

The Effect of Quality Measures in Testing Stocks' Irrational Exuberance in Traumas

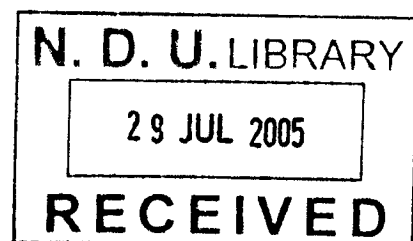
Thesis

**Submitted in partial fulfillment of the requirements of the
degree of Master of Business Administration in Notre Dame
University.**

By

Shady Elias Remeily

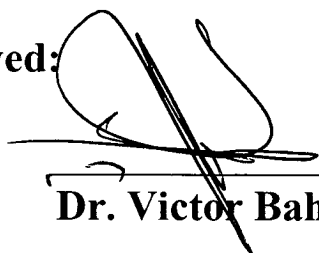
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Notre Dame University


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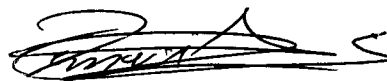

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THERE ARE MANY PEOPLE I WOULD LIKE TO THANK FOR HELPING ME ON THIS ENDEAVOR AND FOR GETTING ME TO THIS POINT. FIRST, I WOULD LIKE TO THANK MY THESIS ADVISOR; PROFESSOR VICTOR BAHOU, PHD. FINANCE, FOR HIS CONSTANT SUPPORT AND FOR HIS GUIDANCE AND ENCOURAGEMENT. I WOULD LIKE TO THANK DR. MOHAMED HAMADEH FOR HIS INVALUABLE ADVICE. I WOULD ALSO LIKE TO THANK: DR. ELIE YACHOUI THE MEMBER OF MY COMMITTEE FOR HIS ADVICE AND PATIENCE. I ESPECIALLY WANT TO THANK MUHIEDINNE HAMMOUDY WHO FIRST TAUGHT ME ABOUT BUSINESS AND THE STOCK MARKET. BESIDES, I CANNOT EXPRESS MY FULL GRATITUDE TO MY BROTHER, HADY REMEILY AND MY FRIEND, RAYMOND MATTAR, WHO PATIENTLY PROOFREAD THIS ENTIRE THESIS. LAST BUT NOT LEAST, MY GREATEST GRATITUDE IS TO MY FAMILY—PAST, PRESENT AND FUTURE. MY LOVELY SISTER'S TOLERANCE AND MY PARENTS WHO GAVE ME LIFE AND HELPED ME UNDERSTAND LOVE AND HOW TO GIVE IT. THIS THESIS IS DEDICATED TO THEM.

ABSTRACT

Shady Elias Remeily for Master of Business Administration
Major: Business Finance

Title: The Effect of Quality Measures in Testing Stocks' Irrational Exuberance in Traumas

The Global financial markets have witnessed great traumas due to several events such as the 2000 US stock market crash, the attack of September 11th 2001, the Afghani war December 2001, and recently the Iraqi war February 2003, the repercussions of which are being felt till today. These events caused immense turbulence in the stability of the stock market and a collapse of investor confidence.

One product of accounting evolution is the use of ratios for analyzing financial statements. Originally developed as short-term credit analysis devices, ratios can be traced as far back as the late 19th century. Since then, analysts have developed many financial ratios that are widely used by practitioners and academicians in stock markets (Pottier 1998).

Ever since the beginning of the stock market, investors, both professional and casual, have been trying to find secret methods that could lead them towards more wealth. Fundamental analysis is one essential method where traders can rely on it for good forecasting means and generating excess trading profits rather than making rational investment decision and a flip of a coin game that could spoil the company intrinsic value where temporarily high prices are sustained mostly by investor enthusiasm rather than estimation of real value.

The purpose of this study is to examine the predictive ability of the quality measures in determining which stock prices would be adversely affected in a crash period. The study will focus on studying the NASDAQ stock market using a sample of 200 listed companies (100 for the analysis sample and another 100 for the holdout). Logistic regression model is used to test the correlation between quality measures and the stock movement. These stocks are subdivided into two groups, which are 1- stocks that are adversely affected during the crash period and 2- stocks that are less affected. The study aims to develop a benchmark that could be used to determine those stocks that would better perform during crash periods.

KEYWORDS: US Market Crash, Financial Ratios, Reliability and Unreliability, Logistic Regression

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Chapter 1

RESEARCH PROBLEM

Introduction

It is human nature to keep things as simple as possible, even if the result is sacrificing the truth. For years people assumed that the stock market would lead the rise and fall of the economy, therefore, it is included in the Index of Leading Economic Indicators. Most traders assumed that something simple was happening; that the stock market was leading the economy because investors were placing bets on future economic strength. It is simple and plausible, but there is little evidence to support this hypothesis (Cooper & Madigan 1997).

Investors do not even know what is the right sustainable level of the market highs, not many of them spend much time thinking about what its level should be or whether it is over or under priced. People in general are capable of thinking, at least on some intuitive level, that if they buy a stock, then it will go up afterward or if they buy a stock, then others will probably want to buy that stock too. Such actions arise because traders tend to follow others' actions judging that it will lead to profitable results, and thus overconfidence arises among each investor

(Shiller 2000). Traders have the same goal, they invest to earn a return, and despite their conflicting and even strange opinions, they all agree that in order to increase wealth significantly and in a very short period of time, the stock market is the only place to invest.

Human emotions and expectations play a significant role in security pricing and thus in return have a great role in the decision-making process. Controlling their emotions when making a certain investment decision is something that all investors struggle with. However it has been found that the more investors are emotionally intelligent, the better are their investment decisions (Varian 2003).

Thus, the main objectives of this study are to develop reliable predictive model for public firms using a company financial statement, and to explore the incremental information content of firm's financial ratios in predicting a financial collapse. Logistic analysis is used to develop alternative prediction model and several financial ratios are tested in order to examine whether they have the potential to provide warning signals over more conventional, accrual-based variables, during a crash period.

1.1- Purpose of the Study

In an attempt to understand the volatility of stock prices, this study takes a deep look into what factors affect the financial market and illustrate the predictive ability of financial ratios in determining the stock prices that could be adversely affected in a crash period. This research presents fundamental results of an empirical study based on a sample of 200 firms registered at the National Association of Securities Dealers Automated Quotations (NASDAQ) market, during the time spanning from January 2000 to January 2002.

The main purpose of this study is to examine the incremental information content of financial ratios to develop a reliable healthy model for the US public firms. The logistic regression is employed to develop a research model that allows us to identify healthy performance company given the firm's financial ratios expressed as categorical variables. It reveals whether these fundamental tools are good predictors, and thus can lead to better results.

However a number studies pointed out the importance of financial ratios. A study done on the predictive ability of financial ratios; ratings, and total assets; as well as combined ratings and financial ratios were compared using a sample of 48 insolvent life insurers from 1990 to 1992. The resulting expected

cost of misclassification revealed that the predictive ability of ratings and total assets is comparable to that of combined financial ratios and ratings (Pottier 1998). Another study concentrated on the ratios of 'Fortune 100' companies two years before downsizing, the year of downsizing, and the subsequent nine years after downsizing. When compared to a set of companies which had not downsized during this period, the downsized companies generally experienced lower performance during the initial few years following the downsizing, but then improved to a similar level to the non-downsizing companies. Overall, the findings suggest that when a firm implements downsizing, it will take several years before its financial health will reemerge (De Meuse, Bergmann, Vanderheiden and Roraff 2004).

Analysts believe that it is important to do tests on a regular basis of stock market efficiency, since the efficiency has consequences for the action of actors in the market and the prosperity of countries. The market conditions such as technology developments and stock exchange turnover alter continuously, which supports the idea of testing the stock market efficiency regularly. Since several drastic occurrences have taken place in the stock market environment in recent years, it is of great interest to investigate if these have influenced the stock market

efficiency in one way or another. Two occurrences, which have reinforced the presumption of market inefficiency, were the big crash in the US stock market on April, 2000 and the September 11th, 2001. After this many wondered whether stock prices really reflect all essential values and information.

1.2- Research Questions

Nowadays, with the huge amount of data availability, many critical questions arise. The question of whether markets are efficient or not, and where the inefficiencies lie, is central to investment evaluation. If markets are efficient, the market price provides the best estimate of value, and the process of evaluation becomes one of justifying the market price that contains the right signals of information. If markets are not efficient, the market price may deviate from the true value, and the process of evaluation is directed towards obtaining a reasonable estimate of this value. Those who do evaluate well will then be able to make 'higher' returns than other investors, because of their capacity to spot under and over valued firms.

Financial ratios are used to quantify, summarize, and interpret financial data for the majority of financial analysts and investors. But is financial ratios an efficient and suitable technique? Does this evaluation method lead to profitable

results? Can people rely on this method for making rational investment decision or is it a gamble and a “flip of a coin” game?

The statistical analysis of financial ratios exhibit that certain ratios, “when applied to many stocks over many time periods, do provide incremental information. Although this does not necessarily imply that ratios analysis can be used to formulate profitable trading results, it does raise the possibility of adding value to the investment process” (Barnes, 1986)

Analysts utilize the data found in financial statements to determine a company’s standing and to compare the company’s ratios to its past performance, as well as to industry statistics to determine risks, trends, and to identify any peculiarities (Downes & Goodman, 2003).

1.3- Scope of the Study

This study is divided into four chapters. Chapter One is the research problem; the introduction.

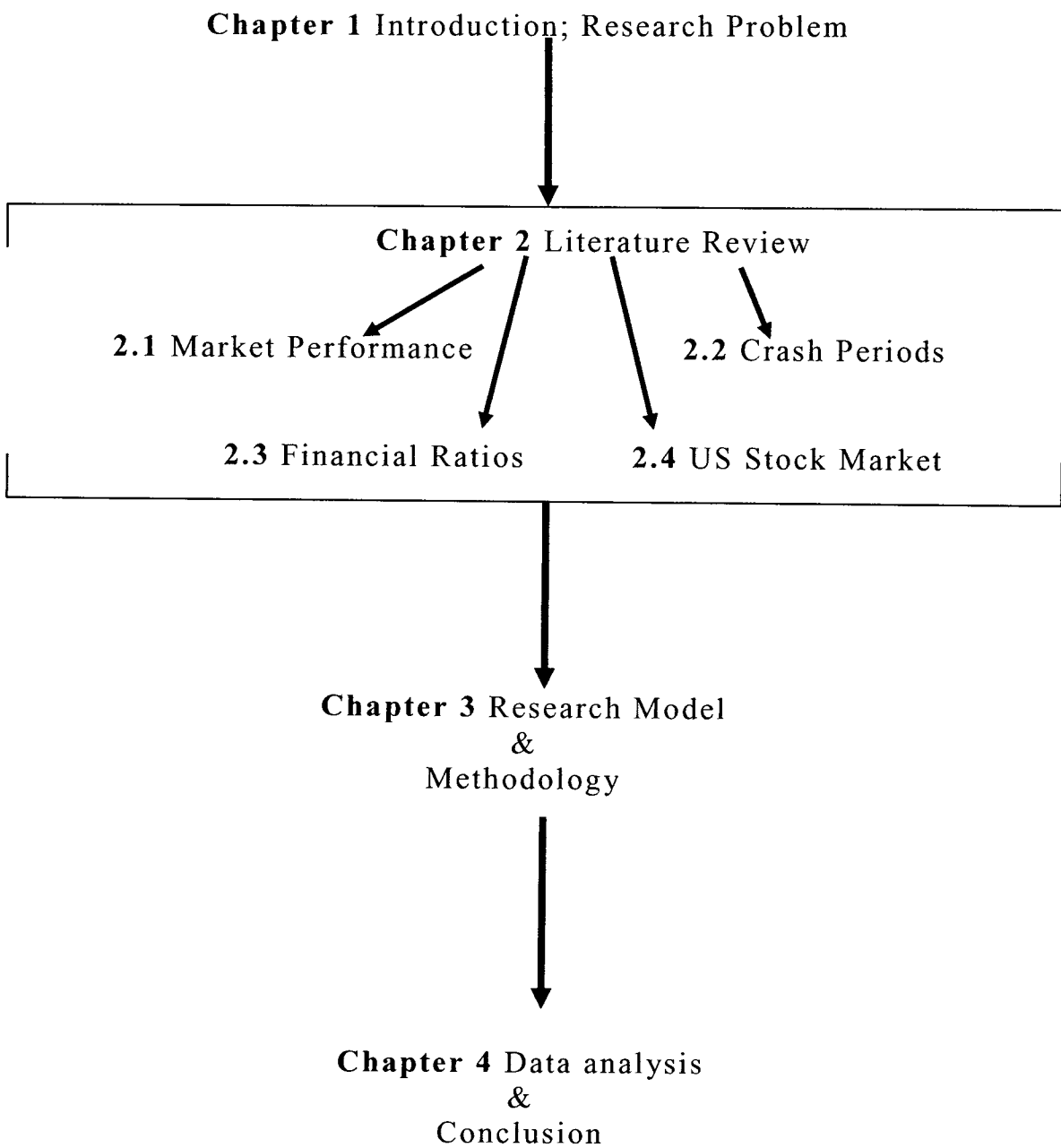
Chapter Two is the literature review. This chapter is divided into four divisions starting with discussing the important factors that have an impact on financial markets and how each one of them could influence the performance and fluctuations of stock prices. Part two concentrates on the crash period during September 11, 2001 and how it affects the stock market. While

part three provides insight on financial ratios. Ratios can show how to do better. As Betty Keith mentioned in his study Do-It-Yourself Investors: “Some investors may be tempted to see if they themselves can obtain extra returns. If such an investor thinks the consensus overestimates the risk, the security is underpriced and he should buy. If he thinks the risk is underestimated, the security is overpriced and he should sell. This leads to contrarian investing - doing what everybody else doesn't. Contrarian investing is related to value investing, since the type of stocks a contrarian buys are often "value stocks" - that is, they have lower-than-average prices as determined by certain financial ratios” (Keith 2005). Ratios are intended to provide meaningful relationships between individual values in the financial statements. Ending with part four, this section elaborates the characteristic of the United States stock market with a brief on the different types of US indices.

Chapter Three discusses the research model using the Logistic Regression. The sample analysis and holdout sample consist of 200 NASDAQ listed companies financial ratios during the year 2000 – 2002, i.e. before and after the crash period. The purpose is to distinguish the stocks that would be adversely affected during a volatile period.

Chapter Four presents the analysis principles. We start by discussing our statistical point of view and the categorization of our study. This is followed by a description of our approach in this investigation. We also present our period of study and explain how we have collected our data and documented a reliable financial system. This reliability is tested by using a holdout sample. Finally, this chapter recaps our data analysis and recommendations for future research.

Figure 1: Structure of the Thesis



Chapter 2

LITERATURE REVIEW

Introduction

This chapter is made of three sections. Section one presents and analyzes the reasons that seemed to cause the stock market turbulence. Section two concentrates on the US market crash. This crash had a significant harmful effect on the performance of the US stock market. Section three discusses the usefulness of financial ratios. This stage examines the major financial ratios applied in our analysis. The last section briefly provides a background of the US exchange markets. The purpose of this part is to display a broad view of securities markets and to provide a detailed discussion of how the stock markets function and the changes that have taken places in financial markets.

2.1- Market Performance

If the growth of the economy does not by itself justify the increase in value of the stock market since 1982, then what has changed since 1982 to justify the market increase? What are the factors that started this surge? What has happened since 1997, the date when the P/E ratios past their record high in 1929, and

increase another 33 percent by the start of the year 2000? (Baker 2000).

For the US securities industry and US securities markets, 1999 was a record-setting year in virtually every aspect. Stock volume, market performance, new capital raising, and merger and acquisition activity all set annual records as Wall Street's longest bull market accompanied the United States longest economic expansion.

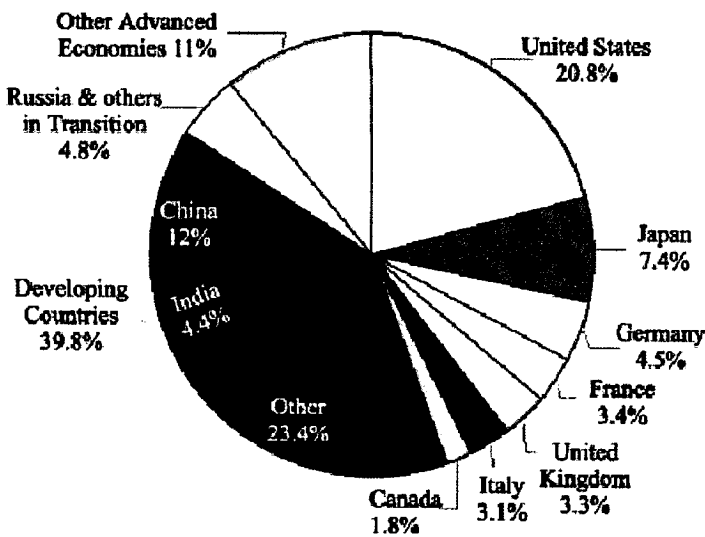
Table 1: Real US GDP

	Real GDP			
	1998	1999	2000	2001
Advanced economies	2.4	3.2	4.2	3.2
Major industrial countries	2.5	2.9	3.9	2.9
United States	4.4	4.2	5.2	3.2
Japan	-2.5	0.2	1.4	1.8
Germany	2.1	1.6	2.9	3.3
France	3.2	2.9	3.5	3.5
Italy	1.5	1.4	3.1	3.0
United Kingdom ¹	2.6	2.1	3.1	2.8
Canada	3.3	4.5	4.7	2.8
Other advanced economies	2.0	4.7	5.1	4.2
Spain	4.0	3.7	4.1	3.5
Netherlands	3.7	3.6	3.9	3.5
Belgium	2.7	2.5	3.9	3.0
Sweden	3.0	3.8	4.4	3.4
Austria	2.9	2.2	3.5	2.9
Denmark	2.5	1.7	2.1	2.1
Finland	5.5	4.0	5.0	4.0
Greece	3.7	3.5	3.5	3.9
Portugal	4.2	3.0	3.4	3.5
Ireland	8.9	9.9	8.7	6.9
Luxembourg	5.0	5.2	5.1	5.0
Switzerland	2.1	1.7	3.0	2.6
Norway	2.0	0.9	3.0	2.4
Israel	2.2	2.2	4.0	4.0
Iceland	4.7	4.5	4.0	2.1
Korea	-6.7	10.7	8.8	6.5
Australia ²	5.2	4.4	4.0	3.4
Taiwan Province of China	4.7	5.7	6.5	6.0
Hong Kong SAR	-5.1	2.9	8.0	4.8
Singapore	0.4	5.4	7.9	5.9
New Zealand ²	-0.2	3.4	4.0	3.2
Memorandum				
European Union	2.7	2.4	3.4	3.3
Euro area	2.7	2.4	3.5	3.4

Source: <http://www.imf.org/external/pubs/ft/weo/2000/02/pdf/chapter1.pdf>

Figure 2: Share of the World Economy

Share of World Economy



International Monetary Fund, Purchasing Power Parity GDP Shares.

Source:

<http://www.gov.nf.ca/Budget2000/economy/images/Share%20of%20World%20Economy.JPG>

In 1999, the US Real GDP growth was 4.2 percent greater by 1 percent than the Advanced Economies GDP 3.2 percent (Table 1), having a market share of 20.8 percent of the World Economy (Figure 2). That bound was met by a decline of 2 percent in 2001, after the market crash (Table 1).

This market dominance was being transformed by an overall of the regulatory and supervisory framework, rapid adoption of new information technology, a shift in the demographic profile in the investor base, and the forces of globalization (Greenspan 2000).

