

**The Impact of Information Disclosure on Stock Market Returns:  
The Sarbanes- Oxley Act and the Role of Media as an Information Intermediary**

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**Abstract**

The Sarbanes-Oxley (SOX) Act of 2002 is one of the, if not the, most important pieces of legislation affecting corporations traded on the U.S. stock exchanges. While SOX does not explicitly address the issue of information security, the definition of internal control provided by the SEC, combined with the fact that the reporting systems in all firms required to comply with SOX are based on systems that promote information security and integrity does imply that more focus on information security is a necessary compliance requirement. Using a dataset on stock market abnormal returns that runs from the period 2000-2006 and consists of 300 firms, we aim to examine how the stock market reaction varies for 8-K filings and news media releases, and how this reaction has changed since the passage of the SOX Act. We hypothesize that the greater timeliness of the 8-K filings induced by SOX increases and accelerates the quality of their information disclosure and dissemination in the market. Further, we classify news articles into press- and firm-initiated articles and hypothesize that the press-initiated coverage of material events has increased in the post-SOX period. We find that the effect of firm-initiated media coverage had significant negative impact relative to press-initiated coverage on the measures of informativeness suggesting that media played a significant role during the scandal-ridden periods when the firms had poor information environment between 2002 and 2004. We also find that the timeliness of release of media articles determines the level of informativeness, suggesting that media is an information intermediary and its role acts as a substitute to the firm's existing information disclosure environment.

## 1. Introduction

Today's new era of corporate governance requires higher levels of information disclosure and data integrity due to regulations such as the Sarbanes-Oxley (SOX), the Gramm-Leach-Bliley Act (GLBP) and the Health Insurance Portability and Accountability Act (HIPAA). Each of these laws imposes strict requirements on enterprises to establish or identify, document, test, and monitor internal control processes (Schneier 2004). The Sarbanes-Oxley (SOX) Act was formulated to increase companies' compliance with SEC disclosure laws. In the aftermath of Enron, World Com, Tyco and other high-profile business scandals between December 2001 and June 2002, Congress rapidly approved the passage of the SOX Act (SOA). What prompted the government to create this provision was a concern stemming from the lack of sufficient controls at these scandal-ridden firms, and the need for firms' financial statements to be accurate and devoid of any kind of accounting manipulation. Thus, the SOX Act required managers to implement controls over the financial reporting process and state whether they were effective.

In particular, the SOX Act introduced significant changes to financial practice and corporate governance regulation, including stringent new rules designed to protect investors by improving the accuracy and reliability of corporate disclosures made pursuant to the securities laws. Perhaps the part of the Act having the most impact was Section 404. Section 404 requires management to submit to the SEC with the company's annually filed financial statements, an internal control report, which shall state the responsibility of management for establishing and maintaining an adequate internal control structure and procedures for financial reporting. It should also contain an assessment, as of the end of the fiscal year, of the effectiveness of the internal control structure and procedures for financial reporting. It also requires auditors to attest to, and report on the management's assessment of the internal control systems. Such reports should include a description of material weaknesses in such internal controls and of any material noncompliance. Furthermore, where significant deficiencies exist, they need to be identified as required under SOX. For an interesting study that examined the cause of significant deficiencies in internal control that required identification, see Ge and McVay (2005). They found that poor internal control is related to "an insufficient commitment of resources for accounting controls".

Since modern financial reporting systems are heavily dependant on technology and associated controls, any review of internal controls would not be complete without addressing controls around information security. An insecure system would not be considered a source of reliable financial information because of the possibility of unauthorized transactions or data manipulation, each of which can compromise data integrity. The SOX Act focuses on management accountability and operating efficiencies in firms. Both of these are tightly coupled with investments in IT and the role played by IT professionals. Indeed, sections 302 and 404 indirectly force the scrutiny of information security controls for SOX compliance.<sup>1</sup> The implication of these new regulations is that organizations, especially those dealing with financial information, must establish the appropriate processes and technologies to evaluate data usage requirements for all users and create a data usage control policy that defines how data may be used by each user. They need to record database activity and report on deviations from the data usage control policy. Further, they need to alert management when a deviation from usage control policy might violate data integrity.

There's been a lot of debate about the impact of new government and industry regulations on IT departments, especially in the financial services sector. The financial services sector has long been presumed to practice superior information security, largely because of the preciousness of its assets and the fact that its business is carried out almost entirely on IT systems. A study based on interviews with 100 IT managers in UK financial services companies reveals that given the current level of investment in technologies that help companies comply with regulations such as SOX, around 60% of IT managers from financial services companies believe the demand on IT to deal with compliance issues will increase over the coming three years (Carr 2006). Indeed, the study states that most respondents are not satisfied with their current capabilities to perform tasks necessary for compliance such as document management and archiving. Further, it also reports that "most financial companies are only just beginning to scratch the surface in areas such as the archiving of electronic messages and digitized phone records." This becomes even more important in the face of a recent study that shows how susceptible the financial services industry is to targeted scans and probing attacks (Schneier 2005). Counterpane tracked the thirteen major vertical markets using attack data between January 2005 and October 2005. The study found although the financial industry ranks second highest in attacks, it is actually the most vulnerable to security breach

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<sup>1</sup>For a good survey of how the SOX Act is related to IT Governance, see Damianides 2005.

activity—approximately 50% of all targeted scans detected by Counterpane occurred within the financial industry.

