# An Event Study of the Impact of Enron's Accounting Fraud on the Financial Industry

by

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**Abstract**

On December 2, 2001, Enron, the world's leading energy company, announced it was bankrupt. Its shocking accounting fraud and sudden bankruptcy, the largest bankruptcy in US history up to that time, led not only to thousands of employees losing their jobs and even their life savings in 401(k) plans tied to the energy company's stock, but also to a disastrous falling down of the whole stock market during the following months, especially in the financial service industry. The aim of this paper is to understand the real impact of the Enron's accounting fraud on the stock market value of the financial services industry. An event study analysis, based on market returns for the S&P500 Stock Index and for a portfolio of 110 financial services, is applied to investigate stock price reaction to the announcement of Enron's fraud. Both traditional parametric *t* tests and nonparametric sign tests are employed to perform my event study. The results of the investigation support the conclusion that the impact of Enron's shocking fraud and sudden debacle are statistically significant, not only in the short period around the occurrence of the event but also during a long time period after its happening. I also analyze possible different effects within selected subsamples, and my findings imply that, in the wake of Enron's big accounting scandal, there is strong evidence that smaller companies and insurers have been the most badly hurt by the event, while the effect on larger companies and banks seems to be insignificant.

## 1. Introduction

It was a nightmare for investors in US stock markets in 2001 and 2002. On September 11, 2001, terrorists launched a devastating attack against the United States using commercial airplanes fully loaded with jet fuel as weapons, and both the 110-story towers of the World Trade Center in New York City collapsed. During the following weeks a market collapse, especially in the Air and Insurance industries, was triggered by the September 11 terrorist attack, which no doubt hit the heart of the American financial district; however, it was not deadly for the US stock market. As you can see from Charts 1 and 2, soon after the market collapsed, both the Dow Jones Industrial Average and the S&P 500 Stock Index began to rise up gradually, with the Dow rising from the minimum of 8235.8 points on September 21 to above 10000 points in October and the S&P 500 from the minimum of 865.8 points on September 24 to above 1100 points in October. It seemed that investors' confidence was recovering little by little. However, interestingly, during the following months, both the S&P 500 and the Dow began to stop their slow increase and dropped again by nearly 25 percent, with the Dow falling from around 11000 points to below 8000 points and the S&P 500 dropping from above 1100 points to below 800 points, and they still appear to be falling down.[1] What led to this?

Indeed, the accounting fraud and the final bankruptcy of Enron, one of the most thrilling rise-and-fall sagas of recent years, played the most important role in this

[1] For detailed data on the Dow and the S&P500 from September 2001 to present, please refer to *Yahoo*'s historical data (available at http://table.finance.yahoo.com).

long-term market collapse in 2002. It was hard to believe that, in order to sustain its rapid growth, Enron developed very fast and loose accounting controls, hiding millions of dollars of debts and inflating profits. Enron's auditing firm, Arthur Anderson, which was involved in Enron's questionable accounting practices, also disappeared soon after Enron's debacle. Furthermore, Wall Street played a big part in the scandal. Even though Enron's financial statements were clearly questionable, analysts still touted Enron's stock, the investment banks still preferred to do business with it and the media still regarded it as "the most innovative firm in America."[2] Wall Street wanted so much to believe in Enron's wondrous legend that it helped keep the stock rising until it was out of control.

But on December 2, 2001, Enron had to file for Chapter 11 bankruptcy protection in a New York bankruptcy court. With $62 billion in assets, it became the biggest bankruptcy case up to that time. [3] The results were not only the bankruptcies of the two giants--Enron and Anderson, with dozens of lawsuits pending against them, and thousands of people losing their jobs and retirement savings, but also a deep crisis in Wall Street, which completely destroyed the confidence of investors after the fraud. The scandal surrounding Enron and Andersen, together with a wave of other major accounting scandals, have come to push the US economy into an endless dark abyss.

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[2] During five consecutive years from 1996 to 2000, Enron was regarded as the "most innovative firm in America" in the surveys of *Fortune* magazine.

[3] Information about Enron's bankruptcy is introduced in detail in many articles which were published pretty soon after Enron's announcement of bankruptcy, such as Behr (2001a) and Oppel and Sorkin (2001).

In this paper, using a sample of 110 financial companies, I focus my examination of the impact of Enron's accounting fraud and its sudden collapse on a specific sector, financial services, which was deeply influenced by the event. Starting in 1985, Enron expanded massively from a natural-gas pipeline company, an energy trading center, to a big multinational giant, which had evolved in many industries and in fact functioned as a kind of financial bank. After its bankruptcy, Enron's thousands of different financial contracts worth billions of dollars caused a number of banks and financial service companies in Wall Street to become involved in this case. Enron's key lenders, JP Morgan&Chase and Citigroup, which were bound tightly to the destiny of the energy trader, began to feel the greatest burden. In addition, the sudden debacle of the once-dominant energy trade giant had also dented a much wider group of banks, insurers and financial service companies, such as Swiss Re, Hartford Financial Services and Reinsurance Group of America Inc, which had to face losses of tens of millions of dollars from Enron bonds in their portfolio.[4] As part of Enron's scandal, the disappearance of Anderson, one of the top accounting firms in the United States, influenced the stocks of American financial corporations, too. Thus, this paper will discuss the influence of Enron's accounting fraud on the financial industry in detail.

[4] All the creditors of Enron are listed in " Consolidated List of Creditors", December 2, 2001, which is available at the website of *FindLaw* (http://news.findlaw.com/legalnews/lit/enron/index.html#documents). Other articles, such as Schwartz (2001), Kadlec (2001), and Behr (2001b), etc., provide details about the effects of Enron's bankruptcy. You can also find stories about Enron's sudden collapse on many websites, including *CNN, BBC News, Washington Post, Houston Chronicle* and *The Daily Enron,* etc.

In this paper, I use an event study to investigate the market reaction to Enron's scandal and its sudden collapse. Traditional parametric *t* tests are introduced and employed to test the hypothesis that abnormal returns for the sample of financial firms are zero. Using this technique, I find large, significant, negative abnormal returns for the group of financial firms studied. Furthermore, dividing the sample firms into several subsamples defined by different size and industry, I find that the market's reaction distinguishes between firms. The results show that, in the long run, small firms and insurers have much more significant negative abnormal returns than other firms, which means that larger companies and banks have a better ability to get through this market collapse.

Importantly, during the last decade an increasing number of studies have raised concerns about the effect of nonnormality on event studies. [5] I use two widely used tests for normality, the Jarque-Bera test and the Chi-squared Goodness of Fit test, and find that there are nonnormality problems for the abnormal returns of my chosen sample. Thus, using the nonparametric sign test as an alternative is an appropriate way to evaluate the results of the *t* tests proposed earlier. Not surprisingly, the statistical results of the sign tests support the hypothesis that Enron's accounting fraud and sudden collapse have had a significant negative impact on the stock returns of financial companies. Overall, both parametric tests and nonparametric tests show massively negative excess returns across

[5] See section 3.3 for further discussion of nonnormality problems for traditional parametric tests and alternative nonparametric tests.

each subsample following Enron's accounting crisis, which shows us how important a firm's reputation and investors' confidence are in today's financial market.

This paper begins by briefly reviewing the story of Enron's rise and its surprising sudden debacle. It then discusses in detail how a standard event study, including a traditional parametric *t* test and a nonparametric sign test, can used to evaluate the effects of the whole scandal on American financial corporations. In the last step, results and conclusions related to the study are presented in detail.

## 2. Background of Enron's Fraud

### 2.1 The Story of Enron

The story of Enron began as a miracle of power and glory in US business history, but ended as the largest corporate bankruptcy, the biggest financial fraud and an auditing failure. [6] Before the scandal was unearthed, Enron was a fast-rising star that had turned an old-economy energy production and transmission company into one of the world's most innovative and vast corporate empires. Enron began in 1985 when Houston Natural Gas merged with InterNorth, a much larger pipeline company based in Omaha, Nebraska, to create a new company, soon renamed Enron, with $12.1 billion worth of assets, 15000 employees and the first nationwide natural gas pipeline system of 37000 miles. During

[6] Information of Enron's business history from 1985 to 2001 is introduced by many books recently published including Fox (2002), Fusaro and Miller (2002), and Swartz and Watkins (2003). In addition, "Enron, 1986-2000," a case study of Darden Business School, University of Virginia, written by Sameuel E. Bodily and Robert F. Bruner (2002), also provides a detailed history of Enron.

the 1990s, Enron moved into the trading business, beginning with natural gas and moving into electricity. In fact, up to that time Enron was the largest trader of electricity. By 2001, the energy giant was put at number 7 in the *Fortune* 500, bigger than IBM and Wal-Mart. As a prototype of the "New Economy," Enron was chosen as the most innovative U.S. company in *Fortune* magazine surveys, beating out Apple Computer, IBM, Sony, and eBay. [7]At the height of its glory, it had more than 20000 employees and operations in 40 countries; its revenue grew rapidly from $4.6 billion in 1990 to $101 billion in 2000;[8] it was an industry leader in the purchase, transportation, marketing and sale of natural gas and electricity, as well as other energy sources and related financial instruments, and in the development, construction and operation of pipelines and various types of power facilities; its business even expanded beyond energy, involving metals, papers, financial contracts and other commodities. [9]At the same time, Enron's stock price soared quickly. It rose from under 10 dollars per share in 1985 to an all-time high of 90.56 US dollars in August 2001, which far outpaced the increase in the Dow Jones Industrial Average and the S&P 500 Stock Index over the same time frame.[10] Put another way, an early shareholder lucky enough to have sold Enron stock at peak valuations after the stock split

[7] Fortune magazine's survey results are from Geoffrey Colvin's article, "America's Most Admired Companies," *Fortune*, February 21, 2000.
[8] Sources for information on Enron's revenues and other figures are Enron's annual reports for 1990 and 2000.
[9] Enron's ranking in the Fortune 500 are from the Fortune 500 "Largest U.S. Corporations" list, *Fortune*, April 16, 2001.
[10] Information of Enron's stock price is from "Enron, 1986-2000," written by Samuel E. Bodily and Robert F. Bruner (2002), Darden Business School, University of Virginia.

could have enjoyed a more than 1400% profit. However, how could Enron grow so quickly, flying higher than other big companies?

### 2.2 Accounting Fraud behind Glory

The later investigation after Enron's sudden demise told us a less spectacular story than its soaring stock and revenue. As early as 1998, Enron actually had a negative cash flow of $59 million, which showed signs of trouble in that Enron used more money than it took from its operating and financing activities. [11] In the years before its collapse, Enron spent money even faster, although it had a positive cash flow that came from a rise in short-term borrowing, while the net cash generated by operating activities fell down quickly. In the meantime, some of Enron's businesses were doing poorly. The Dabhol power plant in India is one of the visible examples that Enron was encountering financial troubles. The Dabhol project is overly expensive due to extremely high construction fees and a high oil price for maintenance so that the local government of India had trouble making its payments under a guaranteed contract. Although Enron Energy Services faced years of losses because of the failure of the Dabhol project, in 2000 Enron reported $103 million income and annual revenue more than doubling to $4.6 billion.[12]

As a matter of fact, behind the wonder, Enron's top leaders created a variety of special investment partnerships called Special Purpose Entities that were not reported on

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[11] Chapter 9 of Loren Fox's book, *Enron: the Rise and Fall* talks about Enron's troubles with cash flow in detail.
[12] The detailed story of Enron's Dabhol project in India is introduced by Parikh (1997). The figures provided in this paragraph are from Enron's annual report in 2000.

their books, some of which were run by Enron's own chief financial executive, and other off-balance financial strategies to do nothing but hide hundreds of millions of dollars of losses and debt from public view. By using such highly complex but legal financial and accounting techniques as "party-related transaction," "prepays," and "share trust transaction," Enron achieved significant financial statement benefits, which made it look much better than it really was. For example, Enron got money from investors and lenders, but instead of counting it as debt to Enron, it was counted as debt only to the SPEs and as income to Enron. [13] Since 1993 when the first SPE named after a well-known character in the Star Wars movies, JEDI, was founded, Enron had fooled its employees, investors and the general public about the company's financial condition, making it seem a healthy growing energy giant for investors and a dreamy work place for employees.