The astonishing growth of the secondary markets was the industry's tremendous investment in state-of-the-art

'technology'. Furthermore, there was a change in the way trading took place. The number of online trading firms has risen from zero to 200 in the last four years prior to 2000. Thus, the rapid growth of NASDAQ was in part due to this surge in on-line trading. The revolution created by internet-based e-commerce and new order handling rules introduced by the SEC in 1997 (the limit order display rule and the market maker quote rule) helped facilitate this growth and allowed alternative trading system (ATS) to capture public order flow going to NASDAQ (Niederhoffer 2001).

Overall, the broad market indices posted new highs almost daily on record volume during that period (Table 2). The most watched "equity price barometer", the Dow Jones Industrial Average rose 25.2 percent in 1999. This follows a 16.1 percent gain in 1998, 22.6 percent in 1997, a rise of 26 percent in 1996 and a jump of 33.5 percent in 1995. This translates into an impressive 200 percent gain over the five-year period. Meanwhile, the S&P 500 Composite Index and the NASDAQ Composite Index extended their string of double digit gains over the few years. The S&P 500 increased 19.5 percent in 1999 after a 26.7 percent rise in 1998, while the NASDAQ, driven by triple-digit gains in technology stocks, climbed 39.6 percent in 1998, before soaring 85.6 percent in 1999.

Table 2: Year-End Share Price Indices

	<u>1995</u>	<u>1996</u>	<u>1997</u>	<u>1998</u>	<u>1999</u>
Dow Jones Industrial Average	5,117.12	6,448.27	7,908.25	9,181.40	11,497.10
NASDAQ	1,052.13	1,291.03	1,570.35	2,192.69	4,069.31
S&P 500	615.93	740.74	970.43	1,229.20	1,469.25

Source: www.finance.yahoo.com

The fact that the market is efficient is important for the public economy when it comes to the distribution of scarce resources. The capital market acts as an intermediary of capital distribution from savers to investors through the mechanism of price. In order for the capital to be allocated to where it makes most use from a public economy point of view, it is important that prices give the right signals, i.e. contain all the important information. Otherwise resources will not be distributed to companies where the capital has the best possibilities of generating high returns. Thus, the society needs the market to be efficient (Calado & Garcia 2001).

From 1992-2000 the markets and economy experienced a period of record expansion. The IPO market had new companies trading at over a One billion dollar market cap with no profits and less than One million dollars in revenue (Bull 2004). People recognized that the market was highly priced, and they were uncomfortable about this fact. Most people were puzzled over the apparent high levels of the stock market. They were unsure

whether the market levels made sense or whether they were the result of some human tendency that might be called ‘irrational exuberance’, or whether they reflected unjustified optimism, an optimism that might pervade thinking and affect a lot of life decisions (Makin 2002).

Robert Shiller mentioned in his book that:

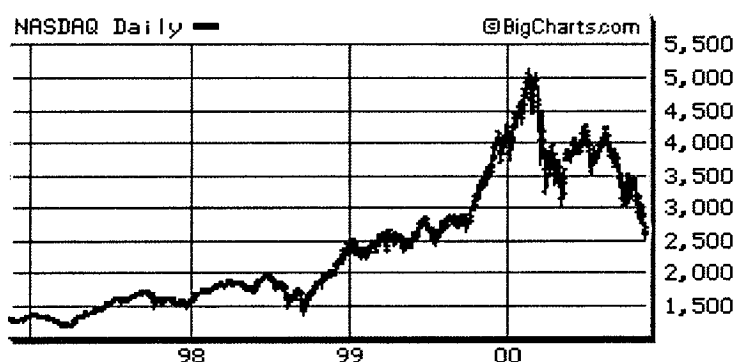
"Are powerful fundamental factors at work to keep the market as high as it is now or to push it even higher, even if there is a downward correction? Or is the market high only because of some irrational exuberance—wishful thinking on the part of investors that blinds us to the truth of our situation?" (Balke & Wohar 2001).

People often make judgments using the representative heuristic, which is when judging the probability that a model is true, they base their estimate on the degree to which the data resembles the model, rather than do appropriate probability calculations. People tend to make the error of anchoring, that is, when making difficult quantitative judgments they tend to start from some arbitrary initial estimate, often suggested to them by something in their immediate environment, and then allow that initial estimate to influence their judgments. Further, they tend to show an availability bias, over-weighing evidence that comes easily to mind, thereby allowing their decisions to be over-

influenced by evidence that is more prominent and attention-grabbling (Modarres-Mousavi 2002).

The level of public interest in the market and attraction to the market has changed significantly over time. Investors continue to live through one of the worst bear markets in recent times. On September 1, 2000, the NASDAQ traded at 4234.33. From September 2000 to January 2, 2001, the NASDAQ dropped 45.9 percent. In October 2002, the NASDAQ dropped to as low as 1,108.49 - a 78.4 percent decline from its all-time high of 5,132.52, the level it had established in March 2000 (Figure 3). A total of Eight trillion dollars of wealth was lost in the crash of 2000 (Bull 2004). Investors started to get rid of the 'hide the money under the mattress' mentality that occurred early in the year 2001, but could not bring themselves to trusting their new savings to the equity market (Plant 2003).

Figure 3: NASDAQ Bubbling On



Source: www.thestreet.com

Many reasons had led to the 2000 US market crash, this section addresses the important factors that have an impact on financial markets and how each one of them could influence the performance and fluctuations of stock prices.

2.1.1- State Role

2.1.1.1- Macro-Economic and Government Policy

The growth of the economy during the past two centuries has been characterized by many dead ends, bankruptcies, and disappeared industries. Today, the economy is more dynamic and unpredictable than ever due to deregulation, globalization, and the information technology revolution. These forces have eroded the ability of experts to make predictions, and eroded the ability of governments and big corporations to control the pace or direction of economic changes (Bradford 2002).

In today's economy, several macro-economic factors have been known to affect financial markets. However, some of the factors which have significant impact on the performance of stocks are the following (Rivera-Batiz 1989):

- *Economic Growth*: The higher the economic growth, the higher the stock price. Stock prices determined in exchanges and other publicly available information help traders make better investment decisions. Better investment

decisions by investors mean better allocation of funds among corporations and, as a result, a higher rate of economic growth.

- *Unemployment:* The higher the unemployment rate, the lower the stock price. The unemployment report is one of the most closely watched of all government reports, because it gives the clearest indication of the direction of the economy. A rising unemployment rate will be seen by analysts and the Federal Reserve as a sign of a weakening economy, which might call for an easing of monetary policy by the Fed. On the other hand, a decline in the unemployment rate shows that the economy is growing, which may spark fears of higher inflation on the part of the Fed, which may raise interest rates as a result. When interest rates rise, the stock and bond markets tend to take a dive.
- *Inflation Rate:* The higher the inflation rate, the lower the stock price. Inflation has a creepy ability to erode the value of securities that don't grow fast enough. That's why investing only in a money market fund can be more risky than it appears on the surface.

- *Interest Rate:* The higher the interest rate, the lower the stock price. A rise in interest rates has a negative effect on the stock market because investors can get more competitive returns from buying newly issued bonds instead of stocks. It also hurts the secondary market for bonds because rates look less attractive compared to newer issues.
- *Money Supply:* The higher the money supply, the higher the stock price. Too much money in relation to the output of goods tends to push interest rates down and push stock price up; too little money tends to push rates up and prices down, causing unemployment and idle plant capacity. The Federal Reserve manages the money supply by raising and lowering the reserves banks are required to hold and the discount rate at which they can borrow money from the Fed.
- *Budget Deficit:* The higher the budget deficit, the lower the stock price. Economists are still concerned about the effect of the budget deficit on the stock market. If foreign investors feel the U.S. government cannot control its fiscal health, they might shift their investments to other countries. The inability of the federal government to control the budget deficit could be interpreted as a broader failure of the nation to address its economic problems, and thus

prompt a loss of business and consumer confidence, which would undermine capital spending and real economic activity.

This is the type of environment that entrepreneurs thrive in. High levels of uncertainty tend to give the edge to small and new companies. This is not because they can prognosticate any better than large firms. In fact, studies found no correlation between start-up success and prior extensive planning. The small-firm flexibility is exemplified by the fast-changing Internet industry, where businesses launch and learn rather than adhere to long-range strategies (Shiller 1998).

Neither businesses, governments, nor the experts can plan the economic future very accurately. Past errors in judging technology and markets might occur again, leading to continuous uncertainty in the economy. This great uncertainty is a fundamental reason why the economy needs a diversity of entrepreneurs to tackle every new opportunity (Shiller 1998).

All governments try to strengthen their economy of their country in order to enhance the performance of financial markets. This is because macroeconomic factors lie at the base of financial market performance. These factors determine the amount of money available in the economy for investment. High inflation decreases savings as the value of money decreases with time and

people tend to spend more in the present (Rivera-Batiz 1989). Interest rates determine how attractive risk-free savings are in comparison to investing in the riskier markets and employment rate determines the surplus cash in the economy available for saving. The government policy on interest rates and taxation also affect the investment process in financial markets (Bradford 2002).

2.1.1.2- Monetary Policy

It is one of the tools that Central Banks use to influence its economy. Using its monetary authority to control the supply and availability of money, a Central Bank attempts to influence the overall level of economic activity in line with its political objectives. Usually this goal is “macroeconomic stability”; low unemployment, low inflation, economic growth, and a balance of external payments (Bradford 2002). Monetary policy tends to affect the required return on stocks and it also affects projections for corporate earnings, which in return both affect stock value. The transmission of monetary policy shocks into stock prices works primarily through changes in current and expected interest rates and dividends. A monetary contraction leads to higher nominal interest rates, which in turn increase the opportunity cost of holding stocks and at the same time decreases dividend

payments since firms have to borrow working capital. (Hayford & Malliaris 2002).

Monetary policy not only has a direct effect on the supply of funds, but can have an indirect effect on the supply and demand of funds. Although fiscal policy typically influences the demand for loanable funds, monetary policy normally has a larger impact on the supply of loanable funds (Hayford & Malliaris 2002). Further, monetary policy can have a strong influence on interest rates and economic growth; it affects the securities traded in all financial markets. Higher interest rates dampen aggregate demand mainly by reducing investment and the rate of investment tends to affect the growth of the economy (Bradford 2002).

Financial market participants that trade the same securities may react differently to monetary policy because they may have different expectations about the policy's impact on economic variables. They have only limited success in forecasting economic variables because of the difficulty in forecasting money supply movements will affect interest rates. Even if financial market participants could correctly appreciate changes in money supply movements, they might not be able to predict future economic conditions. The historical relationship between money supply and economic variables has remained perfectly stable over

time. Some adjustments in the money supply caused by the behavior of depositors can distort the relationship between money supply levels and economic growth (Shiller 1998).

2.1.2- Behavioral Factors

2.1.2.1- Uncertainty and Skepticism

- **Uncertainty**

The watchword of investing is uncertainty, it rules the markets and the economy alike, and it can become a powerful investment deterrent. Uncertainty occurs during circumstances in which there is no specific basis on which to form any calculable profitability no matter what, and in which investors are accordingly often reluctant or unable to assign numerical probabilities to events or to the consequences that might arise from their actions. In return, investors will be incapable of the instrumentally rational, expected utility maximizing, and behavior that lies at the heart of the economic theory.

Many people would agree with the view that uncertainty and instability can be serious obstacles to fixed investment decisions. Casual empiricism also suggests that most fixed investments are more easily done than undone. Until recently, conventional investment theory has paid little attention to these two facts and, more specifically, to the links between them.

Those links are precisely the focus of a recent, but rapidly growing, investment literature. This literature has shown that if the investment is costly or impossible to reverse, investors have an incentive to postpone commitment and wait for new information in order to avoid costly mistakes. Moreover, this value of waiting can be quite considerable, especially in highly uncertain environments. As a consequence, uncertainty can become a powerful investment deterrent (New Orleans 2004).

Amid continuing uncertainty about the economy and jitters about terrorism, the behavior of market participants who panicked in the current climate of uncertainty were considered to be rational and appropriate when they are driven by one or more of the following (Financial Express 2001):

- They are on margin, or otherwise heavily indebted.
- They know little or nothing about the companies or the securities in which they are investing in.
- They believe that their livelihood depends on the near-term performance of the market.
- They own junior securities, especially common stocks.
- They need to raise cash over the relatively near term through the sale of securities.
- They are outlook conscious, rather than price conscious, in their selection of securities, convinced that the macro

outlook for the economy is more important than corporate details.

Although skeptics feared more declines after the tragedy of September 11, 2001. Investors were shaky about getting too comfortable with stocks in general. E. Matthew Brown, head of stock management at money-management firm Wilmington Trust said, “It seems like we heard more good news than bad. That is what we need, but I do not see anything in the near term that is going to cause a breakout period” (Browning 2002).

- **Negative Sentiments**

Investment decisions are prone to be affected by negative sentiments. However, it has been found that in order for investors to keep ahead of the market, they should retain detached skepticism and have the willingness to analyze information at face value, regardless of the source. The concepts of fear, uncertainty, and doubt, better known by the acronym of FUD, should not be a threat to investors (Mann 2000). Fear; although it is considered bad and makes investors act irrationally, it creates a situation where investors run from what should be an opportunity. Therefore, investors should not trust an individual who is attempting to spread fear. On the other hand, uncertainty is a positive thing. Investors should always retain uncertainty about their investments, no matter what they are. The reason for this

analysis is that certainty lends itself to overconfidence, and overconfidence lends itself to blindness, and blindness is inherently bad for making rational decisions, especially if the blindness is willful. Finally, doubt is what investors should do every time any news item about a certain stock is released (Mann 2000).

FUD is an intentional attempt by a competitor or some other agenda-laden source to negatively spin certain facts about a company and its products to induce uncertainty among its investors. In addition, there are a significant number of people who have something to gain by spreading doubt or even slander about any given company. Investors should always keep in mind that negative sentiments, or even negative and skeptical questions, are not full FUD (Mann 2000).

Successful stock investing has little to do with human nature. It has to do with dispassionate analysis of facts and the superior application of those facts in buying and selling equities. In doing so, investors are all guilty from time to time of underweighing certain pieces of information and overweighing others. In fact, investors' minds conspire against them to make this happen, even if it is to their detriment. The next time investors come across points that paint a company they hold in a negative light, they should resist the temptation to dismiss the argument as

FUD, it is possible that one of these days a piece of information counter to their interest is going to turn out to be true, and they will get no credit for having known or ignored it (Mann 2000).

2.1.2.2- Investor Confidence

Recent reports of catastrophic events and massive accounting frauds at some of the nation's largest and most respected companies have provoked policymakers and business leader market reforms to shore up investor confidence. Nevertheless, the phenomenon of investor confidence has received restively little formal study. Current legal scholarship tends to assume, with little discussion, that investors have confidence when they are information that assures them that the incentives provided by the market are adequate to constrain corporate insiders and securities professionals from shirking, stealing and other forms of opportunistic behavior (Stout 2002). The "rational expectations" approach also implies that, in the absence of such assurance investors protect themselves from others' opportunism by refusing to invest in the market in the first place (Browning 2002).

The phenomenon on investor confidence can be understood better if the market assumes not that investors have rational expectations, but that they have what economists call "adaptive

expectations”. Individuals with rational expectations predict others’ behavior by focusing on their external incentives and constraints. In contrast, individuals with adaptive expectations predict others’ behavior by extrapolating from the past. Adaptive expectations consequently permit trust, meaning a belief that another will behave in a cooperative and trustworthy fashion simply because he or she had behaved trustworthy and cooperatively in the past (Stout 2002).

In addition, there is also a substantial reason to believe that an adaptive expectation, which is based on trust, is essential to a well-developed public securities market. One of the most important policy implications that flow from an adaptive expectations model of investor confidence is that trust may be subject to “history effects”. Alan Greenspan, Federal Reserve Chairman, announced on Feb 26, 1997:

“History demonstrates that participants in financial markets are susceptible to waves of optimism... Excessive optimism implants the seeds of its own reversal in the form of imbalances that tend to grow over time. When unwarranted expectations ultimately are not realized, the unwinding of these financial excesses can act to amplify a downturn.”

This implied that if an individual or institution has behaved cooperatively in the past, trusting investors tend to assume that these institutions or individuals will behave cooperatively in the future, even if incentives change so that cooperation is no longer advantageous. Conversely, trust that has been abused tends to disappear, and it can be slow to return even when the problems that led to its abuse have been corrected. This observation carried pessimistic implications for lawmakers' ability to restore investor confidence quickly through legal reforms after that confidence has been eroded (Stout 2002).

The NASDAQ market experienced many downturns during the last half decade as investors worried that falling consumer confidence would lead to a further slowdown in real gross domestic product (GDP). "We were looking for a decline in confidence, but not this big a decline, so a lot of investors were scared initially by the specter of a double-dip recession", said Wayne M. Ayers, chief economist at Fleet Boston Financial (Brough 2002).

Just as people were overly optimistic back during the bubble days, they are overly pessimistic now. One sign of that pessimism is the fact that money continued to pour into Treasury bonds, whose relative safety has made them a refuge for nervous investors, whereas others just wanted to hedge their position.

Also, investor behavior showed a sign of anxiety as money continued to pour into these Treasury bonds. Investors kept saying “what am I putting money in the market for? All it does is go down”. They believe that this is a difficult period as they have ever seen (Stout 2002).

The drop in confidence that faced the economy in 2002 was due to the negative territory fueled by uncertainty over the global financial turmoil. Only 14 percent of investors say that they are going into the 2003 year with more confidence in investing their money in the stock market (Bedminster 2002). Changes in the accounting standards are inevitable if investor confidence is to be flourished. A new framework must be created that will make it hard for fraud to occur and that will prevent investors from being defrauded. However, investor behavior will continue to be a significant factor in explaining the volatility of the stock market, whether it is on its way to the bottom or leading to the top (Stout 2002).

2.1.2.3- Investor Optimism

Most of people’s beliefs are biased to the optimism that causes investors to exaggerate their talents and abilities. Optimists tend to underestimate the likelihood of bad outcomes over which they have no control. Optimistic investors are also

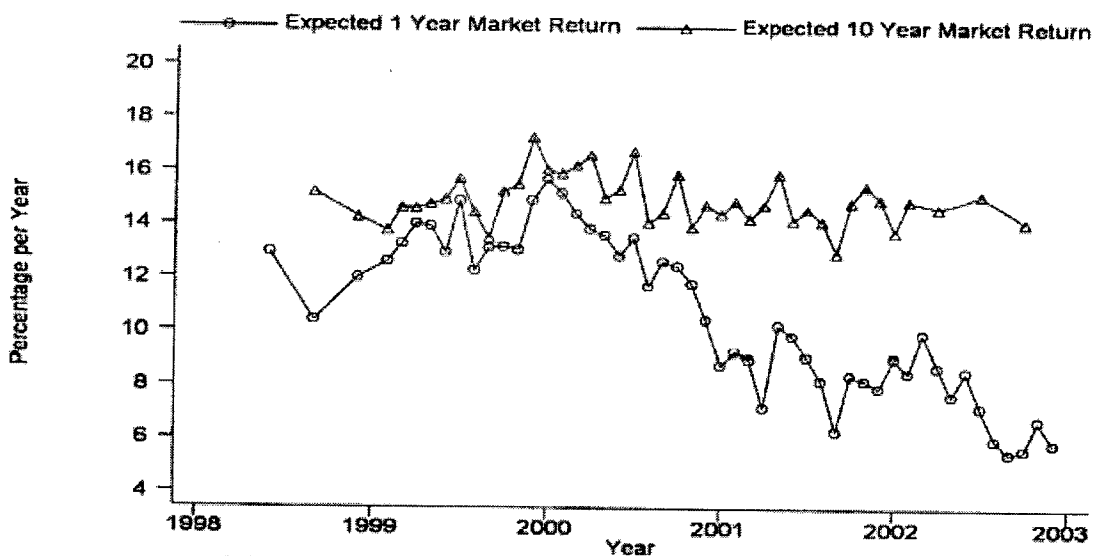
prone to an illusion of control. They tend to misjudge the role of change in human affairs and to misperceive games of chance as games of skill. Optimism, just like overconfidence, causes people to overestimate their knowledge, underestimate risks and exaggerate their ability to control events. It also leaves them vulnerable to statistical surprises and unexpected outcomes (Kahneman 1998).

