	0.731	-0.422	1.519	0.825
13	LNMEDIA	8.363	6.564	8.008	6.171	1.045	11.017	18.509
14	IPS	4.176	0.885	4.172	0.896	0.077	100.377	197.942
15	BREADTH	0.028	0.033	0.027	0.029	0.781	0.076	0.085
16	IOR	0.232	0.229	0.218	0.205	1.243	0.428	0.288
17	P12RET	-0.041	1.174	-0.107	0.927	1.169	0.139	1.022
18	P12VOL	0.049	0.02	0.048	0.019	1.231	0.036	0.017
19	P12BIDASK	0.02	0.022	0.02	0.021	-0.082	0.013	0.018
20	P12VOLUME	1.822	0.823	1.739	0.811	1.908^*	1.757	0.852

This table reports descriptive statistics complete sample of firms, partitioned by sub-sample. TREAT is an indicator variable for treatment firms, equal to one for observations from firms that breach MPRs and zero otherwise. TREAT is an indicator variable for treatment firms, equal to one for observations from firms that breach MPRs and zero otherwise. POST is an indicator variable for the period following month $t = 0$, equal to one for observations following breach or pseudo-breach and zero otherwise. VOLITEMS is the number of voluntary 8-K items. MANITEMS is the number of mandatory 8-K items. TONE is the tone of 8-K filings. BREADTH is investor breadth. LNMKTCAP is market capitalization. ROA is return on assets. LOSS is an indicator variable for loss firms. RND is research and development expense. DEBT is the ratio of debt to assets. CASH is the ratio of cash to assets. LNSEGNO is business segements. LNCOV is analyst coverage. IOR is institutional investor holdings. IPS is the volume of IP addresses accessing firm filings. BM is book-to-market ratio. P12RET is 12-month average stock returns. P12VOL is 12-month average return volatility. P12BIDASK is 12-month average bid-ask spread. P12VOLUME is 12-month average stock volume.

Table 4: Non-compliance and disclosure volume

	VOLITEMS		MANITEMS	
	(1)	(2)	(3)	(4)
TREAT × POST	0.032***	0.043***	0.180***	0.159***
	[2.737]	[3.382]	[9.048]	[7.955]
TREAT	0.015	0.016	0.023	0.009
	[0.986]	[1.124]	[1.099]	[0.442]
POST	−0.0002	−0.019*	−0.015	−0.037**
	[−0.019]	[−1.867]	[−0.995]	[−2.600]
RSPLIT		0.068***		0.077**
		[2.896]		[2.444]
DELISTED		0.054		0.580***
		[1.586]		[14.567]
LNMKTCAP		0.020**		0.023**
		[2.066]		[2.123]
ROA		−0.016		−0.081**
		[−0.661]		[−2.183]
LOSS		0.009		0.033
		[0.536]		[1.460]
RND		0.061		0.134*
		[1.175]		[1.752]
DEBT		0.089**		0.182***
		[2.590]		[4.478]
CASH		−0.008		−0.164***
		[−0.252]		[−3.845]
LNSEGNO		0.002		0.031*
		[0.123]		[1.686]
LNCOV		0.017		0.030*
		[1.153]		[1.822]
IOR		0.023		0.016
		[0.699]		[0.367]
BM		−0.002		−0.008
		[−0.292]		[−0.811]
NEGBM		−0.0003		−0.014
		[−0.011]		[−0.488]
P12RET		0.002		−0.021***
		[0.618]		[−3.610]
P12VOL		−0.494		0.313
		[−0.946]		[0.504]
P12BIDASK		−0.384		−0.733
		[−0.908]		[−1.396]
P12VOLUME		0.032***		0.026*
		[2.871]		[1.868]
Industry FE	YES	YES	YES	YES
Time FE	YES	YES	YES	YES
Observations	31,364	31,339	31,364	31,339
Adjusted R^2	0.001	0.038	0.013	0.060