But once Enron's increasing troubles like a rolling snowball finally began to surface in the numbers that it presented to the public, the fraud came to light. Despite the soaring of revenue and stock price figures, Enron's troubles began to be presented to the public and open skepticism appeared in late 2000 and early 2001. In March 2001, an article entitled "Is Enron Overpriced?" written by Bethany McLean in *Fortune* magazine, questioned the greatness of Enron. The stock began to weaken to return its true value, although Enron had tried to restore credibility and confidence among investors. The situation changed so quickly that no further fraud could hide the truth underneath any

[13] Schwarcz, Steven L. (2002) introduced Enron's SPEs and its fraudulent accounting techniques in his working paper, "Enron, and the Use and Abuse of Special Purpose Entities in Corporate Structures."

more. The crisis finally broke out when Enron was forced to release its third quarter financial statement on October 17, 2001; surprising Wall Street, it revealed that Enron would face close to $1 billion in losses and would restate its financial results for 1997, 1998, 1999, 2000, and the first two quarters of 2001, to correct errors that inflated Enron's net income by $591 million. Furthermore, more shocking to everyone, on October 18 Enron finally announced to the public that it had something to do with an accounting fraud that was related to "complex transactions" between Enron and its Special Purpose Entities (SPEs).[14] Pretty soon after the announcement, the Securities and Exchange Commission (SEC) started to investigate Enron's "related-party transactions,"[15] Wall Street began to be concerned about Enron's dubious finances, and investors lost all their confidence in Enron which may have been its most prized asset. Eventually, the stunning fraud was uncovered completely, putting Enron's stock into a free fall from a high of $90 to less than $1 a share in few days,[16] forcing the company into bankruptcy proceedings, and wiping out thousands of jobs and tens of billions of dollars in savings--more than $60 billion in stock market investments, much of it in the mutual funds and retirement accounts of typical Americans.[17]

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[14] Please refer to Powers, William C. Jr., Raymond S. Troubh, and Herbert S. Winoklir Jr. (2002) "Report of Investigation by the Special Investigative Committee of the Board of Directors of Enron Corp." *Challenge* 45, 117-127. Other sources on the Internet include *CNN, Washington Post, BBC*, etc, also introduce Enron's financial report on Oct 17 in detail.

[15] Please refer to Behr (2001c) published in the *Washington Post.*

[16] Information about Enron's stock fall is from Section 2 of Bodily and Bruner (2002).

[17] For detailed information about Enron's 401(k) plans which made thousands of Enron's employee's lose their all life savings, please refer to *CNN.com In-Depth Specials* (http://www.cnn.com/SPECIALS/2002/enron/) and other major media like *BBC News*, *Financial Times* and *Washington Post.*

It is notable that the staggering rise of Enron's stock, especially from the late 1990's to 2001, was accompanied by a similar on-surface flourish during a time called "New Economy" when information technology and the Internet were such crazy passions all around the world. Indeed, Enron was a classic "New Economy" firm in the eyes of Wall Street and the business press: it developed complicated financial trading technology, which impressed observers and investors so much, made intense use of the Internet and had a presence in two of the hottest areas of the "New Economy"--business to business electronic commerce and broadband communications. Meanwhile, the on-line success of Enron and the promise of its e-business added lots of dot-com patina to Enron's stock. Thus, from the mid 1990's to 2000, the bull stock market, led by technology and Internet-related stocks, pulled venture capitalists and investment bankers to try to repeat the success of dot-com legends like Enron and Nortel as many times as possible.[18]

Compared to the old economy in which a company's stock was based on an estimation of how much it could generate in profits in the future, the stock prices of "New Economy" firms were based on ideas, which could be turned into billions of dollars in profits overnight by companies. Given that the "New Economy" was in its infancy, this warning sign that the profits of corporations were built in the air would not be noticed. So, before Enron's collapse, the whole stock market in the United States was riding a wave of optimism about the prospects of the "New Economy." However, it would turn out that

[18] For detailed information about "New Economy", please refer to Demers and Lev (2000), Edison and Slok (2001), and Jentzsch (2001).

both Enron and other Internet dream companies were illusory. When the bubble economy burst, the bottom dropped out; all previous booms handsomely compensated the American economy.

The whole story also included Enron's outside auditor firm, Arthur Anderson. Founded in 1913 and thriving in the 1990's, Anderson was one of the top accounting firms in the world.[19] Like all of the so-called Big Five accounting firms, Anderson was not merely the outside auditor for bankrupt energy trader Enron, but the company's internal consultant as well. Frankly, the accounting rules during that time were so vague that all the accounting firms did their internal auditing while serving as the external auditor as well. It was difficult to tell how much Arthur Anderson was involved in Enron's fraud, but one thing can be sure -- that all of the fraudulent accounting activities were approved by Anderson. Much more shocking to everyone, Anderson did something even worse: it compounded its errors by destroying Enron-related documents when it knew the company was being investigated by the SEC.

Table 1 lists the major events related to Enron and its accounting partner Arthur Anderson as reported in the *Wall Street Journal*, *Washington Post, New York Times* and other major media from October 2001 to August 2002. Remarkably, as you can see from Table 1, the events before January 2001 relate directly to Enron and fail to mention Anderson, while from January to August the leading actor of the play gradually changed

[19] Information about the business history of Arthur Anderson is from the websites of the *Washington Post*, *CNN* and *BBC News*, etc.

to Anderson. In fact, I added all the events associated with Anderson to the timeline table because Anderson was involved so directly in the whole thing that it is very difficult to separate Enron and Anderson in the whole scandal, so that analysts and writers also called it the "Enron-Anderson debacle."

### 2.3 Recent Accounting Scandals after Enron

Enron was the first but not the last. Investors, with disappointment and mistrust for Wall Street, had their own questions: How many other Enrons were out there? Can any other company's financial statements be trusted? After the fraud of Enron and Anderson, under high pressure from the public, the SEC began to investigate a number of technology companies, prompting some to restate their balance sheets. Extremely shocking to everybody, in the eight months following Enron's bankruptcy, a growing list of companies have followed it on scandal's path, led by WorldCom, Global Crossing, Tyco International, Adelphia Communications and Qwest Communications, Exxon, AOL, etc. WorldCom, the second-largest telecommunications company in the United States, followed Enron into bankruptcy court, which broke Enron's record as the biggest bankruptcy in America's history. The sudden explosion of corporate accounting scandals, bursting throughout Wall Street from late 2001 to the first half of 2002, has captured the attention of the top leaders of government in Washington D. C. and the regulatory reform in accounting suddenly became bipartisan. Pretty soon the reform strode forward: a new

accounting-reform legislation, signed by president George W. Bush, has been approved by Congress. An oversight board was created to investigate and punish accounting violations. Chief executives and financial officers must certify the accuracy of financial statements. White-collar criminals will face fines as high as $5 million and prison terms of up to 20 years.

The story of Enron and its accounting fraud seems to end at this point, but the discussions about Enron and its triggering of accounting reform will never end. Anyway, Enron was the first of the recent business scandals that have devastated investor faith, contributed to a multi-trillion-dollar market fall and made corporate reform a political imperative. As we know after the explosion of the scandals and the burst of the economy's bubble, it is not the idea, but the confidence of investors in corporations' future profits, that is the original motivating power of the whole stock market. Triggered by Enron, the sudden burst of corporate accounting scandals hit the confidence of investors so much that public trust in corporations was at an all time low, thus, a major market correction was inevitable: the U.S stock market was experiencing the longest bear time since 1990.[20] My research contributes to an understanding of how important the confidence of investors is to the stock market and how harmful accounting and auditor fraud is to the whole economy. Although I only examine the financial industry in the U.S.,

[20] For detailed story of recent accounting scandals, please see websites of *CNN*, *BBC News* and *Washington Post* and other major media in US.

it is obvious that this event consisting of an accounting scandal and corporation failure will affect all the corners of the American economy and last for a long time.

## 3. Methodology and Data

### 3.1 A Brief Review of Previous Research

The methodology applied in this paper, an event study, is well accepted and extensively used in several hundred scholarly articles in the leading academic economics and finance journals. In this section, I review its long time history since its invention and its extensive use to study a variety of issues for both financial economists and public policy analysts.

Event study methodology examines the stock returns of some specific firm or an industry before and after the announcement of a special event, such as a merger, an earnings announcement, an acquisition, or even a regulatory change, etc. Event study analysis is based on the assumption that capital markets are sufficiently efficient to evaluate the impact of the events on the future valuations of the firms. Thus, on the one hand the stock price reflects the investor's assessment of the present value of a firm and on the other hand public announcements of events that may affect future firm valuations are used by investors for assessing firm value in order to make stock trading decisions.

Event studies have a long history. Perhaps first employed by James Dolly[21] as early

[21] Actually I cannot find Dolly's paper. MacKinlay (1997) discusses Dolly's study.

as 1933, event studies have been widely used in much financial economics research and a number of developments have been made by researchers like Fama, Fisher, Jensen, and Roll (1969) and Brown and Warner (1980, 1985). In his work, Dolly investigated the price effects of stock splits, studying nominal price changes at the time of the split, which was regarded as the earliest application in the history of event studies. The most classic event study in history was a paper published in 1969 by Fama, Fisher, Jensen, and Roll, in which they examined the impact of stock splits on security prices, using a sample of monthly returns data from 1926 to 1960 and the market model which is applied extensively in today's event studies including my investigation in this paper. In the years since their revolutionary study in 1969, many modifications and adjustments have been developed, including articles published by Brown and Warner (1980, 1985). In their studies, Brown and Warner conduct extensive examinations of event study techniques with the monthly returns data used in early research. Brown and Warner's 1980 paper questions the use of monthly data in early studies, while their paper in 1985 deals with studies using daily returns data. Except for the modification in the sampling interval, a variety of different models, including the mean-adjusted returns model, the market-adjusted model, the multifactor market model and the multivariate regression model (MVRM), etc, have been introduced, analyzed and used in practice to carry out event study analysis. However, compared to those adjusted models that have their own advantages, the market model is the most widely used in today's literature on event

studies in economics and finance.

The event study has many applications. Through an event study, financial economists can study the effects of single and multiple events in a wide range of issues:

(1) *Mergers and acquisitions*. Many researchers have used event studies to analyze the impact of mergers on firms' returns. For example, in their early research Jensen and Ruback (1983) find that the targeted firms gained substantial and significant positive abnormal returns when the merger was initially announced, but lost these gains when the merger would not go through. Research by Simpson and Hosken (1998) examines the abnormal returns of rival firms and indicates that four retailing mergers in the late 1980's did reduce competition and lead to high prices in the whole market. Most of the papers on this issue try to determine the competitive effects of mergers and acquisitions, and evidence from the tests shows mixed results.

(2) *Regulatory changes*. Changes in laws and regulations can influence the way firms operate and thus affect firms' earnings, so they could alter firms' abnormal returns. As an example, Brady and Feinerg (2000) investigated the impact of EU merger control policy on the stock prices of 419 firms associated with merger decisions. Using typical $t$ tests and a market model, they find that enforcement of the merger regulation has had substantial mixed effects on individual company stock values. Another example is a study by Dnes and Seaton (1999). In their paper, an event study is used to compare the stock-market returns of regional electricity companies (RECs) with general stock market

returns for the post-privatization period in the United Kingdom. Their results support the hypothesis that the returns to REC shareholders were abnormally high during the 1991-1995 period, which would be consistent with regulatory capture.

(3) *Announcements of changes within the firm.* Corporate restructurings, capital structure changes, human resource changes and other changes in firms could be reflected in firms' stock returns. Applying the event-study approach to returns for 30 Dow Jones Industrial Average (DJIA) corporations over the period 1988-1995, Poon, Newbould and Durtschi (2001) tested the impact of restructuring announcements by 30 selected firms. Their findings show that restructurings, especially those that impose a charge against the firm's earnings, are typically related to negative excess returns. In another study focusing on the firm's changes, Subramani and Walden (2001) examined the firm's dot-com effects and found that a firm's e-commerce announcements are associated with a significant increase in the valuation of the firm.