It's well known that internal control evaluation and responsibilities are not a new mandate on business in the US. For instance, the US Foreign Corrupt Practices Act of 1977 requires publicly held companies to maintain adequate system of internal control. Further, the evaluation by external auditors has been an integral part of firm audit for many years. However, prior to Section 404, the audit evaluation of internal control was *optional* and might have been avoided, for example, for efficiency or size reasons. There was no requirement to disclose publicly the findings from the internal control evaluation. Post-SOX these disclosures are *mandatory*. Recently, a number of trade press article have voiced for a rollback of portions of the SOX Act, citing Section 404 as imprudent act of overregulation and called for its repeal. This article examines the impact of Sarbanes-Oxley in the role of media as an information intermediary.

Firms that face any event of importance file Form 8-K with Securities and Exchange Commission (SEC) explaining the event. This Form 8-K is expected to benefit investors by providing information in a timely manner. The Form 8-K “plays a critical role in the periodic reporting system, which is intended to provide investors with a continuous stream of corporate information,” (SEC Accounting Series Release No. 306 1982). This form is available on SEC’s website and is publicly available. We take this set of information as the universe of all information that is deemed material to a firm.

Sarbanes-Oxley Section 409 changed the reporting requirements for the form. This provides us a natural setting to examine the informativeness of these forms and associated disclosures by firms. Under rules in existence prior to Sox Section 409, the Form 8-K was required to be filed within 15 calendar days after the occurrence of an event, bankruptcy, or change in fiscal year. The deadline was five business days for events certain other events. Post Section 409, as previously stated, all events are required to be filed on a Form 8-K within four business days after event occurrence.

Further, SOX expanded the number of events that trigger a Form 8-K filing. The combination of Section 409 and Sections 13 and 15 of the Securities Act of 1934 require that a Form 8-K be submitted to the SEC for the following events, if not previously reported on Form 10-K or 10-Q:

change in registrant's certifying accountants (item 1); resignation of registrant's directors (item 2); resignation of registrant's officers (item 3); changes in control (item 4); material disposition of assets (item 5); material acquisition of assets (item 6); bankruptcy or receivership; and a variety of "other" exhibits (e.g., those related to financial statements of a recently acquired business). Form 8-K rules encourage firms to disclose other unspecified events deemed important by the registrant (e.g., lawsuits, securities issuances, and credit-rating changes).

Though the Form filed with the SEC is publicly available, investors may not be aware of the filing. High information collection costs prohibit investors from actively monitoring the SEC website for new filings (though this is rapidly changing with the advent of RSS feeds). News media plays an important role in disseminating information about the company. Because of its increased outreach, information disseminated through news media leads capital markets to react more spontaneously. However, only a fraction of this set of Form 8-K information is expected to be covered in the news media. To the extent that media acts as an information intermediary, we expect that media coverage of the news have capital market consequences. We examine this scenario to understand how the market reaction varies for 8-K filings and news media releases and how this reaction has changed since SOX<sup>2</sup>.

We hypothesize that the greater timeliness of the 8-K filings induced by Section 409 of SOX increases and accelerates their information content. Further, we classify news articles into press- and firm-initiated articles and hypothesize that the press-initiated coverage of material events has increased in the post-SOX period. We measure the information content of the 8-K filings and news articles by observing stock price and volume reactions.

## **2. Related Literature and Hypothesis Development:**

### ***2.1 Form 8-K:***

Using a pre-Sox 1993 data set, Carter and Soo (1999) find that over 26% of Form 8-K filings are filed after the statutory due date. Negative filings for changes in certifying accountants and

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<sup>2</sup> Forms such as 10-Q, 10-K and 10-KSB also contain material information. However, Form 8-K is unique in that the information is immediately reported to SEC within 4 business days of the event. Thus, our setting enables us to examine the capital market consequences better. Further, 10-Ks and 10-Qs contain other confounding information that may add noise to the study.

director resignations result in over 30% tardiness. Further, they find a stock price reaction of 9% as early as one day before the 8-K filing, but no significant response on the filing date itself. This finding indicates a leakage of information in between the event and filing dates. Overall, their findings show that the timeliness of 8-K filings is critical to their informativeness.