This table reports the association between breaching minimum price requirements and voluntary disclosure. All dependent variables are transformed by logarithms. VOLITEMS is the number of voluntary 8-K items. MANITEMS is the number of mandatory 8-K items. TREAT is an indicator variable for treatment firms, equal to one for observations from firms that breach MPRs and zero otherwise. POST is an indicator variable for the period following month $t = 0$, equal to one for observations following breach or pseudo-breach and zero otherwise. RSPLIT is an indicator variable for reverse splits. DELISTED is an indicator variable for month of delisting. LNMKTCAP is market capitalization. ROA is return on assets. LOSS is an indicator variable for loss firms. RND is research and development expense. DEBT is the ratio of debt to assets. CASH is the ratio of cash to assets. LNSEGNO is business segments. LNCOV is analyst coverage. IOR is institutional investor holdings. BM is book-to-market ratio. NEGBM is an indicator variable for negative equity. P12RET is 12-month average stock returns. P12VOL is 12-month average return volatility. P12BIDASK is 12-month average bid-ask spread. P12VOLUME is 12-month average stock volume. All regressions use standard errors clustered by firm and month of observation, with t-statistics shown in brackets.

Table 5: Non-compliance, disclosure volume and the stength of stock price management incentives

Panel A: Suspension of MPRs

	VOLITEMS		MANITEMS	
	(1)	(2)	(3)	(4)
TREAT × POST	0.047***	−0.034	0.173***	−0.020
	[3.603]	[−0.798]	[8.615]	[−0.320]
TREAT	0.016	0.034	0.008	0.038
	[1.105]	[0.958]	[0.386]	[0.900]
POST	−0.022**	0.050	−0.042***	0.057
	[−2.065]	[1.267]	[−2.889]	[1.048]
Sample	RULE	SUSP	RULE	SUSP
Difference	F = 4.168		F = 7.398	
Controls	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES
Time FE	YES	YES	YES	YES
Observations	29,045	2,294	29,045	2,294
Adjusted R^2	0.040	0.040	0.061	0.070

Panel B: Standard deviation of stock returns

	VOLITEMS		MANITEMS	
	(1)	(2)	(3)	(4)
TREAT × POST	0.049***	0.035*	0.166***	0.153***
	[3.025]	[1.696]	[6.913]	[4.507]
TREAT	0.001	0.023	−0.029	0.042
	[0.038]	[1.056]	[−1.240]	[1.371]
POST	−0.017	−0.015	−0.039**	−0.030
	[−1.411]	[−0.929]	[−2.337]	[−1.205]
Sample	LOW	HIGH	LOW	HIGH
Difference	F = 0.217		F = 0.088	
Controls	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES
Time FE	YES	YES	YES	YES
Observations	15,911	15,428	15,911	15,428
Adjusted R^2	0.034	0.053	0.049	0.074

This table reports the association between breaching minimum price requirements and voluntary disclosure, partitioned by the strength of stock price management incentives. Panel A reports the analysis where stock price management incentives are varied using the enforcement status of the requirements. Panel B reports the analysis where stock price management incentives are varied using the standard deviation of stock returns. All dependent variables are transformed by logarithms. The SUSP sample incudes observations during the period of suspension of MPRs. The RULE sample includes observations while the rule is active. The LOW sample includes firms with below median stock return volatility in the 3 months prior to (pseudo) non-compliance. The HIGH sample includes firms with above median stock return volatility in the 3 months prior to (pseudo) non-compliance. VOLITEMS is the number of voluntary 8-K items. MANITEMS is the number of mandatory 8-K items. TREAT is an indicator variable for treatment firms, equal to one for observations from firms that breach MPRs and zero otherwise. POST is an indicator variable for the period following month $t = 0$, equal to one for observations following breach or pseudo-breach and zero otherwise. All regressions use standard errors clustered by firm and month of observation, with t-statistics shown in brackets.