(4) *Occurrence of accident, crisis and fraud.* When a firm faces bad news that will substantially change the prospects for its earnings, investors typically react quickly by selling their stock and bidding down the stock price. Several event studies examine the effect of harmful environment accidents on a firm's reputation, which can be reflected in the price of its stock. Some scholars focus their research on the impact of air crashes and accidents on the airline industry. One of the most important events in the history of the airline industry is the September 11 terrorist attack. Recently Carter and Simkins (2002)

found a significant decrease in airline stock returns in the wake of the attack, using a sample of 22 airline companies and a multivariate model. However, compared to the accident and crisis mentioned above, there are few articles discussing the stock market reaction to the effect of a fraud. One example of this type of study is Brown and Burdekin (2002). They investigated a well-known junior mining stock market failure in 1997 and argued that this market collapse was triggered by the well-publicized fraud of a mining company known as Bre-X. Just like Enron's accounting scandal, when Bre-X's Indonesian claims, previously believed to contain the world's largest gold deposit, were shown to be pure fraud, the whole market began to fall by over 25 percent in less than 6 weeks. Employing the standard event study methodology and a multifactor market model, they not only presented results demonstrating that Bre-X's failure destroyed the whole junior mining stock market significantly, but also suggested that small companies during this collapse were hit more badly than big companies. Published in the *Journal of Economics and Business* in 2000, this article is a good model for my research on the effects of Enron's accounting scandal and its subsequent bankruptcy.

(5) *Other events.* The most common application of the event study methodology has been to investigate the impact of various events on common stock prices, however. For example, Sibley (2001) examines the effect of some special events, in particular forty-one presidential elections in fifteen Latin American countries, using monthly data on currency value changes. The results of his study show that the transfer of power following a

presidential election in Latin America often has a significant negative impact on nominal currency values.

Unfortunately, only a small part of the previous research will be reviewed in my paper, because event studies have been applied to so many issues in economics and finance that I cannot list them all. Compared to the previous literature in which little attention has been paid by researchers to the effect of a firm's fraud, my research presents a surprisingly bad impact of the rising accounting fraud on the whole stock market, and, as a warning whistle, what I hope to do in this paper is to prevent the next Enron, the next Worldcom, and the next accounting fraud.

### 3.2 Procedures for an Event Study, the Market Model and *t* test Statistics

I employ the standard event study methodology to assess the impact of Enron's fraud on the financial industry and use a typical market model, which has been widely used in many event study cases. The procedures for performing a standard event study are described first.

The first step in conducting an event study is to define the event of interest and identify the period over which the event occurs---say, the event window. The event is what the researcher would like to investigate, and it conveys to investors information that could potentially influence the stock price. In the present case, the event is the accounting fraud of Enron Corporation. The event window is the period in which the event occurs.

Typically it should include the period when the occurrence of the event is publicly announced and the day preceding and succeeding the announcement day, which are numerically defined as $t$ = -1, 0, 1, respectively. The selection of an appropriate date is critical to an event study. However, in this case, it is hard to determine the exact event day because Enron's fraud consisted of a series of successive events from the end of the year 2001 to the middle of the year 2002. Several possible dates appear relevant to Enron's fraud as reported by the Wall Street Journal and other major media and summarized in Table 1. In my study, I regard October 18, 2001, the day that Enron officially admitted its SPE-related fraudulent accounting practice, as the event day, because on that day Enron finally announced the truth of Enron's accounting fraud to the public. However, by contrast, December 2, 2001, when Enron was finally destroyed by its plunging stock price, is another important day during the whole fraud. It was actually the peak of the whole fraud, compared to the time of the announcement of the fraud. So, I add this event to the schedule of my study as an alternative event day due to its importance in the fraud timeline. Since December 2, 2001 is a Sunday on which major stock markets were closed, December 3, 2001, one day after Enron's bankruptcy, will be chosen as the bankruptcy day of Enron.

In addition, it is necessary to determine other important concepts related to the study: the estimation window and the post-event window. The period of data used in the estimation of parameters is known as the estimation window. The estimation window in

this study is defined from day –101 (May 21, 2001) to day –2 (October 16, 2001) before the announcement day 0. Furthermore, what I am interested in is not just the short-term impact of Enron's scandal, but the long-term impact as well. In some circumstances, the market may not be able to fully understand and incorporate the impact of the announcement in the company's value in a short period of time, or the market participants may acquire the initial information of the event in the days or months subsequent to the announcement. So, the examination of abnormal returns in the period after the event day, called the post-event window, which is from day +1 (October 18, 2002) to day 150 (April 29, 2002) in this study, is designed to reveal whether the market overreacts or underreacts to the occurrence of the event in the long run. The timing sequence is illustrated with a time line in Figure 1.

Having identified the relevant times for the study, it is necessary to select an examination model. We use the market model, first suggested by Fama, Fisher, Jensen, and Roll in 1969, to examine the impact of Enron's accounting fraud. The form of this classical linear regression model is:

$$R_{s,t} = \alpha_s + \beta_s R_{m,t} + \epsilon_{s,t} \quad ,$$

where $R_{s,t}$ is the period-$t$ returns of stock s and $R_{m,t}$ is the market return during the period $t$, calculated from a market portfolio or a market index, in this case, the S&P 500 Stock Index. $\alpha_s$ is the constant term and $\beta_s$ is the coefficient of $R_{s,t}$; $\epsilon_{s,t}$ is the abnormal return of stock s at time $t$. The two parameters $\alpha_s$ and $\beta_s$ are effectively

estimated by using the data for the 110 financial service companies in the sample during the estimation window, which is not affected by the event. Then the estimated market model is used to evaluate the normal returns of stocks during the event window in the absence of the event. The difference between the observed daily returns and the daily returns predicted from the regression equation is called abnormal returns. This calculation is described by the following equation:

$$AR_{s,t} = R_{s,t} - (\hat{\alpha}_s + \hat{\beta}_s R_{m,t}) \quad ,$$

where $AR_{s,t}$ is the abnormal return of stock $s$ on day $t$ during the event window, $\hat{\alpha}_s$ and $\hat{\beta}_s$ are the OLS estimates of $\alpha_s$ and $\beta_s$ and $R_{s,t}$ and $R_{m,t}$ are defined above.

The abnormal returns ($AR_{s,t}$) of the different stocks can be cumulated over the entire supposed period of impact of the announcement on stock prices. For a given time interval, the cumulative abnormal returns ($CARs$) can be defined as the sum of abnormal returns for each day as follows:

$$CARs = \sum_{t=a}^{b} ARs, t \quad ,$$

where $a$ is the first day of the given time interval and $b$ is the last day of the given time interval. The abnormal returns can also be aggregated and averaged across all the stocks of sample firms in period t in the form of $CARt$ and $\overline{CARt}$, respectively, which are defined as follows:

$$CARt = \sum_{s=1}^{n} ARs, t$$

$$\overline{CARt} = \frac{1}{n} CARt$$

where ***n*** is the total number of firms involved in the test at day ***t***. And for any given time interval, $\overline{\overline{CAR}}$ is the average of all the $\overline{CARt}$ over the chosen intervals:

$$\overline{\overline{CAR}} = \frac{1}{T} \sum_{t=a}^{b} \overline{CARt}$$

where ***T*** is the total number of days in the chosen interval and ***a*** and ***b*** are the same as before.

These abnormal returns ($\overline{CARt}$ and $\overline{\overline{CAR}}$) are subjected to statistical parametric tests (*t*-test) designed to judge the significance of the relation between the bankruptcy of Enron and the stock market value of the financial companies analyzed in this study. The *t*-statistic for abnormal returns during the event window, in this case, is computed by dividing the average of the stock-specific returns across all stocks for the event day or event window by the aggregation of the standard deviations across all stocks during the estimation or pre-event window:

$$t = \frac{\overline{CARt}}{\sigma_{n,pre}}$$

where $\overline{CARt}$ is defined as above and $\sigma_{n,pre}$ is the corresponding standard deviation. Mathematically, it is:

$$\sigma_{n,\,pre} = \sqrt{\left[\sum_{t=a}^{b}\left(\overline{CAR_t} - \overline{\overline{CAR}}\right)^2\right] / n-1},$$

where ***a***, ***b*** are the first and last day of the *estimation* window and ***n*** is defined above. In this case:

$$\sigma_{n,\,pre} = \sqrt{\left[\sum_{t=-101}^{-2}\left(\overline{CAR_t} - \overline{\overline{CAR}}\right)^2\right] / 109}$$

$$\overline{CARt} = \frac{\sum_{s=1}^{110} ARs,\, t}{110}$$

$$\overline{\overline{CAR}} = \frac{1}{100}\sum_{t=-101}^{-2}\overline{CARt}$$

For t= -1, 0, +1, the *t*-statistic for abnormal returns in a given interval in the post-event window is

$$t_{a,\,b} = \frac{\sum_{t=a}^{b}\overline{CAR_t}}{\sqrt{\sum_{t=a}^{b}(\sigma_{n,\,t})^2}}$$

where ***a*** and ***b*** are the first day and the last day of the given intervals, for examples, +1 to +10, +1 to 20, +1 to +150, etc, which are selected to examine the impact of the event either around the event day or after it and $\sigma_{n,\,t}$ is the related estimated standard deviation, which is defined as follows:

$$\sigma_{n,\,t} = \sqrt{\left[\sum_{t=a}^{b}\left(\overline{CAR_t} - \overline{\overline{CAR}}\right)^2\right] / n-1}$$

where ***a***, ***b*** and ***n*** have already been defined before. Many researchers like Masulis (1980) and Brown and Warner (1985) have used these statistics, which are still the most common

parametric tests used to perform event studies in today's literature.

With the event study framework described above, we can test the null hypothesis that there was no abnormal return over the chosen event window or post-event window as a result of Enron's accounting scandal versus the alternative hypothesis that there was an abnormal return. Rejection of the null hypothesis suggests that the market has taken the fraud into account and soon this bad news to the whole market was incorporated into stock shares. Given the nature of the event, there would be a strongly negative response to the whole financial services industry on and after the announcement of Enron's accounting fraud. Therefore, as we expect, the results of the $t$ test statistics would be greater than the critical value for the chosen level of significance. In section 4, the results of the $t$-tests will be presented in detail.

### 3.3 Alternative Nonparametric Test

It is important to note that the use of a specific assumption, that the abnormal returns are normally distributed, is particularly important in traditional parametric tests. The parametric test proposed in this paper relies crucially on the assumption that the individual firm's abnormal returns are normally distributed. If this assumption is violated, parametric tests are not well specified and a more powerful test may be preferred. Alternative nonparametric approaches have become available in recent years, and discussions about whether the parametric or the nonparametric approach is better are still

continuing.

In their two widely cited papers, Brown and Warner (1980, 1985) argued that the non-normality problem of daily abnormal returns has no obvious effect on the event study methodology. Their findings support the belief that the mean abnormal returns in a cross section of securities converge to normality as the number of securities in the sample increases. They also found that event studies based on ordinary least squares (OLS) estimation of the market model which use standard parametric tests are well specified using daily abnormal returns data under a variety of conditions.

However, by contrast, rising concerns over the lack of normality in abnormal return distributions motivated the introduction of such nonparametric test statistics as the rank test and the sign test. Furthermore, the recent findings of many researchers, for example, Campbell and Wasley (1993), have supported the view that nonparametric tests have higher power than traditional parametric tests when the stock returns lack normality. However, Brown and Warner (1985) still concluded that the application of such nonparametric tests would be badly specified due to the problem of variance shifts coincident with the events of interest. Although the argument is still continuing, the advantage of the nonparametric event study approach, that it is free of distributional assumptions, makes it very popular in recent event studies as an alternative approach to the traditional parametric test.

So, if we have reason to believe that the returns are not normally distributed, we can

use a non-parametric test to evaluate the result as an alternative to the parametric t test. Thus, I must first find out whether the abnormal returns of the selected firms in my study are normally distributed or not. If the abnormal returns are normally distributed for most firms, I can conclude that the traditional parametric tests are appropriate in my research, but if not, one of the nonparametric tests will also be employed in my research.