## ***2.2 Financial Information Disclosure***

An additional stream of literature in accounting has analyzed the trade-offs faced by firms in disclosing and presenting financial information (Hirshleifer and Teoh 2003). Earlier work in finance has tried to establish a link between financial reporting and economic consequences (Demski and Feltham 1994). There is no empirical agreement on whether firms are more likely to disclose good news or bad news. Indeed depending on size, firms use different disclosure strategies if the costs and benefits associated with disclosure and nondisclosure vary with firm size. Based on this observation, Tucker and Zorowin (2006) argue that larger firms are more likely to pre-disclose bad news. On the other hand, Diamond and Verrecchia (1991) show that the marginal benefit of increased disclosure increases with firm size. The intuition is that increased disclosures are expected to increase market depth and thereby attract large-traders, who are often associated with larger firms. Their theory predicts that irrespective of the kind of news, larger firms are more likely to make disclosures than are smaller firms. For a detailed review of the empirical disclosure literature, see Healy and Palepu (2001), and Core (2001). In a more recent paper that is related to our paper, Gordon et al. (2007) examine the impact of the Sarbanes-Oxley Act (SOX) of 2002 on the voluntary disclosure of information security activities by corporations. They find that SOX is having a positive impact on such disclosure suggesting that corporate information security activities are receiving more focus since the passage of SOX than before SOX was enacted.

## ***2.3 Role of press as information intermediary:***

The business press is perhaps the broadest and most widely disseminated of all potential information intermediaries, reaching both sophisticated and unsophisticated investors, as well as managers, regulators, and other market participants. Yet, only recently have researchers begun to investigate the role of the press in providing information to firms' investors, creditors, and other constituencies. Dyck and Zingales (2002) argue that the media is one vehicle through which information is aggregated and credibly communicated to the public (and across firms), and that the

media can play a substantial role in reducing the costs of contracting parties for collecting and evaluating information. Dyck and Zingales (2002) and Miller (2005) argue that there is a consumer demand for the investigative reporting role of the media and Zingales (2000) hypothesizes that readers rely on this reporting to form opinions when they believe the information provided is accurate and reliable.

Press coverage of news has capital market consequences and affects stock prices. Chan (2003) examines the predictability of stock returns following news headlines and draws inferences about investors' behavioral biases in responding to news events. Bushee et al (2007) investigate whether the press provides information that is incremental to firm-initiated press releases. The study finds that greater press coverage in the period prior to an earnings announcement leads to a smaller absolute price response and lower trading volume at the time of the earnings announcement. Press coverage during the earning announcement window results in a larger absolute price response and greater trading volume. These results are robust to controlling for a variety of firm characteristics such as size, institutional holdings, firm-initiated disclosures, and the presence of other information intermediaries, such as analysts. Bushee et al (2007) interpret these findings as evidence that press coverage provides new and useful public information to at least a subset of investors. We provide a more complete picture of the information environment. Also, we do not focus on earnings announcement but on non-announcement periods thereby complementing existing research. Further, earnings announcement is a period where investors' attention is pretty high and the demand for media role is higher in "quieter" periods.

### **3 Methodology:**

#### ***3.1 Sample Selection and Data Collection:***

Our sample period for this study is June 2000 to June 2006. Though a part of the SOX Act, the amendment to the 8-K form was not effective till 2004. Beginning August 23, 2004, public companies were required to report events on a reconfigured Form 8-K. This date is the start to our 'Post-SOX' sample which ends in June 30, 2006. In order to compare and contrast this sample prior to SOX, we use a four year sample starting June 2000 and ending in August 2004. One could view this as two sub-periods – one from June 2002 to June 2004 and the other prior to that. The underlying motivation to choose two sub-periods is the fact that between 2002 and 2004, the Form

8-K proposals were already out and were being commented upon. Hence, this provides an interesting setting to understand how the media impact varied with time.

The bottleneck in our data collection and same selection process is the media articles which need to be manually downloaded and, hence, is prohibitively time-consuming. We obtain our data on press articles from the Factiva database. Following Bushee et al (2007), we choose to limit our sample selection to a set of firms for which information asymmetry is likely to be an important issue<sup>3</sup>. Following the method outlined in Bushee et al (2007), we restrict our sample to NASDAQ firms. Next, we require that the sample firms have CRSP and Compustat data for fiscal year 2000. We then restrict the sample to mid-sized NASDAQ firms<sup>4</sup>. We rank the firms by market value on December 31, 2000 and eliminate the largest and smallest 20% of the distribution. This results in a sample of 1298 firms. We then randomly choose 300 companies and obtain media articles for the same. For this sample of firms, we also obtain the 8-K forms from the SEC website using a crawler.

The next step is to align the 8-K forms with corresponding media articles. For this, we used INDRI<sup>5</sup> a state-of-the-art, open source search engine that indexes many types of documents (HTML, PDF, XML) and also supports multiple fields per document (e.g., date, firm, author, free text, and so on) and also supports paragraph-level retrieval. We built two separate search engines, one for searching news articles and one for searching 8K forms. As a paragraph for the news articles we defined the natural paragraphs that existed in the text, and for the 8K forms we defined as paragraphs the Items listed in each form.