Table 6: Non-compliance, disclosure volume and the stength of stock price management incentives

Panel A: Firm fundamentals

	ROA		ZSCORE	
	(1)	(2)	(3)	(4)
TREAT × POST	0.044***	0.037*	0.034**	0.044**
	[2.612]	[1.959]	[2.151]	[2.183]
TREAT	−0.007	0.038	−0.016	0.048**
	[−0.444]	[1.565]	[−1.067]	[2.114]
POST	−0.026**	−0.008	−0.013	−0.019
	[−2.132]	[−0.498]	[−1.196]	[−1.193]
Difference	F = 0.06		F = 0.132	
Sample	HIGH	LOW	HIGH	LOW
Observations	15,343	15,996	15,370	15,624
Adjusted R^2	0.036	0.040	0.034	0.042

Panel B: Proprietary costs

	RND		HHI	
	(1)	(2)	(3)	(4)
TREAT × POST	0.034**	0.045**	0.031*	0.047**
	[2.008]	[2.450]	[1.759]	[2.568]
TREAT	0.047**	−0.017	0.007	0.032
	[2.100]	[−0.964]	[0.464]	[1.485]
POST	−0.005	−0.028**	−0.014	−0.022*
	[−0.426]	[−2.067]	[−0.968]	[−1.690]
Difference	F = 0.216		F = 0.35	
Sample	HIGH	LOW	HIGH	LOW
Observations	16,163	15,176	15,475	15,306
Adjusted R^2	0.034	0.046	0.026	0.051

Table 6 (cont): Non-compliance, disclosure volume and the stength of stock price management incentives

Panel C: Listing incentives

	BREADTH		IOR	
	(1)	(2)	(3)	(4)
TREAT × POST	0.067***	0.020	0.010	0.065***
	[3.185]	[1.294]	[0.596]	[3.633]
TREAT	−0.007	0.039**	0.029	0.014
	[−0.332]	[2.276]	[1.614]	[0.748]
POST	−0.021	−0.013	−0.0002	−0.035**
	[−1.626]	[−0.952]	[−0.016]	[−2.376]
Difference	F = 2.674		F = 4.356	
Sample	HIGH	LOW	HIGH	LOW
Observations	15,460	15,879	15,338	16,001
Adjusted R^2	0.043	0.041	0.039	0.047

Panel D: Investor relations

	VOLITEMS		BM	
	(1)	(2)	(3)	(4)
TREAT × POST	0.046***	0.022	0.054***	0.040**
	[2.637]	[1.330]	[3.677]	[2.094]
TREAT	−0.008	0.013	0.041***	0.001
	[−0.489]	[1.095]	[2.850]	[0.031]
POST	−0.059***	0.043***	−0.021*	−0.018
	[−4.214]	[3.367]	[−1.827]	[−1.277]
Difference	F = 0.893		F = 0.265	
Sample	HIGH	LOW	HIGH	LOW
Observations	17,986	13,353	15,456	15,883
Adjusted R^2	0.042	0.017	0.042	0.038

This table reports the association between breaching minimum price requirements and voluntary disclosure, partitioned by firm characteristics. Disclosure volume is measured using VOLITEMS, transformed by logarithms. Partitions are based on median split for the variables as identified above the corresponding regressions. The median split is based on the average pre-period value of the characteristic. HIGH denotes the sample split above median. LOW denotes the sample split below median. VOLITEMS is the number of voluntary 8-K items. BM is book-to-market ratio. TREAT is an indicator variable for treatment firms, equal to one for observations from firms that breach MPRs and zero otherwise. POST is an indicator variable for the period following month $t = 0$, equal to one for observations following breach or pseudo-breach and zero otherwise. All regressions the full range of control variables, contain industry and year fixed effects and use standard errors clustered by firm and month of observation.

Table 7: Non-compliance and alternative disclosure measures

	PRESSR	CALLS	LENGTH	FLS
	(1)	(2)	(3)	(4)
TREAT × POST	0.030*	0.004	0.022	0.127***
	[1.897]	[0.658]	[0.740]	[2.807]
TREAT	0.006	0.006	−0.042	0.028
	[0.317]	[0.768]	[−1.198]	[0.530]
POST	−0.026**	−0.004	−0.011	−0.025
	[−1.997]	[−0.957]	[−0.435]	[−0.685]
Controls	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES
Time FE	YES	YES	YES	YES
Observations	27,309	31,295	15,073	14,477
Adjusted R^2	0.108	0.083	0.340	0.074

This table reports the association between breaching minimum price requirements and voluntary disclosure measured using alternative measures. All dependent variables are transformed by logarithms. LENGTH is the number of words in 8-K filings. FLS is the number of forward-looking sentences in 8-K filings. CALLS is the number of conference calls. PRESSR is the number of press releases. TREAT is an indicator variable for treatment firms, equal to one for observations from firms that breach MPRs and zero otherwise. POST is an indicator variable for the period following month $t = 0$, equal to one for observations following breach or pseudo-breach and zero otherwise. All regressions use standard errors clustered by firm and month of observation, with t-statistics shown in brackets.

