CAN SHORT SELLERS PREDICT ACCOUNTING RESTATEMENTS AND FORESEE THEIR SEVERITY?

A Dissertation

by

JAP EFENDI

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

August 2004

Major Subject: Accounting

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ABSTRACT

Can Short Sellers Predict Accounting Restatements and Foresee Their Severity?

(August 2004)

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This dissertation investigates whether short sellers establish short positions prior to accounting restatement announcements and whether the levels of short interest are related to the severity of restatements. Using 565 firms with restatement disclosure during the period of 1995 to 2002 and matched control firms with no restatements announcements, I find that the level of short interest is higher for the sample firms compared to the control firms in the months surrounding the announcements. The level of short interest increases as the restatement announcement date approaches and declines thereafter. Related to severity of restatement, I find that the level of short interest in the pre-disclosure period is higher for restatements involving fraud and the revenue accounts. There exists limited evidence that the pre-disclosure level of short interest is positively associated with the number of quarters restated and the magnitude of the restatements. Finally, I find cumulative abnormal returns surrounding the announcements are more negative for restatement firms that have a higher level of short interest. These results suggest that short sellers are highly sophisticated investors who can see through accounting manipulation and consequently profit from their knowledge.

DEDICATION

This dissertation is dedicated to my mother, Liu Rosa Magdalena, and my departed father, Djap Japarmoka, for their unconditional and never-ending love. They themselves never finished high school. Yet their hard work, inspirations, prayers, and sacrifices have made it possible for me to pursue a higher education and finally to finish this dissertation.

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I. INTRODUCTION

> To enjoy the advantage of a free market, one must have both buyers and sellers, both bulls and bears. A market without bears would be like a nation without a free press. There would be no one to criticize and restrain the false optimism that always leads to disaster – Bernard Baruch.

Recent accounting restatements by prominent companies such as Enron and WorldCom are estimated to cost investors billions of dollars. Accounting restatements, which represent public acknowledgements of GAAP reporting violations or accounting manipulations, have tarnished the credibility of accounting practices and raised questions about the quality of corporate financial disclosures. The GAO (2002), under the instruction of Senator Paul S. Sarbanes, reports an alarming rise in the number of restatement announcements from January 1, 1997 to June 30, 2002. The report shows that the number of restatement announcements increased dramatically from 92 in 1997 to 225 in 2001.

This study empirically evaluates whether a certain group of sophisticated investors, in this case short sellers, can predict accounting restatements and foresee their severity. Understanding short sellers' behavior related to accounting manipulation and restatement is intriguing because of the following reasons. First, unlike most investors who profit when prices increase, short sellers profit only when prices fall. Short sellers, therefore, have the motive to identify negative signals in order to predict bad news. Staley (1997), a professional short-seller, characterizes short sellers as very skeptical investors who vigorously attempt to identify firms that manipulate earnings and/or those firms that will restate their earnings in the future. Second, although short selling seems to be an

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This dissertation follows the style and format of *The Accounting Review*

attractive strategy for bearish investors, short selling is a risky and costly investment strategy. Diamond and Verrecchia (1987) suggest that short sellers must be informed traders who are confident about their position, and short sellers will not trade unless they expect the price to fall sufficiently to compensate them for the additional costs and risks of short selling. Kinney and McDaniel (1989), Feroz et al. (1991), Palmorse et al (2004), and GAO (2002) document an average of –10 percent cumulative abnormal return in days surrounding restatement announcements. A negative return of this size should provide plenty of incentive for short sellers to target restatement firms. Finally, the business press provides anecdotal evidence that short sellers have the ability to identify firms that manipulated their financial numbers and profit when the stock prices drop. To date, however, empirical evidence that short sellers target firms involved in accounting manipulation is scant.[1]

Using 565 firms with restatement announcements in January 1995 to June 2002 and paired control firms matched on industry and size, I evaluate whether the level of short interest in the months surrounding restatement announcements is higher for sample firms compared to control firms.[2] I find that the paired difference in the level of short interest increases from 0.5 percent to over 1.0 percent from the 12th month prior to the month of restatement announcements. Subsequently, the paired difference in the level of short interest decreases to 0.4 percent in the 12th month after restatement announcements. The results remain consistent in the multivariate regression settings that control for monthly-paired differences in prices and book-to-market ratios. Further, I find that the

[1] Short sellers' sophistication with regards to accounting manipulation is intriguing. Unlike insiders, institutional investors, or analyst who have inside connections, short sellers are independent and disliked by management (Gasparino 2002; Schwartz 1998).

[2] Level of short interest is the number of common shares shorted divided by the number of common shares outstanding. It is also known as "percentage of short interest outstanding".

level of short interest increases in the months leading up to restatement announcements and declines thereafter.

I also investigate whether the level of short interest is related to the severity of the accounting restatement – to my knowledge, there is no study that links short sellers with the severity of accounting manipulation. I evaluate the levels of short interest for different types of restatement severity with univariate statistics as well as multivariate models that control for transaction costs related to short selling. Analysis within the restatement firms shows that the level of short interest in the pre-announcement period is significantly higher for firms restating revenue accounts and for restatements involving fraud. In addition, there is marginal evidence that the pre-announcement level of short interest is positively associated with the number of quarters restated and the magnitude of the restatements. Finally, I find that cumulative abnormal returns in days surrounding the announcements are more negative for restatement firms that have a higher level of short interest. In summary, the evidence indicates that short sellers have the ability to anticipate and, to a certain extent, foresee the severity of accounting restatement, and short sellers use their understanding about accounting restatement to profit accordingly.

The results of this study should be of interest to the business community as well as to regulators because the results show that short sellers are highly sophisticated with regards to misstated accounting reports. I provide some answers to Jensen's (2004) concern about the inability of short sellers to eliminate the agency costs of overvalued equity.[3] First, although my findings show that short sellers can identify firms that restate

[3] Jensen (2004) points out that neither control markets nor equity-based compensation can solve the agency costs of overvalued equity. He is puzzled that short selling was unable to resolve the problem; hence, it appears that the only solution to the problems lies in the board of directors and governance systems.

their earnings, which represent the extreme cases of accounting manipulations,[4] it appears that the market disregards or underreacts to the levels and changes in short interest.[5] Perhaps investors, auditors, and regulators should pay closer attention to short sellers' activities because this study shows that firms involved in accounting manipulation have a significantly higher level of short interest compared to firms that do not manipulate their financial numbers.[6] Second, high transaction costs associated with short selling may have impeded the contribution of short selling to the pricing efficiency of the equities markets. Short sellers would be unwilling to take a position when the expected transaction costs outweigh the expected price drop; therefore, they act only in the most severe cases. Although this study shows that short sellers establish positions in firms that manipulated their accounting numbers, Richardson (2003) does not find that short sellers take positions in firms with high accruals that may be involved in aggressive earnings management. These combined findings suggest that short sellers will not act when the expected profit is not large enough – that is, when the assessed probability and/or the possible price drop (outcome) are relatively low. The fact that short sellers do not short when misspricing is not sufficiently large should cause the SEC to be concerned because this behavior impedes pricing efficiency. In 1999, the SEC has shown its intention to reduce short selling transaction costs and issued a Concept Release asking for public

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[4] An accounting restatement is an extreme case of accounting manipulation because management is caught and forced to acknowledge the wrongdoing. Often times, the news is followed by resignation or dismissal of company executives.

[5] This fact is not entirely unusual considering numerous research finding that the market or certain market participants are overly optimistic and they are surprised when the facts or bad news are revealed (Sloan 1996; Bradshaw et al. 2001; Richardson et al. 2001; Griffin 2004; Palmrose et al. 2004) It is also possible that investors are gambling on the price momentum (bubble) and speculating that they won't be the last owner when the bubble bursts. The most difficult part is to determine when the bubble will burst.

[6] Any information that helps to reveal earnings manipulation sooner is valuable because it prevents further losses and destruction of a firm's core value. Jensen (2004) estimates that at its peak value, Enron's worth was approximately 30 billion dollars. However, prolonged manipulation finally wiped out the entire value of the company.

comments to relax short selling regulations.[7] Last but not least, short sellers may be unable to solve the overvalued equity problem because they are simply unable to decipher or understand the degree of certain accounting manipulations due to limited information. Management may purposely eliminate or obfuscate items in financial statements to cover up their wrongdoings.[8] Additionally, when restatement occurs, the amount restated may not truly represent the extent of the manipulation because management may have the motive to under-acknowledge the problems in order to reduce negative consequences. When this happens, short sellers would benefit less than if all the wrongdoings were revealed.

The next section of this dissertation provides a literature review of short selling. Section three develops the hypotheses. Section four discusses data and sample selection. Section five elaborates on the research design. Section six presents the results. Finally, section seven suggests ideas for future studies and concludes the study. For those who are interested in the history of short selling, Appendix A provides a narrative on the development of short selling from the early European markets to the present.

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[7] The SEC adopted Rule 10a-1 (Short sale rule) under the Securities Exchange Act of 1934 at a time when securities markets had less trading volume and simpler trading strategies than current markets. Since then, securities trading has increased drastically in volume, velocity, and complexity. There have also been substantial improvements in market transparency and surveillance mechanisms. However, the SEC remains cautious about potentially abusive use of short selling.

[8] For example, Enron provided cryptic disclosures regarding various related-party transactions in its Form 10-K as well as the quarterly form 10-Q.

II. LITERATURE REVIEW

Institutional Information on Short Selling

In the capital market, the conventional approach to making a profit is to buy low and sell high. However, it is also possible to make a profit in the reverse order – sell high and buy low. Short selling is selling a security that the seller does not own by borrowing it from a broker-dealer or an institutional investor. Short selling is important because it contributes to the pricing efficiency of the equities markets. Efficient markets require that prices fully reflect all buy and sell interest. Investors who believe a stock is overvalued may engage in short selling in an attempt to profit from a perceived divergence of prices from true economic values. They add to stock pricing efficiency because the transactions inform the market of their evaluation of future stock price performance.

Although short selling seems to be an attractive trading strategy for bearish investors, it is a high-risk investment strategy because it is more costly compared to long selling (selling securities that the seller owned) for the following reasons. First, the potential loss from short selling is unlimited (Tauli 2003, 45). While the maximum gain from short selling is limited to the price of the security (maximum profit is generated when the price falls to zero), the maximum loss from short selling is theoretically unlimited because there is no limit to how high the price may rise. Second, short sellers may be forced to purchase replacement shares if the lenders of the borrowed shares demand repayment and there are no other shares to borrow (Tauli 2003, 47). Worse come to worst, short sellers can be caught in a "short squeeze" when they are forced to cover the short position to limit their losses as the prices rise sharply and their efforts to buy back the stock leads to further increases in share price (Tauli 2003, 49). Third, the "up-

tick" rule makes short selling difficult because it allows short selling only when the price of the stock is not lower than the last transaction and the last price movement was upward (Tauli 2003, 51). The SEC established the "up-tick" rule in 1934 fearing that short selling can cause the market to spiral down. The fourth cost results from the tax treatment. Short selling profit is taxed as a short-term capital gain no matter how long the position is held (Dechow et al. 2001, 80). Finally, there is a high margin requirement to borrow stocks. Most brokers require a 50 percent margin of the borrowed stock in the trader's account to establish a short sale position and a margin call is triggered when the value of the account falls to 30 percent (Epstein 1995). All these factors related to short selling make it a heavily regulated and risky trading strategy. Since short selling is riskier and more expensive than establishing a long position, Diamond and Verrecchia (1987) suggest that short sellers must be informed traders who are confident about their positions, and short sellers will not trade unless they expect the price to fall enough to compensate them for the high costs and risks of short selling.

Staley (1997), in her book *The Art of Short Selling*, calls short sellers "the alter ego of Wall Street". She describes short sellers as very skeptical investors who target companies with problems that might cause major income reversals or bankruptcies. Short sellers target primarily those companies whose managers lie to investors and/or those companies with tremendously inflated stock prices (bubble stocks). Weis (2002) states that short sellers have an important role to curb hype and manipulation. Recent business press provides anecdotal evidence that short sellers have the motives and the ability to identify firms that manipulate their accounting numbers (Staley 1997; Tauli 2003). For instance, Jim Chanos, an expert in short selling, had been shorting Enron shares heavily

before the shares fell because he was able to see major problems in the company financial reports (Low and McGee 2001). In congressional testimony in February 2002, Chanos attributed the fundamentals of his success to industrial knowledge and rigorous examination of financial statements (SEC 2003).

In order to identify firms that manipulate their financial numbers, Staley (1997) reports that short sellers rigorously evaluate many aspects of the companies, among others, quality of earnings, quality of assets, quality of management, and competition. They carefully evaluate financial and non-financial information including information about managers, boards of directors, and industry information. In addition to using publicly available data as the basis for their research, short sellers accumulate private information, for example, by calling customers and suppliers to validate their suspicions.