In order to evaluate whether the abnormal returns of the selected financial firms are normally distributed, two widely used asymptotically valid tests for normality, the Jarque-Bera test and the Chi-squared Goodness of Fit test are applied in the study.[22] The results show that for most of the firms, abnormal returns are not normally distributed.[23] Thus the sign test, which is based on the sign of the abnormal returns, is employed to carry out the nonparametric test in my study. The sign test simply tests whether the frequency of positive abnormal residuals, or more generally, cumulative abnormal returns, equals 50%. That is to say, under the null hypothesis of no abnormal performance, it is equally probable that the abnormal returns or cumulative abnormal returns will be positive or negative. In other words, if, in this case, I want to investigate whether there are negative abnormal returns associated with Enron's debacle, the null hypothesis will be that the probability of negative abnormal returns is less than or equal to 0.5 and the alternative is that the probability of negative abnormal returns is greater than 0.5. To implement this test, we need to determine the number of stocks that have negative

[22] For a detailed discussion of the Jarque-Bera test and the Chi-square Goodness of Fit test, please refer to Gujarati (1995).
[23] In section 4, I will discuss the results of these two tests in detail.

abnormal returns and the total number of observations. The test statistic is computed as shown in the following equation:

$$S = \left( \frac{N -}{N} - 0.5 \right) \frac{\sqrt{N}}{0.5} \sim N(0, 1)$$

where N- is the number of stock returns that are negative and N is number of stocks in the sample. Under the null hypothesis, this test statistic is normally distributed. The decision rule for this test is that $H_0$ can be rejected if the observed value of the statistic is greater than the critical value for a given significance level; otherwise one does not reject the null hypothesis.[24]

### 3.4 Data

The construction of the data began with the selection of Standard and Poor's 500 Stock Index (S&P 500), which is, compared to other composite stock indexes such as the Dow Jones Industrial Average and the Nasdaq Composite Index, the most readily available proxy for the universe of the financial services industry. Of the many indices available to track the stock market's progress around and after Enron's accounting fraud, I prefer Standard and Poor's 500 Stock Index, although possibilities include the Dow Jones Industrial Average, popularly called "the Dow," which is the world's most widely followed stock market index. The Dow measures the combined price activity of 30 of the United States' top companies. Each company in the Dow represents a major industrial

[24] MacKinlay (1997) introduced this simple sign test in his paper, "Event Study in Finance and Economics," *Journal of Economic Literature* 35, 13-39.

sector in order to reflect a diversified view of market conditions. Thus, the Dow Jones Industrial Average is designed to reflect the best part of the whole American economy and the simplicity of its components determines that I cannot choose it as the representation of the market portfolio for the analysis of the financial industry in my event study. In contrast to the Dow, the Standard and Poor's 500, or S&P500, is a widely used index comprised of a diverse group of 500 top equities traded on U.S. stock exchanges. Unlike the Dow, which only measures the combined movement of 30 top companies, the S&P500 measures a broader spectrum of price activity in equities, which reflect the depth and reach of money movement into, or out of, the 500 top stocks traded across different exchanges – NYSE, NASDAQ and AMEX. Most of the top firms in the financial sector, including Citi Group, American Express Company and KeyCorp, etc, are listed in the S&P 500 Index so that there will be a statistically significant correlation between the movement of the index and the release of negative news about Enron.

To investigate the impact of Enron's debacle on financial services, I use a sample of 110 financial firms for which daily price data are available on the website of *Yahoo!Finance* (http://finance.yahoo.com) and transform the daily price data to daily return data using the econometric software SHAZAM.[25] Since so many stocks of financial firms have been listed in *Yahoo*, the final 110 portfolios used in this study were randomly selected. However, indeed, some financial firms, especially those whose capital

[25] I transfer the daily price data to daily return data in the following way: $P_{s,t}=(P_{s,t}-P_{s,t-1})/P_{s,t-1}$.

valuation and trading volume are small in the stock market, cannot be included in my sample due to the fact that their price data are not always available on a daily basis. In addition, in order to prevent the large firms from dominating the returns, the sample firms were weighted equally in the creation of a portfolio, ranging from such large, established financial services as Citigroup and Morgan Stanley to small financial firms, some of which are under $100 million in capital valuation. The final sample of 110 financial firms is summarized in Table 2, which includes the name of the firm, its ticket name, its capital valuation on April 2, 2003, its net income and revenue in 2001, and its possible index membership as reported on *Yahoo*'s website and *FISonline* (Moody's company data) which is available at the Morisset Library, University of Ottawa.

In order to compare the effects of Enron's debacle among different groups, I divide the 110 financial firms into several subsamples in two different ways. First, firms are classified by size. The financial information contained in Table 2 provides us with a good means of classifying firms into three different groups based on their capital valuation. The individual firm whose capital valuation is less than or equal to $1000 million is regarded as a small firm, while the firm whose capital valuation is greater than $1,000 million but less than or equal to $10,000 million is a mid-sized firm, and those whose capital valuation exceeds $10,000 million are large firms. Separate tests are designed to test for significant differences between the effects on large firms versus small and mid-sized firms.

Next, firms are classified by industry. The financial service sector is divided into 10 different sub-sectors on the website of *Yahoo*: Consumer Financial Services, Insurance (Accident & Health), Insurance (Life), Insurance (Miscellaneous), Insurance (Prop. & Casualty), Investment Services, Misc. Financial Services, Money Center Banks, Regional Banks and S&Ls/Savings Banks. But in my study, by contrast, I will divided them into 3 subsamples: A. Banks, including the 3 types of banks mentioned above; B. insurance companies, including the 4 types of insurance firms mentioned above; and C. other financial services, including Consumer Financial Services and Misc. Financial Services. Both parametric and nonparametric tests, following a detailed analysis of the corresponding results, will be delicately employed in the next section.

## 4. Results

### 4.1 Results of Parametric *t* Test

I present my results in Tables 3 through 4. Based on the *t*-tests for the three-day event window beginning one day before the event, Table 3 presents the empirical findings of two specific events related to Enron's accounting fraud, while Table 4 presents the *t* test results for the effect of Enron's accounting fraud after the chosen event date.

Table 3 contains two parts. Panel A shows the results of *t*-test statistics for the day on which Enron admitted its fraudulent accounting practices and Panel B shows the results for the day on which Enron officially announced its bankruptcy, another important day

during Enron's scandal. Note that the estimation window is the same for both panels of Table 3. Furthermore, each panel in Table 3 includes two different tables, breaking the 110-firm portfolio down according to size and industry, indicating the real impact of the events on the 110 firms as a whole and on the different subsamples. The tables also indicate the level of statistical significance of the *t* ratio and show the sign of significant results. According to Panel A of Table 3, the whole financial industry experienced significantly negative abnormal returns during the day October 18, when Enron admitted its accounting problem. Interestingly, on October 17, the day that Enron released its real financial statement for the previous five years, the whole market did not react at once so that the expected stock decline of financial companies did not appear that day. However, although this result seems puzzling at first, on October 18, the chosen event day, the returns of all the sample companies fell significantly (the absolute value of the *t* test statistic for the whole sample is much greater than 2.326, the 1% critical value). Moreover, on the trading day following the event day, October 19, almost all of the sample firms have negative abnormal returns, although they are not significant in *t* tests for the sample as a whole.

Furthermore, comparisons between the subsamples reveal that the real effects of the event on each subsample are different. Compared to small ones, mid-sized and large financial companies appear to be affected particularly badly by the event partly because Enron's primary creditors, such as Citigroup, JP Morgen Chase, and the Royal Bank of

Canada, etc., most of which are leading companies in the financial services industry, suffered tremendous losses first. Meanwhile, I find large, significant negative returns for each of the insurers and other financial companies but smaller negative returns for banks. In addition, I find some positive but insignificant changes in abnormal returns for small and mid-sized firms one trading day prior to the event day. That is to say, in contrast to large firms, small and mid-sized firms did not react to the event at once. Indeed, according to my analysis in the previous section, most firms were recovering gradually after being badly hit by the terrorist attack, with positive abnormal returns for most firms, but the accounting fraud of Enron broke down their rebound and from that day on the whole financial market tended to decrease again.

With regard to the other important day for Enron's fraud, December 3, the results of Panel B in Table 3 imply that the whole market reacted significantly and negatively to the announcement of Enron's bankruptcy, a response similar to that on the event day, October 18. That is to say, as the fraud case developed, when Enron filed for bankruptcy protection, the market experienced another significant fall. Categorizing the portfolios by size demonstrates that the stock prices of small, mid-sized and large companies reacted in a similar negative manner at the 1% significance level. As in Panel A, insurers and others are hit particularly badly. In general, the results shown in Table 3 reflect that, in a relatively short time, all the financial firms, whether grouped by size or industry, endured negative effects as a result of Enron's well-known accounting fraud for the two specific

events on October 18 and December 3.

The analysis presented so far reveals the relatively short-term market reaction on and around the announcement of the event. However, what I am further interested in is the long-term influence of the event after its occurrence. In fact, the after-effects of Enron's fraud extend from its bankruptcy in December 2001 to August 2002 when Enron's accounting firm, Arthur Anderson, announced it was quitting the auditing business. So, to examine the market's behavior over a much longer horizon after the occurrence of the event, I calculated the cumulative abnormal returns for at most 150 trading days after the event.

Table 4 reports *t*-tests on the cumulative abnormal returns in intervals after the event day. As I indicated in the previous section, cumulative abnormal returns are calculated by summing the abnormal returns across the chosen intervals. Such calculations are designed to show the cumulative effect of the fraud and to provide an opportunity to examine the fraud in a relatively long time period after the event. The frequent occurrence of significance of the *t*-test statistics in Table 4 suggests that, with the further development of the accounting fraud, as Arthur Anderson, one of the biggest auditing firms in the world with a number of clients for its auditing business, was pushed to the front stage of the whole fraud, more and more firms were negatively and significantly affected by the fraud. Remarkably, during the short-term period after the event day, all the sample firms taken together have insignificant negative cumulative abnormal returns, where the *t*

statistics are -1.078839, -1.457509 and -1.461284 for 10 days, 20 days and 30 days respectively, after the event day. Obviously, during these periods after the event, the situation facing the whole financial market was not as bad as we expected. However, things seem to change after Enron filed for its bankruptcy protection on December 2, 2001. In contrast to the periods of (+1, +10), (+1, +20) and (+1, +30) window, in the (+1, +40) post-event window, the *t* test on the cumulative abnormal returns begins to show significant abnormal returns, where the observed value is much higher than 2.326. Thus, as you can notice from Table 5, from (+1, +40) to (+1, +110) window, the financial market did endure an overall significant decreasing. However, the bad effects of the event seemed to weaken gradually so that there are no significant negative abnormal returns in the last two post-event windows, where the results of *t* tests in (+1, +120) and (+1, +150) are -0.518250 and -0.874615, respectively. In conclusion, according to the results for all firms shown in Table 4, all the sample companies did experience a horrible time in the long-term period after the event day, especially after Enron's bankruptcy.

Turning from overall effects to subsample-specific effects, as in Table 3, all the sample firms are divided into two sets of subsamples, by size and industry. However, compared to the results of Table 3, a somewhat noticeable phenomenon emerges in evaluating the abnormal returns of different size subsamples in Table 4: during this long-term market collapse, it was not the large firms but the small firms that were extraordinarily hard hit by Enron's scandal. As I already indicated above, large firms

were hit particularly badly by the fraud on and around the event day. However, by contrast, it seems that the large firms could recover from the crisis more rapidly because of their large size and value. Thus, in Table 4, I find significantly negative abnormal returns for small firms in almost all the after-event intervals but fewer for large and mid-sized firms. Meanwhile, the absence of significant abnormal returns for banks, along with significant abnormal returns in most intervals for insurers and others, provides evidence that banks are the ones that are not significantly affected by the event, while insurers and other firms experienced a horrible time after Enron's collapse. However, one cannot simply conclude that all the significant negative stock returns are due to the Enron accounting fraud because in the long-term period after its occurrence, other events that happened during this period may also have affected the stock prices of the firms.

All in all, the empirical findings of the parametric *t* tests for abnormal returns tend to support a large, significantly negative relationship between the debacle of Enron and the stock returns of the 110 sample financial firms on and after the event date. By comparing the test results for each subsample, firstly I discovered that mid-sized and large firms were affected deeply by the event, as were the Insurers and other financial firms as well. However, as the whole accounting scandal deepened, I found smaller and generally no significant abnormal returns for large firms and banks, but larger and significant negative returns for small firms and insurers.