Once we have setup the search engines, we had to find the news articles that discuss the contents of the 8K forms. To achieve that, we first extracted the important key phrases from each 8K form item, using the Yahoo! Term Extraction service<sup>6</sup>, which identifies key phrases and entities that

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<sup>3</sup> As Bushee et al (2007) point out, Factiva data must be hand collected and only allows 100 articles to be downloaded at a time, which imposes prohibitive costs to obtaining large samples of press articles.

<sup>4</sup> It is possible that some of these firms might have lost value, especially after early 2000 market crash. This does not induce bias on two counts. First, for those mid-size firms that become small, information asymmetry is potentially a bigger issue. Thus, the role of media is all the more important to them. Second, we include size as an additional control variable and we hope to capture some of these effects.

<sup>5</sup> INDRI is a joint effort of the Language Technology Institute of Carnegie Mellon University and of the Center for Intelligent Information Retrieval from University of Massachusetts-Amherst.

<sup>6</sup> <http://developer.yahoo.com/search/content/V1/termExtraction.html>

appear in a document. We manually inspected the output for a large number of forms to ensure that it performs well, and our inspection verified that the Yahoo! Term Extractor works well even within the specialized domain of 8K forms.

Having access to the list of key terms for each 8K form item, we queried the search engine of news articles, restricting the results to be only about the company that filed the 8K form, and to be published in a time window +/-15 days before and after the 8K form publication. INDRI has built intelligence to match the best and most relevant documents for a list of keywords, even if 1-2 keywords do not actually appear in the text.

The result of this process is a list of articles and their relevance score, which were published around the time of the 8K form submission, and which are discussing the 8K form. Given that Factiva lists the publisher and author of each news article, we could identify whether the news article was a press release initiated by the firm, or whether it was a news article written by a non-affiliated journalist. This allowed us to compute a distribution of “news activity” around the 8K filing.

### ***3.2 Variable Definitions:***

We use abnormal returns and abnormal volume as stock-market based measures of informativeness of media articles and Form 8-Ks. Abnormal return refers to the return on a stock in excess of the expected return. The expected return can be measured using an asset pricing model or using the returns on a benchmark portfolio of firms similar in nature. We use measure abnormal returns using both methods to calculate expected returns. We use the Fama-French 4 factor asset pricing model as the measure of expected return based on an asset pricing model (Fama and French 1993). To calculate expected return based on the expected return on a group of benchmark similar firms, we use the size-adjusted abnormal return which is defined as the difference between a sample firm’s cumulative return and the cumulative equal-weighted average return during the same period for all firms in the market capitalization decile similar to that of the sample firm. In general, good news generates a positive return while bad news generates a negative return. However, in circumstances where one cannot identify the direction of the news, one relies on the absolute abnormal return (for example, see Bushee et al 2007). Accordingly we use absolute size adjusted return ( $ABS\_SAR$ ) which is defined as the absolute value of the size-adjusted return and absolute abnormal Fama-French return ( $ABS\_FFM\_CAR$ ) which is defined as the absolute value of the abnormal Fama-

French return. These returns are measured over 3 days starting the day of filing and the day of publishing of the media article<sup>7</sup>. One drawback of using absolute returns as a measure of market's reaction to the filings or the media articles is that we cannot statistically test whether the reaction is significant<sup>8</sup>. Hence, we restrict the use of these returns to the regression where we are more interested in explaining the variation in the abnormal returns.

In addition to returns, we use abnormal volume as a measure of informativeness. Similar to abnormal returns, abnormal volume is defined as the volume in excess of the expected volume. We calculate abnormal trading volumes using a log market model based on Campbell and Wasley (1996). The advantage of volume as a measure of market's reaction to the filings or the media articles is that we can statistically test whether the reaction is significant.

The main variable of interest is whether a media article is initiated by the firm or by the press. The Factiva database contains both firm-initiated disclosures on press release wires and press-initiated articles on news wires and in publications. Similar to Core et al. (2006) and Bushee et al (2007), we assume that all articles carried on press release wires through which firms can directly release information, such as PR Newswire, FD Newswire, and Business Wire, are firm-initiated disclosures. All other articles are considered press-initiated.

Several variables are expected to be related to the measures of informativeness and we control for these variables. Specifically, we expect the timeliness of media article to affect the market reactions. We measure timeliness as the delay in the number of days between when a Form 8-K is filed and the day on which the media article appears (*DELAY*). We also expect that the market reaction to the media article that we measure will vary with the accuracy with which we are able to match the Form 8-K to the media article. This measure is reported by the search engine (*SCORE*). Good matches are assigned negative values of *SCORE* by the search engine. The main model of interest is an OLS model with fixed effects:

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<sup>7</sup> In order to assess the sensitivity of our results to this choice of window, we test other window lengths such as a 4 day window on either side of the filing of the form or a media article. Our results are qualitatively similar.