The US economy has experienced several traumas that resulted in a decrease in investor optimism, some of which include the September 11, 2001 crisis, the Afghani war, and finally the Iraqi war. However, the economy has managed to regain investors' optimism after months of depression (Jones 2003).

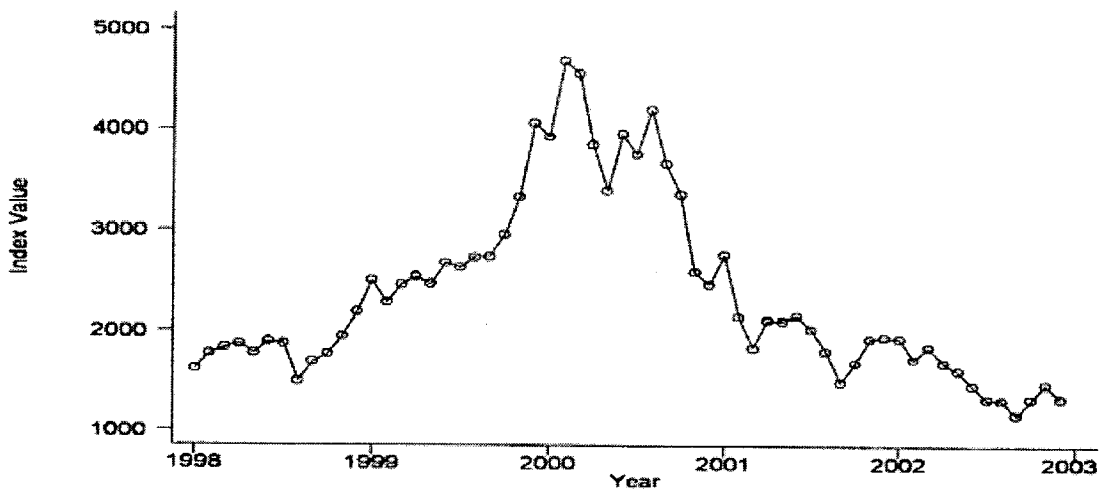
During the month of April 2003, investor optimism continued to show extreme volatility of recent months. The UBS/Gallup Index of Investor Optimism as shown in Appendix 1 is based on qualitative responses to a series of questions about optimism/pessimism regarding the investor's own investment and income outlook as well as about the stock market and other macroeconomic variables. The UBS/Gallup Index hit an all-time low of 5 points in March 2003, but it surged 61 points in April, just as the markets began creeping upward dashing hopes that optimism among investors was building significant momentum.

Starting January 2001, optimism among substantial and average investors declined below 100 reaching a low of 50 in September. As investors expressed continued confidence in the US economic recovery, optimism increased by 36 points to reach 86 in October 2001 reaching a high of 121 in March 2002.

Figure 4: Stock Market Returns & NASDAQ Level 98-02



(a) Average Expected Stock Market Returns



(c) NASDAQ Index

Source:

http://www.kellogg.nwu.edu/faculty/vissing/htm/vissing_nberma_article.pdf

Using the UBS/Gallup data, Figure 4 (a) shows average expected one-year stock-market returns from June 1998 to December 2002. Figure 4 (c) shows the time series for the NASDAQ market index. The average expected one-year stock-market return increased from an average of 11.8 percent in 1998 to 15.8 percent in January 2000, and then declined dramatically to around 6 percent at the end of 2002. Thus, expected returns were high when the market was at its highest, counter to what the historical statistical relation would have predicted. The correlation at the monthly frequency between the average expected one-year stock-market return and the level of the NASDAQ index is 87 (Vissing-Jorgensen 2003).

The previous figure shows the trend of NASDAQ prices in relation with the investor optimism index from 1998 to 2003. As can be seen, the investor optimism index has been very volatile over the past three years. In addition, increases and decreases in the investor optimism index resulted in the same movement along the NASDAQ index.

Many investors and analysts believe a “double dip” recession is very likely because the recovery seems quite slow. However, even though the recovery is sluggish, there is a logical explanation that does not require or imply a return to recessionary conditions. Most economic recoveries are quite

robust because of the considerable repressed demand created by the recession (Jones 2003). The argument for a sustained economic recovery and the end of the bear market is made strong by the following issues and conditions presented in Table 3, which claim to be reasons for optimism in the US economy.

Table 3: Reasons for Optimism (Cornerstone 2002)

Government Related	<ol style="list-style-type: none"> 1. Fiscal and monetary policy are favorable and pro-growth 2. Interest rates are quite low and will remain low 3. The broad measure of the nation's money supply is increasing annually at a rate of 7.2 percent 4. The war against terrorism will succeed, reducing uncertainty and requiring massive government spending and employment
Business Related	<ol style="list-style-type: none"> 5. Productivity gains continue to be robust 6. Business inventories are nearly exhausted. Increased demand will require increased production 7. The pervasive housing market is quite vigorous 8. The technological revolution universally elevates and amplifies all business opportunity 9. The vast potential of the Internet will continue to be usefully exploited beyond all expectation
Consumer Related	<ol style="list-style-type: none"> 10. Unemployment is remarkably low at 5.9 percent 11. Total employment is 134 million people 12. Personal income is rising 13. Demographics favor a strong economy: <ul style="list-style-type: none"> • A two income family structure • A more permanent, white collar, less susceptible to layoff work force • 30 million retired people have permanent income isolated from decline caused by a recession • More workers than ever before have automatic payroll deduction injected into the market

	14. The wealth effect which is a psychological condition created by the appreciation in value of an investor's assets and general net worth. It is believed that the existence of the wealth effect provides the comfort required to motivate consumers to purchase goods and services even when their level of discretionary income does not provide justification
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2.1.2.4- Investor Behavior and Psychology

Investors continue to live through one of the worst bear markets in recent times; it allows examining how their attitudes toward investments have changed. By studying investor thoughts and feelings about the risk/return relationship, light can be shed on investor tendencies, which can lead to a more accurate portrayal of one's investment objectives.

The typical investor behavior of being driven by either fear or greed appears to have given way to uncertainty about when the right time to jump back into stocks. After three consecutive years of losses for the major US markets, investors are more confident that equities have seen the most terrible bear market. Still, the sluggish recovery in the United States economy has precipitated a degree of uncertainty about the outlook for corporate profits for the coming years. Until the economy and markets turn the corner, the mindset of the average investor will be transfixed on the

uncertainty regarding the economy, the markets and, ultimately, their portfolio (Plant 2003).

The following table (Table 4) outlines the various states of mind that a typical investor may currently be experiencing.

Table 4: Investor Behavior in Bear Market (Plant 2003)

Current Investor Behavior	Why Investors are reacting this way	What Investors should instead focus on	Why this new mindset should lead to successful results
- Investors are stuck on the pain of the recent bear market.	- The recent past has a powerful, if not overriding, influence on investment decisions. As a result, investors become over-sensitized to recent events and their views about the future become biased. - North American markets have been disappointing over the past few years. - Forecasted market and economic growth in 2004 is not spectacular.	- The recent past is rarely a strong indicator of future events. - While a healthy dose of skepticism is warranted, forecasters do not have the best track record. The consensus estimated cannot accurately predict turning points in the market.	- The flow of money into mutual funds shows a trend where investors steer their money into recent strong performers and shift funds out of recent laggards. The resulting return from this approach has been shown to be below that of a simple buy and hold strategy.
- Investors are being myopic.	- Prone to procrastination as investors act on short-term decisions as their sensitivity to inevitable short-term volatility is overdone. - The emotional cost of sustaining additional losses outweighs the perceived benefits of investing in stocks over the long-term.	- Shift focus to a longer time horizon. - Over time, the ups and downs of market cycles are smoothed out.	- With a long-term investment objective of risk mitigation, reduced transaction costs and achievable returns are all benefits. - Does not necessarily imply a strict buy and hold strategy, as rebalancing is a prudent asset allocation technique.

<p>- Investors have become more risk averse.</p>	<p>- "House money" effect: investor risk aversion increases after a loss and decreases following a gain. The explanation is that after suffering a loss, investors have lower "emotional reserves" in order to tolerate additional losses. Alternatively, they can accumulate a buffer of emotional strength with each successive gain.</p>	<p>- Keep your fear of a continued downward market spiral in check.</p>	<p>- Markets have a natural tendency to oscillate from high points to low points and back up again. While the duration of whichever phase the cycle is in cannot be accurately predicted, one should realize that markets are resilient. Over the past century, there have been numerous shocks in the market that have temporarily devastated economic growth and investor confidence sometimes for a period of many years. Eventually, however, stocks have managed to push forward and achieve substantially higher gains than alternatives.</p>
<p>- Investors want to know when things will get better.</p>	<p>- Anxiety over how long the bear market will last. - Sense of control; overconfidence.</p>	<p>- Maintain a long-term focus on the markets.</p>	<p>- Over time, stock markets generate superior returns compared to other investments. Peaks and troughs will occur along the way while assets accumulate in the long-term. A long-term optimistic view of the markets is supported by investors taking on greater risks given recent losses as the relevance of "sunk costs" leaves</p>

			investors thinking that they have “invested too much to quit”.
- Investors are following the crowd.	- Following the crowd may reduce guilt or emotional cost associated with losses. In other words, misery loves company.	- Look at the merits of the investment environment through diligent analysis and fundamental research.	- “Herd Mentality” is considered a contrarian approach to investing where one takes the opposite view to the popular prevailing one. By choosing to go against the herd, an investor utilizes a contrarian strategy.

The most predominant actors influencing markets seems to be investor behavior and confidence. This leads us to the study of how behavioral factors have affected the market performance during the crash period.

2.1.2.5- Investor Overconfidence

Instead of reacting to market rumors, anecdotes or advice with a healthy dose of skepticism, many investors not only believe, but also act on what they hear, supremely confident that they are able to discern fact from fiction. Thinking that they know more than they do, investors express their opinion as facts on subjects they actually know little about. The reason for this action is because if investors admit they do not know something, it is considered a sign of ignorance. People in general would

rather pretend to be confident and live with the consequences of being wrong (Shiller 2000).

Overconfidence is the reason behind why investors tend to become irrational in the face of uncertainty. When investors face imminent danger, they tend to react instinctively rather than rationally, knowing that superior investing returns are achieved by those investors who retain their self-awareness in order to overcome all the possible limitations (Mann 2000).

In addition, the culprit of possible overtrading in the market is simply overconfidence, which is at its base an irrational and innate human characteristic. Investors have a need to try to exert control over that which is inherently uncontrollable. Investors rely on the superiority of their knowledge, their rationality, and their ability to process information in order to help them achieve better than average results. At the end, investors' own humanness conspires against them. When investors face imminent danger or actualized danger, they tend to become bold and react instinctively rather than rationally. Whereas, in the perception of safety, they lean towards greater risk taking (Mann 2000).

On the other hand, money managers must be overconfident in order to manage billions of dollars of other peoples' money. Further, institutional investors have more information and resources than individuals. If institutional money managers need

information about a company, they generally have access to all levels of management. It is often in the area that individuals have the most knowledge that they also display the most confidence. This overconfidence and the closeness to the market lead managers to overtrade, in the beliefs that they can beat the market. Not surprisingly, the most diversified funds and the funds with the lowest return are largely coextensive (Mann 2000).

Unfortunately, it is impossible to be completely deductive, so investors must rely on their incomplete knowledge and their impressions. Also, investors have the tendency to seek confirming information and neglect information that is counter to their preconceived notions (Mann 2000).

Overconfidence might also offer an explanation for the failure of some participants to realize that their trades suffer from winner's curse risk and are consequently loss making. Overconfidence reflects a very prevalent tendency to overestimate investors' skills, prospects for success, the probability of positive outcomes, or the accuracy of their knowledge. Overconfidence can manifest itself in three different ways (Biais, Hilton, Mazurier & Pouget 2002):

- It can manifest itself under the form of overestimation of one's abilities relative to the others, sometimes referred to as the "better than average effect". These unrealistic

positive views of the self can lead to unrealistic optimism about the chances of experiencing positive outcomes.

- Overconfidence can also manifest itself in the form of exaggerated perception of personal control. This tendency to overestimate the extent to which one can influence external events could lead to inappropriate judgments relative to the performance of trading strategies.
- Finally, another manifestation of overconfidence is miscalibration, which is the tendency to overestimate the precision of one's information. This strategy leads to excessively aggressive trading strategies and poor performance. Excessive confidence in one's information can be expected to reduce the extent to which one is willing to learn from market signals, such as the orders and quotes placed by other traders. While rational agents realize that trade execution reflects information about the signal of their counterpart and adjust their beliefs and strategies accordingly, overconfident agents fail to make this adjustment and hence suffer from the winner's curse (Biais, Hilton, Mazurier & Pouget 2002).

The attributes psychologists believe that contribute to overconfidence are certainly common in our modern investment environment. Indeed, the elements for overconfidence by

investors may be at their highest levels ever. This overconfidence leads investors to have too much faith in their estimates of stock value and in predictions about the future movement of stock prices. Investing is a difficult process, consisting of gathering and analyzing information leading to decision-making based on that analysis. However, overconfidence causes investors first to misinterpret the accuracy of the information and then to overestimate their skills in analyzing it. This can in return lead to poor investment decisions, which often manifest themselves as excessive trading, risk taking, and ultimately portfolio losses.

There is always investor overconfidence about the precision of private information and the belief of investors that they were the cleverest ones, which causes asymmetric shifts in investors' confidence as a function of their investment outcomes. Overconfidence implies negative long-lag autocorrelations, excess volatility, and when managerial actions are correlated with stock mispricing and public-vent-based return predictability. Biased self-attribution adds positive short-lag autocorrelations (momentum), short-run earnings (drift), but negative correlation between future returns and long-term past stock market and accounting performance (Nofsinger 2001). Variations in investor confidence are an overestimation of the ability to value stocks and predicting future prices arising from biased self-attribution.

In the absence of growth in 2002, Microsoft was still considered synonymous with enduring stock-market wealth generation. The reason being that investors were confident that it was a premium company, financially sound, well-managed and would hurdle the expectations it has set for itself (Nofsinger 2001).

In summer 2002, economic worries prompted investors across the globe to withdraw money out of stocks and into the relative safety of government bonds.

Following the tragedy of 2001, the year 2002 witnessed some of the largest corporate fraud scandals in financial market history (WorldCom, Enron, etc...). These scandals decreased the overall investor confidence and investors deepened their beliefs in intuition and subjective issues rather than financial statements or other objective matters.

Overconfidence has also been found to have a great impact on the volatility of the stock market and the risk undertaken by investors. In addition, overconfidence in the market is due to other factors such as experience and the internet (Nofsinger 2001).

- *Trade Frequency:* Overconfidence increases trading because it causes investors to be too certain about their opinions. Investment opinions derive from beliefs

regarding both the accuracy of the information obtained and the ability to interpret it. Therefore, overconfident investors tend to believe more strongly in their own valuation of a stock and concern themselves less about the beliefs of others.

- *Risk*: Overconfidence also affects risk-taking behavior. Rational investors try to maximize returns while minimizing the amount of risk taken. However, overconfident investors misinterpret the level of risk they take. The portfolios of overconfident investors tend to have higher risk for two reasons. First is the tendency of overconfident investors to purchase higher risk stocks, which are generally from smaller and newer companies. The second reason is the tendency to under-diversify the portfolio. Overall, overconfident investors take more risk and perceive their actions to be less risky than is generally the case.
- *Experience*: Overconfidence is learned and it does not require a long time to learn it. Studies have shown that new or inexperienced investors expect a higher return on their investments than the return expected by much more experienced investors. Additionally, the inexperienced investors are more confident about their ability to beat the

market. Apparently, having been around the block a time or two and having experienced both bull and bear markets help investors more to unlearn some of the overconfidence.

- *The Internet:* Thanks to the Internet, high quality information is now easier and quicker to obtain than ever before. However, the Internet investing environment fosters overconfidence. As investors acquire more information, their confidence in their ability to predict certain outcomes rises far faster than their true ability. Online investors have access to vast quantities of data, but information is not knowledge or wisdom. In fact, having loads of data gives investors the illusion of knowledge and thus control. Ultimately, this data may give investors false confidence of what stocks to pick. Indeed, the increase in trading volume in the stock market during the 1990s is often attributed to the rise in popularity of online trading. This has also coincided with the proliferation of online message boards, which seduce investors into the illusion of control.

Both individual and professional investors can be overconfident about their abilities, knowledge, and future prospects. Overconfidence leads to excessive trading that can lower portfolio returns, and it also leads to greater risk taking.

Investors' ever increasing use of online brokerage accounts is making them ore overconfident than ever before.

People in general tend to be overconfident. As psychologists have predicted, this overconfidence leads investors to overestimate their knowledge, underestimate all kinds of risk, and exaggerate their ability to control and predict certain events. Psychologists have found that people become overconfident when they have experienced in the past successful outcomes. In addition, being exposed to massive loads of information and having a higher degree of control leads to higher overconfidence, thus attaining two factors that are referred to as the illusion of knowledge and the illusion of control (Nofsinger 2001).

- **Illusion of Knowledge**

People have the tendency to believe that the more information they grasp the more accurate are their predictions. This illusion of knowledge states that knowledge increases and decision-making improves the greater is the load of information. However, this is not always the case; increased levels of information do not necessarily lead to greater knowledge. Three reasons support this analysis. First, there are certain information that are of no value and can even misguide and mislead investors into making wrong predictions. Second, the volume of information does not necessarily lead to better interpretation.

Training, experience, and skills are all factors that contribute to the better understanding and analysis of information. Finally, people tend to interpret new information as verification of their prior beliefs, which is not essentially always the case. Instead of being objective, people look for the information that confirms their earlier decisions (Nofsinger 2001).

- **Illusion of Control**

Overconfidence tends to increase when people feel that they have control of the outcomes of certain events and predictions. The key attributes that foster the illusion of control and that investors may consistently experience are outcome sequence, task familiarity, choice, active involvement, and finally information (Nofsinger 2001).

- *Outcome Sequence*: The way in which an outcome occurs affects the illusion of control. Positive outcomes that occur early give the person a greater illusion of control than early negative outcomes.
- *Task Familiarity*: The more familiar people are with a task, the more they feel in control of that task.
- *Choice*: The choice attribute refers to the mistaken feeling that an active choice induces control. People tend to believe that if they make their choices, they have a better chance of observing positive outcomes. In the past, most investors

used full-service brokers who advised them and helped them make investment choices. However, the rise of the no-advice discount broker shifted the decision-making more to the investor. Modern investors must make their own choices as to what, and when to buy and sell. Therefore, the illusion of control is higher due to the decision-making process made by the individual investor.