**4.2 Results of Normality tests.**

Table 5 presents the results of the two tests for normality of the abnormal returns. These tests were performed on the OLS residuals of the estimated market models for each firm. As you can see from this table, the results show that the abnormal returns of most of my target firms are not normally distributed. For the Jarque-Bera test, the decision rule is to reject the null hypothesis that the abnormal returns are normally distributed if the observed value of the statistic is greater than $\chi^2_{2,\alpha}$ where $\chi^2_{2,\alpha}$ is the value of $\chi^2_2$ such that $P(\chi^2_2 \geq \chi^2_{2,\alpha}) = \alpha$. The results show that in many cases, the observed value of the statistic is greater than the critical value, choosing significance at the one percent, five percent and ten percent levels. That is to say, I can reject the null hypothesis that the abnormal returns are normally distributed for most of my sample firms. The second test for normality strongly supports the results of the Jarque-Bera test, which means that the traditional parametric test may not be powerful in my study due to the lack of normality of the abnormal returns. It is noteworthy that these two tests may lead to different conclusions in small samples, because they are only asymptotically valid. Anyway, due to the lack of normality of the abnormal returns for sample firms, I need the results of the nonparametric sign test to support what I have found in the parametric tests. So, I next apply the nonparametric sign test to evaluate the findings shown above.

### 4.3 Results of Nonparametric Sign Test

Table 6 exhibits the results of nonparametric sign tests for the full sample and different subsamples during the 3-day event window. The results presented in Table 7 are consistent with my previous parametric t tests.

In the full sample results of Panel A, the $t = 0$ window shows significantly negative abnormal returns, where the value of the sign test statistic for the entire sample of firms is 4.767312, which is much greater than the critical value for 1% significance level of 2.326. Note that when the abnormal returns are significantly negative, the observed value of the nonparametric sign test statistic will be positive, which is the opposite of the $t$ test statistic. In particular, both parametric and nonparametric tests on the three-day event window present generally no significantly negative abnormal returns for small firms and banks, while mid-sized, large firms, insurers and other firms show strong evidence that they were hard hit by the event. Referring to Panel B, the sign tests also lead to the same conclusion that the news of Enron's final collapse did reach the market immediately and all the subsamples, whether they are defined by size or industry, appear to lose their abnormal returns similarly. All the empirical findings of the $t$ tests were strongly supported by the results of the nonparametric sign test, that is to say, although the abnormal returns for sample firms are not normally distributed, the $t$ test statistics are still powerful for testing the impact of Enron's fraud in this case.

Overall, combining the results of the nonparametric sign tests and the traditional parametric *t* tests, I find that the events related to Enron's scandal had significant negative effects, in both the economic and the statistical sense, on the value of firms involved in the financial services industry. I do find different impacts of the events on different subsamples. In a relatively short period on and after the date of occurrence of the event, large firms and banks seem to be the ones that are hit most badly. However, with the evolution of Enron's scandal over a long time period, there is some strong evidence that not the large firms and banks but the small/mid-sized firms and insurers/others are the ones enduring a difficult bear market.

## 5. Conclusion

Enron's well-known financial statement fraud and its related auditing failure provide a unique opportunity to understand how powerfully financial markets can react to an accounting fraud. During the months following its occurrence, Enron's scandal destroyed billions of dollars in paper wealth, with the Dow Jones Industrial Average and S&P 500 Stock Index shrinking nearly 25 percent. It is meaningful for my research about this kind of issue that the results suggest that Enron's accounting fraud, also called a "crisis in accounting," triggered a shocking collapse with a domino effect on the whole financial market that endured a long time, with smaller or insurance companies being hit particularly badly. Larger firms and banks luckily survived the storm due to their strong

foundations and scale. Indeed, the key reason for the market collapse is that in markets where investors' confidence plays a very important role, fraud or intended misinformation creates widespread mistrust among investors, which may lead investors to re-evaluate their faith in the firms' expected future profits and finally run away from the markets. Terrorist attacks are not the only thing that can demolish the whole market. The reputation of the market per se is even more important. The lessons from Enron teach us that financial markets can be built up by investors but can also be destroyed by investors.

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*ABC News* (http://www.abcnews.go.com/sections/business/DailyNews/enron_subindex.html)

*BBC News* (http://news.bbc.co.uk/hi/english/in_depth/business/2002/enron/)

*Business Week* (http://www.businessweek.com/magazine/toc/02_04/B3767enron.htm)

*CNN* (http://www.cnn.com/SPECIALS/2002/enron/)

*CNN Money* (http://money.cnn.com/news/specials/enron/)
*CorpWatch* (http://www.corpwatch.org)
*Enron* (http://www.enron.com)
*Enron Files* (http://www.enronfiles.com)
*FindLaw* (http://news.findlaw.com/legalnews/lit/enron/)
*Financial Times* (http://specials.ft.com/enron)
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*The Daily Enron* (http://www.thedailyenron.com)
*Time* (http://www.time.com/time/2002/enron/)
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*Yahoo* (http://news.yahoo.com/fc?tmpl=fc&cid=34&in=business&cat=enron)
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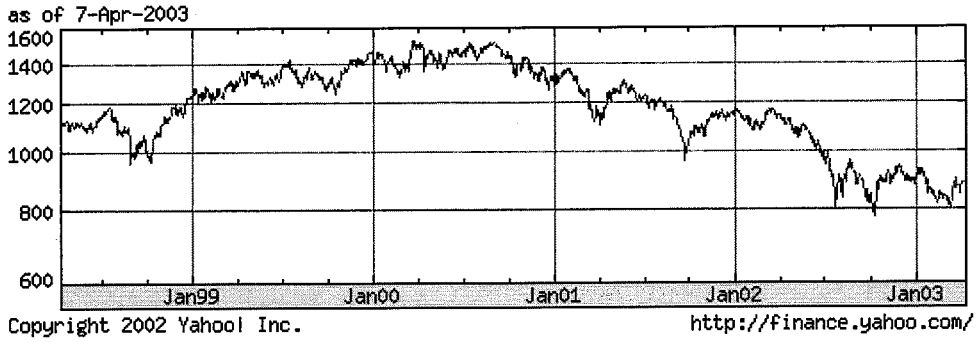
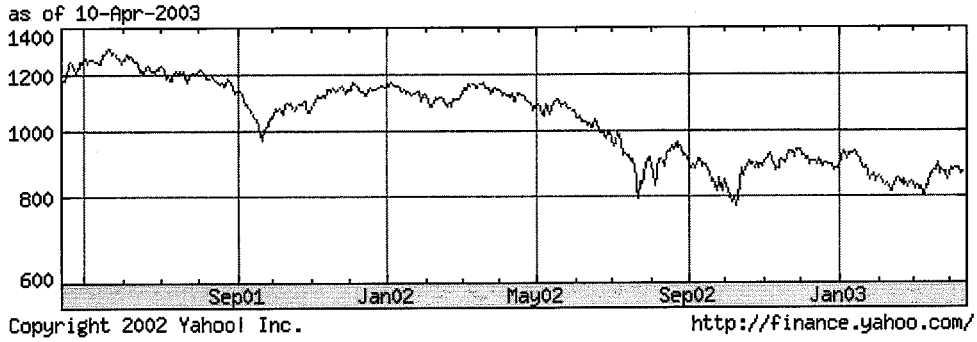
## Chart 1. S&P 500 in Recent Years

### Panel A. S&P 500 in Recent 5 Years

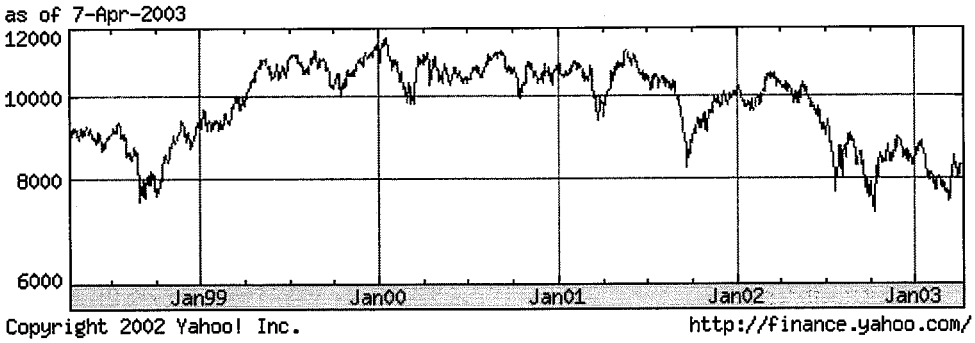



### Panel B. S&P 500 in Recent 2 Years




## Chart 2. Dow Jones Industrial Average in Recent Years

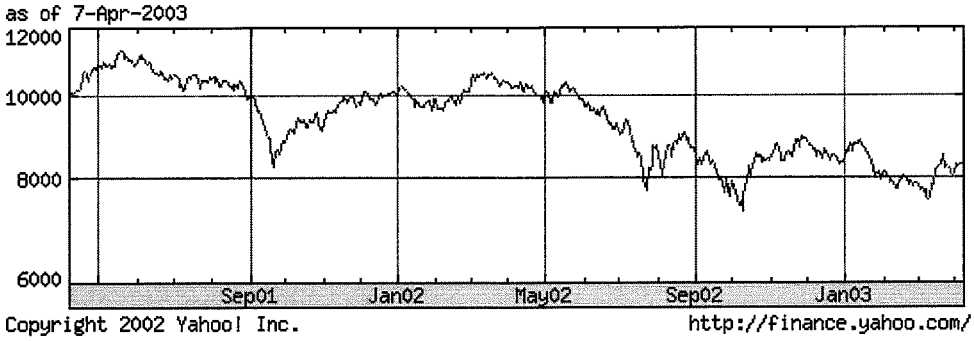
### Panel A. The Dow in Recent 5 Years




**(Continued)**

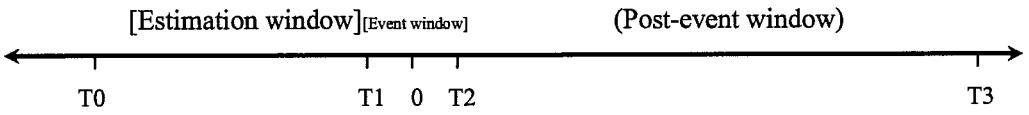
## Chart 2. (Continued)

### Panel B. The Dow in Recent 2 Years




Note: all the charts shown above are provided by yahoo finance website on April 7, 2003 and April 10, 2003

## Figure1. Time line for the event study of Enron's bankruptcy




**T0:** June 1, 2001

**T1**: October 17, 2001

**0:** chosen event day of the announcement of Enron's fraud, October 18, 2001

**T2:** October 19, 2001

**T3:** April 30, 2002

## Table 1. Chronology of the event

| Date | Important event |
|---|---|
| Oct. 17, 2001 | Enron reports third quarter net loss of $618 million after $1.01 billion in charges related to write downs of investments. |
| Oct. 18, 2001 | Enron discloses that shareholder equity shrank by $1.2 billion as a result of a serious of complex transactions including ones undertaken with chief financial officer Andrew Fastow. |
| Oct.19, 2001 | The Wall Street Journal reveals that Fastow made at least $7 million dollars in profits from transactions between the partnership and Enron. |
| Oct. 22, 2001 | Enron announces that the SEC will begin to investigate the company's "related party transactions." |
| Oct. 23, 2001 | Enron's accounting company, Arthur Anderson, begins to shred Enron-related documents, in spite of knowing about the inquiry of the SEC. |
| Oct. 24, 2001 | Enron replaces Fastow as CFO with Jefferey Mcmahon. |
| Oct.31, 2001 | The SEC begins formal investigation into Enron's financial dealings headed by its former CFO Fastow. In the meantime, Enron forms a special committee of the board to investigate the partnerships. |
| Nov. 8, 2001 | Deciding partnerships should be consolidated into its financial results, Enron was forced to restate its earnings from 1997 through 2001, reducing net income by $586 million and boosting debt by $2.6 billion. |
| Nov. 9, 2001 | Enron strikes merger deal with Dynegy, its largest energy-industry rival. |
| Nov. 20, 2001 | Enron warns that credit worries, asset value decreases and reduced trading could hurt its fourth-quarter earnings. |
| Nov. 28, 2001 | Major credit rating agencies downgrade Enron's bonds to "junk" status. As a result, Dynegy backs out of the merger deal and Enron's stock price falls to 61 cent per share. |
| Dec.2, 2001 | Enron files for Chapter 11 bankruptcy protection in a New York bankruptcy court. With $62 billion in assets, it is the biggest such filing in U.S. history up to that time. |
| Dec.3, 2001 | Enron secures almost $1.5 billion in debtor-in-possession financing, and lays off 4000 employees. |
| Dec.4, 2001 | Lawsuit on behalf of members of Enron's employee-retirement plan is expanded to allege that Anderson "knowingly participated in Enron's breaches of fiduciary duty." |
| Jan.10, 2002 | Justice Department confirms it is conducting its own criminal investigation into Enron. |
| Jan.11, 2002 | Enron's board fires its long-time auditor, Arthur Anderson. |
| Jan.14, 2002 | Arthur Anderson discloses that it destroyed documents related to Enron. |
| Jan.16, 2002 | Anderson is facing lawsuit in connection with Enron. |