Table 8: Non-compliance and disclosure tone

| | TONE$_{MAN}$ | TONE$_{VOL}$ | |
	(1)	(2)	(3)
TONE$_{MAN}$			0.934***
			[133.622]
TREAT × POST	−0.067***	−0.022	0.010
	[−3.333]	[−0.891]	[0.804]
TREAT	0.015	0.024	0.012
	[0.731]	[0.886]	[1.320]
POST	0.023*	0.012	−0.001
	[1.658]	[0.744]	[−0.122]
RSPLIT	0.004	−0.018	−0.019*
	[0.160]	[−0.559]	[−1.700]
DELISTED	−0.338***	−0.400***	−0.060**
	[−8.725]	[−7.366]	[−2.226]
LNMKTCAP	0.003	−0.011	−0.009*
	[0.316]	[−0.756]	[−1.945]
ROA	0.072***	0.097***	0.022*
	[3.203]	[3.017]	[1.695]
LOSS	−0.056**	−0.081***	−0.012
	[−2.341]	[−2.792]	[−1.192]
RND	0.002	0.069	0.058**
	[0.030]	[0.954]	[2.222]
DEBT	−0.087**	−0.153***	−0.035
	[−2.441]	[−2.954]	[−1.651]
CASH	0.147***	0.154***	0.006
	[3.497]	[2.954]	[0.288]
LNSEGNO	0.022	0.061	0.017
	[0.608]	[1.364]	[1.147]
BM	−0.004	−0.014	−0.003
	[−0.448]	[−1.080]	[−0.653]
ZBM	−0.025	−0.010	0.018
	[−0.778]	[−0.215]	[1.077]
IOR	−0.024	0.024	0.037*
	[−0.597]	[0.459]	[1.819]
LNCOV	−0.001	−0.016	−0.003
	[−0.081]	[−0.771]	[−0.474]
RET	0.054***	0.050**	−0.001
	[2.834]	[2.398]	[−0.150]
VOL	−0.621***	−1.098***	−0.091
	[−2.960]	[−4.515]	[−0.850]
Industry FE	YES	YES	YES
Time FE	YES	YES	YES
Observations	20,094	15,036	14,315
Adjusted R^2	0.074	0.116	0.773

This table reports the association between breaching minimum price requirements and the characteristics of voluntary disclosure. VOLITEMS is the number of voluntary 8-K items. BM is book-to-market ratio. TREAT is an indicator variable for treatment firms, equal to one for observations from firms that breach MPRs and zero otherwise. POST is an indicator variable for the period following month $t = 0$, equal to one for observations following breach or pseudo-breach and zero otherwise. RSPLIT is an indicator variable for reverse splits. DELISTED is an indicator variable for month of delisting. LNMKTCAP is market capitalization. ROA is return on assets. LOSS is an indicator variable for loss firms. RND is research and development expense. DEBT is the ratio of debt to assets. CASH is the ratio of cash to assets. LNSEGNO is business segements. LNCOV is analyst coverage. IOR is institutional investor holdings. BM is book-to-market ratio. All regressions use standard errors clustered by firm and month of observation, with t-statistics shown in brackets.