- *Active Involvement*: The more people participate in a task, the greater their feeling of being in control. People believe that they have a greater chance of reaching successful outcomes if they are involved in the process. Modern investors have high participation in the investment process. Investors using discount brokers must conduct their own investment decision-making process, thus they must obtain and evaluate information, make trading decisions, and then place the trades.
- *Information*: The greater the amount of information obtained, the greater the illusion of control. When learning new information, people place too much emphasis on how extreme or important it is. Too little emphasis is placed on validity or accuracy. Much of the information received is really noise and is not important, a lot of what we call information is inaccurate, hearsay, or simply outdated. In

fact, some information used by investors these days is really an info bomb, which is a deception perpetrated by modern scam artists. Thus, information does not necessarily lead to knowledge or understanding.

Due to the illusion of control, investors often become even more overconfident after switching from traditional brokerage trading to online brokerage accounts. A study consisting of 1,607 investors who switched from phone-based trading to online trading showed that even before going online, these investors were active traders, their average annual turnover was 70 percent. After the switch to online trading, their turnover increased 120 percent annually. Before the switch, these investors performed well. Their portfolio returns after costs exceeded that of the major indices. After the switch to online trading, these investors began under-performing these indices. In short, it appears that investors became more confident after switching to online trading accounts. This overconfidence in return led to excessive trading and lower profits (Nofsinger 2001).

2.1.3- Communication and Media Effect

2.1.3.1- Communication and Flow of Information

The communication of asset return distribution is a central issue in finance. Investment advisors are legally obliged to

inform their clients about the potential risk of their investments, whereby financial risk is usually expressed by the variance or the standard deviation of the underlying distribution of the future returns on the investment. Investors are thus implicitly required to accurately perceive and interpret statistical information, irrespective of how the information is presented (Kirchler, Maciejovsky & Weber 2004).

In recent years, new possibilities of acquiring financial information have become available to investors. One of the main information sources is the Internet, which provides investors with a vast quantity of investment data. Evidence has shown that investors generally benefit from the provision of information. Empirical studies, however, indicate that more information does not necessarily imply an increase in actual knowledge. In the psychological literature, this tendency is referred to as the illusion of knowledge and is empirically confirmed for a variety of decision domains. Even when news media recipients are socially involved with issues covered in the media, they are prone to the illusion of knowledge. This tendency will increase the more recipients use the media (Kirchler, Maciejovsky & Weber 2004).

Information does not only play an important role in individual investment decisions, but also in market environments.

Market efficiency, for instance, requires that neither objectively irrelevant information nor selectively distributed information affect aggregate market prices. If, for example, some traders receive a positive signal about the likely return on an asset, whereas an equal number of traders receive the opposite signal, this information should be completely revealed, leaving aggregate market prices unaffected. Thus, while individual investors may be prone to biases, such as the illusion of knowledge, aggregate market prices are considered to be unbiased (Kirchler, Maciejovsky & Weber 2004).

In addition, it has been indicated that objectively irrelevant information influences trading behavior massively. Moreover, positively and negatively framed information leads to a particular trading pattern, but leaves trading prices and trading volume unaffected. Participants who experience a gain in their securities tend to sell their assets more rapidly than those who experience a loss. Further, positively framed subjects generally sell their assets later than negatively framed subjects (Kirchler, Maciejovsky & Weber 2004).

Financial advisors were a vital force in reinvigorating America's confidence as well as its economy. They began an effective communication process with their clients to help restore their confidence. From a survey conducted by Merrill Lynch, it

was found that although it was difficult for advisors to deal with the challenges of the events of September 11, those who personally contacted their clients helped to reduce tremendously their anxiety level and thus helped to boost their confidence. However, this process was unsuccessful, as investor confidence remained low. The reason behind this could have been that information provided to them lowered their morale and expectations about the future as they were not provided with any solutions to their problems (Klein & Suleyman 2004).

Communications made on behalf of companies to their investors through annual reports and press releases have shown to greatly affect the attitude and behavior of investors. The market sloppiness is based on the idea that earnings estimates have to come down. For example, in 2002 investors briefly turned bullish as talk raced through the stock market that some big financial institutions were conducting an “asset allocation” trade. That means they were selling Treasury bonds to take some profits, and shifting toward stocks on the theory that they were cheap. As for the Phillip Morris, in September 2002, the stock dropped 11 percent and reached a 52-week low after the Food and Tobacco Company warned that its financial performance would not meet expectations because of weak consumer spending and competition from discounters. In fact the prices of other tobacco company

stocks also fell in reaction to this particular announcement (Browning 2002).

In order for the securities markets to prosper, the cloud of investor skepticism should be removed and the market should support the SEC's proposals aimed at transforming the quality of corporate disclosure. In addition, investors should become genuine leaders in improving the quality of disclosures by publicly-traded companies. The federal government can also set minimum standards for acceptable behavior and punish those who violate these standards. For the industry to prosper and for investor confidence in the disclosures of publicly-traded firms is to be restored, quality information should be available to investors at all times (Fisher 2002).

- **Value and Quality of Information**

The information society is often defined by the centrality of information production and consumption functions. Information's centrality is determined in the demand for it, and by the degree this demand is met. Hence, another way to view the viability of the information society is by assessing the vitality of information exchange and flow within it.

Information has several unique characteristics that render it difficult to value. It is considered expensive to produce and cheap to reproduce. In fact, distribution is accomplished mainly

by reproduction or copying. The same content can be distributed by different media sources, and the price is often derived from the medium rather than from the value delivered by the content itself. In point of fact, people consume information both by sharing and by purchasing, while most other goods are consumed via purchasing only. The cost of information can be either direct or indirect. Also, the quest for the value of information is further complicated by the fact that its value is revealed only after consumption (Raban & Rafaeli 2003).

The tradition of studying decision-making under uncertainty has addressed patterns of information use and the value assigned to information. Studies have shown that people tend to ignore available information such as prior probabilities, sample size, and the like. Instead, decisions are based on other subjective methods such as representative, availability, adjustment, and anchoring. In addition, people tend to be conservative and undervalue information available for the revision of a prior opinion (Raban & Rafaeli 2003).

Restoring the validity of the US's securities markets is dependent upon improving the quality of information that investors receive. The securities markets are extremely efficient at pricing and allocating capital on the basis of all available information. Unfortunately, the important information is too

often not available. When critical information is absent, or where great disparities exist in the quality of information available to different players, the power of markets is misdirected and the allocation of resources becomes skewed, mocking the claim which investors make that their securities markets are the most efficient means they have of converting their collective savings into investments (Fisher 2002).

In order to promote the idea that investors have a fundamental right to see the companies in which they invest through the eyes of management, investors should see both the real economic leverage and the key indicators of business value that are available to insiders. If there is no way for companies to disclose their basic financial and business facts, then there will never be an alignment between the interests of corporate insiders with those of their investors (Fisher 2002).

In addition, public attention has focused on conflicts of interest borne by securities analysts. If neither analysts nor investors have the right information with which to price a company's securities, then the mere removal of conflicts of interest between them will not get investors as far as they want to go. If the market is incapable of putting both investors and analysts on the same footing as insiders, particularly with respect to companies' real economic leverage, then the best days of the

securities industry are in the past. However, traded capital markets can prosper if investors are provided with sufficient information to price a company's securities on the same basis as insiders (Fisher 2002).

Investors should know two kinds of facts that corporate insiders know. First, the handful of key indicators of business value that management actually uses to assess the company's current performance and near-term prospects. Second, the company's real asset-liability ratio and the fundamental financial information about all of the company's contractually obligated assets and liabilities (Fisher 2002).

Observable facts have shown that management has lacked the sufficient incentive to provide information to investors. Their lack of incentive is a reflection of the much bigger problem that there are two completely different valuation methodologies at work in the economy today. One for those inside the temple of modern finance and who have access to insiders' data, and a different one for the outsiders who do not understand the basics of modern finance theory and who must rely only upon publicly available information (Fisher 2002).

As long as a gap exists between corporate insiders and investor, the opportunity and the temptation for insiders to game the system will be too great. If fundamental information

asymmetries are allowed to persist, whole armies of independent directors, auditors, and regulators will fail to align the interests of insiders and investors. Also, the disclosure to investors is too important to be left to the accountants (Fisher 2002).

- **Information Asymmetries**

When investors suspect significant information asymmetries, their market will “break down”, namely trade will decay and the benefits of active and open markets diminish. In such cases, companies are hurt by the decline of available funding, and investors suffer from diminishing trade and investment opportunities. In addition, it has been found that knowledge assets create, in general, significant information asymmetries (Lev 2000).

Information asymmetry has also been found to increase because of the inherently large uncertainty that is found in the economy. Investors react to uncertainty by demanding a compensating return premium, which translates to a higher cost of capital to the company.

The combination of outdated accounting rules, the high uncertainty associated with most knowledge assets, and investors’ preferences for quick gratification in the form of high corporate earnings, leads to large groups of knowledge-intensive companies being systematically undervalued by investors and subjects such

companies to excessively high cost of capital. These companies that most urgently need to adopt new technologies, change organizational designs and invest in research and human resources, encounter great difficulties doing so because of investors' skepticism (Lev 2000).

In order to prevent such an outcome, a combination of managerial, financing, and disclosure strategies are needed. On the managerial front, new initiatives aimed at extracting value from under-utilized knowledge assets, such as vigorous licensing of patents and know-how is called for. New and imaginative financing arrangements will reduce the high cost of capital currently associated with most knowledge investments. Finally, improved and credible disclosure strategies, aimed at alleviating investors' concerns about the high risk and distant returns of knowledge assets, will narrow the gap between undervalued stocks and their intrinsic values (Lev 2000).

2.1.3.2- Effect of the Media

The stock market and the surrounding media circus provide a source of endless fascination for the public. Whether the media induces, amplifies or simply reflects the public's interest in the daily performance of the US equity market, it is clear that the content of the media's reports on the stock market is inextricably

linked to the psychology of the marketplace. In addition, the media provides an invaluable and uncontaminated source of data on the psychology of the marketplace (Tetlock 2003).

The *Wall Street Journal* is one of the most influential media reports on the daily stock market activity. When the *WSJ* “Abreast of the Market” column contains many negative words, expected future stock returns decline and expected return volatility increases. These results have two reasonable interpretations: the media reports investor sentiment before this sentiment is fully incorporated into market prices, or the media directly influences investors’ attitudes toward securities. The news media are in constant competition to capture the public attention they need to survive. Survival for them requires finding and defining interesting news, focusing attention on news that has word of mouth potential, and whenever possible defining an ongoing story that encourages their audience to remain steady customers. The competition is by no means haphazard. Those charged with disseminating the news cultivate a creative process, learning from each other’s successes and failures that aim to provide emotional color to news, to invest news stories with human-interest appeal, and to create familiar figures in the news. Years of experience in a competitive environment has made the

media professions quite skillful at claiming public attention (Tetlock 2003).

Promising emerging equity markets often witness investment herds and frenzies, accompanied by an abundance of media coverage. Because information has a high fixed cost of production, its equilibrium price is low when quantity is high. Investors all buy the most popular information because it has the lowest price. Given two identical asset markets, asset demand is higher in the market with abundant information because information reduces risk. By lowering risk, information raises the asset's price. So often, investors react wildly to bad news, resulting in selling shares that are considered perfectly good investments. The reason for this reaction is that investors react with their emotional money minds rather than their rational ones (Veldkamp 2003).

The news media are naturally attracted to the financial markets because, at the very least, the markets provide constant news in the form of daily price changes. Nothing beats the stock market for sheer frequency of potentially interesting news items. The public considers it the Big Casino, the market for major players, and believes that on any given day it serves as a barometer of the status of the nation- all these are impressions that the media can foster and benefit from. Financial news may

have great human potential to the extent that it deals with the making or breaking of fortunes. Waves of negative news on corporate performance and the economy knocked the NASDAQ Composite Index down nearly 3 percent, to its lowest level in six years in September 2002. The drop in technology stocks left investors fretting that other major indexes, including the Dow Jones Industrial Average, might also fall. This fear amongst investors led to its reality (Browning 2002).

Strategist Tobias Levkovich at Salomon Smith Barney said, “the economic news does not bode well for the market after September 11, mostly because investors’ reaction to it helped demonstrate the depths of their continuing bearish mood. For the market to react the way it did to this tragedy just shows that it remains in a very reactive instead of anticipatory mode” (White 2002).

- **Media Legitimizing Effects**

Despite the pervasiveness of the media in markets, organizational scholars have dedicated surprisingly little attention to studying how it affects the choices of market participants. The media records public knowledge and opinions and focuses public attention and interest on certain issues, thus setting the agenda of public discourse. Further, it frames issues through persistent patterns of cognition, interpretation, and

presentation of selection, emphasis, and exclusion, providing institutional and cultural accounts within which the appropriateness and desirability of actions can be evaluated. Therefore, in performing its functions of informing, highlighting, and framing, the media presents market participants with information that affects impression formation and the legitimating of firms (Pollock & Rindova 2003).

Whereas numerous researchers have suggested that the media plays an important role in the legitimating processes, they have neither agreed on, nor systematically investigated, how this role is performed. Some researchers have argued that media coverage reflects public evaluation and therefore provides a measure of organizational legitimacy. Others have suggested that the media affects perceptions of legitimacy and therefore is an active force that firms need to manage strategically in the pursuit of legitimacy (Pollock & Rindova 2003).

In addition, whereas some level of legitimacy may be necessary for a firm to be considered newsworthy, media coverage further legitimates firms. The media legitimates firms by directing public attention to those it selects for coverage, thereby increasing the public's exposure to them. It also impacts the ways that stakeholders interpret and evaluate information

about firms by framing its descriptions of them in positive and negative terms (Pollock & Rindova 2003).

- **Effect of Journalists**

The effect of journalists on investors' behavior has emerged greatly as a source of information. Investors in the stock market tend to rely on the media of a great deal, but most importantly, some investors have come to trust journalists that they find to be reliable, honest, and not biased. In return they follow what they say, affecting their behavior and thus their investment decisions. Many journalists in the economy have grown worthy to investors and thus it is found that whenever they release a report, investors take this information and turn it into facts.

One journalist worth mentioning is Maria Bartiromo, who sets the standard for business news programming throughout America and the world, delivering the stories behind every great deal each weeknight and whose reports have come to have a great impact on the behavior of investors in their decisions regarding certain investments. She is bearish on ignorance and although Americans are jumping into the stock market in record numbers, she finds that too many jumps without looking. In her reports she shows investors how to use timely news and hot information to make money in today's market. A media luminary with the solid credentials of a seasoned pro, Maria Bartiromo has set the

standard for business news programming, delivering indispensable, up-to-the-minute information from the New York Stock Exchange (NYSE) and other financial markets (CNBC 2003).

The role of the news media in the stock market is not simply a convenient tool for the investors, who are acting directly to the economically significant news itself. The media actively shape public attention and categories of thought, and they create the environment within which the stock market events are played out. Studies made on the news and the stock market crashes of 1929 and 1987, illustrate that the news media are fundamental propagators of speculative price movements through their efforts to make news interesting to their audience. They sometimes strive to enhance interest by attaching news stories to stock price movements that the public has already observed, thereby enhancing the relevance of these movements and focusing greater attention on them. The media can foster stronger feedback from past price changes to further price changes, and they can also foster another sequence of events, referred to as further price changes, and they can also foster another sequence of events, referred to as an attention cascade. However the media alone is not to blame for pushing ideas into people's heads, the people are not passive to these ideas; it is however the cultural aspects of

these people that influence their interpretation of the media (Pollock & Rindova 2003).

2.1.4- Market Reaction

2.1.4.1- New Economic Thinking

The term 'New Era' has been used to describe the times when stock market expansion is often associated with popular perceptions that the future is brighter or unreliable than it was in the past. The twentieth century has been gradually growing into a better standard of living with low impact of economic risks on individuals (England 2001).

However studies have been done using word count of publications, to get some idea of the changing frequency with which certain economic terms are used. A search of the term "new era economics" turned out that the term had not been in circulation until July 1997 when it showed up on the Business Week Cover Story. The New Era theory emerged after the interpretation of a stock market boom. Whenever the market reaches new high, writers and other prominent people suddenly appear, armed with explanation for the optimism seen in the market. Reporters also suggest that it was the words of these prominent people that caused the market shifts. Although this is somewhat true, yet the new era thinking they promote is part of

the process by which a boom may be sustained and amplified, which is part of the feedback mechanism that can create speculative bubbles (Brooks 2000). In the stock market, bubbles are usually limited to individual sectors which ride high on excessively exuberant expectations. Table 5 shows when a healthy bull market turn into a bubble ripe for the popping:

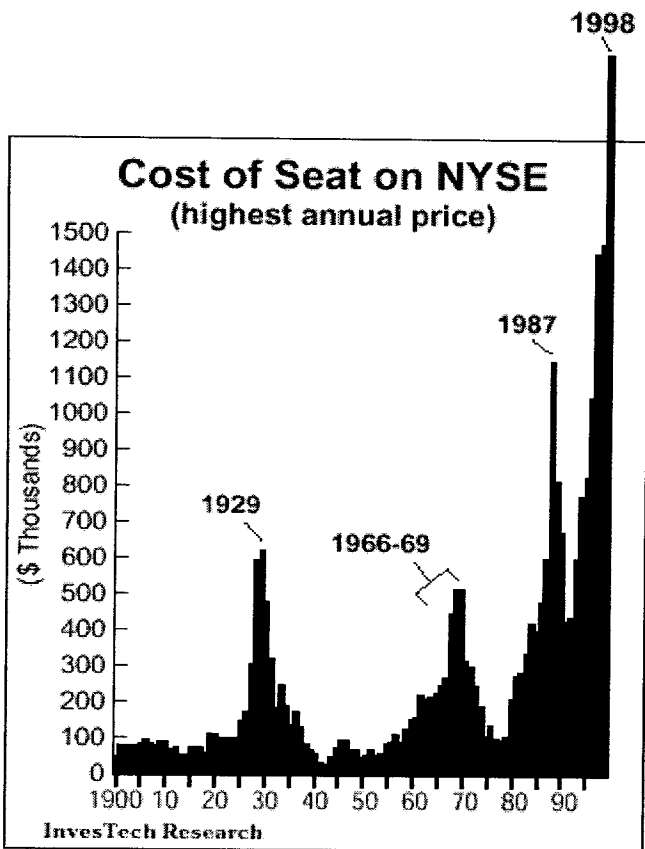
Table 5: Is a "Bubble" Identified as a Bubble

HEALTHY BULL MARKET	↔	DANGEROUS BUBBLE
Buying based on intrinsic fundamentals or underlying values	↔	Buying based only on anticipation of rising prices or profits
Expectations based on historic norms	↔	Expectations based on recent gains
Healthy respect for risk	↔	No respect for risk
Major perceived risk: <i>"Losing 1/3 or 1/2 in a bear market"</i>	↔	Major perceived risk: <i>"Not being on board"</i>
"Feared Recession" arguments	↔	"New Era" arguments
Periodic or frequent corrections	↔	Absent or infrequent corrections
"Smart Money" profits	↔	"Foolish Money" profits
Skepticism and logic prevail	↔	Speculation and greed prevail

Source: <http://www.bearmarketcentral.com/bubble.pdf>

Market historians note that stock market bubbles have been accompanied by a "bubble" in the price of a seat on the New York Stock Exchange (Figure 5). In March 1998, a seat sold for a cool \$2.0 million – far above the peak prior to the 1987 Crash. Also note the 1929 and 1966-69 peaks.

Figure 5: Cost of Seat on NYSE



Source: <http://www.bearmarketcentral.com/bubble.pdf>

A prominent speaker may still think that it would be good business to commend a vision of brilliant future for the economy, but it is simply not credible to do so. One could even present a case that the economy and the stock market is under priced and should go up, but one cannot attain public attention the way they did after a major stock market run up and economic boom. There are times when the audience is receptive to optimistic statements and times when it is not. Nowadays, a pessimistic report on the economy would definitely get more attention and thus reaction than an optimistic one.