**(Continued)**

**Table 1. (Continued)**

| Date | Important event |
|---|---|
| Jan.23, 2002 | Kenney Lay resigns as chairman and chief executive of Enron less than 24 hours after the court requests his removal. |
| Jan.25, 2002 | Former Enron vice chairman Cliff Baxter is found dead as the government investigation intensifies. |
| Feb.4, 2002 | Former federal reserve chairman Paul Volcker is hired to introduce widespread reforms at Andersen and restore its reputation. |
| Mar.14, 2002 | The US Justice Department charges Andersen with deliberately destroying evidence relating to its audit of Enron whilst an investigation was already underway. |
| Mar.26, 2002 | Chief executive Joseph Berardino resigns amid an ongoing exodus of clients and partners. |
| Apr.2, 2002 | Andersen admits defeat in trying to forge a merger deal for its international partnerships. |
| Apr.8, 2002 | 7,000 US employees of Anderson are laid off - about a quarter of its US workforce - as US operations are splitup. |
| May 7, 2002 | The trial begins, after settlement talks between Andersen and the US Justice Department break down. |
| June 12, 2002 | The jury in the Andersen trial admits it is deadlocked. It is then granted permission to deliver a guilty verdict against the company even if they fail to agree which individual is responsible for the actions. |
| June 15,2002 | Arthur Andersen, the US arm of the accounting giant, is found guilty of obstructing justice by shredding evidence relating to the Enron scandal. It agrees to cease auditing public companies by 31 August. |

Notes: All events are listed as described in reports in the Wall street Journal, BBC news website and Washington Post website.

## Table 2. Size and Financial Information for Portfolio Firms

| Company Name | Ticket | Market Capital (Million) | Total Revenue (Million) | Operating Income (Million) | Total Number of Employees | Index Membership |
|---|---|---|---|---|---|---|
| *Money Center Banks* | | | | | | |
| Citigroup Inc. | C | $192,519.31 | $112,022 | $5,296 | 242,000 | the Dow; S&P500 |
| Bank of America Corporation | BAC | $105,165.91 | $52,641 | $10,117 | 142,670 | S&P500 |
| HSBC Holdings plc (ADR) | HBC | $100,326.04 | $14,725 | $5,296 | 180,000 | N/A |
| UBS AG (ADR) | UBS | $52,971.79 | $22,153.347 | $4,009.974 | 69,985 | N/A |
| J.P. Morgan Chase & Co. | JPM | $51,209.63 | $50,429 | $2,566 | 94,335 | the Dow; S&P500 |
| Barclays PLC (ADR) | BCS | $41,184.58 | $19,515.446 | $5,296 | 78,600 | N/A |
| Bank One Corporation | ONE | $41,183.77 | $24,527 | $4,151 | 73,685 | S&P500 |
| Banco Santander Central Hsp | STD | $33,221.26 | $30,936.702 | $5,253.708 | 105,160 | N/A |
| FleetBoston Financial | FBF | $26,712.76 | $19,133 | $2,521 | 56,000 | S&P500 |
| Deutsche Bank AG (ADR) | DB | $26,005.69 | N/A | N/A | 77,442 | N/A |
| Bank of New York Co. | BK | $16,044.19 | $7,160 | $2,058 | 19,435 | S&P500 |
| *Rigional Banks* | | | | | | |
| Royal Bank of Canada | RY | $26,204.42 | $16,148 | $3,190.026 | 59,549 | N/A |
| BB&T Corporation | BBT | $15,431.77 | $6,106.016 | $1,238.215 | 22,500 | S&P500 |
| MBNA Corporation | KRB | $20,314.99 | $10,144.721 | $3,430.596 | 28,000 | S&P500 |
| Toronto-Dominion Bank | TD | $14,474.53 | $9,177.508 | $3,161,487 | 45,565 | N/A |
| Bank of Montreal | BMO | $13,527.29 | $8,244.6 | $1,364.798 | 33,912 | N/A |
| Sanpaolo IMI S.p.A. (ADR) | IMI | $13,135.76 | $9,943.262 | $1,701.974 | 35,729 | N/A |
| PNC Financial Services | PNC | $12,297.45 | $6,680 | $564 | 23,900 | S&P500 |
| State Street Corporation | STT | $10,994.50 | $5,637 | $930 | 18,952 | S&P500 |
| Capital One Financial Corp. | COF | $7,615.52 | $7,254.29 | $1,035.42 | 18,757 | S&P500 |
| Northern Trust Corporation | NTRS | $6,987.39 | $3,261.5 | $731.9 | 9,317 | S&P500 |

**(Continued)**

**Table 2(Continued)**

| Company Name | Ticket | Market Capital (Million) | Total Revenue (Million) | Operating Income (Million) | Total Number of Employees | Index Membership |
|---|---|---|---|---|---|---|
| UnionBanCal Corporation | UB | $6,059.41 | $2,911.715 | $715.272 | 9,472 | N/A |
| Popular, Inc. | BPOP | $4,609.70 | $2,561.378 | $409.114 | 10,959 | N/A |
| Citizens Banking Corp./MI | CBCF | $1,004.67 | $691.040 | $147,872 | 2,520 | N/A |
| *Insurance (life)* | | | | | | |
| ING Groep N.V. (ADR) | ING | $26,143.96 | $65,832.494 | $5,361.131 | 112,000 | N/A |
| AXA (ADR) | AXA | $22,531.29 | $64,723.325 | $1,521.020 | 90,151 | N/A |
| MetLife, Inc. | MET | $19,579.83 | $31,928 | $739 | 48,500 | S&P500 |
| Sun Life Financial of Canada | SLF | $12,057.18 | $10,500.719 | $786.5 | 11,787 | N/A |
| Prudential plc (ADR) | PUK | $10,803.77 | $13,461.278 | $23,627.929 | 20,746 | N/A |
| Canada Life Financial | CLU | $4,786.34 | N/A | N/A | 6,600 | N/A |
| ORIX Corporation (ADR) | IX | $3,797.85 | $4,938.465 | $550.268 | 11,271 | N/A |
| Reinsurance Group of Am. | RGA | $1,314.25 | $1,968.284 | $84.247 | 684 | N/A |
| Amerus Group Co Cl A | AMH | $987.41 | $1,287.454 | $144.856 | 1,415 | N/A |
| FBL Financial Group | FFG | $556.60 | $474.590 | $65.464 | 1,970 | N/A |
| Scottish Annuity & Life | SCT | $472.84 | $83.934 | $25768 | 100 | N/A |
| *Insurance (Prop. & Casualty)* | | | | | | |
| American Int'l Group, Inc | AIG | $140,043.48 | $55,459 | $10,864 | 80,000 | S&P500 |
| Allstate Corporation (ALL) | ALL | $24,763.19 | $28,865 | $1,596 | 39,284 | N/A |
| Millea Holdings, Inc. (ADR) | MLEA | $12,044.83 | N/A | N/A | 14,200 | N/A |
| XCapitalLtd | XL | $10,435.48 | $4056.759 | $758.636 | 2100 | S&P500 |
| Cincinnati Financial Corp | CINF | $5,869.75 | $2,561 | $277 | 3,511 | S&P500 |
| St. Paul Companies, Inc. | SPC | $7,695.46 | $8,943 | $1,431 | 9,700 | S&P500 |
| CNA Financial Corporation | CNA | $5,075.95 | $13,203 | $2,148 | 15,500 | N/A |
| SAFECO Corporation | SAFC | $5,004.84 | $6,862.5 | $1,347.6 | 12,000 | S&P500 |
| Everest Re Group, Ltd. | RE | $3,035.80 | $1,801.545 | $100,136.347 | 477 | S&P 400 MidCap |

**(Continued)**

**Table 2 (Continued)**

| Company Name | Ticket | Market Capital (Million) | Total Revenue (Million) | Operating Income (Million) | Total Number of Employees | Index Membership |
|---|---|---|---|---|---|---|
| PartnerRe Ltd. | PRE | $2,792.41 | 1,525.602 | $101.25 | 689 | N/A |
| W.R. Berkley Corporation | BER | $2,354.80 | $1,941.797 | $105.675 | 4,244 | N/A |
| Markel Corporation | MKL | $2,206.79 | $1,397.412 | $133.551 | 1,621 | N/A |
| Commerce Group, Inc. | CGI | $1,126.00 | $1,153.838 | $115.425 | 1,780 | N/A |
| 21st Century Insurance Group | TW | $1,124.29 | $914.078 | $52.075 | 2,600 | N/A |
| Vesta Insurance Group Inc | VTA | $78.72 | $373.644 | $5.263 | 1,650 | |
| *Insurance (Miscellaneous)* | | | | | | |
| Marsh & McLennan Co's | MMC | $24,047.99 | $9,943 | $1,763 | 59,500 | S&P500 |
| Aon Corporation | AOC | $6,731.95 | $7,676 | $594 | 55,000 | S&P500 |
| Hilb, Rogal & Hamilton Co | HRH | $1,121.08 | $330.267 | $65.792 | 2,600 | S&P 600 SmallCap |
| Baldwin & Lyons, Inc. | BWINB | $293.70 | N/A | N/A | 288 | N/A |
| Crawford & Company | CRDB | $216.40 | N/A | N/A | 8,269 | N/A |
| *Insurance (Accident & Health)* | | | | | | |
| UnitedHealth Group Inc. | UNH | $27,561.43 | $23,454 | $1,566 | 32,000 | S&P500 |
| Aetna Inc. | AET | $7,269.52 | $25,190.8 | $330.4 | 28,000 | S&P500 |
| CIGNA Corporation | CI | $6,729.63 | $19,115 | $1,497 | 41,200 | S&P500 |
| Transatlantic Holdings | TRH | $3,499.50 | $2,030.182 | $33.786 | 435 | N/A |
| UnumProvident Corp. | UNM | $2,319.78 | $9,394.8 | $994.7 | 13,800 | S&P500 |
| Humana Inc | HUM | $1,511.21 | $10,194.886 | $208.382 | 13,500 | S&P500 |
| Universal American Financial | UHCO | $330.86 | $284.091 | $33.066 | 860 | N/A |
| HealthExtras, Inc. | HLEX | $132.21 | $124.351 | $7.771 | 82 | N/A |
| *Investment Services* | | | | | | |
| Morgan Stanley | MWD | $45,829.41 | $43,727 | $208,382 | 55,726 | S&P500 |
| Goldman Sachs Group | GS | $34,008.71 | $31,138 | $3,696 | 13,500 | S&P500 |

**(Continued)**

**Table 2 (Continued)**

| Company Name | Ticket | Market Capital (Million) | Total Revenue (Million) | Operating Income (Million) | Total Number of Employees | Index Membership |
|---|---|---|---|---|---|---|
| Bear Stearns Companie | BSC | $6,887.53 | $8,701.033 | $934.444 | 10,452 | S&P500 |
| AMVESCAP PLC (ADR) | AVZ | $3,968.31 | $2,348.940 | $472.567 | 8,519 | N/A |
| SEI Investments Company | SEIC | $2,884.79 | $658.013 | $183.186 | 1,800 | S&P 400 MidCap |
| Alliance Capital Management | AC | $2,287.64 | $182.02 | $182.02 | 4,172 | N/A |
| A.G. Edwards, Inc. | AGE | $2,180.59 | $2,363.801 | $117.446 | 16,791 | S&P 400 MidCap |
| Waddell & Reed Financial | WDR | $1,493.46 | $482.562 | $171.12 | 1,514 | S&P 400 MidCap |
| Raymond James Financial | RJF | $1,348.98 | $1,657.844 | $157.468 | 5,651 | S&P 600 SmallCap |
| LaBranche & Co., Inc. | LAB | $1,079.84 | $424.130 | $208.760 | 597 | S&P 400 MidCap |
| Gabelli Asset Management | GBL | $863.28 | $224.414 | $93.448 | 169 | N/A |
| Knight Trading Group, Inc | NITE | $522.52 | $684.712 | $54.345 | 1,307 | N/A |
| TradeStation Group, Inc. | TRAD | $150.10 | $40.987 | $17.835 | 272 | N/A |
| *Consumer Financial Services* | | | | | | |
| American Express Company | AXP | $46,628.17 | $22,582 | $3,097 | 75,500 | the Dow; S&P500 |
| Household International (HI) | HI | $13,422.56 | N/A | N/A | 31,000 | S&P500 |
| Leucadia National Corp. | LUK | $2,175.42 | $375.298 | $108.873 | 785 | S&P 400 MidCap |
| WFS Financial Inc. | WFSI | $806.92 | $683.349 | $101.151 | 1,951 | N/A |
| Redwood Trust, Inc. | RWT | $540.76 | $144.539 | $34.634 | 39 | N/A |
| Federal Agricultural Mort | AGM | $274.05 | $42.580 | $25.425 | 33 | N/A |
| American Home Mortgage Ho | AHMH | $168.75 | $128.053 | $40.587 | 1,325 | N/A |
| Metris Companies, Inc. | MXT | $120.62 | $1,851.447 | $421.868 | 4,000 | N/A |
| ACE Cash Express, Inc. | AACE | $104.36 | $196.775 | $46.673 | 2,336 | N/A |
| *S&Ls/Savings Banks* | | | | | | |
| Washington Mutual Inc. | WM | $34,309.08 | $17,692 | $4,311 | 52,459 | S&P500 |
| National Bank of Greece | NBG | $2,373.52 | N/A | N/A | 24,030 | N/A |
| IndyMac Bancorp, Inc. | NDE | $1,095.64 | 64,720 | 64,720.25 | 3,223 | S&P 400 MidCap |