Related Research

The earlier literature in finance shows inconclusive evidence on the relationship between levels of short interest and future returns (Bhattacharya and Gallinger 1991; Choie and Hwang 1994; Figlewski 1981; Senchack and Starks 1993; Vu and Caster 1987; Woolridge and Dickinson 1994).[9] Nevertheless, recent studies using improved methodology show that the level of short interest is negatively associated with returns (Desai et al. 2002; Asquith and Muelbrook 1995). Dechow et al. (2001) show that short sellers identify overpriced securities using information contained in fundamental-to-price ratios (book-to-market ratio, etc.) and that they are less likely to short firms with high short selling transaction costs. Dechow et al. (2001), however, find that short sellers are

[9] One perspective argues that since short selling is costly, short sales by liquidity traders are less likely. If informed traders are more likely to sell short, then a high level of short interest conveys adverse information, implying a negative relationship between short interest and stock returns. On the other hand, many investors on Wall Street believe that short interest is a bullish signal because it represents latent demand, which will transform eventually into actual purchase of the shares to cover the short position.

highly sophisticated investors because they use information beyond fundamental-to-price ratios to distinguish if low fundamental-to-price ratios are attributed to temporarily low fundamentals or temporarily high prices.

The first test in my study is related to the findings in Dechow et al. (1996) and Griffin (2004). Dechow et al. (1996) investigate causes and consequences of earnings manipulation using 92 firms subject to accounting enforcement actions by the Securities and Exchange Commission for alleged violation of GAAP from 1982 to 1992. Comparing sample firms with industry-and size-matched control firms, they find that the motivation for earnings manipulation is to attract external financing at low cost. The likelihood of earnings manipulation is systematically related to weakness in the oversight of management. They document that the consequences of the wrongdoings, among others, are higher levels of short interest for firms subject to enforcement actions compared to control firms beginning from 2 months before up to 6 months after announcements of accounting manipulation. However, Dechow et al. (1996) use only 28 sample and 33 control firms to study the levels of short interest. Their sample differs from mine in two additional aspects. First, the number of AAERs issued by the SEC is limited due to SEC resource constraints.[10] My sample is more extensive because it includes announcements initiated by management and auditors, as well as regulators. Second, I study restatements announced from January 1995 to June 2002. This time period is certainly more appealing because management experienced tremendous

[10] Due to an increase in workloads and limited staffing, the SEC was selective about the cases it pursued. The SEC takes into account the seriousness of the wrongdoing, the probability of success, and the message the case would deliver to the industry and the public. As a consequence, firms receiving AAERs are involved in either more severe cases of manipulation or clustered in certain types of wrongdoings (for example revenue recognition or IPRD adjustment).

pressures to meet their earnings targets and, consequently, the number of accounting restatements increased significantly during this period.

Griffin (2004) examines the responses of First Call financial analysts to the announcements of a corrective disclosure that gave rise to a class action lawsuit.[11] He compares their responses to the responses of other informed investor groups, including short sellers. He observes that the level of short interest increases in months leading up to the restatement announcements. Rather than observing only the level of short interest for the firms announcing corrective disclosure, I implement a matched pair design that controls for year, month, size, and industry. Dechow et al. (2001) and Brent et al. (1990) point out that there are systematic changes in the level of short interest across months and years. Additionally, levels of short interest are affected by firm size (liquidity) and industry (Table 3 shows that firms in some industries have a higher propensity to announce restatements). In summary, my first test extends Dechow et al. (1996) and Griffin (2004) primarily by increasing the sample size and improving the methodology respectively.

Further, this study documents that short sellers not only have the knowledge about the existence of accounting manipulations, but also, to some extent, the knowledge about the severity of the manipulations. These findings offer a novel insight into the degree of short sellers' sophistication on accounting manipulations. Finally, I provide direct evidence that short sellers use their knowledge about accounting manipulations to take larger position in firms that will experience larger price declines. I find restatement firms

[11] Griffin (2004) explains that not all earnings restatements are followed by class action litigations. He indicates that the market responds more severely to a corrective disclosure related with class action litigation than a corrective disclosure without class action litigation. Cumulative abnormal returns over days (–1,0,1) are –8.69 percent and –6.56 percent respectively.

with level of short interest in the top quartile suffer greater negative abnormal returns compared to their counterparts in the bottom quartile in the days surrounding restatement announcements.

In a broader context, my study is related to past studies on understanding and the behavior of various market participants with regards to earnings management or manipulation. Some studies evaluating analyst behavior show that analysts tend to be optimistically biased in their review and forecasts. Bradshaw, Richardson, and Sloan (2001) show that analyst earnings forecasts do not incorporate the predictable future earnings declines associated with high accruals. Griffin (2004) suggests that analysts do not anticipate accounting restatements that lead federal class action law suits; he finds analysts downgrade firms, revise earnings forecasts, and drop coverage in the month of corrective disclosure but not in the months prior to restatements. This pattern indicates that analysts simply react to the news rather than predict it. According to Griffin (2004), analysts may be reluctant to reveal bad news for some of the following reasons. They may fear that unraveling bad news will cost them access to management information in the future. In addition, a conflict of interest between analysts' research and investment banking roles may cause analysts to fear that their companies would lose the investment banking business if the bad news is revealed.

On the contrary, Griffin (2004) documents increasing net insider sales transactions, increasing level of short interest, and decreasing percentage of institutional ownership in the months leading up to the restatement announcements. His finding suggests that these informed investors have some understanding about accounting manipulations and subsequent restatements. By nature, insiders have the information

about the company's practices. It is no surprise that institutional investors are also knowledgeable about the problems because of their close relationship with the company. However, compared to the behavior of other market participants, the behavior of short sellers provides a more interesting setting for the following two reasons. First, short sellers are generally independent and are typically disliked by analysts and corporate insiders. For example, Solomon Smith Barney's Jack Grubman publicly attacked a short seller who criticized their banking client by stating that short sellers lack an understanding of the communication industry (Gasparino 2002). McGough (1991) describes short sellers and the chief executive of the company being shorted as natural enemies. For instance, Michael Sayer, the CEO of Microstrategy, wrote letters to shareholders and advised them on how to make it more difficult for short sellers to borrow Microstrategy shares (Tauli 2003). Further, there are reports that short sellers have been physically ejected from meetings by angry company management (Schwartz 1998). Unlike analysts, short sellers have to put their money where their mouths are and they have to incur relatively greater transaction costs compared to other investors.

Richardson (2003) examines short sellers' abilities to process (financial) information. He evaluates whether short sellers understand earnings quality information impounded in accruals by testing whether discretionary accruals are associated with the level of short interest. Since abnormally high discretionary accruals are commonly used as a surrogate for aggressive earnings management, in a broader context, his study can be viewed as testing whether short sellers can decipher accounting manipulations. Consistent with Sloan (1996) he finds that high-accrual firms have lower future stock returns. However, he finds no evidence that short sellers trade based on earnings quality

information contained in discretionary accruals.[12] Recently, researchers are starting to use accounting restatements in their studies (Myers et al. 2003; Raghunandan et al. 2003; Agrawal and Chadha 2003; Palmrose and Scholz 2004; Palmrose et al. 2004; Efendi, Srivastava, and Swanson. 2004). Rather than relying on accruals, I use restatement announcements as a proxy for earnings manipulations. Earnings restatements provide more concrete evidence of accounting manipulations because an earnings restatement is a public acknowledgment that a firm has violated GAAP reporting. Moreover, there are some technical concerns about using accruals as a surrogate for earnings manipulation. McNichols (2000) shows that accruals are often correlated with long-term growth; hence, high-growth companies may be erroneously classified as earnings manipulators. In addition, Hribar and Collins (2002) warn that accruals, particularly those estimated using a balance sheet approach, are potentially contaminated by measurement errors.

[12] Sloan (1996) reports that taking a short position in the highest accrual decile portfolio generates only 5.7 percent annual cumulative abnormal returns. The returns may not be sufficient to compensate short sellers for the risks and transaction costs they take to establish the short position.

III. HYPOTHESES

The question of whether investors can decipher accounting manipulations is of great interest to both academicians and capital market participants. Capital market studies suggest that, in general, the market cannot see through accounting manipulations. The significant negative abnormal returns observed surrounding the restatement announcements indicates that the market is surprised by the revelation of GAAP violations (Dechow et al. 1996, Kinney and McDaniel 1989). Short sellers are more sophisticated than other investors with regard to bad news because they profit from large security price drops. General Accounting Office (GAO 2002), Palmorse et al. (2004), and Feroz et al. (1991) document that accounting restatements result in approximately a negative 10 percent cumulative abnormal return surrounding the restatement announcements and approximately a negative 30 percent cumulative abnormal return over a one year period. In order to benefit from the large price declines associated with restatements, short sellers have the incentive to identify these firms a priori. I expect restatement firms will have a higher level of short interest compared to the control firms and that the difference in the level of short interest will rise in months prior to corrective disclosures. Higher levels of short interest indicate that there is a greater consensus among short sellers and that the short sellers are more confident about the existence of accounting manipulation.

H1a: Levels of short interest are higher for sample firms compared to control firms in months prior to restatements

H1b: The difference in the level of short interest between restatement and control firms increases as the restatement date approaches

Restatements represent a continuum of GAAP violation with different nature and type of violation involved. One way to classify GAAP violation is whether the financial misstatement is a result of errors and fraud.[13] Statements of Auditing Standards (SAS) No. 53 defines "errors" as "unintentional" misstatements or omissions of amounts or disclosures in financial statements. Errors can result from mistakes in gathering or processing accounting data, incorrect accounting estimates arising from misinterpretation of facts or misunderstanding of complex GAAP rules (e.g., calculation of In Process Research and Development cost). On the other hand, SAS No. 53 defines fraud as "intentional" misstatements or omissions of amounts or disclosures in financial statements. Examples of fraud include intentional misapplication of GAAP to change the timing of revenue recognition, or alteration, falsification or manipulation of the accounting records from which financial statements are prepared such as recording fictitious sales. Palmrose et al. (2004) report that restatement firms associated with fraud suffer greater price drops than those with no fraud. Consistently, Staley (1997) reports that short sellers primarily target firms that are involved in fraudulent accounting. In fact, many of the major recent corporate frauds such as Enron, Tyco, Sunbeam, and ZZZZ Best were first exposed by short sellers. If short sellers have a higher motivation and the ability to identify firms involved in fraud; I, therefore, expect the levels of short interest in months prior to restatements to be higher for restatement firms that have indications of fraud compared to restatement firms with no indications of fraud.

[13] Generally the terms "irregularity" and "fraud" can be used interchangeably. Technically, a distinction can be drawn between irregularity and fraud. An irregularity is an intentional misstatement in financial statements. An irregularity evolves into fraud only when financial statements are shown to another, who then justifiably relies on them to his or her detriment (Young 2002, 4).

H2a: Pre-announcement levels of short interest are higher for restatement firms with fraud indications than restatement firms with no fraud indications

Restatements can also be classified according to the accounts restated. Palmrose and Scholz (2004) examine the relationship between types of accounts restated and the probability of auditor litigation. They classify restatements as either economic or technical. Economic restatements involve transactions and accounts related to core (recurring) earnings, such as revenue, cost of goods sold, and operating expense (including depreciation). Other restatements, such as adjustments to intangible assets and in process R&D write-offs are classified as technical. Palmrose and Scholz (2004) find that auditors are more likely to be sued in cases of economic restatements. More importantly, Palmrose et al. (2004) and Anderson and Yohn (2002) find that firms restating core or revenue accounts suffer greater price declines because they convey negative information about the future prospect of the company. If short sellers have a higher motivation and the ability to identify firms manipulating core (revenue) accounts, I expect the levels of short interest in the months prior to restatement announcements to be higher for firms restating core accounts compared to firms restating other accounts.

H2b: Levels of short interest are higher for firms that restate core (revenue) accounts compared to those that restate non-core accounts

Another important factor that affects market reaction to corrective disclosures is the materiality of the restatement. The more material is the restatement, the greater it affects investors' estimates of current and future profitability and, therefore, firm value. Consequently, Palmrose et al. (2004) document that materiality of the restatement is positively associated with the price decline. Two proxies for estimating the materiality of

the restatement are the number of quarters restated and the restatement magnitude, which is calculated as the amount restated divided by total assets. If short sellers are able to foresee the materiality of forthcoming restatements then the levels of short interest should be higher for more material restatements.

H2c: The level of short interest is positively associated with the number of quarters restated

H2d: The level of short interest is positively associated with the magnitude of restatement

The main motivation for short selling is to profit from the security price drop. Desai et al. (2002) and Dechow et al. (2001) document that, in general, one-year returns are negatively associated with the level of short interest, indicating that profit generated from short selling is positively associated with short sellers' confidence to short the shares. However, I am not aware of any study that examines the relationship between level of short interest and returns for a sample of restatement firms. I expect restatement firms with higher levels of short interest to suffer more pronounced negative abnormal returns surrounding the restatement announcements compared to firms with lower levels of short interest.

H3: Abnormal returns surrounding the restatement announcements are more negative for restatement firms with higher levels of short interest

IV. DATA AND SAMPLE SELECTION

I obtained monthly short interest data from the AMEX, Nasdaq, and New York Stock Exchange. The short interest variable used in my analysis is the level of short interest: the number of common shares shorted divided by the total number of common shares outstanding. These numbers are reported as of the middle of the month. The releases are published monthly by, among others, *The Wall Street Journal, Barron's,* and *The New York* Times. In addition, I obtained financial and monthly stock returns data from the COMPUSTAT and CRSP databases.