<sup>8</sup> There are a few papers (for example, Carter and Soo 1999) that develop a method to test the significance with absolute returns, its efficacy is uncertain. Hence, we refrain from the use of such a measure.

$$\text{Informativeness}_{it} = \beta_0 + \beta_1 \text{FIRM}_{it} + \beta_2 \text{SCORE}_{it} + \beta_3 \text{DELAY}_{it} + \varepsilon_{it}$$

where  $i$  and  $t$  refer to firm and date respectively. Here *Informativeness* refers to one of our 3 measures of informativeness discussed above. To control for unobserved heterogeneity amongst the companies in our data, we use firm-level fixed effects. Based on the above discussion we expect that the co-efficient on *FIRM* to vary across the three periods of our sample. Specifically, we expect that in the post-SOX period, the role of media may have reduced because the information environment of the firm has improved due to regulations.

#### 4. Results and Discussion

Table 1 presents the frequency statistics of the sample across the three periods. First, we note that there are far more new items in the 8-K form post-2004 indicating that the firm's information environment would have changed because now more firm-level events are now required to be reported. As we can see the number of Form 8-Ks filed during 2004-2006 is close to 3 times that in the 2000-2002 period. We actually notice a high level of disclosure starting 2002 itself. A look at the item-wise breakdown shows some interesting preliminary evidence about the information and control effects of SOX. Specifically, we note that there are fewer changes of the firm's certifying accountants over the years and there is a huge increase in the departure of executive officers. Together these findings suggest that the firms control environment has improved possibly because of better internal controls and higher quality of information. The table also indicates that information on events that were previously not available to investors is now disclosed.

Table 2 table presents the overall and item-wise abnormal volume reactions to Form 8-K filings for each of the three periods June 1, 2000 – June 30, 2002, June 30, 2002 – June 30, 2004 and June 30, 2004 – June 30, 2006. As discussed in Section 3, volume is the only measure of informativeness we use to test for statistical significance. We note that, overall, the Form 8-K filing generates a significant level of abnormal volume indicating that these forms indeed provide information to which the market reacts. This finding sets stage for further analysis of media articles. If the form 8-K had not been informative, then our initial assumption that SOX changes the information environment for firms will be invalid. Hence, the natural setting that we claimed helps understand the changing role of media will not hold.

Table 3 provides a glimpse at the media coverage of these Form 8-K filings. We see that there is a steady decline in the level of media coverage. One possible argument for this finding is that as the firm's disclosure environment improves the information intermediary role of media declines suggesting the complementary nature of media and firm's information environment. This finding is further corroborated by similar declining trends at the item – level as well.

Table 4 presents the results of the regression. We find that the effect of firm-initiated media coverage had significant negative impact relative to press-initiated coverage on the measures of informativeness suggesting that media played a significant role during the scandal-ridden periods when the firms had poor information environment. However, this difference is insignificant in the pre-2002 and post-2004 period. This observation, in conjunction with the findings in Table 3 suggest that firm-environment and press-initiated media coverage are substitutes. We also find that the timeliness of media articles determines the level of informativeness. In sum, there is a reasonable evidence that media is an information intermediary and its role acts as a substitute to the firm's existing information environment.

## **5. Conclusion and Future Research**

The Sarbanes-Oxley Act of 2002 is one of the, if not the, most important pieces of legislation affecting corporations traded on the U.S. stock exchanges, since the Securities Act of 1933 and Securities Exchange Act of 1934 were enacted (Gordon et al. 2007). While SOX does not explicitly address the issue of information security, “the definition of internal control provided by the SEC, combined with the fact that the reporting systems in all firms required to comply with SOX are based on sophisticated computer-based systems, does imply that more focus on information security is a necessary, though not sufficient, compliance requirement” (Gordon et al. 2007). In fact, the Security Exchange Commission's (SEC) staff guidance on section 404 implementation clearly states that management should document and test relevant information technology controls to ensure the reliability of financial information (SEC 2005). Our results demonstrate that the passage of mandatory government regulation like SOA may be altering the operation of capital markets by affecting the stock performance of firms. This may not only affect US firms directly but may also have an impact on the number of foreign investors in US markets. Even with the SECs partial

exemption of the compliance requirements of foreign companies, some of them may stay away from US markets because of the tougher accounting rules and heightened emphasis on corporate governance.

Thus, the SOA throws up interesting implications of this act on the net social welfare generated not just from product markets but also from the interactions with capital markets. Does a decrease in participation in public markets, or an increase in the number of acquisitions adversely affect social welfare? We use the passage of the Sarbanes-Oxley Act as a natural setting to understand the changing role of media with changes in firm's information environment. We find preliminary evidence that press-initiated media is active when the firm's information environment is relatively poor. Thus, press acts as a valuable information intermediary.