**(Continued)**

**Table 2 (Continued)**

| Company Name | Ticket | Market Capital (Million) | Total Revenue (Million) | Operating Income (Million) | Total Number of Employees | Index Membership |
|---|---|---|---|---|---|---|
| Commercial Federal Corp. | CFB | $976.37 | $991.761 | $141.056 | 2,800 | S&P 600 SmallCap |
| BankUnited Financial Corp | BKUNA | $457.74 | N/A | N/A | 690 | S&P 600 SmallCap |
| First Sentinel Bancorp | FSLA | $407.00 | $138.04 | $36.772 | 277 | N/A |
| First Financial Holdings | FFCH | $324.62 | $198.195 | $35.169 | 763 | N/A |
| Port Financial Corp. | PORT | $258.91 | $76.558 | $15.795 | 175 | N/A |
| First Indiana Corporation | FINB | $245.67 | $201.091 | $32.283 | 738 | N/A |
| First Essex Bancorp, Inc. | FESX | $247.11 | $124.52 | $428.562 | 319 | N/A |
| Flushing Financial Corp. | FFIC | $219.11 | $107.957 | $23.798 | 187 | N/A |
| *Misc. Financial Services* | | | | | | |
| Federated Investors, Inc. | FII | $2,862.01 | $715.777 | $310.204 | 1706 | N/A |
| Janus Capital Group Inc. | JNS | $2,629.70 | N/A | N/A | 22 | N/A |
| Tri-Continental Corp. | TY | $1,654.21 | $61.24 | $42.624 | N/A | N/A |
| ACM Income Fund, Inc. | ACG | $1,977.34 | $59.305 | $53.405 | N/A | N/A |
| Thornburg Mortgage, Inc. | TMA | $1,186.11 | $278.594 | $58.662 | N/A | N/A |
| Salomon Brothers Fund | SBF | $925.88 | $20.286 | $11.166 | N/A | N/A |
| Adams Express Company | ADX | $884.25 | $24.161 | $21.092 | 30 | N/A |
| Equity Investor Fund | ATF | $685.45 | $28.447 | $28.074 | N/A | N/A |
| Dreyfus Strategic Muni. | LEO | $563.32 | $55.961 | $1.447 | N/A | N/A |
| CMGI Inc. | CMGI | $330.52 | $1,237.702 | $5,771.327 | 2,414 | N/A |
| Credit Suisse AM Inc Fund | CIK | $223.04 | $25.018 | $23.217 | 6 | N/A |
| Dreyfus Municipal Income | DMF | $190.78 | $17.698 | $15.068 | 12 | N/A |
| H&Q Healthcare Investors | HQH | $198.91 | $2.856 | $2.222 | N/A | N/A |
| Nuveen Ny Muni Fd | NNY | $138.65 | $8.691 | $7.596 | N/A | N/A |

Note: This table presents some financial data of selected 110 sample firms. All the data are taken from the website of *Yahoo* (finance.yahoo.com) and *FISonline* (Moody's Company Data). All the information of market capital valuation is taken on April 5, 2003.

## Table 3. Results of t-test Statistics on the Abnormal returns for the Specific Event Date

**Panel A**

| Enron admitted its accounting fraud (October 18, 2001) | | | | |
|---|---|---|---|---|
| Date | small | middle | large | overall |
| -1 | 1.291305 | 0.259293 | -0.914281 | 0.033712 |
| 0 | -1.890468* | -3.147793*** | -3.599082*** | -3.069341*** |
| +1 | 0.857993 | -0.571215 | -1.800799* | -1.134987 |

| Enron admitted its accounting fraud (October 18, 2001) | | | | |
|---|---|---|---|---|
| Date | Banks | Insurers | Others | overall |
| -1 | 0.298414 | -1.078694 | 0.883288 | 0.033712 |
| 0 | -2.569773*** | -3.185794*** | -3.622974*** | -3.069341*** |
| +1 | -0.489751 | -1.071696 | 0.420678 | -1.134987 |

**Panel B**

| Enron announced its bankruptcy (December 3, 2001) | | | | |
|---|---|---|---|---|
| Date | small | middle | large | overall |
| -1 | -0.173945 | -2.248442** | -0.771908 | -1.214426 |
| 0 | -2.840755*** | -2.984051*** | -2.437678*** | -2.873536*** |
| +1 | -0.407414 | -0.980939 | -0.322222 | -0.731892 |

| Enron announced its bankruptcy (December 3, 2001) | | | | |
|---|---|---|---|---|
| Date | Banks | Insurers | Others | overall |
| -1 | -2.388784*** | -0.3349525 | -0.987010 | -1.214426 |
| 0 | -1.268429 | -3.136872*** | -4.374947*** | -2.873536*** |
| +1 | 0.515317 | -2.289558** | -0.462094 | -0.731891 |

Notes: 1.Date 0: the chosen event date, the date of the announcement of the event.

2.Date –1:alternative event date, the announcement may occur one day in advance of date 0.

3.Date +1:alternative event date, the announcement may occur one day later than date 0.

4. If the t-test statistic is greater in absolute value than 1.645 or 1.960 or 2.326, the relevant abnormal returns are statistically nonzero at the 10% or 5% or 1% level, respectively.

5. *: Denotes significance at 10% level

**: Denotes significance at 5% level

***: Denotes significance at 1% level

## Table 4. Results of t-test Statistics on the Cumulative Abnormal Returns in Chosen Intervals in the Post-event Window

**Panel A**

| 30 Days after Event Day | | | | |
|---|---|---|---|---|
| Date | small | Middle | Large | Overall |
| +1 to +10 | -1.277243 | -1.025159 | -1.124288 | -1.078839 |
| +1 to +20 | -1.217429 | -1.453796 | -1.457509 | -1.457509 |
| +1 to +30 | -1.783361* | -1.321641 | -0.830530 | -1.461284 |

| 60 Days after Event Day | | | | |
|---|---|---|---|---|
| Date | small | Middle | Large | Overall |
| +1 to +40 | -2.469359*** | -2.457698*** | -2.007334** | -2.511758*** |
| +1 to +50 | -2.625263*** | -2.268386** | -1.9195350* | -2.541304*** |
| +1 to +60 | -2.723960*** | -2.474761*** | -2.161904** | -2.781187*** |

| 90 Days after Event Day | | | | |
|---|---|---|---|---|
| Date | small | Middle | Large | Overall |
| +1 to +70 | -2.307033** | -1.854610* | -1.447377 | -2.193248** |
| +1 to +80 | -2.596578*** | -1.522506 | -1.121262 | -1.950125* |
| +1 to +90 | -3.348828*** | -1.699356* | -1.106806 | -2.286201** |

| 150 Days after Event Day | | | | |
|---|---|---|---|---|
| Date | small | Middle | Large | Overall |
| +1 to +110 | -2.874085*** | -1.400471 | 0.209500 | -1.718345* |
| +1 to +130 | -1.806797* | -0.145508 | 1.030570 | -0.518250 |
| +1 to +150 | -1.830137* | -0.566407 | 0.570155 | -0.874615 |

Notes: 1. Small: the sample of 33 financial companies with capital valuation less than or equal to $1,000 million.

2. Middle: the sample of 50 financial companies with capital valuation large than $1,000 million, but less than or equal to $10,000 million.

3. Large: the sample of 27 financial companies with capital valuation greater than $10,000 million.

4. If the t-test statistic is greater in absolute value than 1.645 or 1.960 or 2.326, the relevant cumulative abnormal returns of the chosen intervals are statistically nonzero at the 10% or 5% or 1% level, respectively.

5. *: Denotes significance at 10% level

**: Denotes significance at 5% level

***: Denotes significance at 1% level

**(Continued)**

**Table 4 (Continued)**

**Panel B**

| 30 Days after Event Day | | | | |
|---|---|---|---|---|
| Date | Banks | Insurers | Others | Overall |
| +1 to +10 | 0.6373718 | -1.772608* | -2.062740** | -1.078839 |
| +1 to +20 | 0.2570409 | -3.144853*** | -0.3354175 | -1.457509 |
| +1 to +30 | -0.3704239 | -2.635847** | -1.312326- | -1.461284 |

| 60 Days after Event Day | | | | |
|---|---|---|---|---|
| Date | Banks | Insurers | Others | Overall |
| +1 to +40 | -1.1764465 | -4.026139*** | -2.248556** | -2.511758*** |
| +1 to +50 | -1.5186301 | -3.734890*** | -2.304081** | -2.541304*** |
| +1 to +60 | -1.6669137 | -4.607576*** | -1.9676047** | -2.781187*** |

| 90 Days after Event Day | | | | |
|---|---|---|---|---|
| Date | Banks | Insurers | Others | Overall |
| +1 to +70 | -0.9353129 | -3.415130*** | -2.161419** | -2.193248** |
| +1 to +80 | -0.9969110 | -2.621348*** | -2.194826** | -1.950125** |
| +1 to +90 | -0.9768211 | -3.215440*** | -2.614718*** | -2.286201** |

| 150 Days after Event Day | | | | |
|---|---|---|---|---|
| Date | Banks | Insurers | Others | Overall |
| +1 to +110 | -0.1225928 | -3.248806*** | -1.698611* | -1.718345* |
| +1 to +130 | 0.7667122 | -1.435729 | -0.8663917 | -0.5182500 |
| +1 to +150 | 0.8438872 | -1.716488* | -1.704472* | -0.8746147 |

Notes: 1. Banks: the sample of 35 banks including Money Center Banks, Regional Banks and S&Ls/Savings Banks.

2. Insurers: the sample of 40 insurance companies including Insurance (life), Insurance (Prop. & Casualty), Insurance (Miscellaneous), Insurance (Accident & Health).

3. Others: the sample of 35 other financial companies including Consumer Financial Services, Investment Services, Misc. Financial Services.

4. If the t-test statistic is greater in absolute value than 1.645 or 1.960 or 2.326, the relevant cumulative abnormal returns of the chosen intervals are statistically nonzero at the 10% or 5% or 1% level, respectively.