Historically, bubbles have always been a part of the lessons of investing. There was the Japanese stock market and real estate bubble which popped in 1989. In domestic real estate, there was the “not so recession-proof California”, as well as the price deflation or washouts of condominiums in Hawaii... residences in the Northeast... commercial office space in the oil belt... and numerous other regions in the 1980’s. Yet history has left several notable eras which were recognized as “bubbles” only in the eventual and inevitable devastation. Seasoned investors may remember the “Nifty Fifty” era of the 1970’s, the “Go-Go Fund” era of the 1968’s or even the “Investment Trust” era of the 1920’s.

It is impossible to prove the statement that some speculative excesses were behind many of the events. One can always argue that the reasons offered by investors to justify them were valid in terms of the evidence that was available when the market was going up, and that “New Era” stories were never without value as theories of what might happen. The possibility of major speculative bubbles, now and in the future, cannot be ignored (England 2001).

2.1.4.2- PE & Long-Term Returns

By historical standards, the US stock market has soared to extremely high levels in recent years. Yet if people take into consideration the history of high market valuations, they will notice that there was no escape from the market crash that occurred. Today's parallels with history and repeated warnings from the SEC and the Federal Reserve carry ominous overtones. A correctionless bull market, record overvaluation, plus public exuberance all add up to unprecedented risk – for the stock market, as well as the U.S. economy (Stiroh 2000). By July 1998, stock market capitalization (in relation to GDP) has reached over twice the peak before the last recession or prior to the 1987 stock market crash (Figure 6).

Figure 6: Stock Market Cap as a percentage of GDP



Source: <http://www.bearmarketcentral.com/bubble.pdf>

Part of the explanation for the remarkable price behavior between the years 1990 and 2002 has to do with the unusual earnings. Certainly not in small-caps; the cumulative P/E ratio of all domestic NASDAQ stocks has been hitting unprecedented, frothy levels. It would require a decline of over 75 percent to take the NASDAQ P/E ratio back to where it started this bull market in October 1990 (Stiroh 2000).

Figure 7: NASDAQ Price to Earning Ratio



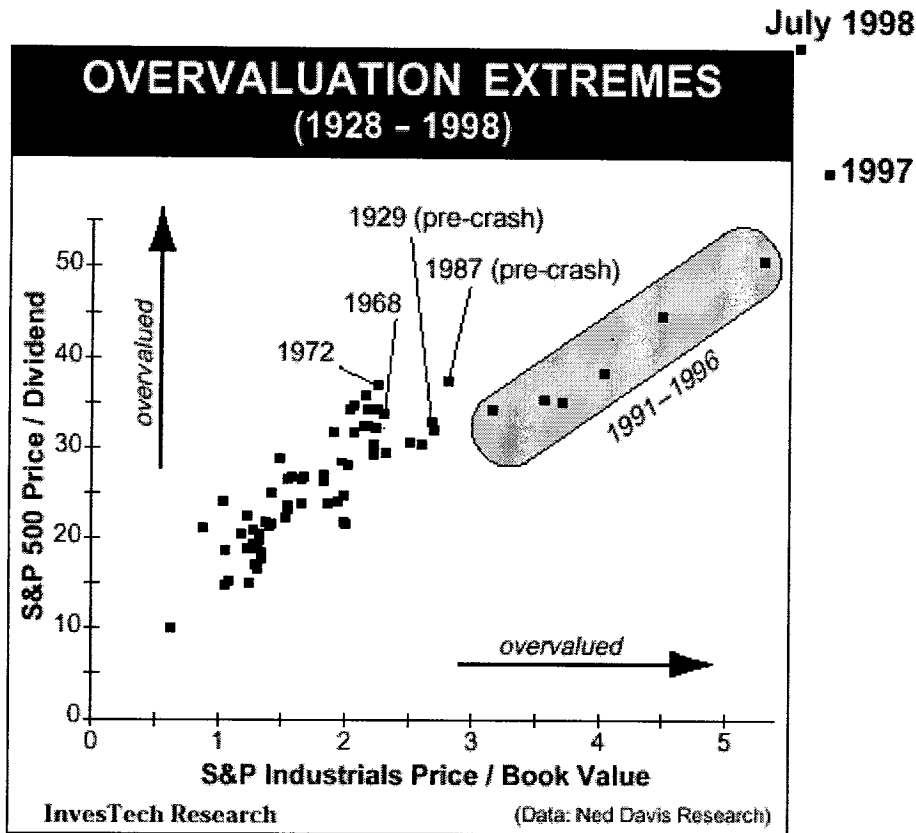
Source: <http://www.bearmarketcentral.com/bubble.pdf>

The price-earnings ratio is a measure of how expensive the market is relative to an objective measure of the ability of corporations to earn profits. In Figure 7, one can notice an enormous spike after 1997, when the ratio rises to a high of 81.2 by 1998.

Wall Street consensus is that the U.S. has entered a “new era” of tame inflation, low interest rates, and rising productivity that will carry economic prosperity well into the new millennium. If so, then today’s extreme valuation levels in the stock market are justified. Just how extreme is stock overvaluation? (Baker 2000). Figure 8 shows the S&P 500 Price-to-Dividend Ratio on the vertical scale, and the S&P Industrials Price-to-Book Value Ratio on the horizontal scale. Simply, the higher on the chart, or the farther to the right a year appears, the more overvalued it is.

One dot represents each of the past 70 years of stock market valuation. Clearly, when compared to overvaluation at some of the most historic market tops such as 1929, 1968, 1972, and 1987, while 1998 is off-the-chart! (Shiller 2002).

Figure 8: S&P Overvaluation



Source: <http://www.bearmarketcentral.com/bubble.pdf>

2.1.4.3- Baby Boom

Following World War II, there was an increase in birth rate; peace time prosperity encouraged those who had postponed families due to war and the depression. The Baby Boom was marked by very high birth rates during the year 1946-66, and so there are now unusually large number of people between the ages

of 35 and 55. Two theories suggest that the presence of so many middle aged people ought to boost today's stock market. One theory justifies the high price-earning ratio as the result of those Boomers competing against each other to buy stocks to save for their eventual retirement and thus bidding up prices relative to the earnings they generate. The other theory states that it is spending on current goods and services that boost stocks through a generalized positive effect on the economy; high expenditures mean high profits for companies. However these theories neglect the fact that the Baby Boom effect is already factored into stock prices by investors. They also neglect the emergence of new capitalist economies world wide and their demand for US stocks. These theories also assume that Baby Boomers have a low level of risk averseness, since they have no memory of the great depression of the 1930s or World War I (Granger 2004).

2.1.4.4- Overreaction and Under Reaction

Recent empirical research in finance has identified two families of pervasive regularities: under reaction and overreaction. The under reaction evidence shows that over horizons of perhaps one to twelve months, security prices under react to news. As a consequence, news is incorporated only slowly into prices, which tend to exhibit positive autocorrelations

over these horizons. A related way to make this point is to say that current good news has power in predicting positive returns in the future. The overreaction evidence shows that over longer horizons of perhaps three to five years, security prices overreact to consistent patterns of news pointing in the same direction. That is, securities that have had a long period record of good news tend to become overpriced and have low average returns afterwards (Dreman & Eric 2000). Put differently, securities with strings of good performance, however measured, receive extremely high valuations, and these valuations, on average, return to the mean (Caginalp, Porter & Smith 2000).

This evidence presents a challenge to the efficient market theory because it suggests that in a variety of markets sophisticated investors can earn superior returns by taking advantage of under reaction and overreaction without bearing extra risk (Barberis, Shleifer & Vishny 1998). Suppose that a company announces good news over a period of three to five years, such as earnings reports that are consistently above expectations. It is possible that investors overreact to such news and become excessively optimistic about the company's prospects, pushing its stock price to unnaturally high levels. In the subsequent years, however, investors realize they were unduly optimistic about the business and the stock price will correct

itself downwards. In a similar way, loser stocks may simply be stocks that investors have become excessively pessimistic about, and as the misperception is corrected, these stocks earn high returns (Dreman & Eric 2000).

Investors sometimes also make the mistake of under reaction to certain types of financial news. Suppose a company announces quarterly earnings that are substantially higher than expected. Evidence suggests that investors see this as good news and send the stock price higher, but for some reason, not high enough. Over the next six months, this mistake is gradually corrected as the stock price slowly drifts upwards towards the level it should have attained at the time of the announcement. Investors who buy the stock immediately after the announcement will benefit from this upward drift and enjoy higher returns (Barberis, Shleifer & Vishny 1998).

The same under reaction principle applies to bad news. If bad news is announced, like if a company announces that it is cutting its dividends, stock price will fall. However, it does not fall enough at the time of the announcement and instead continues to drift downwards for several months (Barberis, Shleifer & Vishny 1998).

In both cases, when investors are faced with either good or bad announcements, they initially under react to this news and

only gradually incorporate its full import into the stock price, which in return signals an inefficient market.

The course of events over the past few years has been nothing less than a tragedy for the thousands of people who have lost their savings in the stock market, and even lost their trust in the financial world itself. Probably no subject in recent financial literature has generated more controversy than whether investors behave rational when pricing stocks, or whether they overreact to market information, resulting in prices being too high or too low (Caginalp, Porter & Smith 2000).

Although the efficient market hypothesis states that, with minor exceptions, securities are rationally priced, repeated evidence has been presented of predictable over and under reaction. This evidence is based primarily on consistently higher returns for over favored stocks and below average returns for favored issues. The existence of overreaction in the marketplace is important to both investment decision-making and theory, and in more acute cases, it can be the major cause of financial bubbles and panics (Caginalp, Porter & Smith 2000).

The observation of pervasive regularities of under and overreaction of stock prices to specific news puts market efficiency theory in question. It suggests that several sophisticated investors can obtain abnormal returns. Behavioral

models have been designed in an attempt to accommodate investor behavior, which in return leads to the overreaction and under reaction of stock prices (Caginalp, Porter & Smith 2000).

When a positive surprise is followed by another positive surprise, the investor increases the likelihood that he is in the trending regime. On the other hand, when a negative surprise follows a positive one, the investor raises the likelihood of being in the mean-reverting regime (Calado & Garcia 2001).

Under reaction to new announcements is the circumstance in which the average return on the stock in the period after the announcement of good news is higher than the average return in the period following bad news. Whereas, overreaction occurs when the average return following not one but a series of announcements of good news is lower than the average return following a series of bad news. This signifies that after a series of announcements of good news, investors became overly optimistic of the fact that future news announcements will also be good and hence overreact. However, the new effective announcements might probably contradict that optimism, and thus generate lower returns (Calado & Garcia 2001).

2.1.4.5- Analysts Recommendations

Investment advisors and celebrity analysts have encouraged the public's interest in the securities markets. While the majority of professionals are conscientious about the messages they deliver, a few either wittingly or unwittingly have encouraged investors to develop unreasonable expectations of their stock market portfolio.

Investors tend to believe the opinion of financial analysts, thus it is seen that certain investors who have little knowledge about finance are dependant on financial analysts to make their investment decisions for them. There is presently debate on the scarce 'sell' recommendation given by analysts (Bowen 2001). According to data about analysts' recommendations on some 6000 companies, only 1 percent of recommendations were 'sell' in late 1999, while 69.5 percent were 'buy' and 29.9 percent were 'hold'. This situation stands in striking contrast to that indicated by previous data. Ten years earlier the fraction of sells was 9.1 percent, which is nine times higher (Malmendier & Shanthikumar, 2004).

Table 6: Brokerage Firm Characteristics

BrokerName (1)	Cos. (2)	Industries (3)	Analysts (4)	Industry "Presence" (5)	Co. Avg. Size Decile (6)	Followed Co. Avg. Coverage (7)	Broker's Recommendations			
							Recom- mendations (8)	Consensus Level (9)	Strong Buy (%) (10)	Underperform and Sell (%) (11)
1 Salomon Smith Barney	2,343	59	365	35.4	5.6	9.4	6,515	1.99	29.5%	4.8%
2 Merrill Lynch	2,205	58	430	36.2	5.8	9.5	6,225	2.02	26.1%	3.3%
3 Credit Suisse First Boston	1,967	57	287	28.9	6.0	10.1	4,519	1.98	14.7%	4.1%
4 Morgan Stanley	1,849	58	269	29.3	6.1	10.3	5,291	2.02	18.2%	5.4%
5 Goldman Sachs	1,781	57	228	28.1	6.3	10.6	4,665	2.02	24.7%	4.4%
6 Lehman Brothers	1,778	55	218	24.8	6.0	10.2	4,054	1.97	29.5%	6.0%
7 Banc of America Securities	1,691	56	165	22.7	5.4	9.6	3,215	1.88	57.8%	1.6%
8 Bear Stearns	1,617	54	194	23.5	5.7	10.0	3,610	1.93	31.3%	3.6%
9 UBS Warburg	1,562	58	219	22.8	6.0	10.4	2,982	1.94	0.0%	2.8%
10 Donaldson	1,546	58	110	22.4	6.0	10.3	3,845	2.03	14.1%	3.6%
11 CIBC World Markets	1,527	55	161	21.2	5.4	9.4	3,270	1.92	23.9%	4.2%
12 J.P. Morgan	1,510	55	249	22.6	6.1	10.7	3,372	1.98	41.0%	5.0%
13 Deutsche Banc Alex. Brown	1,473	58	222	22.7	6.0	10.4	3,144	1.97	17.4%	2.1%
14 Prudential Securities	1,343	54	156	19.4	5.9	10.7	3,410	1.96	38.7%	2.4%
15 Alex Brown	1,339	53	134	21.6	5.5	9.7	2,751	1.99	24.9%	0.9%
16 Robertson Stephens	1,218	49	136	14.8	4.9	8.5	2,784	1.87	16.5%	0.4%
17 Standard and Poor's	1,166	58	70	19.6	7.3	12.5	2,705	2.08	11.8%	13.8%
18 Dain Rauscher Wessels	1,109	53	108	12.8	4.9	8.9	2,286	1.89	25.6%	0.3%
19 A.G. Edwards & Sons	1,095	55	105	18.4	5.9	10.8	3,983	2.00	26.9%	6.5%
20 ABN AMRO	1,041	56	108	17.2	6.2	11.3	2,105	1.99	40.1%	1.9%
Ranked 1-20 by Number of Cos. Cov'd	5,823	59	3,914	23.2	5.9	10.2	74,731	1.97	25.5%	4.0%
Ranked > 20 by Number of Cos. Cov'd	7,479	59	5,831	2.9	5.0	9.0	94,396	1.95	31.3%	3.9%
All Brokerage Firms:	7,793	59	9,745	3.7	5.0	9.0	169,127	1.95	28.7%	4.0%

Source:

http://mba.tuck.dartmouth.edu/pages/faculty/kent.womack/working_papers/AIPM.pdf

Table 5 shows the largest 20 firms, ranked by number of companies for which they provide coverage according to the IBES Detail Recommendation file. Standard & Poor's, although not a brokerage firm, contributes its recommendations to IBES and ranks 17th in number of companies covered. Interestingly, it is the only firm in the top 20 whose sum of "underperform" and "sell" recommendations exceeds 10 percent of all its recommendations during the time period. Columns 2 and 3 show the number of companies and industries that are covered by the largest 20 U.S. brokerage houses and collectively the remaining brokerage firms and subsidiaries listed in IBES. While, Column 4 gives the total number of analyst listed in IBES per firm. When

an analyst changes firms, he or she may be counted again at another brokerage firm. For column 5, a brokerage firm's industry presence is calculated for each industry, and is defined as the number of companies followed (with at least one recommendation change) in the industry by the broker, divided by the total number of companies in that industry. Consensus Level is the average consensus level of the companies the firm covers. Percent Strong Buy and Percent Under perform and Sell are as a percent of the firm's recommendations over the period as categorized by I/ B/ E/ S (now part of Thomson, First Call) (Boni & Womack, 2004).

Analysts are reluctant to recommend investors to 'sell' anything. One reason often given is that a sell recommendation might bring on the wrath of the company involved. Companies might retaliate by refusing to talk to analysts whom they view as submitting negative reports, excluding them from information sessions, and not offering them access to key executives as they prepare earnings forecasts. This situation represents a change in the fundamental culture of the investment industry and in the tacit understanding that the recommendations are as objective as the analyst can make them (Cicccone 2003).

Another reason why analysts are reluctant to issue sell recommendations is that a lot of them are employed by firms that underwrite securities, and these firms do not want their analysts

to do anything that might jeopardize this lucrative side of the business. One of the most infamous cases to show this fact is the case when an email between an analyst and an investment banker leaked out of Merrill Lynch's server, in the of summer 2002. In the email the analyst pleads with the investment banker to allow a rating drop on one of the companies that Merrill Lynch had underwritten. The investment banker answers back that if the analyst dropped the rating something bad would happen to the analyst's career. It is not known how the email leaked out, but it landed in the hands of 'Eliot Spitzer', the Attorney General for New York State, who took Merrill Lynch to court under allegations of corporate fraud and misconduct. Merrill Lynch had to settle out of court, agreeing to pay \$100 million in penalties, rather than bare the long and damaging process of battling it out in court (Cicccone 2003).

2.1.4.6- Earnings Expectations

In today's economy, management would announce an increase in quarterly earnings when they are confident that they will reach their expected cash flows, and thus, support a higher payment. If information about earnings had leaked out of the company prior to the announcement date, investors would have bid up the stock price at that point. Thus, the actual earnings

announcement date would be an irrelevant factor of stock price. This information could have been revealed through analyst's forecasts, earnings announcements of other firms, news about sales or costs, or insider trading (George, Hein, Schmidt & Solberg 2001).

Investors in the audience are encouraged to applaud by bidding up the share price of companies that deliver earnings that meet expectations. The audience hates to be disappointed, so the main actors have learned to deliver their lines in such a way that generally guarantees audience approval. The widely accepted doctrine is: "Good companies always deliver consistent earnings growth". This is because any well-run company has planning and control systems that help management set earnings targets, track their progress, and make in-course adjustments to meet expectations of the investment crowd (Puplava 2001).

If delivered well, the managers of the companies are rewarded by a rising share price that makes them wealthier through exercisable stock options. Since most businesses involve a certain degree of uncertainty, management's job is to remove as much uncertainty as possible. The key rule is to deliver earnings that always go up and do whatever it takes to make that happen. A consistent trend of quarterly earnings growth sends a strong

signal to the stock market. It is rewarded by analyst's upgrades and recommendations and a rising stock price (Puplava 2001).

Falsifying accounting records and financial statements had nothing to do with brokers, investment bankers, and analysts. It had to do with the corporations themselves. Among them and most important is Enron, then WorldCom, Qwest, and Global Crossing among others.

Enron is the story of the largest bankruptcy in US history that has cost thousands of employees their jobs and their retirement funds. Enron, through a variety of accounting tricks relating to partnerships, inflated their profits and lowered their debts. They misled their employees' investors and the general public about the company's financial condition. Once those off-the-book partnerships were exposed, the bottom dropped out, with Enron's stock plummeting from almost \$80 to less than \$1 a share. Enron executives reaped millions through these partnerships and by selling off stock before the demise, while Enron employees lost much of their retirement and investors lost millions (Mills 2003).

Enron took down with it one of the biggest auditing firms in the world, Arthur Andersen LLP. Arthur Andersen's involvement in the accounting fraud was clear when on the 9-10 of January 2002 they declared that they have been destroying Enron official

documents after the Justice Department announced it had begun a criminal investigation of Enron. Thus, on March 14, 2002, Enron's accounting-auditing firm Arthur Andersen was indicted by a federal grand jury for obstruction of justice charges for knowingly, intentionally and corruptly persuading employees to shred Enron related documents. The next day the US government suspends new business dealings with Enron and its former auditing firm Andersen, citing evidence of misconduct by the former energy giant and the criminal indictment of the auditor. After that Arthur Andersen filed for bankruptcy protection under Chapter 11 (Mills 2003).