The sample comprises firms that announced restatements from January 1995 to June 2002. I obtain 919 restatement announcements from January 1997 to June 2002 from the GAO Report (2003) titled *Financial Statement Restatements: Trends, Market Impacts, Regulatory Responses, and Remaining Challenges*.[14] The GAO report excludes restatements that result from normal corporate activity or simple presentation issues and includes only restatements that were not fairly presented with GAAP. I also identify an additional sample of restatement firms for 1995 and 1996 using Lexis-Nexis Business Wire and News Wire by conducting search on keywords "restat", "revis", "adjust", "amend" or "error" combined with keyword "financial". Consistent with the GAO report, I remove restatements due to normal corporate activity or simple presentation issues. The 1995 and 1996 searches identify an additional 167 announcements, bringing the total announcements to 1,086. As presented in Panel A of Table 1, I delete 322 announcements

[14] Although the announcements are termed as restatement announcements by the GAO, some of the disclosures are initial indications of accounting manipulations such as SEC probes. In this study, I relied on the GAO term and refer to these disclosures as restatement announcements. The GAO report (2002) shows an alarming increase in the percentage of companies restating their financial statements from 0.89 percent in 1997 to 2.95 percent in 2002.

because the firms are not covered by the Compustat database. Further, I eliminate 68 announcements because the firms do not have adequate financial data in Compustat. Finally, I delete 131 observations with no short interest data because these firms are listed outside of AMEX, NASDAQ, or NYSE. Panel B of Table 1 shows the distribution by year of the final 565 restatement announcements used in this study.

Panel A of Table 2 illustrates the distribution of restatements by the type of restatement according to the classification method provided by the 2002 GAO Report. Of the 565 observations in the sample, the most common type of restatement is related to revenue with 235 occurrences (approximately 42 percent of the sample). The next most common type of restatement is related to expenses with 88 cases (approximately 16 percent of the sample). Panel B of Table 2 shows that nearly 90 percent of the firms restated two-years or less of accounting information. There are only a few cases where the number of periods restated exceeds five years.

TABLE 1
Sample Selection

Panel A: Sample Generation

Description	Number
Restatement cases from GAO report (Jan 1997 - June 2002)	919
Hand collected restatements (1995-1996)	167
Firms not reported in the Compustat database	-322
Firms with incomplete Compustat data	-68
Firms with no short interest data (not listed in AMEX, NASDAQ, or NYSE)	-131
Final sample used in the analysis	565

Panel B: Distribution of Restatement Sample by Year

Year	Sample Firms with Available Data Frequency	Percent
1995	29	5.1%
1996	28	5.0%
1997	40	7.1%
1998	50	8.8%
1999	90	15.9%
2000	101	17.9%
2001	143	25.3%
2002-July	84	14.9%
	565	100.0%

TABLE 2
Sample Distribution

Panel A: Distribution by Types of Restatement

Type	Frequency	Percent
Revenue	235	41.6%
Expenses	88	15.6%
Restructuring, Asset and Intangibles	58	10.3%
Others	39	6.9%
Securities	34	6.0%
Merger & Acquisition	27	4.8%
IPR&D	23	4.1%
Reclassification	17	3.0%
Unspecified	14	2.5%
Related Party	12	2.1%
Loan Loss	11	1.9%
Tax Related	7	1.2%
Total	565	100.0%

Panel B: Distribution by Number of Quarters Restated

Quarters Restated	Frequency	Frequency %	Cumulative Frequency %
1	86	17.55%	17.55%
2	39	7.96%	25.51%
3	47	9.59%	35.10%
4	147	30.00%	65.10%
5	22	4.49%	69.59%
6	21	4.29%	73.88%
7	31	6.33%	80.20%
8	43	8.78%	88.98%
9	4	0.82%	89.80%
10	5	1.02%	90.82%
11	7	1.43%	92.24%
12	17	3.47%	95.71%
13	3	0.61%	96.33%
14	4	0.82%	97.14%
15	1	0.20%	97.35%
16	3	0.61%	97.96%
17	1	0.20%	98.16%
18	1	0.20%	98.37%
19	1	0.20%	98.57%
20	5	1.02%	99.59%
22	1	0.20%	99.80%
26	1	0.20%	100.00%

Notes:
The classification of the restatement types follows the GAO Report 2002.

Table 3 displays the distribution of restatement announcements by two-digit SIC code. A large number of the cases is concentrated in the following industries: Business services (15.9 percent), industrial, commercial machinery, computer equipment (7.8 percent), electronic, other electrical equipment (7.4 percent), depository institutions (7.1percent), measurement instruments, photo goods, and watches (6.9 percent), and chemical and allied products (6.4 percent).

A paired control firm is selected by matching the industry and the size of each sample firm in the fiscal year before the restatement announcement. First, I remove the sample firms from the pool of potential control firms. If more than one control firm is identified for a specific year and two-digit industry code, then the firm with the lowest absolute difference in total assets is selected as the matched paired control firm.

Table 4 provides descriptive statistics comparing restatement and control firms. These two groups of firms do not differ in term of total assets and sales, indicating an effective size control in the matching process. The differences in price, book value, market value, book-to-market value, operating ROA, and debt ratio between the two groups are statistically insignificant. Restatement firms' ROA is 2.1 percent lower compared to the control firms; the difference is significant at p-value 0.041. Kinney and McDaniel (1989) find that restatement firms have a poorer performance history compared to control firms. Dividend yield is marginally higher for control firms with a p-value of 0.119.

TABLE 3
Distribution of Sample Restatement Firms by 2-Digit Industry Code

SIC	DESCRIPTION	FREQ	% FREQ
10	Metal Mining	4	0.7%
13	Oil and Gas Extraction	9	1.6%
14	Mining, Quarry Nonmetal Minerals	1	0.2%
16	Bldg Construction and General Contractor	3	0.5%
20	Food and Kindred Products	17	3.0%
22	Textile Mill Products	1	0.2%
23	Apparel and Other Finished Products	2	0.4%
24	Lumber and Wood Products	3	0.5%
25	Furniture and Fixtures	2	0.4%
26	Paper and Allied Products	5	0.9%
27	Printing, Publishing, and Allied Products	7	1.2%
28*	Chemicals and Allied Products	36	6.4%
29	Petroleum Refining & Related Industries	4	0.7%
30	Rubber & Miscellaneous Plastics Products	7	1.2%
31	Leather and Leather Products	2	0.4%
32	Stone, Clay, Glass, Concrete Products	3	0.5%
33	Primary Metal Industries	6	1.1%
34	Fabricated Metal, Excluding Machinery and Transportation Equipments	4	0.7%
35*	Industrial, Commercial Machinery, Computer Equipment	44	7.8%
36*	Electronic, Other Electrical Equipments, Excluding Computers	42	7.4%
37	Transportation Equipment	8	1.4%
38*	Measurement Inst, Photo Gds, Watches	39	6.9%
39	Misc. Manufacturing Industries	5	0.9%
42	Motor Freight Transportation, Warehouse	3	0.5%
45	Transportation By Air	1	0.2%
47	Transportation Services	1	0.2%
48	Communications	10	1.8%
49	Electric, Gas, Sanitary Service	18	3.2%
50	Durable Goods-Wholesale	10	1.8%
51	Nondurable Goods-Wholesale	8	1.4%
52	Bldg Material, Hardware, Garden	1	0.2%
53	General Merchandise Store	6	1.1%
54	Food Stores	4	0.7%
55	Auto Dealers, Gas Stations	1	0.2%
56	Apparel and Accessory Stores	12	2.1%
57	Home Furniture & Equip Store	11	1.9%
58	Eating and Drinking Places	2	0.4%
59	Miscellaneous Retail	9	1.6%
60*	Depository Institutions	40	7.1%
61	Non-depository Credit Institution	5	0.9%
62	Security & Commodity Brokers	9	1.6%
63	Insurance Carriers	15	2.7%
64	Insurance Agents, Broker & Service	1	0.2%
65	Real Estate	3	0.5%
67	Holding, Other Investment Offices	16	2.8%
70	Hotels, Other Lodging Places	3	0.5%
72	Personal Services	1	0.2%
73*	Business Services	90	15.9%
78	Motion Pictures	5	0.9%
79	Amusement, Recreation	3	0.5%
80	Health Services	5	0.9%
82	Educational Services	6	1.1%
83	Social Services	1	0.2%

TABLE 3 (Continued)

SIC	DESCRIPTION	FREQ	% FREQ
87	Engineering, Accounting, and Mgmt Related Services	9	1.6%
99	Nonclassifiable Establishment	2	0.4%
		565	100.0%

Notes:
* indicates a 2-digit industry where percentage frequency of restatement announcements exceeds 5 percent. Later, if a firm belongs to any of these 2-digit industries, it is classified as belonging to a high restatement industry and has a HIDNUM dummy variable of 1.

TABLE 4
Descriptive Statistics of Restatement and Control Firms

	Restatement Firms		Control Firms		Difference		t-test
	Mean	**Median**	**Mean**	**Median**	**Mean**	**Median**	**p-value**
Total Assets	2,400.74	272.14	2,456.85	299.69	-56.11	0.33	0.4317
Sales	2,459.64	258.12	2,301.07	248.81	158.57	11.68	0.3907
Price	21.37	14.25	20.88	15.69	0.49	-0.94	0.7081
Book Value	189.85	2.16	223.71	7.29	-33.87	-0.09	0.3329
Market Value	3,327.51	296.92	4,499.68	336.85	-1172.17	-7.55	0.2921
Book-to-Market Ratio	0.12	0.01	0.15	0.03	-0.02	0.00	0.4085
Dividend Yield	0.01	0.00	0.01	0.00	0.00	0.00	0.1188
ROA	-0.07	0.02	-0.03	0.03	-0.05	0.00	0.0406
Operating ROA	0.06	0.11	0.08	0.12	-0.02	0.00	0.2111
Debt Ratio	0.27	0.24	0.26	0.23	0.01	0.00	0.2433

Notes:
Descriptive statistics provide information about restatement and control firms in the year prior to restatement announcements. The following information lists the variable names in the descriptive statistics table and the corresponding data item numbers in the annual Compustat database. Total assets (data item 6); Sales (data item 12); Price = Fiscal year end closing price (data item 199); Book value = Deferred tax & investment tax credit (data item 35) + Common stock (data item 85); Market value = Common shares outstanding (data item 25) x Fiscal year end closing price (data item 199); Book-to-market ratio = Book value / Market value; Dividend yield = Dividend per share (data item 25) /Fiscal year end closing price (data item 199) ; ROA = Net income (data item 172) / Total assets (data item 6); Operating ROA = Operating income before depreciation (data item 13) / Total assets (data item 6); Debt ratio = Total long term debt (data item 9) / Total assets (data item 6).

V. RESEARCH DESIGN

Restatement vs. Paired Match Control Firms

To test the first hypothesis, I use a matched pair design controlling for year, month, size, and industry.[15] Matching by year is important because Brent et al. (1990) and Dechow et al. (2001) show that the proportion of shares held short (level of short interest) has increased from the 1970s to the early 1990s, perhaps due to the growth in hedge funds and the deregulation of the capital market. Figure 1 shows a similar pattern as reported in prior studies. It illustrates that the mean level of short interest for the combined exchanges quadrupled from 0.50 percent in 1988 to over 2.10 percent in 2002. Further, controlling for month is important because Brent et al. (1990) document a systematic increase in level of short interest in December followed by a decline in January. They speculate that level of short interest increases at the end of the year as investors attempt to delay tax recognition of gains or losses, and level of short interest subsequently declines as investors reverse their short positions by covering it with their own shares. Table 5 indicates that drop in level of short interest between December and January is significantly higher compared to the change in other months. Level of short interest, on average, drops by 13.06 percent from the December to January period. Furthermore, each of the 15 annual periods consistently shows a decline in level of short interest. Changes in level of short interest are positive for the other months but some changes are neither statistically significant nor consistent across years. I include a control for size because Dechow et al. (2001) show that size (a proxy for liquidity) affects the cost of short selling; therefore, it influences the level of short interest. Transaction costs

[15] A matched pair design has been used in study of firm performance such as Kinney and Wempe (2002) and Efendi, Kinney, and Smith (2003).

are lower for more liquid stocks because these stocks are easier to borrow and less likely to be subject to a short squeeze. I also include an industry control because Table 3 shows that restatements tend to be concentrated in certain industries.

To examine if the difference in level of short interest changes in the months leading up to and following restatement announcements, I analyze the monthly time-series paired difference in the change of level of short interest between sample and control firms. In a multivariate setting, paired differences in level of short interest is regressed on paired differences in prices, paired differences in book-to-market ratios, and month relative to restatement announcements. Dechow et al (2001) observe that short sellers move in when price increases and move out when price decreases and they are more likely to establish positions in firms with low book-to-market ratios.[16] These findings are consistent with the hypothesis that short sellers take positions in overvalued stocks and square their positions to profit when the price declines. Controlling for differences in prices and book-to-market ratios provides a better test of whether short sellers can identify firms that manipulate accounting numbers beyond the reasons of price run-up or overvaluation.