Table 9: Non-compliance and 8-K filing stock returns

	$\text{FRET}^{RAW}_{[-1,+1]}$		$\text{FRET}^{SA}_{[-1,+1]}$	$\text{FRET}^{SA}_{[-1,+3]}$	$\text{FRET}^{SA}_{[-1,+5]}$
	(1)	(2)	(3)	(4)	(5)
CONSTANT	0.031***	0.283	0.278	0.089	0.314
	[4.067]	[1.113]	[1.078]	[0.675]	[1.248]
TREAT × POST	0.037**	0.019	0.018	0.040	0.065**
	[2.158]	[0.949]	[0.932]	[1.499]	[2.273]
TREAT	−0.062***	−0.080***	−0.080***	−0.100***	−0.124***
	[−5.617]	[−6.569]	[−6.759]	[−6.615]	[−7.052]
POST	0.010	0.019	0.020	0.011	0.008
	[0.964]	[1.390]	[1.471]	[0.801]	[0.455]
RSPLIT	−0.005	−0.007	−0.007	−0.006	−0.008
	[−0.227]	[−0.351]	[−0.346]	[−0.211]	[−0.291]
DELISTED	−0.261***	−0.276***	−0.278***	−0.335***	−0.358***
	[−6.658]	[−5.998]	[−6.047]	[−6.283]	[−6.399]
LNMKTCAP		−0.014**	−0.014**	−0.019**	−0.029***
		[−2.163]	[−2.280]	[−2.293]	[−3.348]
ROA		0.006	0.006	0.030	0.053*
		[0.331]	[0.311]	[1.207]	[1.761]
LOSS		−0.004	−0.004	−0.007	0.013
		[−0.217]	[−0.252]	[−0.249]	[0.599]
RND		0.023	0.022	0.054	0.047
		[0.731]	[0.706]	[1.259]	[1.053]
DA		−0.011	−0.009	−0.021	−0.018
		[−0.397]	[−0.333]	[−0.756]	[−0.599]
LNCOV		0.012	0.012	0.017	0.022
		[1.153]	[1.142]	[1.388]	[1.577]
IOR		0.009	0.008	0.011	0.012
		[1.150]	[1.059]	[1.117]	[1.000]
BM		0.008	0.005	0.031	0.026
		[0.401]	[0.278]	[1.205]	[0.885]
NEGBM		0.052	0.045	0.095***	0.089**
		[1.584]	[1.413]	[2.698]	[2.221]
VOL		1.198***	1.238***	1.559***	1.677***
		[4.056]	[4.235]	[4.673]	[4.471]
Returns ≠ 0	χ^2 = 1.76				
Industry FE	NO	YES	YES	YES	YES
Time FE	NO	YES	YES	YES	YES
Observations	6,447	6,444	6,444	6,444	6,444
Adjusted R^2	0.012	0.027	0.027	0.036	0.035

This table reports the association between breaching minimum price requirements and 8-K announcement stock returns. TREAT is an indicator variable for treatment firms, equal to one for observations from firms that breach MPRs and zero otherwise. POST is an indicator variable for the period following month $t = 0$, equal to one for observations following breach or pseudo-breach and zero otherwise. RSPLIT is an indicator variable for reverse splits. DELISTED is an indicator variable for month of delisting. LNMKTCAP is market capitalization. ROA is return on assets. LOSS is an indicator variable for loss firms. RND is research and development expense. LNCOV is analyst coverage. IOR is institutional investor holdings. BM is book-to-market ratio. NEGBM is an indicator variable for negative equity. All regressions use standard errors clustered by firm and month of observation, with t-statistics shown in brackets.