2.1.4.7- The Bull Market

There is an old Wall Street proverb that has held true for decades stating that new bull markets usually begin in the face of great uncertainty, skepticism, and optimism. In today's market, following that strong rally post-September 11, the Afghani war and the Iraqi war, uncertainty and skepticism are widespread. Investors are asking themselves, "Are we on the brink of a new bull market, or will the bear market of the last two years continue?" However, a new bull market has begun, but the upswing may see several false starts (Dowd 2002).

Analysts have predicted a push/pull tug-of-war between the bulls and the bears continuing in the near future. Investors also became concerned about possible bankruptcies caused by 'accounting shenanigans', such as the Enron case. However, as consequences are doled out and tighter regulations emerge from auditors and analysts, the markets will likely begin to trade on the positive backdrop for the future (Dowd 2002).

2.1.4.8- Herd Behavior

An important observation about human society is that people who communicate regularly with one another think similarly. If millions of people who invest were all truly independent of each other, any faulty thinking would tend to average out, and such thinking would have no effect on prices. But if irrational thinking is similar over large numbers of people, then such thinking can indeed be the source of stock market booms or busts. Part of the reason peoples judgment is similar at similar times is that they are reacting to the same information, information that was publicly available at that time. However, rational response to public information is not the only reason that people think similarly, nor is the use of that public information always appropriate or well reasoned. Experiments done during the 1950s to explain, the ability of the communist propaganda, to

influence the minds and brainwash people into following its ideologies, as if they were herding cattle, demonstrated the enormous power of authority over the human mind. People are ready to believe the majority view or to believe authorities even when they plainly contradict simple human judgment. Most people have had many prior experiences of making errors when they contradicted the judgments of a larger group or of authority figure, and they have learned from these experiences. Given this kind of behavior it is not at all surprising that many people are accepting of the perceived authority of others on such matters as stock market valuation (Nofsinger 2001).

Even completely rational people can participate in herd behavior when they take into account the judgments of others, even if they know that everyone also is behaving in a herd-like manner. This herd like behavior is said to arise from an information cascade (Mann 2000). Consider the following example. Suppose two restaurants open next door to each other. Each potential customer must choose between the two. Customers maybe able to make some judgments about the quality of each of the restaurants when viewing it through the front window, but such judgment will not be very accurate. The first customer that arrives must choose based only on viewing the two empty restaurants. However, the next potential customer can rely not

only on his or her own information based on the appearance of the restaurants, but also by seeing the first customer eating in one. If the second customer chooses to go to the same restaurant as the first, the third customer will see two people eating in that restaurant. The end result will be that all customers may wind up eating at the same restaurant, and it could well be the poorer restaurant, since there was no real consideration of the combined evidence inherent in all their observations about the two restaurants. If all of them had been able to pool their first impressions and discuss these as a group, they might have been able to deduce which restaurant was likely to be the first one. Stories like this have clear significance to stock market behavior. People instead of rationally picking the stocks they want to hold according to quantitative methods, they just follow the herd, and thus choosing not to waste their time and effort in exercising their judgment about the market, by that they do not exert any independent impact on the market (Hersh 2000).

Human society has been able to conquer all living organisms on earth primarily because of its information processing ability. A fundamental component of this information processing ability is the effective communication from one person to another. The incessant exchange of information is a fundamental characteristic of our species. The media has a

profound capability for spreading ideas. However interpersonal and interactive communications, particularly face to face or word of mouth communication, still have the most powerful impact on our behavior. The power of international, word of mouth communication about investments has been amply illustrated by the work of the market surveillance units at the stock exchanges and within the SEC. The most famous example came when a sequence of word of mouth communications was started in May 1995, when a secretary at IBM was asked to photocopy documents that included reference to IBM's top secret take over of Lotus Development Corporation, a deal scheduled to be announced on June 5 of that year. She apparently told her husband. On June 2 he told a coworker, who bought shares 18 minutes later, who told a friend who initiated a sequence of phone calls. By the time the announcement on June 5, twenty five people connected to the group had spent half a million dollars on investments based on the tip only. The 25 included a pizza chef, an electrical engineer, a bank executive, a dairy wholesaler, a former school teacher, a gynecologist, an attorney and four stock brokers. This shows how word of mouth communication can proceed with great speed and across different social groups (Hersh 2000).

Nowadays, the new technological innovations that facilitate interpersonal communication, consisting of e-mail, chat rooms, and interactive websites, may have the effect of expanding the interpersonal relay of ideas. They may have allowed enthusiasm for the market to spread much more widely in the 1990s than it would otherwise have. Continued technological progress in those computer based communications media that allow better simulation of face to face communication will undoubtedly make the transmissibility of ideas more effective in the future. Today scientists are comparing the rate of the spread of word of mouth to that of the spread of infectious diseases (Nofsinger 2002).

One reason why the spread of ideas can sometimes happen rapidly, and why public thinking can experience such abrupt turnarounds, is that the ideas in question are already in peoples minds. Even conflicting ideas can coexist at the same time in people's minds, and a shift in supporting facts or public attentions may suddenly bring to the front an apparent belief that contradicts formerly stated beliefs. For example, people widely believe that the stock market is unforecastable and that market timing is futile. Also, they believe that if the stock market is to crash, it would definitely come back up. One explanation for the fact that people are able to hold such conflicting views simultaneously is that they think they have heard both views

being said by experts. There is a readiness to take free rides here, supposing that the experts have thought the apparent contradictions and therefore assume that the experts know why they are not in fact contradictions at all (Nofsinger 2002).

Further more people find it very difficult to explain what made them decide to take a certain course of action; the original attention trigger may not be remembered. This is a principle reason why changes in speculative asset prices, which very quickly neglect changes in attention, often seem inexplicable. Price changes themselves may be an attention grabber, even among professional investors. In a study of institutional investors' choice of stock, it was found that most investors in rapid price increase in stocks themselves say that they were unsystematic in their decision making (Nofsinger 2002).

The problem with moving with the herd is that it magnifies the psychological biases. It causes people to make decisions that are based on the "feeling" of the herd instead of the rigor of formal analysis. Additionally, the feeling of regret on picking a loser when investors know that many others picked the same stock. There are a lot of people, who do not know whether they are bears or bulls, but they just see what is going on in the market and they want to take part. This proves the theory of Herd Behavior (Mann 2000).

2.1.4.9- Expansion of Pension Plans

Changes in the nature of employee plans have encouraged people to learn more about, and eventually accept, stocks as investments. Although these changes do not technically favor stocks over other investments for retirement, they have worked in the direction of encouraging investment in stocks. Making such choices teaches people about stock and increases their level of awareness with them (Mills 2003).

The most revolutionary change in these institutions in the US has been the expansion of defined contribution pension plans at the expense of defined benefit plans. In 1981, the 401(K) plan came in which the employer merely promised a fixed pension to its employees when they retired. Reserves to pay the defined benefit were managed by the employer. With the 401(K) plan employees are offered the opportunity to have contributions to a tax deferred retirement account deducted from their paychecks. Then, they own their investments in this account and must allocate them among stocks, bonds and money market accounts. Through these tax incentives for participation in plans offering choices between stocks and bonds, the government has forced many workers to learn about the advantages of stock versus bonds or money market investments. Any incentive to learn about an investment vehicle is likely to boost demand for it. In 1954, when

the NYSE carried out a marketing study to understand how to promote public interest in the stock market, it concluded that most people did not know very much about stocks, only 23 percent knew what a share is. The survey also revealed a public distrust of the stock market (NYSE 1998). Looking at a typical 401(K) plans, one can notice that almost all of them are engineered in a way to divert all interest in the stock market instead of other options like, real estate and bonds. Seemingly, this unconscious interest has helped in bidding up the price of the stock market (Mills 2003).

2.1.4.10- Growth of Mutual Funds

The stock market boom has coincided with a peculiar growth in the mutual fund industry and an explosion of advertising for mutual funds. In 1982, at the beginning of the recent bull market, there were only 40 equity mutual funds; and 6.2 million equity mutual fund shareholder accounts in the US. By 1998, there were 3,513 (more equity mutual funds than stocks listed on the NYSE), and 119.8 million fund shareholder accounts, nearly 2 accounts per family in the US (Mills 2003).

Part of the reason that equity mutual funds proliferated so rapidly after that date is that they are used as part of 401(K) pension plans. As people invest their plan balances directly in

mutual funds, they develop a familiarity with the concept; thus, they are more inclined to invest their non 401(K) plan savings in mutual funds as well. Another reason for the funds explosive growth is that they have paid for a great deal of advertising. TV shows, magazines, and newspapers frequently carry advertisements for them. Mutual funds encourage more naïve investors to participate in the market, by leading them into thinking that experts managing the funds will steer them away from pitfalls (Mills 2003).

The increasing number of small investors who have entered the market now face the mutual or hedge funds, the big, new sophisticated players in the investment world into which not only wealthy individuals but large mutual funds and endowments have poured money. Big investors like mutual fund are secretive, and small investors are not sufficiently protected. It is a setup for a small investor to get killed (Mills 2003).

Mutual funds do not really hedge; mainly they sell short as well a buy long; and they are very aggressive in the marketplace, taking strong positions and moving money very quickly. A news report is issued at noon, moments later mutual and hedge funds are buying or selling. They have added a new dynamic to the market that is reflected in the enormously increased volume of stock transactions and in the very greatly shortened period of

time for which shares (on average) are held by investors. The market is made much more volatile, there are spikes of trading on any news. It is important for investors to realize that the stock markets in the first years of the 21st century are not just down, but down in a particular way, as a result of the new forces at work in the market, the most important of which is the mutual fund. The smaller investor cannot play this game successfully. Mutual funds are a much bigger part of the market than they used to be; they follow a herd mentality, which is simply a sales gimmick (Mills 2003).

Thus, the growth of mutual funds injects a much larger speculative element into the market. Too much speculation turns the markets from an investment vehicle into a casino. Mutual funds most likely affect the performance of the market by making it more volatile and limiting its upside potential via much larger amounts of short-selling (Mills 2003).

2.2- Crash Periods

The Big Bull Market was dead. Billions of dollars' worth of profits - and paper profits - had disappeared. The grocer, the window-cleaner, and the seamstress had lost their capital. In every town there were families which had suddenly dropped 'from showy affluence into debt. Investors who had dreamed of retiring to live on their fortunes now found themselves back once more at the very beginning of the long road to riches. Day by day the newspapers printed the grim reports of suicides.

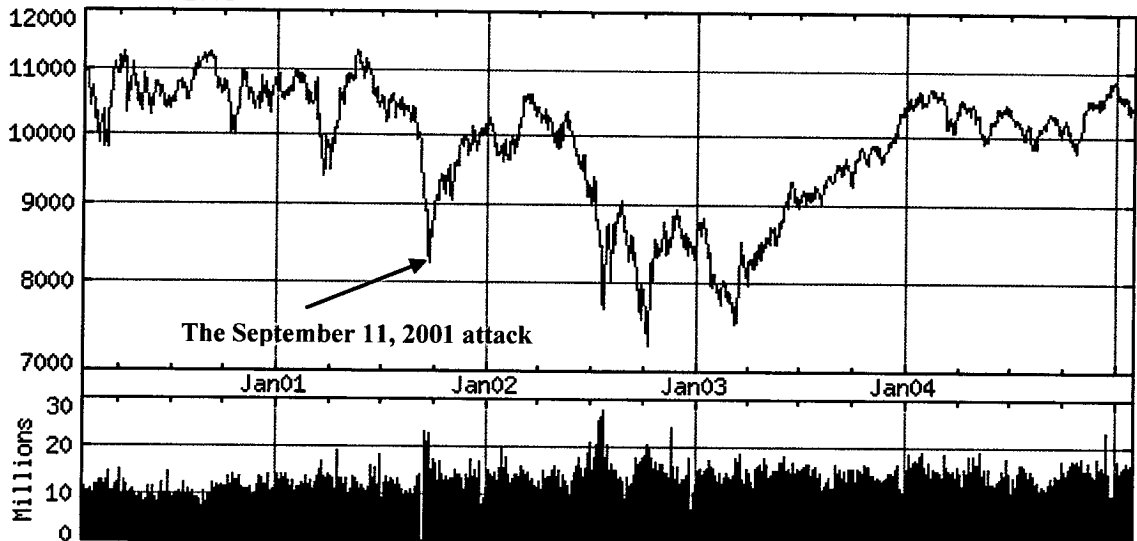
2.2.1- September 11 and Its Repercussions

The financial services industry was severely tested by the events of September 11, 2001, the most terrorist attack in the US history that hit New York City and Washington, DC. The industry was severely tested by the terrorist attack on the Wall Trade Center – home to dozens of banks, insurance companies, brokerages, and securities firms in the city recognized as the financial capital of the world. Yet the catastrophe also demonstrated the enormous resiliency of the financial sector. The devastation wrought by the attacks was mind-numbing in its scope, but failed to achieve its objective of paralyzing the financial system. The NYSE closed for several days and thus resulted in a complete halt of trading activities. The Dow Jones

Industrial Average (DJIA) plummeted 2,000 points in the wake of the attacks, which was the sharpest drop in 9 years (Verma 2002). The following Figure 9 shows the major decline in the DJIA after the attack.

Figure 9: DJIA Prices after September 11th Attack

DJ INDU AVERAGE (DOW JONES & CO
as of 28-Jan-2005

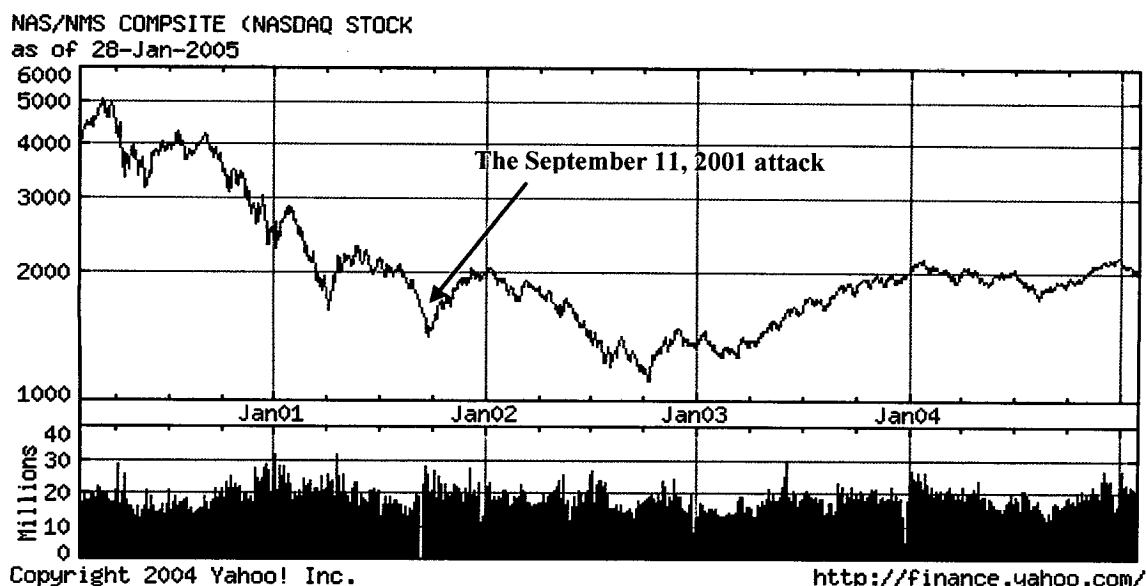


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As can be seen from Figure 9, the Dow Jones Industry Average had a quick recovery after September 11, 2001 but this recovery seemed artificial or short lived since the index became even lower a year later in September 2002.

Figure 10: NASDAQ Prices after September 11th Attack



The same, Figure 10 shows the poor performance of NASDAQ market after the impact of September 11, 2001. The NASDAQ fell from 1,805.43 to 1,498.80 during the month, followed by a short improvement where in September 2002 the NASDAQ market hits a low of 1,172.06 due to bad financial news that was enough to paralyze any investor (Healy 2003).

The American economy slipped into recession, as of March 2001. The unemployment rate has increased by 4 percent since the September 11 attacks. Chairman of the Federal Reserve, Allen Greenspan announced two consecutive half point interest rate cut in three weeks. Central banks in EU, Japan, Canada and Britain also announced rate cuts in joint effort to stabilize the global financial system. Federal Reserve pumped \$38.25 billion of cash in the banking system, the Bank of Japan and the European Central Bank put in \$80 billion. The airline industry lay off

almost 100,000 positions, whereas the insurance industry suffered a \$7 billion net loss after taxes in 2001, its first-ever net loss for a full year (CNN 2001). President Bush proposed a tax cut of up to \$75 billion which should boost consumer spending; Bush said that the tax cuts should stimulate the economy faster than using spending programs (Galli 2002).

Federal Discount rates have also crashed to 1.25 percent to go along with the drop of the economy. They are the lowest they have been in 40 years (CNN 2001). Lowering rates is the easiest way to boost the economy since it encourages consumers to spend more of their disposal income. When the Federal Reserve reduces the interest rates to the banks the banks in turn, reduce the interest on loans. This chain reaction puts more money into the customer's pocket. Although the stock market makes positive progression at the word of Allen Greenspan lowering rates, it has negative effect on people with money invested in banks, since their interest earnings decreases (Galli 2002).

Analysts' equity valuation models suggest the market has become undervalued as a result of the collapse of stock prices in the week following the attacks. Historical "event studies" reveal that the stock market usually recovers quickly following the onset of war or other national emergencies. Nonetheless, tech analysts believe that the high-sector, which before the attacks was an

ongoing source of concern, might do better than some other areas of capital spending. Computer and telecommunications systems in the WTC will have to be replaced, and back-up facilities established or re-established. Heightened security measures likely will emphasize technological solutions and, at least in the short-run, business may substitute video and tele-conferencing for face-to-face contact. Still, the events of September 11 cannot be construed as a net positive for investment in equipment and software in the near-term. However, reports on the technology sector are indicating better than expected earnings and an increase in demand for inventories. The result was a rally in low-quality stocks, some of which rose as much as 150 percent. In many cases, the stock prices were low but were not necessarily inexpensive when measured against the company's valuations. Even though, investors bought them anyway (Sankovitz 2001).

2.2.2- War on Terrorism

Shortly after the drastic September 11th 2001 tragedy, the US attacked Afghanistan in an attempt to fight back terrorism. During the month of October 2001, several assaults by the US resulted in few casualties. The Afghani war had its consequences on US financial markets. On Monday December 10, 2001, US bombs killed more than 3,500 civilians. This led the DJIA to

plunge to 9,811.15, down 238 points from previous close. This severe decline resulted from the high number of civilian casualties in Afghanistan, in addition to the US government's secrecy about the outcomes of the war, which lead to uncertainty among investors regarding what is going on the regions of Afghanistan (Hin 2001).

The Pentagon has repeatedly denied reports of civilian casualties in Afghanistan, and most US media outlets have qualified their reports of casualties with the statement "could not be independently confirmed". However, civilian casualties were found, they were poor people to begin with and they had absolutely nothing to do with the events of September 11, they were merely the human costs to war (Hin 2001).

In the wake of the successful US – led military campaign in Iraq, Americans today express significantly greater optimism about progress in the war on terrorism than they did before with the Afghani war, and a majority believes the war has made the United States safer from terrorism. This event led financial markets to experience negative outcomes. During the month of February 2003, US shares tumbled for the seventh time in eight sessions, as fear over a war continued to haunt investors (BBC 2003).