Another interesting dimension to consider in future would be the size of the firm. The effect of Sarbanes-Oxley on the firm's information environment is expected to vary with the size of the firm. Further, media coverage is generally better for larger firms. Hence, it would be interesting to consider how our findings will vary across firms of different sizes. Another interesting avenue that we are currently exploring relates to follow-up media articles. We would like to understand whether and how firms and press decide to republish information that has already been covered in media. A third area that we are examining is to understand the determinants of a firm's decision to publicize any information. Form 8-Ks are publicly accessible at no cost. So why then do firms engage in spreading this information in media articles? To understand this we must first note that publicizing news in media has two effects: it increases the speed with which information reaches investors and it also increases the audience to investors who may currently not be the shareholders of the company. The motives to publicize news relates to these two effects. The first relates to manager's opportunistic behavior. Managers may be interested in engaging in insider trading activity and, hence, would like to affect the stock price as much as they can. Media is one good way to amplify the effects of news. Alternatively, the reason for publicizing the news could relate to building the firm's brand image (i.e. investor recognition) that would help the firm in many ways such as lower cost of capital and better terms and conditions in contracts.

Furthermore, we can further analyze the patterns of publication, scrutinizing the timing of the firm initiated and the press-initiated articles. For example, if a piece of news is disclosed to the press by

the firm before the 8K is published, and then the press follows with extensive coverage, then such an event is different than an event that the company did not try to make as public as possible and only “silently” filed the 8K form. Similarly, if such a “silent” 8K submission is then followed by substantial press activity and then followed by firm-initiated articles, then this may be a potential case of “damage control”. We plan to use subjectivity analysis and opinion mining to discover whether a news article reports facts or opinions and also examine whether the reported sentiment is positive or negative. Such an approach will give us the ability to examine in a more fine grained way how different types of disclosures affect the returns. In ongoing research, we aim to look at specific events in the 8-K that are related to information security.

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## **Table 1: Frequency Distribution of Form 8-K Filings**

Table Notes: This table presents the overall and item-wise frequency distribution of Form 8-K filings for each of the three periods June 1, 2000 – June 30, 2002, June 30, 2002 – June 30, 2004 and June 30, 2004 – June 30, 2006. The first two periods together is referred to as the Pre-SOX period while the last period is referred to as the Post-SOX period. Those items that did not exist in the 8-K forms prior to 2004 are marked “New” in the Pre-SOX Item Number column.

			2000-2002	2002-2004	2004-2006
Overall			367	1229	1162
Post-SOX item number	Event	Pre-Sox Item Number			
1.01	Entry into a Material Definitive Agreement	New	-	-	512
1.02	Termination of a Material Definitive Agreement	New	-	-	40
1.03	Bankruptcy or Receivership	Item 3	0	0	0
2.01	Completion of Acquisition or Disposition of Assets	Item 2	115	323	37
2.02	Results of Operations and Financial Condition	Item 12	0	2556	568
2.03	Creation of a Direct Financial Obligation or an Obligation under an Off-Balance Sheet Arrangement of a Registrant	New	-	-	37
2.04	Triggering Events That Accelerate or Increase a Direct Financial Obligation or an Obligation under an Off-Balance Sheet Arrangement	New	-	-	1
2.05	Costs Associated with Exit or Disposal Activities	New	-	-	9
2.06	Material Impairments	New	-	-	0
3.01	Notice of Delisting or Failure to Satisfy a Continued Listing Rule or Standard; Transfer of Listing	New	-	-	28
3.02	Unregistered Sales of Equity Securities	New	-	-	48
3.03	Material Modification to Rights of Security Holders	New	-	-	8
4.01	Changes in Registrant's Certifying Accountant	Item 4	98	24	11
4.02	Non-Reliance on Previously Issued Financial Statements or a Related Audit Report or Completed Interim Review	New	-	-	14
5.01	Changes in Control of Registrant	Item 1	17	9	0
5.02	Departure of Directors or Certain Officers; Election of Directors; Appointment of Certain Officers; Compensatory Arrangements of Certain Officers	Item 6	0	0	205
5.03	Amendments to Articles of Incorporation or Bylaws; Change in Fiscal Year	Item 8	8	4	30
5.04	Temporary Suspension of Trading Under Registrant's Employee Benefit Plans	Item 11	0	64	0
5.05	Amendments to the Registrant's Code of Ethics, or Waiver of a Provision of the Code of Ethics	Item 10	0	6	21
5.06	Change in Shell Company Status	New	-	-	0
7.01	Regulation FD Disclosure	Item 9	188	1403	170
8.01	Other Events	Item 5	1835	4667	1080
9.01	Financial Statements and Exhibits	Item 7	1603	5574	1839

**Table 2: Market Reactions to Form 8-K Filings - Abnormal Volume**

Table Notes: This table presents the overall and item-wise abnormal volume reactions to Form 8-K filings for each of the three periods June 1, 2000 – June 30, 2002, June 30, 2002 – June 30, 2004 and June 30, 2004 – June 30, 2006. The first two periods together is referred to as the Pre-SOX period while the last period is referred to as the Post-SOX period. Those items that did not exist in the 8-K forms prior to 2004 are marked “New” in the Pre-SOX Item Number column. The abnormal volume calculation is discussed in the methodology section. The t-statistics are presented in parentheses. Significance at the 5% level is denoted with a \*.