[16] The fact that Dechow et al. (2001) document that 11 percent of firms classified as having a high level of short interest are in the top decile book-to-market ratio portfolio is very interesting. I suspect a high book value for some of these firms is the result of accounting manipulations.

FIGURE 1
Mean Level of Short Interest from 1988 to 2002

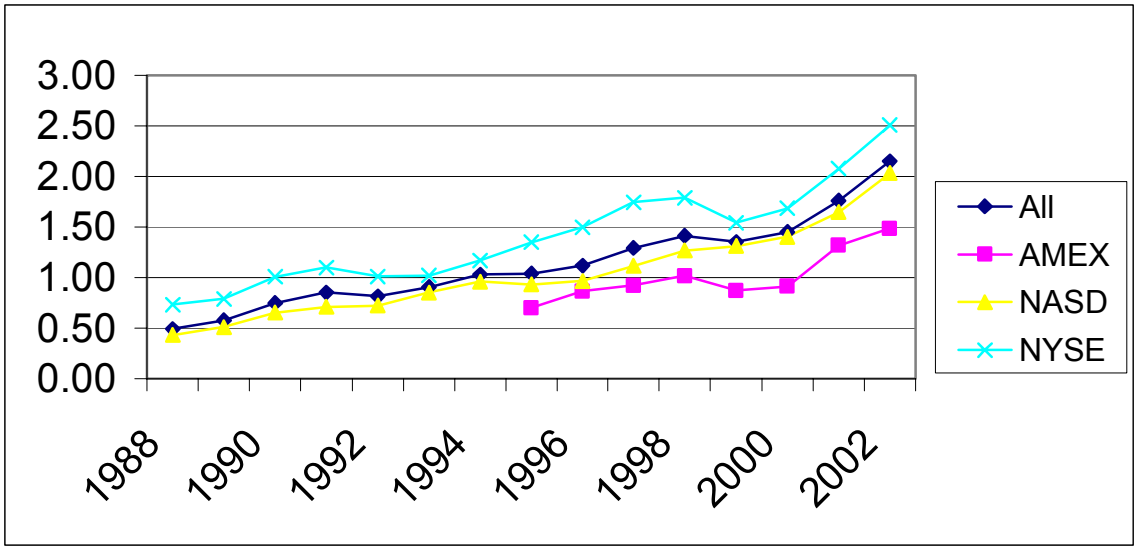

TABLE 5
Monthly Change in the Level of Short Interest from 1988 to 2002

Month	Change in the level of short interest[(a)]	Std Dev	t-test p-value[(b)]	# of months in 15 year period where changes are greater than 0%
Dec - Jan	-13.06%	7.57%	-6.68	0
Jan - Feb	2.13%	1.85%	4.46	12
Feb - Mar	0.39%	4.66%	0.32	9
Mar - Apr	2.29%	3.34%	2.65	10
Apr - May	0.07%	2.04%	0.13	9
May - Jun	1.30%	2.44%	2.06	11
Jun - Jul	1.43%	3.02%	1.84	10
Jul - Aug	1.43%	2.73%	2.09	10
Aug - Sep	0.52%	1.95%	1.06	7
Sep - Oct	2.63%	2.99%	3.51	11
Oct - Nov	0.03%	2.24%	0.06	5
Nov - Dec	2.68%	9.60%	1.12	6
Mean	0.20%	3.70%		

Notes:
(a) Change in the level of short interest = (level of short interest$_t$ - level of short interest$_{t-1}$) / level of short interest$_t$.
(b) The column reports the p-values from two-sided t-tests for the changes in the levels of short interest.

For each restatement, I have 25 monthly observations covering both 12 months before and after the announcement with the restatement announcement month in the middle. The variable "relative month" equals 0 for the announcement month, equals –12 for the 12 months prior to the announcement, and equals +12 for the 12 months after the announcement. In the multiple regressions setting, the variable "relative month" captures the trend (or movement) in the paired difference in the level of short interest. Two separate regressions are conducted. One for the pre-disclosure period and one for the post disclosure period because I expect an increase in level of short interest in the pre-disclosure period and a decrease in the post-disclosure period. To mitigate the concern about serial correlation in regressions using longitudinal observations, I apply the Prais-Winsten procedure to correct for first-order serial correlation.[17]

$$\text{DIFSHORT} = \beta_0 + \beta 1\text{DIFPRICE} + \beta_2\text{DIFBMV} + \beta_3\text{RELMONTH} + e \qquad (1)$$

where:

DIFSHORT is the paired difference between the levels of short interest of sample and control firms [$\text{DIFSHORT}_t = \text{SHORT Sample}_t - \text{SHORT Control}_t$];

DIFPRICE is the paired difference in the monthly price between control and sample firms [$\text{DIFPRICE}_t = \text{PRICE Sample}_t - \text{PRICE Control}_t$];

DIFBMV is the paired difference in book-to-market ratios of control and sample firms [$\text{DIFBMV}_t = \text{BMV Sample}_t - \text{BMV Control}_t$]; and

[17] When autocorrelation exists in OLS residuals, the OLS estimator is unbiased but not efficient. The sampling variances are underestimated, causing inferences from *t*- and *F*-tests to be invalid. One way to compensate for the autocorrelated residuals is to apply the Prais-Winsten procedure. This procedure estimates the autoregressive form of the error term and then estimates the coefficients via generalized least squares (GLS). One particular advantage of the Prais-Winsten to Cochrane-Orcut procedure is that it retains the information in the first observation (Greene 1990, 442).

RELMONTH is a trend variable that starts as -12 at the 12th month before the restatement month and increases to +12 at the 12th month after the restatement month.

Alternatively, I run the following regression to detect if the level of short interest increases in months leading up to accounting restatements. Instead of using the variable "RELMONTH", this regression uses twelve "MONTH" dummy variables.

$$DIFSHORT = \beta_0 + \beta 1DIFPRICE + \beta_2 DIFBMV + \delta_1 MONTH_{t-1} + \delta_2 MONTH_{t-2} + \ldots + \delta_{11} MONTHt_{-11} + e \quad (2)$$

where:

$MONTH_t$ is a dummy variable set equal to 1 for the observation month relative to corrective disclosure, set equal to 0 otherwise. The base month used is the 12th month prior to the restatement announcement; and

All remaining terms are as previously defined.

This model is not restricted to linear monthly changes in the level of short interest. Further, it potentially provides insights to when (relative to restatement announcement) the level of short interest begins to increase and during which months the increases are significant.

Restatement Severity

Palmrose et al. (2004) report that market reactions to restatement announcements vary for different types of restatements. I classify the severity of restatements based on the following factors: intention of fraud, types of accounts affected, and the materiality of the restatements. I use a multivariate approach similar to Dechow et al. (2001) and Richardson (2003) to evaluate whether there is a relationship between the level of short

interests in the months leading up to the restatement announcements and the severity of the restatements. Since the following tests are cross sectional (non-paired) tests, I include a dummy variable for whether a firm belongs to high restatement industries and control for log of market value, book-to-market ratio, and dividend yield. Dechow et al. (2001) show that short sellers take transaction costs into account when they establish their positions. They are more likely to short stocks of larger firms because of higher liquidity. Short sellers are also less likely to take positions in firms that pay dividends because stock prices tend to fall by less than the amount of the dividend the short-seller is required to reimburse. Dechow et al. (2001) find that short sellers use book-to-market ratios to identify overvalued stocks. Therefore, controlling for transaction costs of short selling and book-to-market ratios, I examine whether short sellers can distinguish the severity of the GAAP violation. I also include a dummy variable to control for high restatement industries. These are the six 2-digit industries with more than 5 percent frequency of restatement listed on Table 3.

In order for a restatement to be classified as “fraud”, it must have either a clear statement from the company that fraud is involved or that the restatement is subject to SEC’s AAER. I partition the types of accounts restated to core (or revenue) accounts and non-core (or non-revenue) accounts. Following Palmrose et al. (2004), I define materiality in two ways. The first measure of materiality is the amount of correction divided by total assets in the period prior to restatement. This variable captures both the relative size of the restatement and the direction of its impact on net income. The second materiality variable is the number of quarters restated. I run the following regression analysis for each of the severity measures.

$$SHORT_t = \beta_0 + \beta_1 HIDNUM + \beta_2 LOGMV_t + \beta_3 BMV_t + \beta_4 DIVYIELD_t + \beta_5 SEVERITY + e \quad (3)$$

where:

SHORT is level of short interest;

HIDNUM is a dummy variable equal to 1 if a firm belongs to a high restatement industry (2-digit SIC code 28, 35, 36, 38, 60, and 73);

LOGMV is log of market value;

BMV is book-to-market ratio;

DIVYIELD is total dividends paid during the last fiscal year divided by price at the end of the last fiscal year; and

SEVERITY (a) is a dummy variable equal to 1 if fraud is involved and 0 otherwise;

(b) is a dummy variable equal to 1 if core (revenue) accounts are involved and 0 otherwise;

(c) is a variable for materiality measured by the amount of correction divided by total assets in the year prior to restatements;

(d) is a variable for materiality measured by the number of quarters restated.

VI. RESULTS

Restatement vs. Control Firms

Univariate comparison for the level of short interest for restatement and control firms are reported on Figure 2 and Table 6. Level of short interest is already higher for restatement firms compared to control firms in month –12. The difference in the level of short interest, on average, hovers around 0.5 percent from month –12 to month –6. After month –6, paired difference in the level of short interest increases continuously and peaks at about 1 percent in month 0. Subsequently after the restatement announcements, paired differences in the level of short interest declines and falls to less than 0.4 percent in month +12. The paired differences of level of short interest are significantly greater than zero from month –12 to month +9, but become insignificant afterwards. Hence, the controlled univariate results support hypothesis 1(a). Figure 2 shows that there is a disparity between the mean and median paired difference in the level of short interest. The distribution is skewed to the right meaning that there are firms with very high levels of short interest. This pattern calls for further investigation to determine whether there is a relationship between different categories of restatement with the level of short interest. It is interesting to observe that Table 6 shows an increasing trend in the level of short interest for the control firms through time. This reinforces the importance of the time control in studying the level of short interest.

FIGURE 2
Paired Difference in the Level of Short Interest between Sample vs. Control Firms Surrounding Restatement Announcements

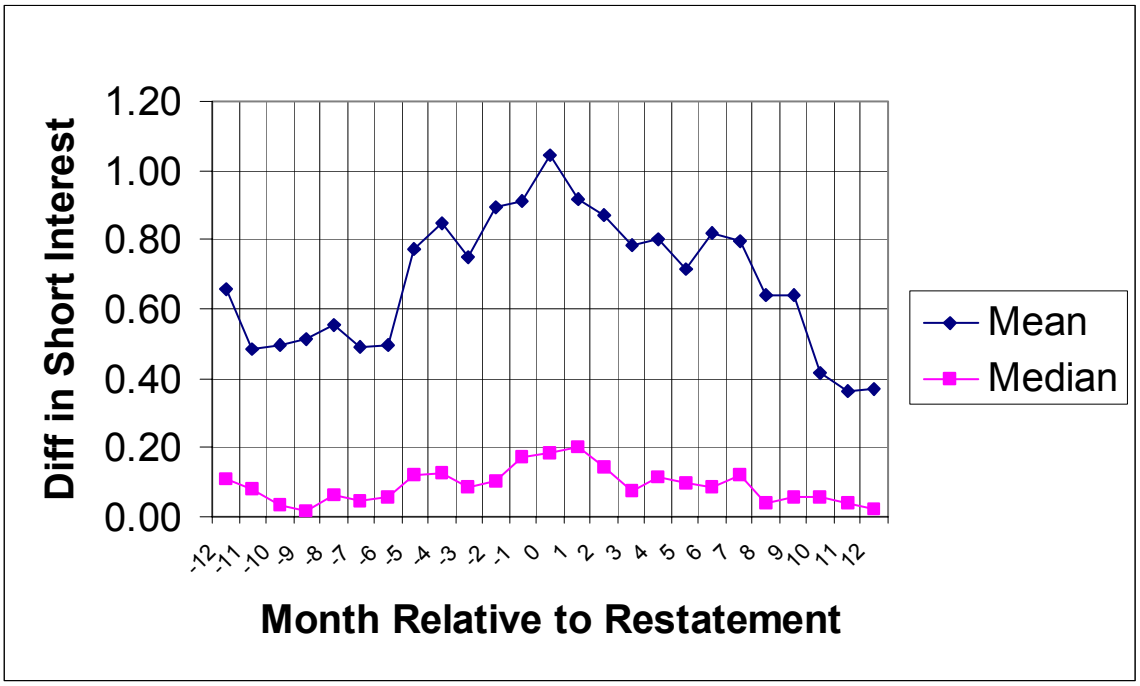

TABLE 6
Comparison of Level of Short Interest between Restatement and Control Firms