Several economic indicators in the US economy are affected by such a war, consumer spending, business spending, consumer confidence, but most importantly oil prices. Oil prices represent the biggest risk in the war, and the longer a war remains, the greater the risk of oil prices staying elevated. Prolonged high oil prices will have a negative effect on both consumer and business spending. If the war is resolved successfully and quickly, oil prices will swing back to more normal levels (Jandrain 2003).

The Dow Jones Industrial Average (Figure 11) dipped below 8,000 for the first time in three months yet investors continued to unload shares after a speech by chief UN weapons inspector Hans Blix to the UN Security Council failed to calm war jitters. On the 3rd of February 2003, the Dow closed down at 7,864.23, while the technology-driven NASDAQ (Figure 12) fell 17 points or 1.3 percent to 1,325 (BBC 2003).

Figure 11: DJIA Prices after Iraqi War

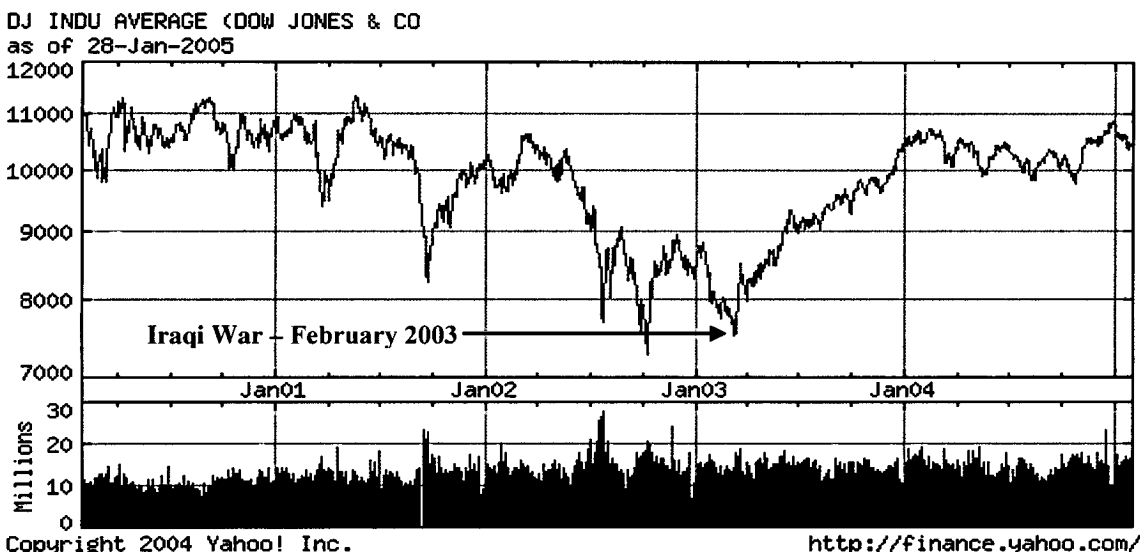
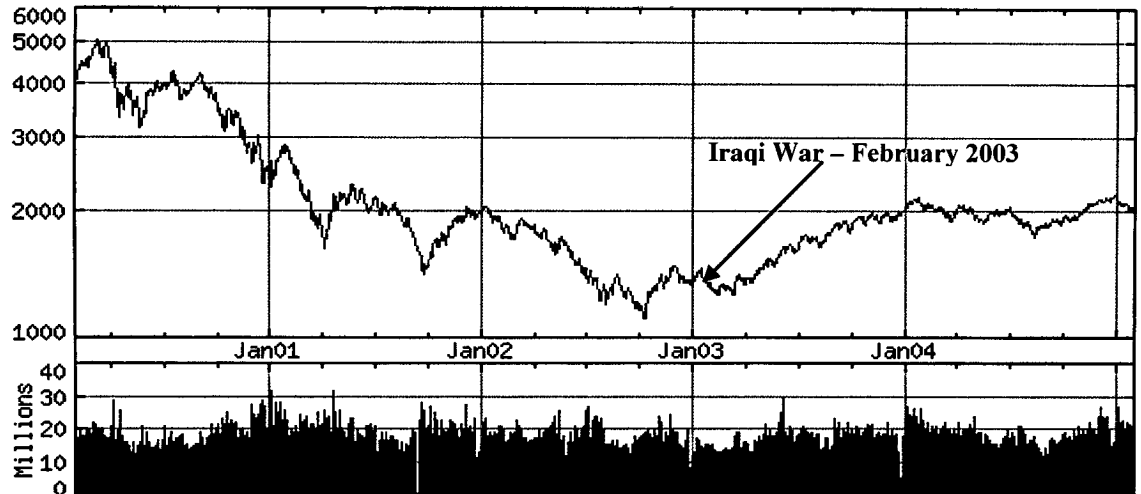


Figure 12: NASDAQ Prices after Iraqi War

NAS/NMS COMPOSITE (NASDAQ STOCK)
as of 28-Jan-2005



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However, the war has not typically been a negative force on stock market performance. On the contrary, the stimulative impact of increased spending and war-related production has caused markets to rise, at least temporarily. According to a recent CNN and USA Today Gallup poll, conducted April 22-23 of 2003, 65 percent of Americans said that the United States and its allies are winning the war against terrorism. Following the announcements, the Dow Jones Industrial Average closed at 8,515.66, while the NASDAQ closed at 1,466.16. Although the global uncertainty that precedes most conflicts brings a wave of heightened conservatism and a resulting flight to safety, the relief of early victories can produce a rally (Jandrain 2003).

Some analysts argued that wars are rarely sufficient to disrupt financial markets over the long-term. The key factor in how markets react to a crisis is the economic environment in

which the crisis takes place. These analysts have stated that the impact of the US attack on Iraq will only have a mild direct effect on the US stock market. They believe that Wall Street share prices would decline only if an attack on Iraq were to change the US's economic environment of low inflation and its modest rate of economic growth (Healy 2003).

This is not the first time the world's financial markets have been impacted by an international event, and it likely will not be the last. The US economy believes that the biggest risk it is currently facing and what is continuing to cause concern for the market is its inaction and lack of a clear outcome of the current uncertainty over Iraq. Traders and investors do not like uncertainty, and once the US either attacks or walks away, the situation will be easier to evaluate. Since September 11, the level of worry has fluctuated, depending mostly on the news; during periods of government terror alerts or increased news stories about terrorism, worry has increased (Sterling Investments Services 2003).

2.3- Financial Ratios

Modern theories are increasingly proving that stock markets are saddled with irrationality. In the last three decades, the modern finance has strongly touted the efficient market theory. The irony is that investors exhibit irrational behavior and commit systematic errors of judgment called biases. Not only are individual investors afflicted by these biases, even the security analysts are also afflicted. The emerging field of behavioral finance is probing into such idiosyncrasy of individual investors and their decision-making style (Hong 2002).

Classical economic theory assumes that all people have the same preferences, perfect knowledge of all alternatives, and understanding of the consequences of their decisions. In short, people behave rationally. When investing in stock market, investors tend to have one goal and that is to make some profit. The question of whether a company is in some objective sense good or strong or profitable is really irrelevant to the investor, except as it affects other investors' attitudes toward its stock. Studies have shown that markets cannot be relied upon to make investors rational. They will get stuck in non-optimal strategies because the cost of trying something else is too high (Mullainathan & Thaler 2001).

However, the problem occurs when the word “rational” is used as a substitute for “efficient”, or to suggest that stock price should conform to other measurements of the value of a company. Often, stock prices will reflect these external value measurements, but only when investors are collectively possessed by the belief that it should. The discarding of financial ratios and other traditional valuation methods may not be a good thing. It may contribute to the market’s volatility, exposing the investor to greater risk and companies to greater instability (Brealey & Myers 2003).

This part illustrates the performance of financial ratios to evaluate the company profitability and allow investors to better make systematic forecasting with a lower random of errors. This argument is very plausible for repetitive short-term forecasting. If people are making forecasts each month based on the company financial ratios, then it is plausible that they will get better returns at it over time. Even analysts employ financial ratios in their analysis because numbers in isolation are typically not very meaningful.

2.3.1- Purposes and Limitations

Ratios are highly important profit tools in financial analysis that help financial analysts implement plans that improve profitability, liquidity, financial structure, reordering, leverage, and interest coverage. Although ratios report mostly on past performances, they can be predictive too, and provide lead indications of potential problem areas.

Ratio analysis is primarily used to compare a company's financial figures over a period of time, a method sometimes called trend analysis. Through trend analysis, analysts can identify trends, good and bad, and adjust their business practices accordingly.

Any successful business owner is constantly evaluating the performance of his or her company, comparing it with the company's historical figures, with its industry competitors, and even with successful businesses from other industries. To complete a thorough examination of any company's effectiveness, one needs to look at more than just easily attainable numbers like sales, profits, and total assets. One must be able to read between the lines of the financial statements and makes the seemingly inconsequential numbers accessible and comprehensible.

This massive data overload could seem staggering. Luckily, there are many well-tested ratios out there that make the task a

bit less daunting. Comparative ratio analysis helps to identify and quantify a company's strengths and weaknesses, to evaluate its financial position, and to understand the risks taken by traders (Bernstein & Wild 1999).

Although financial ratios cannot tell a complete story about a business, they can help in directing toward key issues facing an individual firm. Understanding the financial statements can be an important first step toward improving or continuing a successful business operation (Bernstein & Wild 1999). In the first part of this fact sheet, we presented some important factors that led to the US market crash. Now, we will demonstrate and discuss the financial ratios, show how they are calculated, what they mean, and how these ratios can be used to provide a good indication of how well a business is doing. Finally, we will show how to use the financial ratios in a proactive manner and conduct an empirical study using the logistic regression to develop a benchmark for the ratios in evaluating the relative efficiency of a company during a crash period, also helping the decision makers to use ratios in a proficient way.

The study of financial ratios analysis has become important to the global economy, particularly the US market due to significant impact of incidences of stock market crash and economy depressions that have occurred over the past years.

Many papers have been presented in the realm of clarifying the relevance of financial ratios analysis and its associated issue of framing to financial market phenomena (Irwin 2001). For example, a research article on identifying financial distress indicators of selected banks in Asia, where the banking sector occupies an important role in the development of most Asian economic countries. In 1997, a full-fledged banking and financial crisis took place in the South Asian countries, where the majority of banks had to be bailed out by their governments. As a result, it was necessary to search for the indicators that led to the problems suffered by banks in this region. Models were developed for each country that identified banks experiencing financial distress as a function of financial ratios. The countries in the study include Indonesia, South Korea and Thailand, because their banking sectors enjoyed profitability during the pre-crisis period and were the most severely affected by the financial crisis in 1997. Using the logistic regression for the sample during the period ranging from 1995 to 1997, capital adequacy, loan management and operating efficiency are the three common performance dimensions found to be able to identify problem banks in all three countries. "It is hoped that the financial ratios and results of the models will be useful to

bankers and regulators in identifying problem banks in Asia” (Rahman, Tan & Hew 2004).

Financial ratios are widely used for modeling purposes both by practitioners and researchers. Practitioners use financial ratios, for instance, to forecast the future success of companies, while the researchers' main interest has been to develop models exploiting these ratios. Many distinct areas of research involving financial ratios can be discerned. Historically one can observe several major themes in the financial analysis literature (Salmi & Martikainen 1994).

Technically, financial ratios can be divided into several, sometimes overlapping categories. A financial ratio is of the form X/Y , where X and Y are figures derived from the financial statements or other sources of financial information. One way of categorizing the ratios is on the basis where X and Y come from. In traditional financial ratio analysis both the X and the Y are based on financial statements. If both or one of them comes from the income statement the ratio can be called dynamic while if both come from the balance sheet it can be called static. The concept of financial ratios can be extended by using other than financial statement information as X or Y in the X/Y ratio (Tyran 1986).

Different approaches have been applied on the classification problem of the financial ratios. The first approach could be called a pragmatic or an authoritative approach. In this approach the classifications of financial ratios have largely developed from established business practices and personal views of eminent financial analysts. Many standard text-books present material from this approach. (e.g.: Aho 1981, Bernstein 1989, Brealey & Myers 1984, Foster 1986, Fridson & Marocco 1986, Kettunen & Mäkinen & Neilimo 1976 and Lev 1974).

The second approach has been more deductive. In this approach the classification of the financial ratios has been based on the technical relationships between the different financial ratios. The "Du Pont triangle" from the beginning of the century is a classic in this respect. The modern papers using this "pyramid" approach include Curtis (1978), Laitinen (1983), and Bayldon & Woods & Zafiris (1984).

The third approach has been inductive, empirical classification of financial ratios using statistical techniques, factor analysis in particular. In this approach, factor analysis is used to reduce a (large) number of financial ratios into a smaller number of mutually exclusive categories covering the various aspects of the firm's activities. (e.g.: Salmi & Dahlstedt & Luoma & Laakkonen 1986 for a brief summary of the objectives of factor

analysis in ratio analysis). Methodologically, this means reducing a large number of measured variables into a smaller number of latent variables, and then giving interpretative names to these latent variables.

Finally, it seems that despite the initial optimism the inductive studies have been unable to agree on a consistent classification of financial ratio factors, at least beyond three to five factors. Consequently a number of later studies hypothesize an a priori classification and then try to confirm the classification with empirical evidence. Kanto and Martikainen (1991) evaluate Lev's (1974) a priori classification of financial ratios by introducing the usage of confirmatory factor analysis to testing a priori classifications of financial ratios. Confirmatory factor analysis provides statistical significance tests for the existence and stability of the "a priori" factor structure (Salmi & Martikainen 1994).

But the problem was the lack of credibility of the research being done on the stock market and the credibility of the financial ratios analysis. For example, the researchers that gave realistic and informed market projections did not grab the headlines and thus did not have a chance to influence the public. Instead the headlines reflected the news media's constant attention to people opinion about the market's price level. Driven

by competition for readers, listeners and viewers, who seem to always like good news about the market; most investors also seem to believe that the stock market is a force of nature by itself; they do not realize that they themselves as a group determine the level of the market.

This paper focused on the basis of the financial ratios and whether they have the ability to forecast movements in stock prices, or more precisely, whether the ratios analysis using the logistic regression possess the capability in determining the soundness of stocks performance during normal or disturbing periods. Many observers suggest that there has been a secular shift in the attitudes of the investing public towards the stock market. As the baby-boom generation comes to dominate the economically and financially active population, its attitudes become more important while those of earlier generations have less and less weight. It is argued that baby-boomers are more risk-tolerant (perhaps because they do not remember the extreme economic conditions of the 1930s), and that they tend to favor stocks over bonds (perhaps because they are influenced by the extremely poor performance of bonds during the inflationary 1970s) (Campbell & Shiller 2001). Thus, financial ratios may be extreme tool today in deciding whether a company is healthy or none because the 2000 US stock market crash had left perceptible

worries among investors after losing big amounts of money in investments. It was ascertained that failing firms exhibited significantly different ratio measurements than businesses which were successful. Historical accounts specifically cite the use of ratios in predicting bankruptcy (Irwin 2001).

2.3.2- Types of Financial Ratios

There are many different ratios and models used today to analyze companies. A ratio can be computed from any pair of numbers. Given the large quantity of variables included in financial statements, a very long list of meaningful ratios can be derived. Financial ratios are usually expressed in percentage or times. A standard list of ratios or standard computation of them does not exist. The following ratio presentation includes ratios that are most often used when evaluating the credit worthiness of a company.

2.3.2.1- Liquidity and Activity Ratios

“A credit institution’s liquidity ratio may be defined as the ratio between its liquid claims and liquid liabilities”. Rule no. 386 of May 29, 2002 (Central Bank Act no. 36/2001), stipulates the liquidity ratio of credit institutions. This ensures that credit institutions always have adequate liquidity to be able to pay their

anticipated liabilities over a specified period (Monetary 2004). Such ratios are of particular interest to the cooperative's short-term creditors. They compare assets that can be converted to cash quickly to fund maturing short-term obligations. The current ratio and the quick ratio are the two most commonly used measures of liquidity. For most cooperatives, these two ratios provide a good indication of liquidity (Chesnick 2000).

Studies categorizing financial ratios often include the current ratio in the data basis along with the quick ratio. A study done on examining the usefulness of financial ratios as predictors of household insolvency. Using two different statistical methods logistic regression and a classification tree procedure (CART), the financial ratios were developed for 1,934 households using data from the Survey of Consumer Finances. According to the standardized coefficients for the logistic regression, the Liquidity ratio was the most important predictor while the Assets/Liabilities ratio was the most important variable in the classification tree (DeVaney 1994).

Current Ratio (CR)

Provides an indication of the liquidity of the business by comparing the amount of current assets to current liabilities. A business's current assets generally consist of cash, marketable

securities, accounts receivable, and inventories. Current liabilities include accounts payable, current maturities of long-term debt, accrued income taxes, and other accrued expenses that are due within one year. In general, businesses prefer to have at least one dollar of current assets for every dollar of current liabilities. However, the normal current ratio fluctuates from industry to industry. A current ratio significantly higher than the industry average could indicate the existence of redundant assets. Conversely, a current ratio significantly lower than the industry average could indicate a lack of liquidity.

- Formula:

$$\frac{\text{Current Assets}}{\text{Current Liabilities}}$$

Acid Test or Quick Ratio (QR)

A measurement of the liquidity position of the business. The quick ratio compares the cash plus cash equivalents and accounts receivable to the current liabilities. The primary difference between the current ratio and the quick ratio is the quick ratio does not include inventory and prepaid expenses in the calculation. Consequently, a business's quick ratio will be lower than its current ratio. It is a stringent test of liquidity.

- Formula:

$$\frac{\text{Cash} + \text{Marketable Securities} + \text{Accounts Receivable}}{\text{Current Liabilities}}$$

Working Capital Ratio (WC)

Working capital is the lifeblood of any business. Firms need cash to pay for all their day-to-day activities. They have to pay wages, pay for raw materials, pay bills and so on. The money available to them to do this is known as the firm's working capital. The main sources of working capital are the current assets as these are the short-term assets that the firm can use to generate cash. However, the firm also has current liabilities and so these have to be taken account of when working out how much working capital a firm has at its disposal.

Working capital is one of the most difficult financial concepts to understand for the small-business owner. In fact, the term means a lot of different things to a lot of different people. One of the main advantages of looking at the working capital position is being able to foresee any financial difficulties that may arise. Even a business that has billions of dollars in fixed assets will quickly find itself in bankruptcy court if it cannot pay its monthly bills. Under the best circumstances, poor working capital leads to financial pressure on a company, increased borrowing, and late payments to creditor - all of which result in a lower credit rating. A lower credit rating means banks charge a higher interest rate, which can cost a corporation a lot of money over time.

- Formula:

$$\text{Working Capital} = \text{Current Assets} - \text{Current Liabilities}$$

Working Capital per Dollar of Sales Ratio (WCS)

To find the approximate amount of working capital a company should have, one should look at "working capital per dollar of sales." In other words, one should have to compare the amount of working capital on the balance sheet to the total sales. A business that sells a lot of low-cost items, and cycles through its inventory rapidly (a grocery store) may only need 10-15 percent of working capital per dollar of sales. A manufacturer of heavy machinery and high-priced items with a slower inventory turn may require 20-25 percent working capital per dollar of sales.

This factor indicates the firm's ability to finance revenue growth internally without incurring additional debt. A high value indicates the firm has the ability to fund short-term growth and suggests it is creditworthy

- Formula:

$$\frac{\text{Working Capital}}{\text{Revenue}}$$

Working Capital to Total Assets Ratio (WCTA)

The Working Capital to Total Assets ratio is another measure of a firm's ability to meet its financial obligations and

gives an indication as to the distribution of a business's assets into liquid and non-liquid resources. This liquidity ratio, which records net liquid assets relative to total capitalization, is the most valuable indicator of a looming business disaster. Consistent operating losses will cause current assets to shrink relative to total assets. A negative ratio, resulting from negative net working capital, presages serious problems.