5. *: Denotes significance at 10% level
   **: Denotes significance at 5% level
   ***: Denotes significance at 1% level

## Table 5. Results of Tests for Normality

| Company Name | Results of Jarque-Bera Normality Test | Results of Chi-square Goodness of Fit test |
|---|---|---|
| *Money Center Banks* | | |
| Bank of America Co. (BAC) | 21.9402*** | 13.9134 |
| Bank One Co. (ONE) | 262.2847*** | 28.0978*** |
| Bank of New York Co. (BK) | 290.4518*** | 7.5577 |
| Barclays PLC (ADR) (BCS) | 1.8849 | 3.8791 |
| Banco Santander Central H (STD) | 2.7524 | 7.3694 |
| Citigroup Inc.(C) | 11.4979*** | 14.6306 |
| Deutsche Bank AG (ADR) (DB) | 12.2115*** | 10.0302 |
| FleetBoston Financial (FBF) | 31.0190*** | 22.7451*** |
| HSBC Holdings plc (ADR) (HBC) | 19.5956*** | 8.1977 |
| J.P. Morgan Chase & Co. (JPM) | 0.2199 | 11.1098 |
| UBS AG (ADR) (UBS) | 25.7233*** | 8.1954 |
| *Rigional Banks* | | |
| Bank of Montreal (BMO) | 7.4215*** | 13.5771 |
| BB&T Corporation (BBT) | 177.1504*** | 27.3087*** |
| Capital One Financial (COF) | 175.2972*** | 10.6478 |
| Citizens Bank Co. (CBCF) | 10.7354*** | 17.9554** |
| MBNA Corporation (KRB) | 15.2830*** | 30.6752*** |
| Northern Trust Co. (NTRS) | 6.6369** | 8.5193 |
| Popular, Inc. (BPOP) | 134.0591** | 33.5169*** |
| PNC Financial Services (PNC) | 17.9628*** | 34.0200*** |
| Royal Bank of Canada (RY) | 6.8150** | 22.6030*** |
| Sanpaolo IMI S.p.A. (ADR) (IMI) | 15.3380** | 9.7728 |
| State Street Corporation (STT) | 28.1185** | 15.5180* |
| Toronto-Dominion Bank (TD) | 6.9086** | 16.1316* |
| UnionBanCal Corporation (UB) | 31.2174*** | 3.8059 |
| *Insurance (life)* | | |
| AXA (ADR) (AXA) | 16.4275*** | 16.2321* |
| AmerUs Group Co. (AMH) | 96.5394*** | 14.9546 |
| Canada Life Financial (CLU) | 17.2798*** | 28.8166*** |
| FBL Financial Group (FFG) | 47.3761*** | 23.0432*** |
| ING Groep N.V. (ADR)(ING) | 386.9015*** | 13.7258 |
| MetLife, Inc. (MET) | 8.5792*** | 8.6328 |
| ORIX Corporation (ADR) (IX) | 17.1293*** | 5.2773 |

**(Continued)**

**Table 5 (continued)**

| Company Name | Results of Jarque-Bera Normality Test | Results of Chi-square Goodness of Fit test |
|---|---|---|
| Prudential plc (ADR) (PUK) | 24.5480*** | 15.6253* |
| Reinsurance Group of Am. (RGA) | 25.0279*** | 6.2852** |
| Scottish Annuity & Life (SCT) | 31.2185*** | 25.6714*** |
| Sun Life Financial of Can (SLF) | 20.8807*** | 14.0962 |
| *Insurance (Prop. & Casualty)* | | |
| American Int'l Group, Inc (AIG) | 0.7304 | 9.2109 |
| Allstate Corporation (ALL) | 905.8212*** | 44.5294*** |
| Commerce Group, Inc. (CGI) | 16.5753* | 20.8962*** |
| Cincinnati Financial Corp (CINF) | 4.0801 | 11.3452 |
| CNA Financial Corporation (CNA) | 557.0338*** | 41.6741*** |
| Everest Re Group, Ltd. (RE) | 23.0474*** | 23.6465*** |
| Vesta Insurance Group Inc(VTA) | 6222.6817*** | 55.1168*** |
| Markel Corporation (MKL) | 68.1796*** | 8.6162 |
| Millea Holdings, Inc. (ADR) (MLEA) | 1.1196 | 5.9673 |
| PartnerRe Ltd. (PRE) | 449.8231*** | 15.6909* |
| Reitmans (Canada) Ltd(RTM) | 23.3533*** | 23.6465*** |
| St. Paul Companies, I (SPC) | 393.9417*** | 30.6291*** |
| SAFECO Corporation (SAFC) | 2.4736 | 14.0300 |
| W.R. Berkley Corporation (BER) | 81.4668*** | 44.4698*** |
| 21st Century Insurance Group (TW) | 33.3269*** | 20.1496*** |
| XL Capital Ltd. (XL) | 23.1068*** | 24.5582*** |
| *Insurance (Miscellaneous)* | | |
| Aon Corporation (AOC) | 860.5261*** | 40.5388*** |
| Baldwin & Lyons, Inc. (BWINB) | 71.0147*** | 14.4672 |
| Crawford & Company (CRDB) | 560.4520*** | 31.7282*** |
| Hilb, Rogal & Hamilton Co. (HRH) | 76.8131*** | 28.9723*** |
| Marsh & McLennan Co's (MMC) | 132.3500*** | 26.2155*** |
| *Insurance (Accident & Health)* | | |
| Aetna Inc. (NYSE:AET) | 7.0158** | 9.0420 |
| CIGNA Corporation (CI) | 1951.4869*** | 41.5582*** |
| HealthExtras, Inc. (HLEX) | 384.4110*** | 23.3109*** |
| Humana Inc (HUM) | 44.4432*** | 31.3394*** |
| Transatlantic Holdings (TRH) | 195.9981*** | 15.2919 |
| UnitedHealth Group Inc. (UNH) | 8.0888*** | 9.0816 |

**(Continued)**

**Table 5 (continued)**

| Company Name | Results of Jarque-Bera Normality Test | Results of Chi-square Goodness of Fit test |
|---|---|---|
| *Investment Services* | | |
| Universal American Financial Corp.(UHCO) | 72.5779*** | 38.2148*** |
| UnumProvident Corp. (UNM) | 102.8232*** | 15.3226 |
| Alliance Capital Manageme (AC) | 18.0290*** | 11.9753 |
| A.G. Edwards, Inc. (AGE) | 69.5574*** | 11.2522 |
| AMVESCAP PLC (ADR) (AVZ) | 6.1635** | 13.5865 |
| Bear Stearns Companie (BSC) | 5.0815* | 13.1175 |
| Gabelli Asset Management (GBL) | 2.4806 | 11.0742 |
| Goldman Sachs Group (GS) | 1.7027 | 5.4452 |
| Knight Trading Group, Inc (NITE) | 2.1067 | 16.2012* |
| LaBranche & Co., Inc. (LAB) | 20.2938*** | 11.3455 |
| Morgan Stanley (MWD) | 103.9230*** | 16.2448* |
| Raymond James Financial (RJF) | 64.5757*** | 12.8541 |
| SEI Investments Company (SEIC) | 11.7981*** | 21.9369** |
| TradeStation Group, Inc. (TRAD) | 94.6928*** | 27.1617** |
| Waddell & Reed Financial (WDR) | 9.9300*** | 8.9191 |
| *Consumer Financial Services* | | |
| ACE Cash Express, Inc. (AACE) | 522.2245*** | 29.7121*** |
| American Express Company (AXP) | 63.2289*** | 20.4899*** |
| American Home Mortgage Ho (AHMH) | 4.1934 | 13.6837 |
| Federal Agricultural Mort (AGM) | 159.5337*** | 33.1796*** |
| Household International (HI) | 5.8610* | 15.8568* |
| Leucadia National Corp. (LUK) | 1.7559 | 18.9640* |
| Metris Companies, Inc. (MXT) | 8.1871*** | 24.9309*** |
| Redwood Trust, Inc. (RWT) | 47.6102*** | 47.7949*** |
| WFS Financial Inc. (WFSI) | 50.3592*** | 10.6710 |
| *S&Ls/Savings Banks* | | |
| BankUnited Financial Corp (BKUNA) | 21.6385*** | 24.6152*** |
| Commercial Federal Corpor (CFB) | 33.9583*** | 11.0336 |
| First Essex Bancorp, Inc. (FESX) | 15.8126 | 13.8293 |
| First Financial Holdings (FFCH) | 0.8468 | 10.0600 |
| First Indiana Corporation (FINB) | 10.3725*** | 22.3912*** |
| First Sentinel Bancorp (FSLA) | 22.7140*** | 7.7565 |
| Flushing Financial Corp. (FFIC) | 15.8817*** | 28.2043*** |
| IndyMac Bancorp, Inc. (NDE) | 4.6886* | 11.8364 |

**(Continued)**

**Table 5 (continued)**

| Company Name | Results of Jarque-Bera Normality Test | Results of Chi-square Goodness of Fit test |
|---|---|---|
| National Bank of Greece (NBG) | 462.3288*** | 20.5799*** |
| Port Financial Corp. (PORT) | 93.5770*** | 30.9116*** |
| Washington Mutual Inc. (WM) | 85.9640*** | 37.7066*** |
| *Misc. Financial Services* | | |
| ACM Income Fund, Inc. (ACG) | 259.0090*** | 54.4999*** |
| Adams Express Company (ADX) | 114.3331*** | 22.6741*** |
| Credit Suisse AM Inc Fund (CIK) | 391.0187*** | 32.4455*** |
| CMGI Inc. (CMGI) | 1057.9432*** | 21.6341*** |
| Dreyfus Municipal Income (DMF) | 230.3097*** | 13.0456 |
| Dreyfus Strategic Muni. (LEO) | 7.9836*** | 23.2258*** |
| Equity Investor Fund (ATF) | 15.4796*** | 17.0495* |
| Federated Investors, Inc. (FII) | 0.7192 | 5.1700 |
| H&Q Healthcare Investors (HQH) | 31.4523*** | 19.0619** |
| Janus Capital Group Inc. (JNS) | 2.8519 | 11.5966 |
| Nuveen Ny Muni Fd (NNY) | 4.9613* | 12.2895 |
| Salomon Brothers Fund (SBF) | 1.1428 | 17.5767** |
| Thornburg Mortgage, Inc. (TMA) | 4.7882* | 17.1717* |
| Tri Contl Cp (TY) | 160.0802*** | 33.9380*** |

Notes: 1.If the Jarque-Bera Normality test statistic is greater in absolute value than 4.61 or 5.99 or 7.38, the relevant abnormal returns are statistically nonnomarlity at the 10% or 5% or 1% level, respectively.

2. If the Chi Square Goodness of Fit test statistic is greater in absolute value than 15.51 or 17.53 or 20.09, the relevant abnormal returns are statistically nonnomarlity at the 10% or 5% or 1% level, respectively.

3. *: Denotes significance at 10% level

**: Denotes significance at 5% level

***: Denotes significance at 1% level

## Table 6. Results of Nonparametric Sign Test on the Abnormal Returns for the Specific Event Date

**Panel A**

| Enron admitted its accounting fraud (October 18, 2001) | | | | |
|---|---|---|---|---|
| Date | small | middle | large | overall |
| -1 | 0.870387 | 0.000000 | 0.962249 | 0.953462 |
| 0 | 1.566698* | 3.2716511*** | 3.394112*** | 4.767312*** |
| +1 | -0.522233 | 0.8485281 | 1.732050** | 1.144153 |

| Enron admitted its accounting fraud (October 18, 2001) | | | | |
|---|---|---|---|---|
| Date | Banks | Insurers | Others | overall |
| -1 | -0.507093 | 1.581139* | 0.507092 | 0.9534615 |
| 0 | 1.859339** | 3.162278*** | 6.169625*** | 4.7673121*** |
| +1 | 0.845155 | 1.581139* | -0.507093 | 1.144153 |

**Panel B**

| Enron announced its bankruptcy (December 3, 2001) | | | | |
|---|---|---|---|---|
| Date | small | middle | large | overall |
| -1 | 1.218543 | 1.347150* | 2.828427*** | 3.241772*** |
| 0 | 2.263008** | 2.886750*** | 1.979899** | 4.195235*** |
| +1 | 0.870387 | -0.577353 | 0.848528 | 0.762769 |

| Enron announced its bankruptcy (December 3, 2001) | | | | |
|---|---|---|---|---|
| Date | Banks | Insurers | Others | overall |
| -1 | 2.873524*** | 0.948683 | 1.859339** | 3.241772*** |
| 0 | 2.873524*** | 2.213594** | 2.197310** | 4.195236*** |
| +1 | -0.845155 | 2.213594** | -0.169032 | 0.762770 |

Notes: 1.Date 0: the chosen event date, the date of the announcement of the event.

2.Date –1:alternative event date, the announcement may occur one day in advance of date 0.

3.Date +1:alternative event date, the announcement may occur one day later than date 0.

4. If the nonparametric sign test statistic is greater than 1.28 or 1.65 or 2.33, the relevant abnormal returns are statistically negative at the 10% or 5% or 1% level, respectively.

5. *: Denotes significance at 10% level

**: Denotes significance at 5% level

***: Denotes significance at 1% level