		Restatement Firms		Control Firms[b]		Paired Difference		
Relative Month[a]	N	Mean	Median	Mean	Median	Mean	Median	t-test p-value[c]
-12	497	2.1433	0.8001	1.4874	0.5062	0.6559	0.1101	**0.0013**
-11	503	2.0861	0.7533	1.5999	0.4866	0.4862	0.0820	**0.0184**
-10	508	2.1476	0.7307	1.6517	0.5349	0.4958	0.0364	**0.0165**
-9	513	2.2664	0.8661	1.7551	0.6202	0.5113	0.0198	**0.0171**
-8	524	2.2814	0.8226	1.7265	0.6187	0.5548	0.0615	**0.0078**
-7	526	2.2946	0.8303	1.8052	0.6491	0.4894	0.0474	**0.0305**
-6	528	2.3892	0.9565	1.8933	0.6561	0.4959	0.0573	**0.0386**
-5	535	2.5056	0.9698	1.7312	0.5929	0.7744	0.1216	**0.0007**
-4	536	2.5541	1.0007	1.7082	0.5935	0.8459	0.1265	**0.0002**
-3	538	2.4873	0.9629	1.7363	0.5995	0.7510	0.0885	**0.0009**
-2	539	2.5823	0.9728	1.6866	0.6239	0.8957	0.1010	**0.0001**
-1	540	2.6101	1.0424	1.6986	0.6223	0.9115	0.1746	**0.0001**
0	531	2.6602	1.1145	1.6186	0.6219	1.0417	0.1870	**0.0001**
1	524	2.5748	1.1034	1.6557	0.5645	0.9191	0.2029	**0.0001**
2	521	2.5862	1.0409	1.7161	0.5791	0.8700	0.1451	**0.0002**
3	519	2.6362	1.0156	1.8523	0.6764	0.7839	0.0732	**0.0030**
4	516	2.6459	1.0596	1.8436	0.6586	0.8024	0.1145	**0.0007**
5	513	2.5952	1.0531	1.8824	0.6955	0.7128	0.0999	**0.0031**
6	509	2.6806	1.1137	1.8590	0.7009	0.8216	0.0879	**0.0011**
7	497	2.7222	1.2133	1.9240	0.7304	0.7982	0.1199	**0.0024**
8	475	2.6160	1.0815	1.9731	0.7102	0.6429	0.0409	**0.0151**
9	459	2.6783	1.1759	2.0352	0.6574	0.6431	0.0592	**0.0289**
10	439	2.6728	1.1352	2.2583	0.7373	0.4145	0.0584	0.1998
11	417	2.5812	1.0908	2.2191	0.7842	0.3621	0.0407	0.2673
12	401	2.6253	1.0654	2.2578	0.7610	0.3675	0.0222	0.2730

Notes:
(a) Relative month denotes the month relative to the restatement announcement month which is 0.
(b) Control firms are selected based on industry and size. A list of potential control firms with the same 2-digit SIC code are identified for each restatement firm. The firm with the smallest absolute difference in Total Assets is selected as the matched paired control firm.
(c) The column reports the p-values from two-sided t-tests for the mean paired differences in the level of short interest between restatement and control firms.

Panel A of Table 7 reports the two-sided t-tests of paired changes in the level of short interest in a 3-month interval. All four of the quarterly mean paired changes leading up to month 0 are positive. The highest mean paired change is from month –3 to month 0 with a mean paired increase of 0.2077 percent, but at best, it is nearly significant with a p-value of 0.1189. The mean and median paired changes in the level of short interest are more often negative or very close to zero in the period after the restatement.

Dechow et al. (2001) show that changes in the level of short interest are related to other factors, including changes in price and book-to-market ratio. Therefore, I conduct a multivariate regression analysis including differences in price and book-to-market value between sample and control firms as control variables. Panel B of Table 7 reports regression results of differences in the level of short interest from month –12 to month 0 (equation 1). The relationship between the two control variables and paired differences in level of short interest are consistent with expectations. The coefficient for paired differences in price is positive at 0.05 with a p-value of 0.0001. The coefficient for paired differences in book-to-market value is negative at –0.52 with a p-value of 0.0003. The coefficient of interest, relative month, is positive at 0.07 with a significant p-value at 0.0009. This result indicates that there is a linear increase in level of short interest in months approaching the restatement announcements; thus supporting hypothesis 1(b). Model 2 offers a robustness check by controlling for annual differences in level of short interest and the results remain unchanged.

TABLE 7
Comparison of Changes in the Level of Short Interest between Restatement and Control Firms

Panel A: Paired Changes in Level of Short Interest for Each 3 Month Interval

		Restatement[a]		Control[b]		Difference		
Month Interval	N	Mean	Median	Mean	Median	Mean	Median	t-test p-value
-12 to -9	501	0.1468	0.0090	0.0549	0.0024	0.0919	0.0077	0.2556
-9 to -6	521	0.1462	0.0000	0.0575	-0.0001	0.0888	0.0108	0.3930
-6 to -3	531	0.1054	0.0011	0.0365	0.0000	0.0689	-0.0019	0.5007
-3 to 0	526	0.1470	0.0014	-0.0607	-0.0011	0.2077	0.0281	0.1189
0 to 3	512	0.0492	-0.0001	0.1205	0.0063	-0.0713	-0.0166	0.6281
3 to 6	504	-0.0069	0.0000	-0.0090	-0.0021	0.0021	0.0052	0.9910
6 to 9	455	-0.0225	-0.0002	0.0514	0.0000	-0.0739	-0.0157	0.5392
9 to 12	397	0.0113	-0.0076	0.0007	0.0000	0.0106	-0.0305	0.9186

Panel B: Regression of Difference in Level of Short Interest (Month –12 to Month 0)

Variables[c]		Model 1		Model 2	
Rel Month = M-12 to M0	Predicted Sign	Parameter Estimate	Pr > |t|	Parameter Estimate	Pr > |t|[d]
INTERCEPT		1.36	0.0001	0.89	0.0083
DIFPRICE	(+)	0.05	0.0001	0.05	0.0001
DIFBMV	(-)	-0.52	0.0003	-0.51	0.0004
RELMONTH	(+)	**0.07**	**0.0009**	**0.07**	**0.0005**
DY96	(+)			-1.10	0.0067
DY97	(+)			0.00	0.9992
DY98	(+)			0.18	0.6839
DY99	(+)			1.41	0.0001
DY00	(+)			0.15	0.6861
DY01	(+)			0.44	0.2058
DY02	(+)			1.21	0.0009

Panel C: Regression of Difference in Level of Short Interest (Month 0 to Month +12)

Variables[c]		Model 1		Model 2	
Rel Month = M0 to M+12	Predicted Sign	Parameter Estimate	Pr > |t|	Parameter Estimate	Pr > |t|[d]
INTERCEPT		1.42	0.0001	0.03	0.9333
DIFPRICE	(+)	0.04	0.0001	0.04	0.0001
DIFBMV	(-)	0.09	0.3099	0.10	0.2642
RELMONTH	(+)	**-0.09**	**0.0002**	**-0.07**	**0.0030**
DY96	(+)			0.08	0.8682
DY97	(+)			1.24	0.0137
DY98	(+)			1.91	0.0003
DY99	(+)			1.35	0.0013
DY00	(+)			0.49	0.2415
DY01	(+)			1.64	0.0001
DY02	(+)			2.72	0.0001

TABLE 7 (Continued)

Panel D: Regression of Difference in Level of Short Interest with Dummy Month Variable

Variables[c]	Predicted Sign	Parameter Estimate	Pr > |t|[d]
INTERCEPT		0.25	0.5547
DIFPRICE	(+)	0.05	0.0001
DIFBMV	(-)	-0.51	0.0005
DY96	(+)	-1.10	0.0069
DY97	(+)	0.00	0.9972
DY98	(+)	0.18	0.6823
DY99	(+)	1.41	0.0001
DY00	(+)	0.14	0.6926
DY01	(+)	0.44	0.2066
DY02	(+)	1.21	0.0009
DM-11	(+)	-0.08	0.8226
DM-10	(+)	0.00	0.9948
DM-9	(+)	-0.01	0.9812
DM-8	(+)	-0.01	0.9973
DM-7	(+)	0.14	0.7139
DM-6	(+)	0.20	0.5900
DM-5	(+)	0.30	0.4102
DM-4	(+)	0.40	0.2753
DM-3	(+)	0.33	0.3776
DM-2	(+)	0.47	0.1992
DM-1	(+)	**0.61**	**0.0960**
DM0	(+)	**0.79**	**0.0339**

Notes:

(a) Control firms are selected based on industry and size. A list of potential control firms with the same 2-digit SIC code are identified for each restatement firm. The firm with the smallest absolute difference in Total Assets is selected as the matched paired control firm.

(b) The column reports the p-values from two-sided t-tests for the mean paired differences in the level of short interest between restatement and control firms.

(c) DIFSHORT is the paired difference between the level of short interest of sample and control firms [$DIFSHORT_t$ = SHORT $Sample_t$ – SHORT $Control_t$]; DIFFPRICE is the paired difference in monthly price between control and sample firms [$DIFFPRICE_t$ = PRICE $Sample_t$ – PRICE $Control_t$]; DIFFBMV is the paired difference in book-to-market ratios of control and sample firms [$DIFFBMV_t$ = BMV $Sample_t$ – BMV $Control_t$]; RELMONTH is a trend variable that starts as -12 at the 12th month before the restatement month and increases to +12 at the 12th month after the restatement month; DY96 is a dummy year 96 variable which is 1 if year is 1996 and 0 otherwise – and so forth; DM-11 is a dummy month which is equal to 1 if the relative month is -11 and 0 otherwise – and so forth.

(d) Prais-Winston procedure to correct for first-order serial correlation is used to calculate the significance.

Panel C of Table 7 presents the same regression for month 0 to month +12. The coefficient for relative month is –0.09 with p-value of 0.0002, indicating that paired difference in level of short interest decreases as time progresses in the post restatement period. Rather than using relative month as an independent variable, Panel D of Table 7 reports the results using relative month dummy variables from month –12 (equation 2). Although the coefficients of the month dummy variables are positive in 9 out of the 12 months, they are significant only for dummy month –1 and dummy month 0. The results show that month –1 and month 0 level of short interest are 0.61 percent and 0.79 percent higher compared to month-12 and the differences are significant at p-values of 0.0960 and 0.0339.

Within Restatement Firms Partitioned by the Severity Measures

Figure 3 depicts the level of short interest for fraud restatement firms along with those of no fraud firms. The level of short interest is higher for fraud firms compared to the no fraud firms in most of the pre-announcement period. Panel A of Table 8 shows the results of a regression of level of short interest on a fraud dummy variable (equation 3). All control variables in the regression are significant and in the expected directions. HIDNUM is a dummy variable indicating if a firm belongs to a high restatement two-digit industry. Consistent with expectations, the reported coefficient for HIDNUM indicates that, on average, the level of short interest is 0.63 percent higher for firms that belong to the high restatement industries. The coefficient for LOGMV is also positive which is consistent with prior findings that shares of larger firms are more liquid and liquidity is negatively associated with the transactions costs of short selling.

FIGURE 3
Paired Difference in the Level of Short Interest between Fraud and No-Fraud Restatements Surrounding Restatement Announcements

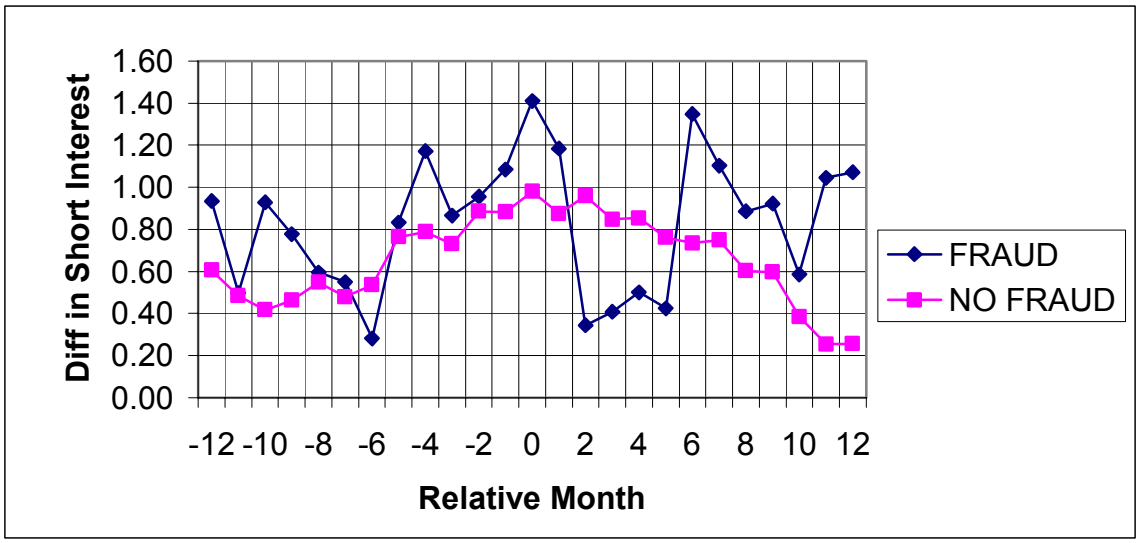

TABLE 8
Regression of the Level of Short Interest for Fraud vs. No-Fraud Firms

Panel A: Aggregate from Month-12 to Month 0

		Model 1		Model 2	
Variables[s]	Predicted Sign	Parameter Estimate	Pr > |t|[b]	Parameter Estimate	Pr > |t|[b]
INTERCEPT		-1.3700	0.0001	-1.4725	0.0001
HIDNUM	(+)	0.6307	0.0001	0.5953	0.0001
FRAUD	(+)	**0.5984**	**0.0001**	**0.7324**	**0.0001**
LOGMV	(+)	0.7007	0.0001	0.6488	0.0001
BMV	(-)	-0.3312	0.0163	-0.3891	0.0049
DIVYIELD	(-)	-0.0273	0.0001	-0.0253	0.0001
RELMONTH	(+)	0.0434	0.0028	0.0443	0.0019
DY96	(+)			-0.9208	0.0014
DY97	(+)			0.8211	0.0111
DY98	(+)			-0.0751	0.8170
DY99	(+)			0.9977	0.0002
DY00	(+)			0.0463	0.8570
DY01	(+)			0.6016	0.0166
DY02	(+)			0.8031	0.0024