			2000-2002	2002-2004	2004-2006
<b>Overall</b>			1.95* (2.69)	5.91* (12.57)	4.83* (7.18)
Post-SOX item number	Event	Pre-SOX Item Number			
1.01	Entry into a Material Definitive Agreement	New	-	-	9.75* (7.65)
1.02	Termination of a Material Definitive Agreement	New	-	-	-2.24* (-5.20)
1.03	Bankruptcy or Receivership	Item 3	-	-	-
2.01	Completion of Acquisition or Disposition of Assets	Item 2	0.07 (0.27)	2.49* (9.83)	2.65* (2.14)
2.02	Results of Operations and Financial Condition	Item 12	-	5.91* (28.39)	5.76* (15.74)
2.03	Creation of a Direct Financial Obligation or an Obligation under an Off-Balance Sheet Arrangement of a Registrant	New	-	-	3.04* (2.58)
2.04	Triggering Events That Accelerate or Increase a Direct Financial Obligation or an Obligation under an Off-Balance Sheet Arrangement	New	-	-	-
2.05	Costs Associated with Exit or Disposal Activities	New	-	-	-0.67 (-0.76)
2.06	Material Impairments	New	-	-	0
3.01	Notice of Delisting or Failure to Satisfy a Continued Listing Rule or Standard; Transfer of Listing	New	-	-	-0.86* (-2.36)
3.02	Unregistered Sales of Equity Securities	New	-	-	8.90* (2.83)
3.03	Material Modification to Rights of Security Holders	New	-	-	-0.24 (0.25)
4.01	Changes in Registrant’s Certifying Accountant	Item 4	-1.66* (-4.47)	6.05* (4.56)	-0.59 (-0.74)
4.02	Non-Reliance on Previously Issued Financial Statements or a Related Audit Report or Completed Interim Review	New	-	-	-1.45 (-1.82)
5.01	Changes in Control of Registrant	Item 1	8.84* (6.30)	9.69* (5.93)	-
5.02	Departure of Directors or Certain Officers; Election of Directors; Appointment of Certain Officers; Compensatory Arrangements of Certain Officers	Item 6	-	-	1.32 (1.62)
5.03	Amendments to Articles of Incorporation or Bylaws; Change in Fiscal Year	Item 8	-	-	-0.37 (-0.13)

5.04	Temporary Suspension of Trading Under Registrant's Employee Benefit Plans	Item 11	-	0.12 (0.42)	-
5.05	Amendments to the Registrant's Code of Ethics, or Waiver of a Provision of the Code of Ethics	Item 10	-	0.64 (0.92)	-1.37 (-1.33)
5.06	Change in Shell Company Status	New	-	-	-
7.01	Regulation FD Disclosure	Item 9	2.67* (5.51)	7.45* (22.13)	4.87* (5.46)
8.01	Other Events	Item 5	4.62* (15.25)	5.27* (35.53)	9.47* (15.40)
9.01	Financial Statements and Exhibits	Item 7	4.77* (13.95)	5.55* (38.94)	7.22* (18.09)