Table 10: Non-compliance and stock coverage and recognition

	$LNCOV_{t+1}$	LNMEDIA	BREADTH	IOR_{t+1}	IPS
	(1)	(2)	(3)	(4)	(5)
TREAT × POST	−0.005	0.147***	−0.023*	−0.001	0.052***
	[−1.320]	[5.107]	[−1.872]	[−0.908]	[3.160]
TREAT	−0.002	0.073	0.023	−0.002**	0.005
	[−1.162]	[1.383]	[1.169]	[−2.538]	[0.414]
POST	−0.002	−0.038*	0.033***	0.001	−0.025*
	[−0.788]	[−1.696]	[3.558]	[1.112]	[−1.790]
RSPLIT	−0.009***	0.147**	0.079***	0.012***	0.015
	[−2.791]	[2.433]	[3.038]	[5.038]	[1.067]
LNMKTCAP	0.004**	0.148***	0.035***	−0.0001	0.043***
	[2.313]	[5.255]	[2.678]	[−0.125]	[4.184]
ROA	−0.001	−0.027	−0.019	0.002**	−0.040**
	[−0.797]	[−0.474]	[−1.026]	[1.997]	[−2.388]
LOSS	0.003	0.112**	−0.020	0.002	0.033***
	[1.568]	[2.049]	[−0.937]	[1.564]	[2.832]
DEBT	0.00002	0.286***	0.008	0.0002	0.104***
	[0.008]	[3.486]	[0.249]	[0.144]	[4.082]
LNCOV	0.974***	0.125***	0.043***	0.002***	0.026***
	[156.399]	[2.714]	[2.882]	[2.769]	[2.808]
IOR	0.016***	0.093	0.476***	0.966***	0.044*
	[2.678]	[0.843]	[8.275]	[158.367]	[1.786]
BM	−0.001	0.001	−0.014*	−0.0003	0.004
	[−1.331]	[0.062]	[−1.720]	[−1.330]	[0.794]
EARNVOL	0.002	0.040	−0.006	0.0003	0.001
	[0.961]	[0.968]	[−0.419]	[0.386]	[0.068]
P12RET	−0.0001	0.037***	0.023***	0.002***	0.008
	[−0.062]	[3.454]	[5.300]	[5.322]	[1.251]
P12VOLUME	−0.295**	−4.389***	−0.589	−0.099**	0.037
	[−2.214]	[−2.863]	[−1.042]	[−2.330]	[0.089]
P12BIDASK	0.008***	0.135***	0.024*	−0.001	0.046***
	[2.803]	[3.819]	[1.944]	[−1.429]	[3.520]
P12VOL	0.185	0.010	−1.251**	−0.030	−1.315***
	[1.434]	[0.007]	[−2.032]	[−1.035]	[−3.467]
Lagged Dep Var	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES
Observations	31,189	31,189	31,189	31,189	28,515
Adjusted R^2	0.979	0.177	0.333	0.959	0.744

This table reports the association between breaching minimum price requirements and stock coverage and recognition. The dependent variables are analyst coverage, media coverage, institutional investor breadth and holdings, and broad investor recognition. LNMEDIACOV is media coverage. BREADTH is investor breadth. LNCOV is analyst coverage. IOR is institutional investor holdings. IPS is the volume of IP addresses accessing firm filings. TREAT is an indicator variable for treatment firms, equal to one for observations from firms that breach MPRs and zero otherwise. POST is an indicator variable for the period following month $t = 0$, equal to one for observations following breach or pseudo-breach and zero otherwise. RSPLIT is an indicator variable for reverse splits. LNMKTCAP is market capitalization. ROA is return on assets. LOSS is an indicator variable for loss firms. DEBT is the ratio of debt to assets. LNCOV is analyst coverage. BM is book-to-market ratio. EARNVOL is earnings volatility. P12RET is 12-month average stock returns. P12VOL is 12-month average return volatility. P12BIDASK is 12-month average bid-ask spread. P12VOLUME is 12-month average stock volume. All regressions use standard errors clustered by firm and month of observation, with t-statistics shown in brackets.

Table 11: Non-compliance and stock liquidity

	BIDASK	ILLIQ	VOLUME	NONTRADE
	(1)	(2)	(3)	(4)
TREAT × POST	−0.0001	−0.003**	0.041***	−0.002**
	[−0.344]	[−2.577]	[3.274]	[−2.008]
TREAT	0.001***	−0.002	0.037***	−0.001
	[4.638]	[−1.507]	[2.660]	[−1.346]
POST	0.0002	0.001	0.0001	0.001
	[1.138]	[0.858]	[0.017]	[1.446]
RSPLIT	−0.001***	−0.001	0.097***	−0.002***
	[−7.234]	[−1.215]	[4.885]	[−3.364]
DELISTED	0.003***	−0.001	0.300***	−0.003
	[2.911]	[−0.312]	[5.896]	[−0.992]
LNMKTCAP	−0.001***	−0.006***	0.058***	−0.004***
	[−10.824]	[−8.745]	[7.718]	[−5.942]
ROA	0.0004*	0.003***	−0.089***	0.003***
	[1.929]	[2.726]	[−4.269]	[3.257]
LOSS	0.0002	0.001	−0.001	−0.001
	[0.730]	[0.565]	[−0.102]	[−1.026]
DEBT	0.0002	0.002	0.056**	0.001
	[0.591]	[0.755]	[2.171]	[0.509]
BM	0.0002**	0.001	−0.003	−0.0003
	[1.999]	[1.257]	[−0.586]	[−0.619]
Lagged Dep Var	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Observations	28,709	28,708	28,709	28,709
Adjusted R^2	0.837	0.298	0.664	0.576