Panel B: Only at Specific Month (Snap-shot Approach)

		Month-12		Month-9		Month-6		Month-3	
Variables[a]	Predicted Sign	Parameter Estimate	Pr > |t|	Parameter Estimate	Pr > |t|	Parameter Estimate	Pr > |t|	Parameter Estimate	Pr > |t|
INTERCEPT		-2.1539	0.0228	-2.2713	0.0128	-1.8543	0.0500	-1.4057	0.1147
HIDNUM	(+)	0.3209	0.4026	0.5873	0.1250	0.7057	0.0756	0.6933	0.0897
FRAUD	(+)	**1.0918**	**0.0354**	**0.9588**	**0.0639**	0.7450	0.1693	0.3094	0.5831
LOGMV	(+)	0.6964	0.0001	0.6805	0.0001	0.6880	0.0001	0.6264	0.0001
BMV	(-)	-0.1641	0.7217	-0.2987	0.5414	-0.3134	0.5253	-0.5927	0.2426
DIVYIELD	(-)	-0.0219	0.0042	-0.0266	0.0004	-0.0279	0.0005	-0.0258	0.0017
DY96	(+)	-0.6937	0.5065	-0.4570	0.6466	-0.9552	0.3651	-1.1573	0.2820
DY97	(+)	0.9946	0.3958	1.7928	0.1105	0.7436	0.5336	0.4647	0.7022
DY98	(+)	0.3057	0.8016	0.0497	0.9657	-0.6568	0.5773	0.0955	0.9371
DY99	(+)	1.3029	0.1853	1.3750	0.1359	1.1941	0.2957	0.8118	0.4182
DY00	(+)	0.5497	0.5615	0.6217	0.4890	0.0567	0.9521	-0.5191	0.5900
DY01	(+)	-0.0424	0.9640	0.4480	0.6097	0.2880	0.7554	0.8677	0.3538
DY02	(+)	0.1679	0.8643	0.8454	0.3619	0.5796	0.5518	0.8356	0.3972

Notes:

(a) The dependent variable SHORT = number of common shares shorted / number of common shares outstanding; HIDNUM is a dummy variable equal to 1 if a firm belongs to a high restatement industries (2-digit SIC code 28, 35, 36, 38, 60, and 73); FRAUD is a dummy variable equal to 1 if fraud is involved and 0 otherwise; LOGMV is log of market value; BMV is book-to-market ratio; DIVYIELD is total dividends paid during the last fiscal year divided by price at the end of the last fiscal year; DY96 is a dummy year 96 variable which is 1 if year is 1996 and 0 otherwise – and so forth.

(b) Prais-Winston procedure to correct for first-order serial correlation is used to calculate the significance.

The coefficient relative month again suggests that there is a linear increase in level of short interest for restatement firms from month –12 to month 0. On average, the monthly increase is about 0.04 percent and it is significant at a p-value 0.0028. The coefficients for DIVYIELD and BMV are both significantly negative which indicate that short sellers are less likely to take positions in firms that pay higher dividends or firms with higher book-to-market ratios (proxy for overvaluation). Finally, the variable of interest, Fraud, shows that level of short interest for firms labeled with fraud, on average, is almost 0.60 percent higher compared to firms without fraud.

Panel B of Table 8 reports the results of regressions of level of short interest using a 'snap-shot' approach. Although I had used a Prais-Winston procedure to correct for serial correlation in the previous regression, this alternative approach eliminates the problem of serial correlation by conducting four separate regressions at four different individual months (month –12, month –9, month –6, and month –3). Results in Panel B of Table 8 show that the coefficients for all control variables remain in the expected direction, except some of them now become insignificant perhaps due to a smaller number of observations. All coefficients for fraud in each 'snap-shot' regression are positive, ranging from 0.3094 percent to 1.0918 percent and two out of four coefficients are significant. These reported results modestly support the hypothesis that short sellers can predict whether restatements will be related to fraud or not.

The next results are based on partitioning the restatements into revenue versus non-revenue related restatements (equation 3). The results from partitioning restatements into core versus non-core accounts are not reported because the results are driven mainly

by revenue accounts. Figure 4 presents the level of short interest for firms restating revenue accounts versus firms restating non-revenue accounts. It is apparent that the level of short interest is higher for firms restating revenue accounts in all the observed months. I perform a multivariate regression with a revenue dummy variable that takes a value of 1 for firms restating a revenue account and 0 otherwise. Panel A of Table 9 shows that all control variables are significant and remain in the predicted direction as with previous results.

The coefficient for the revenue dummy variable is positive and significant. It indicates that, on average, level of short interest in the months prior to restatement announcements is higher by 0.89 percent for firms restating revenue accounts. Panel B of Table 9 reports the 'snap shot' analysis of level of short interest at four different points in time. The coefficients for revenue dummy variables in all four regressions are all positive, ranging from 0.8218 percent to 1.3337 percent, and are all significant. This evidence provides strong support for the hypothesis that short sellers are able to distinguish whether the GAAP violation involves revenue accounts.[18]

[18] Unreported results from partitioning the sample firms based on expense vs. non-expense related restatements show no indication that short sellers are able to differentiate between the two cases. I speculate my results are consistent because it is relatively easier to read (financial statement numbers and notes) whether a firm has aggressively recognized revenue compared to whether a firm has misreported expenses. Additionally, firms restating revenue accounts suffer more severe price drops compared to firms restating expense accounts. Hence, short sellers may be less interested in targeting firms misreporting expenses.

FIGURE 4
Paired Difference in the Level of Short Interest between Revenue and Non-Revenue Restatements Surrounding Restatement Announcements

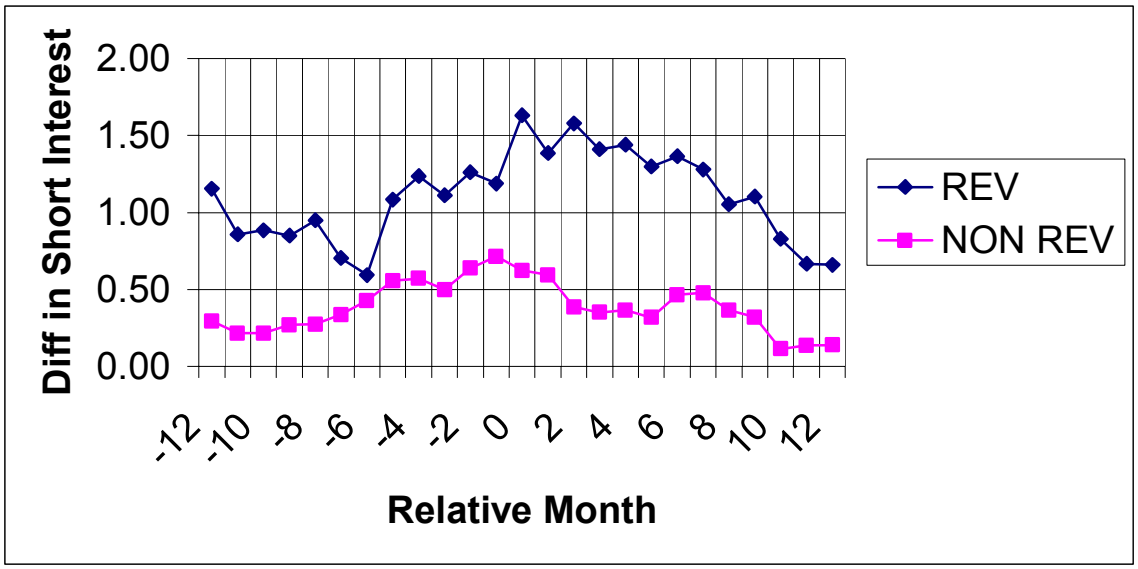

TABLE 9
Regression of the Level of Short Interest for Revenue vs. Non-Revenue Accounts

Panel A: Aggregate from Month-12 to Month 0

		Model 1		Model 2	
Variables[(s)]	**Predicted Sign**	**Parameter Estimate**	**Pr > |t|[(b)]**	**Parameter Estimate**	**Pr > |t|[(b)]**
INTERCEPT		-1.6386	0.0001	-1.6897	0.0001
HIDNUM	(+)	0.6259	0.0010	0.5883	0.0001
REVENUE	(+)	**0.8915**	**0.0001**	**1.0779**	**0.0001**
LOGMV	(+)	0.6922	0.0001	0.6458	0.0001
BMV	(-)	-0.2579	0.0610	-0.2702	0.0505
DIVYIELD	(-)	-0.0259	0.0001	-0.0240	0.0001
RELMONTH	(+)	0.0431	0.0029	0.0439	0.0019
DY96	(+)			-1.0446	0.0003
DY97	(+)			0.7458	0.0203
DY98	(+)			-0.0067	0.9834
DY99	(+)			1.0371	0.0001
DY00	(+)			-0.1577	0.5390
DY01	(+)			0.2026	0.4234
DY02	(+)			0.8001	0.0024

Panel B: Only at Specific Month (Snap-shot Approach)

		Month-12		Month-9		Month-6		Month-3	
Variables[(a)]	**Predicted Sign**	**Parameter Estimate**	**Pr > |t|**	**Parameter Estimate**	**Pr > |t|**	**Parameter Estimate**	**Pr > |t|**	**Parameter Estimate**	**Pr > |t|**
INTERCEPT		-2.3308	0.0136	-2.4987	0.0058	-2.0729	0.0287	-1.6568	0.0841
HIDNUM	(+)	0.3466	0.3636	0.5887	0.1201	0.7029	0.0759	0.6609	0.1027
REVENUE	(+)	**1.0291**	**0.0097**	**1.3337**	**0.0008**	**0.8218**	**0.0487**	**1.1664**	**0.0062**
LOGMV	(+)	0.6979	0.0001	0.6811	0.0001	0.6958	0.0001	0.6125	0.0001
BMV	(-)	-0.0640	0.8897	-0.1398	0.7744	-0.2326	0.6384	-0.4374	0.3870
DIVYIELD	(-)	-0.0203	0.0077	-0.0248	0.0009	-0.0271	0.0007	-0.0246	0.0025
DY96	(+)	-0.7996	0.4433	-0.6486	0.5122	-1.0066	0.3391	-1.3160	0.2180
DY97	(+)	0.9182	0.4320	1.6477	0.1390	0.7145	0.5488	0.4002	0.7399
DY98	(+)	0.3514	0.7720	0.0833	0.9418	-0.5453	0.6423	0.1379	0.9083
DY99	(+)	1.3120	0.1810	1.3521	0.1388	1.0788	0.2677	0.8942	0.3688
DY00	(+)	0.3974	0.6750	0.3221	0.7194	-0.0602	0.9492	-0.7737	0.4199
DY01	(+)	-0.4427	0.6396	-0.1162	0.8955	-0.0131	0.9888	0.4794	0.6093
DY02	(+)	0.1339	0.8912	0.7908	0.3893	0.6116	0.5291	0.8275	0.3977

Notes:
(a) The dependent variable SHORT = number of common shares shorted / number of common shares outstanding; HIDNUM is a dummy variable equal to 1 if a firm belongs to a high restatement industry (2-digit SIC code 28, 35, 36, 38, 60, and 73); REVENUE is a dummy variable equal to 1 if revenue accounts are restated and 0 otherwise; LOGMV is log of market value; BMV is book-to-market ratio; DIVYIELD is total dividends paid during the last fiscal year divided by price at the end of the last fiscal year; DY96 is a dummy year variable which is 1 if year is 1996 and 0 otherwise – and so forth.
(b) Prais-Winston procedure to correct for first-order serial correlation is used to calculate the significance.

Table 10 reports results of regressing the levels of short interest on the number of quarters restated along with other control variables (equation 3). For this analysis, I exclude observations in which the number of quarters restated exceeds seven (above 75th percentile). The reason is because it is very expensive and risky to maintain a short position especially when no significant bad news about accounting manipulations or GAAP violations emerges after several months. Although short sellers can identify firms that are involved in manipulations, they can't control when restatements will be announced and prices will fall. Panel A of Table 10 shows that coefficients of all the control variables are significant and in the expected directions. The coefficient for number of quarters is significantly positive at a p-value of 0.0002. It suggests that, on average, the level of short interest increases by 0.1513 percent for each additional quarter restated. Results using the snap shot approach reported on Panel B of Table 10 show that coefficients for number of quarters in the 'snap-shot' regressions are all positive but none of them are significant. These results offer limited support for the hypothesis that short sellers have a good sense of the number of quarters firms have violated GAAP.[19]

[19] Number of quarters restated and magnitude of restatements could be biased surrogates for the materiality of accounting manipulation. Management may underacknowledge the materiality to lessen the negative consequences while hoping they can make it up in the future (just like the way it started). Management may also overacknowledge the materiality in order to save for the future (big bath hypothesis).