**Table 3: Media Coverage of Form 8-K Filings**

			<b>2000-2002</b>	<b>2002-2004</b>	<b>2004-2006</b>
<b>Overall</b>			98% (41%)	97% (35%)	57% (17%)
Post-SOX item number	Event	Pre-SOX Item Number			
1.01	Entry into a Material Definitive Agreement	New	-	-	69.6% (12%)
1.02	Termination of a Material Definitive Agreement	New	-	-	62.5% (25%)
1.03	Bankruptcy or Receivership	Item 3	-	-	-
2.01	Completion of Acquisition or Disposition of Assets	Item 2	98% (30%)	99% (22%)	75% (8.3%)
2.02	Results of Operations and Financial Condition	Item 12	-	99% (25%)	74.5% (15%)
2.03	Creation of a Direct Financial Obligation or an Obligation under an Off-Balance Sheet Arrangement of a Registrant	New	-	-	45% (15%)
2.04	Triggering Events That Accelerate or Increase a Direct Financial Obligation or an Obligation under an Off-Balance Sheet Arrangement	New	-	-	-
2.05	Costs Associated with Exit or Disposal Activities	New	-	-	33.3% (16.7%)
2.06	Material Impairments	New	-	-	-
3.01	Notice of Delisting or Failure to Satisfy a Continued Listing Rule or Standard; Transfer of Listing	New	-	-	87% (27%)
3.02	Unregistered Sales of Equity Securities	New	-	-	50% (11%)
3.03	Material Modification to Rights of Security Holders	New	-	-	29% (0%)
4.01	Changes in Registrant's Certifying Accountant	Item 4	100% (17%)	100% (8.3%)	100% (0%)
4.02	Non-Reliance on Previously Issued Financial Statements or a Related Audit Report or Completed Interim Review	New	-	-	87.5% (25%)
5.01	Changes in Control of Registrant	Item 1	100% (0%)	100% (33.3%)	-
5.02	Departure of Directors or Certain Officers; Election of Directors; Appointment of Certain Officers; Compensatory Arrangements of Certain Officers	Item 6	-	-	63% (13.6%)
5.03	Amendments to Articles of Incorporation or Bylaws; Change in Fiscal Year	Item 8	-	-	90% (10%)
5.04	Temporary Suspension of Trading Under Registrant's Employee Benefit Plans	Item 11	-	100% (6.25%)	-
5.05	Amendments to the Registrant's Code of Ethics, or Waiver of a Provision Code of Ethics	Item 10	-	100% (33.3%)	100% (16.7%)
5.06	Change in Shell Company Status	New	-	-	-
7.01	Regulation FD Disclosure	Item 9	96% (40%)	97.5% (28.4%)	85% (23.5%)
8.01	Other Events	Item 5	98% (38%)	98% (32%)	76% (15%)
9.01	Financial Statements and Exhibits	Item 7	98% (35.5%)	100% (14%)	71% (14%)

Table Notes: This table presents the overall and item-wise media coverage of Form 8-K filings which is defined as the fraction of 8-K forms that have an associated media article. This statistic is presented for each of the three periods June 1, 2000 – June 30, 2002, June 30, 2002 – June 30, 2004 and June 30, 2004 – June 30, 2006. The first two periods together is referred to as the Pre-SOX period while the last period is referred to as the Post-SOX period. Those items that did not exist in the 8-K forms prior to 2004 are marked “New” in the Pre-SOX Item Number column. The number in parentheses presents the fraction of 8-K items that were publicized by firm in news media i.e. firm-initiated news.

**Table 4: Market Reaction to Media Articles**

Table Notes: This table presents the results of the fixed effects regression. Panel A presents the summary statistics of the variables used in the regression. ABS\_SAR is the absolute value of abnormal size-adjusted return, ABS\_FFM\_CAR is the absolute value of abnormal returns from the Fama-French model, AB\_VOLUME is the abnormal volume, FIRM is a dummy variable that takes a value 1 if the media article is initiated by the firm and takes a value 0 otherwise, SCORE is a measure of accuracy of the 8-K – media article match and DELAY is the number of days between the filing of the Form 8-K and the publishing of the media article. Panel B presents the regression results. The t-statistics are presented in the parentheses. All standard errors are clustered at the firm level.

**Panel A: Summary Statistics of Variables**

Variable	Obs	Mean	Std. Dev.	Min	Max
ABS_SAR	22,992	0.136	0.141	0.000	1.372
ABS_FFM_CAR	22,992	0.140	0.146	0.000	1.374
AB_VOLUME	22,987	5.788	13.265	-19.609	243.177
FIRM	23,584	0.225	0.418	0.000	1.000
SCORE	22,997	-7.223	0.768	-12.428	-2.643

**Panel B: Regression results**

	ABS_FFM_CAR			ABS_SAR			AB_VOLUME		
	2000-2002	2002-2004	2004-2006	2000-2002	2002-2004	2004-2006	2000-2002	2002-2004	2004-2006
Constant	0.177* (7.59)	0.044* (4.28)	0.168* (7.23)	0.161* (7.25)	0.055* (5.55)	0.169* (7.38)	5.0128* (3.02)	3.548* (4.43)	8.617* (2.60)
FIRM	-0.008 (-0.14)	-0.014* (-5.22)	-0.002 (-0.41)	0.002 (0.41)	-0.013* (-5.02)	-0.003 (-0.48)	-0.651 (-1.58)	-1.378* (-6.80)	-0.921 (-1.10)
SCORE	-0.002 (-0.54)	-0.013* (-9.19)	0.005 (1.69)	-0.004 (-1.26)	-0.011* (-8.26)	0.006 (1.93)	-0.090 (-0.40)	-0.358* (-3.26)	0.098 (0.22)
DELAY	-0.000* (-7.96)	-0.000 (-1.34)	-0.000 (-1.60)	-0.000* (-11.51)	-0.000* (-2.02)	-0.000 (-1.60)	-0.000* (-10.11)	-0.002* (-3.53)	-0.001* (-2.32)
N	3912	14606	4465	3921	14606	4465	3916	14606	4465
R-squared	0.0167	0.0082	0.0012	0.0340	0.0071	0.0014	0.0282	0.0050	0.0015