This table reports the association between breaching minimum price requirements and stock liquidity. The dependent variables are bid-ask spread, illiquidity, trading volume and non-trading days. BIDASK is bid-ask spread. VOLUME is the volume of stock traded. ILLIQ is stock illiquity as per Amihud (2002). NONTRADE is the proportion of non-trading days. TREAT is an indicator variable for treatment firms, equal to one for observations from firms that breach MPRs and zero otherwise. POST is an indicator variable for the period following month $t = 0$, equal to one for observations following breach or pseudo-breach and zero otherwise. RSPLIT is an indicator variable for reverse splits. DELISTED is an indicator variable for month of delisting. LNMKTCAP is market capitalization. ROA is return on assets. LOSS is an indicator variable for loss firms. DEBT is the ratio of debt to assets. BM is book-to-market ratio. All regressions use standard errors clustered by firm and month of observation, with t-statistics shown in brackets.

Table 12: Consequences and disclosure policy change measures

Panel A: Non-compliance sample only

	LNMEDIACOV	IPS	BIDASK	ILLIQ	VOLUME	NONTRADE
	(1)	(2)	(3)	(4)	(5)	(6)
ΔVOLITEMS × POST	0.279***	0.116**	−0.002***	−0.004	0.042	−0.002
	[4.627]	[2.531]	[−2.595]	[−1.304]	[0.770]	[−0.801]
ΔITEMS × POST	0.162***	0.072**	0.001	0.003	0.051	−0.00004
	[3.479]	[2.017]	[1.211]	[1.366]	[1.412]	[−0.026]
ΔVOLITEMS	−0.024	−0.047	0.0001	0.006*	−0.065*	0.004*
	[−0.321]	[−1.413]	[0.156]	[1.753]	[−1.781]	[1.715]
ΔITEMS	−0.141***	−0.013	0.0004	−0.003	0.043*	−0.002**
	[−2.806]	[−0.579]	[0.826]	[−1.299]	[1.800]	[−2.097]
POST	−0.003	−0.001	0.0002	−0.003***	0.018	−0.001
	[−0.188]	[−0.073]	[0.803]	[−2.797]	[1.495]	[−0.984]
Sample	TREAT	TREAT	TREAT	TREAT	TREAT	TREAT
Controls	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Observations	15,635	14,382	14,326	14,325	14,326	14,326
Adjusted R^2	0.289	0.744	0.828	0.323	0.642	0.598

Panel B: Full sample

	LNMEDIACOV	IPS	BIDASK	ILLIQ	VOLUME	NONTRADE
	(1)	(2)	(3)	(4)	(5)	(6)
ΔVOLITEMS × TREAT × POST	−0.043	−0.021	−0.002*	−0.018**	−0.006	−0.011**
	[−0.370]	[−0.279]	[−1.681]	[−2.340]	[−0.073]	[−2.398]
ΔITEMS × TREAT × POST	0.009	0.026	0.001	0.009	0.017	0.002
	[0.140]	[0.647]	[0.879]	[1.612]	[0.378]	[0.627]
ΔVOLITEMS × TREAT	0.100	0.010	0.0004	0.016**	−0.042	0.009*
	[0.900]	[0.181]	[0.408]	[2.009]	[−0.716]	[1.796]
ΔITEMS × TREAT	0.037	−0.010	0.0003	−0.012**	0.065*	−0.005*
	[0.531]	[−0.316]	[0.396]	[−2.175]	[1.769]	[−1.719]
ΔVOLITEMS × POST	0.305***	0.131**	0.0002	0.014**	0.051	0.010**
	[3.218]	[2.129]	[0.130]	[2.107]	[0.963]	[2.275]
ΔITEMS × POST	0.178***	0.060	−0.0004	−0.008	0.047	−0.003
	[3.277]	[1.461]	[−0.384]	[−1.613]	[1.362]	[−1.344]
ΔVOLITEMS	−0.158*	−0.058	−0.001	−0.010	−0.031	−0.005
	[−1.796]	[−1.292]	[−0.704]	[−1.413]	[−0.661]	[−1.172]
ΔITEMS	−0.131**	−0.001	0.001	0.008*	−0.004	0.003
	[−2.507]	[−0.053]	[1.463]	[1.851]	[−0.155]	[1.322]
POST	−0.011	−0.012	0.0002	−0.001	0.015**	0.0001
	[−0.809]	[−1.063]	[0.915]	[−1.495]	[2.306]	[0.185]
Sample	FULL	FULL	FULL	FULL	FULL	FULL
Controls	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Observations	31,295	28,571	28,709	28,708	28,709	28,709
Adjusted R^2	0.296	0.745	0.837	0.297	0.664	0.576