TABLE 10
Regression of the Level of Short Interest on Number of Quarters Restated

Panel A: Aggregate from Month-12 to Month 0

		Model 1		Model 2	
Variables[(s)]	**Predicted Sign**	**Parameter Estimate**	**Pr > |t|[(b)]**	**Parameter Estimate**	**Pr > |t|[(b)]**
INTERCEPT		-1.7464	0.0001	-1.7780	0.0001
HIDNUM	(+)	0.6715	0.0001	0.5735	0.0001
QUARTER	(+)	**0.1513**	**0.0002**	**0.0823**	**0.0467**
LOGMV	(+)	0.7509	0.0001	0.6762	0.0001
BMV	(-)	-0.5160	0.0669	-0.6315	0.0250
DIVYIELD	(-)	-0.0272	0.0001	-0.0235	0.0001
RELMONTH	(+)	0.0591	0.0018	0.0606	0.0008
DY96	(+)			-0.7021	0.0314
DY97	(+)			0.9419	0.0094
DY98	(+)			0.0188	0.9586
DY99	(+)			1.4834	0.0001
DY00	(+)			-0.0235	0.9368
DY01	(+)			1.2553	0.0001
DY02	(+)			1.8640	0.0001

Panel B: Only at Specific Month (Snap-shot Approach)

		Month-12		Month-9		Month-6		Month-3	
Variables[(a)]	**Predicted Sign**	**Parameter Estimate**	**Pr > |t|**	**Parameter Estimate**	**Pr > |t|**	**Parameter Estimate**	**Pr > |t|**	**Parameter Estimate**	**Pr > |t|**
INTERCEPT		-2.1836	0.0392	-2.4679	0.0293	-2.3350	0.0538	-2.2252	0.0791
HIDNUM	(+)	0.5060	0.2569	0.7469	0.1235	0.5634	0.2739	0.5809	0.2959
QUARTER	(+)	0.0595	0.6472	0.0548	0.6927	0.0883	0.5535	1.5701	0.3318
LOGMV	(+)	0.6665	0.0001	0.6836	0.0001	0.7284	0.0001	0.6799	0.0001
BMV	(-)	-0.8552	0.4696	-0.7966	0.5487	-0.8140	0.5201	-0.6363	0.4296
DIVYIELD	(-)	-0.0186	0.0245	-0.0222	0.0105	-0.0263	0.0048	-0.0260	0.0090
DY96	(+)	-0.5786	0.5882	-0.4333	0.6959	-0.6865	0.5717	-0.7629	0.5564
DY97	(+)	0.9802	0.4121	2.0108	0.1049	1.0659	0.4339	0.5258	0.7152
DY98	(+)	0.4380	0.7214	0.3340	0.7940	-0.4051	0.7621	0.1218	0.9320
DY99	(+)	1.7725	0.0839	1.7695	0.0909	1.2686	0.2637	1.3567	0.2648
DY00	(+)	0.2940	0.7654	0.5283	0.6052	0.0858	0.9386	-0.4905	0.6767
DY01	(+)	0.2883	0.7652	0.9176	0.3492	1.0263	0.3396	1.6131	0.1536
DY02	(+)	0.7294	0.4935	1.8384	0.0915	1.9338	0.1041	1.9821	0.1150

Notes:
(a) The dependent variable SHORT = number of common shares shorted / number of common shares outstanding; HIDNUM is a dummy variable equal to 1 if a firm belongs to a high restatement industries (2-digit SIC code 28, 35, 36, 38, 60, and 73); QUARTER is number of quarters restated; LOGMV is log of market value; BMV is book-to-market ratio; DIVYIELD is total dividends paid during the last fiscal year divided by price at the end of the last fiscal year; DY96 is a dummy year variable which is 1 if year is 1996 and 0 otherwise – and so forth.
(b) Prais-Winston procedure to correct for first-order serial correlation is used to calculate the significance.

Next, I evaluate the relationship between the level of short interest and the magnitude of the restatements (equation 3). Because some of the restatements increase net income, I include only those observations in which the restatements decrease net income. Panel A of Table 11 shows that all the control variables within the regression are in the expected direction. The regression coefficient for "magnitude" is 1.2888 and is significant at a p-value of 0.0596. Panel B of Table 11indicates that all coefficients of "magnitude" from the four 'snap-shot' regressions are positive as expected but none of them are significant. These findings provide limited support for the assertion that short sellers can see through the magnitude of GAAP violations prior to the restatement announcements.

Level of Short Interest and Abnormal Returns

Dechow et al. (2001) and Desai et al. (2002) provide evidence that, in general, the level of short interest is negatively associated with returns. In this section, I evaluate whether the level of short interest is associated with returns among restatement firms. Panel A of Table 12 shows that, on average, restatement firms in this study suffer approximately –5.60 percent abnormal returns in the 5-day window surrounding the disclosure date. Panel B of Table 12 reports the short window abnormal returns of the top and the bottom quartile portfolios based on the level of short interest. The top quartile portfolio has short-term cumulative abnormal returns of -7.1 percent and -6.2 percent for the 5- and 3-day windows. The abnormal returns are -7.3 percent and -7.4 percent for the (0,+1) and (0,+2) windows. Meanwhile, the bottom quartile portfolio has short-term cumulative abnormal returns of -3.8 percent and -3.5 percent for the 5- and 3-day windows. The abnormal returns for the (0,+1) and (0,+2) windows are -3.0 percent and -

3.4 percent respectively. A t-test comparing the returns between the two portfolios shows that the mean differences in the abnormal returns are -3.3 percent, -2.7 percent, -4.3 percent, and -4.0 percent respectively. These differences are significant for the (0,+1) and (0,+2) windows with p-value of 0.0348 and 0.0638. These findings support hypothesis 3 by providing evidence that the price drops at the restatement announcements are more severe when short sellers establish stronger positions. Although results from the prior subsection show that level of short interest is higher for more severe restatements, they do not provide a direct test of the proposition that the main motivation for short selling is to make a profit. Linking levels of short interest with abnormal returns provides a direct test on the ability of short sellers to maximize profit for a set of firms with restatement announcements. This implies that short sellers use their knowledge about the severity of the GAAP violation and trade accordingly to generate profits.

TABLE 11
Regression of the Level of Short Interest on Restatement Magnitude

Panel A: Aggregate from Month-12 to Month 0

		Model 1		Model 2	
Variables[(s)]	**Predicted Sign**	**Parameter Estimate**	**Pr > |t|[(b)]**	**Parameter Estimate**	**Pr > |t|[(b)]**
INTERCEPT		-1.6998	0.0001	-1.7292	0.0001
HIDNUM	(+)	0.8575	0.0001	0.8228	0.0001
MAGNITUDE	(+)	**1.2888**	**0.0596**	**1.7597**	**0.0103**
LOGMV	(+)	0.6482	0.0001	0.6210	0.0001
BMV	(-)	-0.2184	0.0980	-0.2520	0.0572
DIVYIELD	(-)	-0.0203	0.0001	-0.0177	0.0001
RELMONTH	(+)	0.0084	0.6122	0.0091	0.5775
DY96	(+)			-1.1139	0.0004
DY97	(+)			0.8589	0.0077
DY98	(+)			-0.2483	0.4581
DY99	(+)			0.3267	0.2622
DY00	(+)			0.1412	0.6086
DY01	(+)			0.2628	0.3203
DY02	(+)			0.7472	0.0116

Panel B: Only at Specific Month (Snap-shot Approach)

		Month-12		Month-9		Month-6		Month-3	
Variables[(s)]	**Predicted Sign**	**Parameter Estimate**	**Pr > |t|**	**Parameter Estimate**	**Pr > |t|**	**Parameter Estimate**	**Pr > |t|**	**Parameter Estimate**	**Pr > |t|**
INTERCEPT		-1.8678	0.0908	-2.1191	0.0426	-2.1740	0.0452	-1.5900	0.1050
HIDNUM	(+)	0.4274	0.3795	0.7908	0.0937	0.9625	0.0470	1.0266	0.0224
MAGNITUDE	(+)	0.4670	0.8871	1.3236	0.6827	3.8668	0.2544	1.3283	0.4194
LOGMV	(+)	0.6650	0.0001	0.6520	0.0001	0.6805	0.0001	0.5667	0.0001
BMV	(-)	-0.1950	0.6858	-0.3448	0.5205	-0.2561	0.6126	-0.2517	0.5936
DIVYIELD	(-)	-0.0163	0.0803	-0.0199	0.0202	-0.0225	0.0135	-0.0149	0.0671
DY96	(+)	-0.9128	0.4695	-0.7740	0.5095	-1.0544	0.3883	-1.2167	0.2738
DY97	(+)	0.7844	0.5400	1.6748	0.1598	1.0787	0.3909	0.7728	0.4983
DY98	(+)	0.0730	0.9581	-0.1611	0.8994	-0.6807	0.5945	0.0266	0.9819
DY99	(+)	0.6528	0.5772	0.6851	0.5251	0.9662	0.3926	0.0305	0.9766
DY00	(+)	0.2880	0.7952	0.4606	0.6555	0.4674	0.6640	-0.0779	0.9363
DY01	(+)	-0.3674	0.7351	0.2059	0.8346	0.1721	0.8678	0.0571	0.5410
DY02	(+)	0.8006	0.5018	1.2947	0.2415	0.8674	0.4481	0.6040	0.5641

a) The dependent variable SHORT = number of common shares shorted / number of common shares outstanding; HIDNUM is a dummy variable equal to 1 if a firm belongs to a high restatement industries (2-digit SIC code 28, 35, 36, 38, 60, and 73); MAGNITUDE is equal to the amount of correction / total assets in the year prior to the restatement announcement; LOGMV is log of market value; BMV is book-to-market ratio; DIVYIELD is total dividends paid during the last fiscal year divided by price at the end of the last fiscal year; DY96 is a dummy year variable which is 1 if year is 1996 and 0 otherwise – and so forth.
(b) Prais-Winston procedure to correct for first-order serial correlation is used to calculate the significance.

TABLE 12
Cumulative Abnormal Returns Surrounding Restatement Announcements

Panel A: CAR Surrounding the Restatement Announcements for All Sample Firms

Window	Number	CAR
(-2,+2)	423	-0.0560
(-1,+1)	421	-0.0545
(0,+1)	417	-0.0548
(0,+2)	418	-0.0532

Panel B: Comparison of CAR between Top vs. Bottom Quartile Level of Short Interest Portfolio

	Top Quartile		Bottom Quartile		Difference		
Window	Number	CAR	Number	CAR	CAR	t-value	Pr > |t|
(-2,+2)	112	-0.071	96	-0.038	-0.033	1.45	0.1490
(-1,+1)	112	-0.062	94	-0.035	-0.027	1.29	0.1986
(0,+1)	110	-0.073	93	-0.030	**-0.043**	**2.13**	**0.0348**
(0,+2)	110	-0.074	93	-0.034	**-0.040**	**1.86**	**0.0638**

Notes:
CAR is the market adjusted cumulative abnormal returns calculated using the EVENTUS statistical module.

VII. FUTURE STUDIES AND CONCLUSIONS

Short selling contributes to pricing efficiency that is very important in efficient markets. However, research on short sellers' trading strategy, behavior, and sophistication is relatively limited and is still in an early stage. Although Dechow et al. (2001) and I show that short sellers can identify overvalued firms as well as firms that manipulate accounting numbers, we do not examine the source and the type of information used by short sellers. Future research efforts could investigate whether short sellers use accounting information such as Lev and Thiagarajan's (1993) fundamental analysis to arrive at their target companies. In addition, researchers could look into whether short sellers use non-financial information such as quality of corporate governance to establish their positions. Some studies have used different measures for corporate governance quality such as board composition, CEO power, and existence of an audit committee. Related to pricing efficiency, one could investigate short sellers' behavior in different markets (countries) where transaction costs of short selling are different. Further, one can examine levels of short interests under different accounting regimes (across time or markets). As I suggested earlier, the quality of disclosure may affect the ability of short sellers to identify and understand the degree of problems in a company, and therefore, affect the level of short interest.

In this study, I provide evidence that short sellers are sophisticated investors with regards to accounting manipulations. The results show that firms involved in accounting manipulations have high, and an increasing, level of short interest leading up to the restatement announcements. Further, short sellers can distinguish types of restatements before the announcements are made. They establish higher short positions in restatements

involving fraud, revenue accounts, and to some extent, restatements with more quarters and larger in magnitude. These findings are important because they suggest short sellers are highly sophisticated investors with regards to bad news. Therefore, investors, auditors, analysts, and regulators should pay closer attention to short sellers' activity to identify hyped or manipulated companies. We are blessed to have an optimistic nation since optimism leads to hope and progress. However, as Bernard Baruch stated nearly a century ago, "Uncurbed false optimism always leads to disaster".