This table reports the association between breaching minimum price requirements, media coverage, broad stock recognition and stock liquidity. The dependent variables are media coverage, broad investor recognition, bid-ask spread, illiquidity, trading volume and non-trading days. IPS is the volume of IP addresses accessing firm filings. BIDASK is bid-ask spread. VOLUME is the volume of stock traded. ILLIQ is stock illiquity as per Amihud (2002). NONTRADE is the proportion of non-trading days. POST is an indicator variable for the period following month $t = 0$, equal to one for observations following breach or pseudo-breach and zero otherwise. All regressions use standard errors clustered by firm and month of observation, with t-statistics shown in brackets.

Table 13: Disclosure and stock delisting

	Pr(DELISTPRICE = 1)		Pr(DELISTOTHER = 1)	
	(1)	(2)	(3)	(4)
ΔVOLITEMS	−1.644**	−4.024**	−0.326	−0.271
	[−2.534]	[−2.557]	[−0.606]	[−0.252]
ΔITEMS	0.994***	1.695	1.505***	2.082***
	[2.947]	[1.524]	[4.641]	[3.140]
LNOPENPRC	−3.640***	−5.200	−2.340***	−1.535
	[−3.376]	[−1.454]	[−2.656]	[−0.752]
RSPLIT	−2.584***	−4.804***	−1.216***	−1.079*
	[−3.523]	[−3.099]	[−4.009]	[−1.913]
LNMKTCAP	−0.156	−0.009	0.053	−0.211
	[−0.969]	[−0.015]	[0.550]	[−0.714]
ROA		−0.838		−0.355
		[−0.644]		[−0.581]
LOSS		−0.741		0.940
		[−0.640]		[1.064]
RND		−2.728		0.715
		[−1.081]		[0.518]
DEBT		1.245		1.066
		[0.705]		[1.168]
CASH		0.542		0.934
		[0.300]		[0.790]
LNSEGNO		−0.895		−0.865
		[−0.636]		[−0.776]
EARNVOL		−0.114		−0.034
		[−0.191]		[−0.088]
BM		1.744		4.037***
		[0.770]		[2.867]
P12RET		−2.248*		0.242
		[−1.727]		[0.419]
P12VOL		0.232		−0.267
		[0.636]		[−1.118]
P12BIDASK		−3.097*		0.210
		[−1.854]		[0.432]
P12VOLUME		50.008*		23.198
		[1.649]		[1.251]
Sub-sample	TREAT	TREAT	TREAT	TREAT
Industry FE	YES	YES	YES	YES
Cohort FE	YES	YES	YES	YES
Observations	700	699	700	699
Pseudo-R^2	0.15	0.67	0.1	0.44

This table reports the association between breaching minimum price requirements and future delisting. The dependent variable is delisting from the exchange. DELISTPRICE is an indicator for delisting for price-based reasons. RSPLIT is an indicator variable for reverse splits. LNOPENPRC is the opening stock price. ROA is return on assets. LOSS is an indicator variable for loss firms. RND is research and development expense. DEBT is the ratio of debt to assets. CASH is the ratio of cash to assets. LNSEGNO is business segments. LNCOV is analyst coverage. IOR is institutional investor holdings. EARNVOL is earnings volatility. P12RET is 12-month average stock returns. P12VOL is 12-month average return volatility. P12BIDASK is 12-month average bid-ask spread. P12VOLUME is 12-month average stock volume. All regressions use standard errors clustered by firm and cohort of observation, with t-statistics shown in brackets.