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APPENDIX A

HISTORY OF SHORT SELLING

Short selling is selling a security that a seller doesn't own by borrowing the security from, typically, a broker-dealer or an institutional investor. Short sellers hope for prices to decline after they establish their positions. When the stock price falls, short sellers close out their positions by purchasing equivalent securities on the open market to make a profit. Therefore, short selling is an investment method used to profit from an expected downward price movement. Aside from its function as an instrument for speculation, short selling is often used for hedging and arbitrage activities. Generally, some small portion of short interest exists day-to-day for hedging and arbitrage purposes. However, when the portion of short interest increases and becomes large, it indicates that professional short sellers are betting on a price decline.

Short sellers have been traditionally unpopular throughout history because they make money from others' misfortune. Today, they are often unfairly blamed as the cause of market crash. Short sellers also have often been labeled as unpatriotic because they profit from calamitous events such as the recent September 11 terrorist attack. There were even allegations that terrorist groups establish heavy short interest just prior to the 911-attack. The fact is, however, short sellers neither have any control over tragedies nor market crashes.[20] Charles Tennes, a Director of Rydex Global Portfolio Management,

[20] FBI officials had investigated a dual Egyptian and U.S. Citizenship stock trader who shorted stocks prior to the September 11, 2001 tragedy for a potential connection to terrorist groups. The FBI, however, found no evidence of the connection (Wall Street Journal 2002). Market crash is generally attributed to poor business conditions or unsustainable hype.

said, "… we should remember that those who bought flood insurance did not cause the flood but they are entitled to the claim" (Tauli 2003).

The following sections of this chapter provide a historical perspective of short selling from the Dutch Republic in early 1600's to the present. The sections illustrate how short selling develops from individual activities into institutional activities carried out by hedge funds and then short-only funds. It shows how short sellers evolved from market manipulators into forensic investors who target overvalued and fraudulent firms. I develop this history section primarily from the works of Chancelor (1999, 2001) and Tauli (2003). The final section in the chapter discusses the important role short selling plays in the efficient market.

Short Selling in Early European Stock Markets

Although short selling seems to be counter-intuitive and sophisticated at first (because one sells first and then buy back to make a profit rather than the other way around), it has been practiced all the way back in the early 1600s at the Amsterdam Bourse. The Dutch did not invent the institutions and practices of financial capitalism such as double-entry bookkeeping, banking, bills of exchange, and stock markets. However, they created sophisticated financial instruments such as margin loans, futures contracts, options, as well as short selling. While some of these trading instruments had been used in the previous century for commodities such as grain, spices, oil, Italian silks, it was not until this era that these instruments become available for trading shares of companies such as the East India Company.[21]

[21] The Dutch also establish the Amsterdam Wisselbank, Europe's first central bank, which paid no interest on deposits, made no loans, and issued notes only against its gold holdings. Its existence allowed Dutch merchants across the globe to settle their accounts in a universally accepted currency. All these developments earned Amsterdam the title as the financial capital of the world in that era.

In 1609, Isaac Le Maire, a founding member of the Dutch East India Company, orchestrated the first known "bear raid" against the company he founded. Le Maire, relying on information he received from the company's treasurer, shorted heavily the shares of the East India Company creating an imbalance between supply and demand to bring the share price down. In addition, he spread horrible rumors to provoke the market. Although Le Maire's raid ended in personal failure, the raid caused the East India Company to complain to the government, seeking protection from short sellers. The company claimed that these attacks were causing harm to 'innocent stockholders, among whom one will find many widows and orphans.' It was the first time, but not the last, that the protection of the innocents was evoked in order to turn sentiments against short sellers. Subsequently, in 1610, the Dutch banned all short sales.

In the following century, as stock markets become established in France and Britain, the negative sentiment towards short sellers continued to spread to the new markets. In 1719 France, history recorded the first bubble in the Mississippi Company, which controlled among others, French Louisiana, French East India and China companies, the tobacco monopoly, and the mint. The hype and speculative fever in the company pushed the share price from under 500 livres (old French currency) to over 20,000 by late 1719 and finally it fell back to under 500 livres. Following the collapse, short sellers who had profited from the decline in the Mississippi stock were fined and the practice of short selling was subsequently outlawed. Of course who else was to blame but those short sellers who profited from others' misfortunes. Short sellers have been portrayed as ghoulish characters that hope for catastrophes.

At around the same time, the English had observed the sudden rise and collapse of The South Sea Company. Years later, the British Parliament passed a bill to prevent the practices of speculation by outlawing the use of futures, options, and short sales of stocks. Although the statute remained on the books until 1860, brokers continued to engage in short sales, which were enforced through a gentlemanly code of conduct rather than legal sanction.

The French aversion towards short selling continues throughout the centuries. Napoleon considered short selling as unpatriotic and, in 1802, he signed a regulation subjecting short sellers to up to one year in imprisonment. He regarded short selling as an act of treason because it made raising money for his war more difficult when the market was shaky. The French dislike stays even to the recent years. After George Soros and other speculators shorted the sterling and drove down its value in September 1992, the French finance minister, Michael Sapin, commented that 'during the Revolution such people were known as agioteurs, and they were beheaded.'

Short Selling in the U.S. Stock Markets

The fate of short selling in the early United State capital market was similar to its counterparts in earlier European markets. The New York Legislature banned short selling in 1812. When the ban was finally lifted in the 1850s, it was accepted with open arms by speculators. Albeit the U.S. economy was growing strongly in the latter half of the century, the stock market was still small and was relatively easy to move or corner. Short selling was widely abused by speculators who loaded-up short positions and then circulated negative rumors to create fear that led to tumbling prices. One example: John Gates, the president of the American Steel and Wire Company, shorted shares of his

company then announced that the business was weak and he closed down plants and laid-off workers. The news sent the share price down from 60 dollars to 30 dollars a share. He then squared his position, making a quick 30 dollars a share, and later announced that business had improved and the company reopened plants and rehired workers. No doubt, the lack of regulations such as rules on disclosures resulted in a rampant misuse of short selling.

In this era, nonetheless, short sellers themselves could become the victims of their own medicine. For example, Daniel Drew would manipulate a stock to hype-up the price. Short sellers, expecting that the stock price would collapse, would see this as an opportunity to make money. Unfortunately for them, Drew, who controlled most of the stock, would continue to drive the stock price upward. When short sellers were forced to cover their positions to avoid losses, their actions only accelerated the price increase and thus worsened their losses. In essence, short sellers were coerced to repurchase the stock at a highly inflated price. This disastrous position experienced by short sellers is known as a "short squeeze". In fact Daniel Drew loved to say, "He who sells what isn't his must buy it back or go to prison."

The twentieth century saw both an increase in the size of the market and the market regulations which made manipulations and cornering a stock more difficult. Although most investors would still act mostly on rumors due to little available information, this era marked the birth of investors who practiced market and technical analysis. For example, Bernard Baruch shorted Amalgamated Cooper Company in 1901 when the company attempted to monopolize the copper market, driving the competition away, and driving up the prices. However, Baruch believed that higher prices would lead

to lower demand and the company's attempt to corner the market would be unsuccessful. He was right and he made seven hundred thousand dollars from the trade. Meanwhile, Jesse Livermore, who at age 14 got a job at Paine Webber in 1901 posting stock prices on a chalk board, had incredible math skills and a photographic memory to remember all the historic movements of the stock he followed. He used his ability to identify profitable trading patterns which is known today as technical analysis. Livermore had no preference between buying long or shorting a stock as long as he made money. One of his famous investing quotes was: "There is only one side to the stock market; and it is not the bull side or the bear side but the right side." History recorded that some of his most successful trades were short sales. In the stock market crash in 1907, he made a handsome three million dollars and in the crash of 1929, some estimated he made as much as 100 million dollars.

As history repeated itself, again, many believed that short sellers, including Livermore, caused the market crashes including the 1929 crash that led to the Great Depression. Livermore received multiple death threats from people who blamed him for their losses. [22] Following the crash, Congress drafted section 10(a) of the Securities Exchange Act of 1934 which gave the Securities and Exchange Commission powers to regulate short selling. When the stock market plunged again in 1937, the SEC created the "up-tick rule" under clause 10(a)-1 which is fundamentally unchanged until today. The SEC feared that short selling could result in unwarranted downward pressure on a stock

[22] Ironically, though, short selling actually was light during the late 1920s compared to the previous decades. In November 1929, the NYSE reported that around one hundredth of one percent of outstanding shares had been sold short. Perceptive investors had learned that shorting stocks when the market was booming was a quick way to lose money. Further study of large block sales identified the liquidation of long positions as the main cause of market weakness.

price and believed that the problem would be circumvented if a short sale is only allowed when the price is up.

Short Selling by Pooled Capital Managers

The initial practice of pooling capital to invest in the U.S. capital market started in the 1920s bull market. One of the most well-known organizers of pooled capital was William Durant, who was also the founder of General Motors. Using his large amount of capital, Durant amassed the power to move and to manipulate the market. This power was no longer attainable using individual capital as the size of the market grew tremendously. In 1949, Alfred Winslow Jones established the first hedge fund which included short selling in its investment strategy. However, shorting by hedge funds dissipated in the 1960s and early 1970s because of the bullish stock market. It was not until the 1980s that hedge funds reemerged. One of the top hedge fund managers during this period was George Soros who shorted Avon, a famous brand-name stock, when it was trading at 120 dollar per share. His analysis showed that the population was getting older; therefore, demand for Avon's products would start to tumble. Avon's shares fell to 20 dollar per share in two years and Soros made about 1 million dollars on the trade. There are other prominent hedge fund managers who made good returns from shorting stocks through good analysis, among others, Michael Steinhardt. He made millions of dollars by shorting overvalued companies and he even targeted mega companies such as GE, Coca Cola, and McDonalds.

The 1980s also saw the emergence of a new breed of pooled capital management that is the short-only funds. Unlike the hedge funds which maintain portfolios with both long and short positions, short-only funds specialize only on short sales. The Feshbach

brothers managed one of the first short-only funds in 1982 and they specialized in targeting firms committing fraud. One of their greatest successes was when they shorted ZZZZ Best, a carpet-cleaning company founded by Barry Minkow. They conducted a tremendous amount of analysis on the company, including calling customers, suppliers, and competitors, and concluded that the company was announcing bogus contracts. Soon afterwards, the company filed bankruptcy and Minkow was convicted of securities fraud. Although small in number, the short-only funds made sensational returns from the mid-80s to 1990. The short-only funds, however, dwindled during the protracted bull market in the 1990s.

Recently, some short-only funds have made a comeback. One of the most famous one is Kynikos Associates which is managed by George Chanos. Although he lost a substantial amount of money shorting internet stocks in the 1990s; he was successful in shorting companies such as Enron, Tyco, and WorldCom. Chanos carried out thorough analysis of these companies financial statements. In his testimony in front of the Congress about Enron, he revealed that he was deeply suspicious of the company's revenue recognition process and cryptic footnotes describing related party transactions. Collecting further information, both financial and non-financial, he shorted Enron heavily before the stock took a tailspin and finally ended-up worthless.

Short Selling and Efficient Markets

Short selling is important to the market because it helps market liquidity and pricing efficiency. The SEC acknowledged the role short sellers play in the equities markets in the following excerpt from the Concept Release on Short Selling in (SEC 1997):

> Substantial market liquidity is provided through short selling… short selling adds to the trading supply of stock available to purchasers and reduces the risk that the price paid by investors is artificially high because of a temporary contraction of supply. Short selling also contributes to the pricing efficiency of the equities markets. When a short seller speculates on a downward movement in a security, his transaction is a mirror image of the person who purchases the security based upon speculation that the security's price will rise… Market participants who believe a stock is overvalued may engage in short sales in an attempt to profit from a perceived divergence of prices from true economic values. Such short sellers add to stock pricing efficiency because their transactions inform the market of their evaluation of future stock price performance. This evaluation is reflected in the resulting market price of the security.[23]

Proponents of short selling have stated that short sellers perform better fundamental analysis then the bulls. Short sellers are skeptical and they perform thorough analysis of facts rather than relying on management stories and projections. There is evidence that short sellers' forensic works exposed manipulations and frauds; thus, bringing prices back in line with true economic values. In a 1997 Concept Release on Short Selling, the SEC sought public comments on the regulation of short sales of securities. The SEC invited inputs on, among others, providing exceptions for actively traded securities to eliminating short selling regulations altogether. Yet, there has been no decision on the implementation of new short selling rules.

Despite short sellers' contribution to market efficiency, short sellers remained deeply misunderstood and have been blamed during every major downturn. Complaints against short sellers continue from the early equity markets in Europe until today. During the Asia crises in 1997 and 1998, Prime Minister Mahatir Mohammad of Malaysia banned short selling of companies in the Kuala Lumpur index, accusing a "Jewish conspiracy" led by George Soros to re-colonize his country. In 2001, lawmakers in the

[23] SEC Concept Release: Short Sales. Release No. 34-42037; File S7-24-99.

US asked the SEC to consider a temporary ban on short selling shortly after the 911-tragedy.

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