- Formula:

$$\frac{\text{Working Capital}}{\text{Total Assets}}$$

Activity Ratios (Efficiency Ratios or Turnover Ratios) measure the efficiency of the firm as well as the liquidity of current assets. These ratios indicate whether the firm's investment in current and long-term assets is too large, too small, or just right. If too large, funds may be tied up in assets that could be used more productively. If too small, the firm may be providing poor service to customers or inefficiently producing products. These ratios are often referred to as management ratios as they can provide indications of the owner's/management's ability to efficiently run the firm. How long does it take to pay receivables? How long does it take for the firm to pay its suppliers? How often is the inventory or total assets turning over

in a year? Are these numbers increasing or decreasing? These are factors usually directly controlled by management and can point to potential problems if not addressed early (Tyran 1986).

A study done on the consolidation and efficiency in the US life insurance industry, where it scrutinizes the affiliation between mergers and acquisition, efficiency and scale economies. A logistic regression model using activities financial ratios is used to test the hypothesis that efficient firms are attractive acquisition firms. A positive coefficient of one or more of the efficient variables would support the hypothesis. The results provide that the acquired firms realize greater efficiency than the firms that are not involved in merger and acquisition (Cummins, Tennyson & Weiss 1998).

Accounts Receivable Turnover Ratio (ART)

This ratio shows the number of times accounts receivable are paid and reestablished during the accounting period. The higher the turnover, the faster the business is collecting its receivables and the more cash the client generally has on hand.

- Formula:

$$\frac{\text{Total Net Sales}}{\text{Accounts Receivable}}$$

Inventory Turnover Ratio (ITR)

This ratio shows how many times in one accounting period the company turns over (sells) its inventory and is valuable for spotting under-stocking, overstocking, obsolescence and the need for merchandising improvement. Faster turnovers are generally viewed as a positive trend; they increase cash flow and reduce warehousing and other related costs.

- Formula:

$$\frac{\text{Cost of Goods Sold}}{\text{Inventory}}$$

Fixed Asset Turnover Ratio (FAT)

It indicates how well a business is using its fixed assets to generate sales. Generally speaking, the higher the ratio, the better because a high ratio indicates the business has less money tied up in fixed assets for each dollar of sales revenue. A declining ratio may indicate that there is an over-invested in plant, equipment, or other fixed assets.

- Formula:

$$\frac{\text{Net Sales}}{\text{Average Net Fixed Assets}}$$

Asset Utilization Ratio (AU)

Asset Utilization or Asset Turnover Ratio indicates how efficiently the company generates sales on each dollar of assets.

A volume indicator, this ratio measures the ability of the company's assets to generate sales. This financial ratio indicates whether a company is handling too high a volume of sales in relation to investment. Very low percentages relative to industry norms might indicate overly conservative sales efforts or poor sales management.

Asset utilization can be used as a metric for focusing reliability efforts. AU is a tool focused on uncovering your hidden plant by measuring the difference between what the asset is capable of producing and what it actually produces. This difference is referred to as the "opportunity gap."

Most reliability improvement efforts fail to demonstrate financial results because they are focused on activities, the nose count of problems, and not on the business cost of unreliability. While no single measure can provide a clear performance target or focus attention on all critical areas of plant performance, asset utilization is a metric that should be used to focus reliability improvement efforts because it focuses on eliminating the cause(s) of business opportunity gaps. And the magnitude, in terms of dollars, of the business opportunity gaps generally far exceeds the cost of maintenance. Make no mistake; focusing reliability efforts on the systematic elimination of the cause(s) of

asset utilization losses is one of the most cost-effective methods for increasing plant profitability (Ellis 1998).

- Formula:

$$\frac{\text{Total Revenues}}{\text{Total Assets}}$$

Days Sales Outstanding Ratio (DSO)

DSO or Days Sales Outstanding gives the average collection period, or how long on average it takes a business to turn its receivables into cash. In short, regular DSO measures the time it takes to collect the receivables, and provides an understanding of the company's internal collection efficiencies. A negative change in DSO represents an improvement, while a positive number is deterioration. Poor performance in DSO may be a sign of weakness in customer-to-cash processes: sales, sales order processing, and credit and collections management. Companies with a high proportion of cross-border sales may struggle with DSO because of abnormally long payment terms in some regions. (In Italy, for example, terms can often be in excess of 100 days compared with an average of 58 days in France and 34 in Germany). Moving receivables off the books through a securitization can result in an improvement in DSO, but does not reflect improved management processes.

- Formula:

$$\frac{\text{Accounts Receivable}}{\text{Total Credit Sales}} \times \text{Number of Days}$$

Payable Period Ratio (PPR)

The payable period measures the average amount of time to use each dollar of the trade credit. That is, it measures how long to use the trade credit before paying the obligations to those businesses or individuals who extend credit. This measurement gauges the relationship between the trade credit and the cash flow. A longer payable period allows maximizing the trade credit. Maximizing the trade credit means delaying the cash outflows and taking full advantage of each dollar in the cash flow. A positive change in payable period is an improvement, a negative change indicates deterioration. Increasing this ratio improves working capital and increases cash on-hand, but must be weighed against the possibility of discounts for prompt payment. Poor performance is often a sign of weakness in procure-to-pay processes, which include supplier management, procurement and payables processes.

- Formula:

$$\frac{\text{Accounts Payable}}{\text{Annual Purchases on Account}} \times \text{Number of Days}$$

2.3.2.2- Leverage Ratios

Leverage ratios measure the extent of the firm's "total debt" burden. They reflect the cooperative's ability to meet both short- and long-term debt obligations. The ratios are computed either by comparing earnings from the income statement to interest payments or by relating the debt and equity items from the balance sheet. Creditors value these ratios because they measure the capacity of the cooperative's revenues to support interest and other fixed charges, and indicate if the capital base is sufficient to pay of the debt in the event of liquidation. In terms of debt load, the more predictable the returns of the firm, the more debt will be acceptable, because the firm will be less likely to be surprised by circumstances that prevent fulfilling debt obligations (Chesnick 2000). Analysts should examine a firm's leverage with respect to both the firm's ability to service debt (principle and interest payments) and the amount of debt relative to the size of the firm.

In a study done on examining the economic rational for auditor change by Malaysian listed firms and its effects on shareholders wealth, the auditor change involves corporate management decision to change or retain the auditor and the choice of quality differentiated audit firms associated with changes in firm characteristics over time. Audit quality is defined

by classifying the audit firms into tiers. Tier 1 (now Big-5) firm is defined as high quality supplier of audit product and Tier2 (now non-Big 5) firm is defined as lower quality audit supplier, though firms in both tiers follow the generally accepted auditing standards. The distinguishing attribute between the two groups of audit products is believed to be the credibility that each group brings to the audit engagement. Tier1 audit firms have high potential reputation loss from failing to deliver the quality expected by market relative to Tier 2 audit firms. Factors associated with the choice of audit firm and changes in firms' characteristic were determined using the logistic regression model. Overall, the findings showed that the auditor switch of Malaysian listed firms was partially explained by changes in management, and higher turnover growth. Changes in firms' characteristics such as asset growth, purchase of fixed asset to total asset, and firms' leverage, explained the choice of quality differentiated audit firms. There is no evidence of significant wealth effect of auditor switch announcements. Portfolios of firms categorized based on auditor change type and firms observable characteristics showed that firms that switched to Tier1 (Tier2) experienced cumulative average gains (loss) over the 8 days (-8 to 0) surrounding the announcements (Huson, Shamsheer & Mohd 1998).

Financial Leverage Ratio (FLR)

Financial Leverage is important in evaluating a business. It shows the difference between the return on the owner equity and the return on the total assets. Businesses have to decide how leveraged they want to be, and just as in the securities markets, increased leverage increases potential profitability and potential risk. Financial Leverage is the degree to which an investor or business is utilizing borrowed money. A positive value indicates an improvement in the return on owner equity by using financial leverage; a negative value indicates deterioration in the return on owner equity. Companies that are highly leveraged may be at risk of bankruptcy if they are unable to make payments on their debt; they may also be unable to find new lenders in the future. Financial leverage is not always bad, however; it can increase the shareholders' return on their investment and often there is tax advantages associated with borrowing.

- Formula:

$$r_e = (d/e)(r_a - r_d) + r_a$$

Where: d = debt (either as \$ or %)

e = equity (either as \$ or %)

r_e = financial leverage or return on equity

r_d = interest rate on debt (%)

r_a = return on assets (%)

Debt to Equity Ratio (DTE)

Debt to equity is also called debt to net worth. It quantifies the relationship between the capital invested by owners and investors and the funds provided by creditors. The higher the ratio, the greater the risk to a current or future creditor. A lower ratio means your client's company is more financially stable and is probably in a better position to borrow now and in the future. However, an extremely low ratio may indicate that your client is too conservative and is not letting the business realize its potential.

- Formula:

$$\frac{\text{Total Debt}}{\text{Total Equity}}$$

Equity to Asset Ratio (EQTA)

Measures the proportion of total assets financed by the owner's equity capital, and therefore indicates financial position. The higher the ratio value, the more total capital has been supplied by the owner and less by creditors.

- Formula:

$$\frac{\text{Total Equity}}{\text{Total Assets}}$$

Debt to Asset Ratio (DTA)

This ratio is often called the debt ratio since it compares what is owed to the value of the assets used by the organization. This monitors use of debt used to build a business. It tells what percentages of the firm's assets are financed by borrowing. A firm reporting a debt ratio greater than 100 percent is functionally bankrupt. As long as some equity exists, this ratio has to be less than 100 percent.

The ratio is one measure of the risk exposure of the business; thus, is important in evaluating the financial trend of the business. The goal of most business operators is to approach a debt free operation. The higher the ratio is, the greater the risk.

- Formula:

$$\frac{\text{Total Debt}}{\text{Total Assets}}$$

Debt to Fixed Asset Ratio (DTFA)

This ratio indicates the proportion of the owners' equity invested in fixed assets. The amount over a ratio of 1, if it exists, represents proportion of owners' equity involved in working capital. A rising ratio would, in general, indicate that a firm is becoming more liquid; a declining ratio warns that the company is possibly expanding its physical (or fixed) facilities beyond its

concurrent ability to financially support them. This would be particularly drastic during a general period of declining business.

- Formula:

$$\frac{\text{Total Debt}}{\text{Total Fixed Assets}}$$

Long Term-Debt to Total Assets Ratio (LDTA)

Long-term debt is used for the measurement of the firm's leverage by dividing it by total assets. Long-term debt represents all interest bearing financial obligations, excluding amounts due within one year. This ratio is believed to be a potentially important governance structure like ownership. In particular, a significant negative coefficient of it could be reasoned by an argument saying that firms with strong financial performance prefer not to borrow and firms with high debt levels may perform better because it provides high-powered incentives.

- Formula:

$$\frac{\text{Total Long Term Debt}}{\text{Total Assets}}$$

Equity Multiplier Ratio (EM)

Represents a risk measure because it reflects how many assets can go into default before a firm becomes insolvent. The higher the ratio is, the more the company is relying on debt to

finance its asset base. EM affects a firm's profits because it has a multiplier impact on ROA to determine a firm's ROE.

$$\text{ROE} = \text{ROA} \times \text{EM}$$

It compares assets with equity such that large values indicate a large amount of debt financing relative to stockholders' equity.

- Formula:

$$\frac{\text{Total Asset}}{\text{Total Equity}}$$

Expense Ratio (ER)

Indicates a firm's gross operating expenses as a percentage of total investment. The lower (greater) is the ER, the more (less) efficient a firm will be in controlling expenses. Analysts should examine ER to reveal whether specific types of expenses contribute to significant differences in performance.

In an attempt to better capture the management quality, the ratio of operating ER is used in the model development. This ratio represents operating efficiency of the management and was also used by Gonzalez-Hermosillo, Pazarbasioglu, and Billings (1997). A higher ratio reflects lower management quality and higher probability of failure (Persons 1999).

- Formula:

$$\frac{\text{Total Operating Expenses}}{\text{Total Assets}}$$

2.3.2.3- Profitability Ratios

Profitability ratios are essential key to the firm's success. They provide information about cash flow potential, repayment capacity, and perhaps most importantly, they contribute to the overall wealth of the firm. It is not the goal of the firm to just maximize profits; rather, the firm should be concerned about maximizing the firm's overall wealth (Tyran 1986).

Profitability ratios measure the success of the firm in earning a net return on its operations. Profit is an important objective of a cooperative, so poor performance indicates a basic failure that, if not corrected, would probably result in the firm going out of business. Hence, appropriate profitability ratios pose the biggest challenge for analyzing cooperatives. Patronage refund policies have a dramatic effect on cooperative profitability ratio analysis. Some cooperatives return patronage at the end of the operating year and show significant profits on the closing statements. Other cooperatives have different operational policies and may show little end-of-the-year profits. Lending institutions not familiar with these businesses may shy away from cooperatives with low reported net income. This will be especially true for pooling cooperatives that generally report a minimum amount of income at year-end (Chesnick 2000).

Obeua S. Persons in his analysis combines qualitative and quantitative information from financial statements and auditors' reports with logistic models to differentiate Thailand failed finance companies from surviving companies. Data are based on all 41 publicly-owned Thai finance companies for the years 1993 to 1996. Failed companies are those which were forced to suspend their operations in mid-1997 by the bank of Thailand. The logistic regression model shows that failed finance companies are smaller in size, lower profitability ratios, lower management quality and less foreign borrowing. This is very much in contrast to the inability of auditors to differentiate failed finance companies from surviving ones. This logistic model has relatively high predictive ability for failed finance companies and low expected costs of misclassification (Persons 1999).

Net Profit Margin Ratio (NPM)

Shows how much net profit is derived from every dollar of total sales. It indicates how well the business has managed its operating expenses. It also can indicate whether the business is generating enough sales volume to cover minimum fixed costs and still leave an acceptable profit. The higher this ratio is, the more profitable the firm. This ratio is computed based upon sales and earnings from continuing operations, because the analysis seeks to derive insights about future expectations.

- Formula:

$$\frac{\text{Net Income}}{\text{Net Sales}}$$

Return on Asset Ratio (ROA)

This evaluates how effectively the company employs its assets to generate a return. Return on assets measures a company's earnings in relation to all of the resources it had at its disposal [the shareholders' capital plus short and long-term borrowed funds]. Thus, it is the most stringent and excessive test of return to shareholders. If a company has no debt, the return on assets and return on equity figures will be the same.

Conceptually the ratio "return on assets" consists of a numerator derived from the income statement and indicating a level of earnings of the firm, and a denominator derived from the balance sheet and reflecting resources devoted to the generation of those earnings. Bernstein (1993) notes that "care must be used in determining which elements enter the computation as there exists a variety of views, which reflect different objectives, of how these elements should be defined." As shown, when using ROA as a tool in financial analysis, a definitional problem exists both as regarding the numerator as well as the denominator of the ratio (Firer 1994).

The lower the profit per dollar of assets, the more asset-intensive a business is. The higher the profit per dollar of assets, the less asset-intensive a business is. All things being equal, the more asset-intensive a business, the more money must be reinvested into it to continue generating earnings (Higgins 2001).

Return on assets is widely used as a measure of profitability (Tam and Kiang [1992]; Barr and Siems [1994]; Cole and Gunther [1995]; Hwang and Lee [1997]; Gonzalez-Hermosillo, Pazarbasioglu, and Billings [1997]) (Persons 1999).

- Formula:

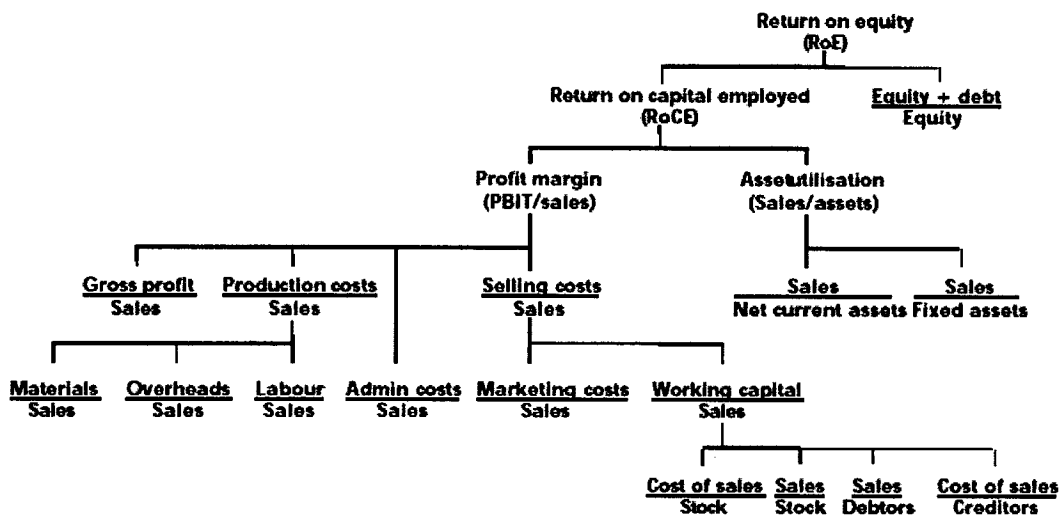
$$\text{ROA (NI/Total Assets)} = \text{PM (NI/Sales)} \times \text{AU (Sales/Total Assets)}$$

Return on Equity Ratio (ROE)

Reveals how much profit a company earned in comparison to the total amount of shareholder equity found on the balance sheet. It is what the shareholders “own”. Shareholder equity is a creation of accounting that represents the assets created by the retained earnings of the business and the paid-in capital of the owners. A business that has a high return on equity is more likely to be one that is capable of generating cash internally. For the most part, the higher a company’s return on equity compared to its industry, the better.

The return on owners' equity ratio is extremely important to the owner of the enterprise (the common stockholder), since it indicates the rate of return management has earned on the capital provided by the owners after accounting for payments to all other capital suppliers.

Figure 13: DuPont Analytical Framework



Source: http://www.sbs.gov.uk/content/pdf/fsmed_finance.pdf

Figure 13 shows the breaking down of the Return on Equity. The importance of ROE as an indicator of performance makes it desirable to divide the ratio into several components to gain insights into the causes of changes. Specifically, ROE ratio can be broken down into previously discussed ratios.

- Formula:

$$\text{ROE (NI/Equity)} = \text{ROA (NI/Total Assets)} \times \text{EM (Total Assets/Equity)}$$

Earning per Share Ratio (EPS)

One of the most important figures used in the fundamental share analysis. The earnings per share serve primarily as a comparison of different companies in the same industry and an examination of the income position of an individual company over time (Higgins 2001).

Why is EPS important? Well...it can be argued that earnings are the single most important determinant of a company's stock price. Investors love to see EPS increasing steadily year-over-year and are inclined to bid stock prices up when EPS rises. Conversely, stock prices tend to fall when EPS declines.

There are many varieties of EPS being used these days, and investors, to make informed investment decisions, must understand what each represents. For example, the EPS announced by the company may differ significantly from what is reported in the financial statements and in the headlines. As a result, a stock may appear over or undervalued depending on the EPS being used (Wayman 2005).

By definition, EPS is net income within a specified period of time (quarter, financial year) divided by the number of shares outstanding; however, both the numerator and denominator can change depending on how to define "earnings" and "shares outstanding" (Higgins 2001).

- Formula:

$$\frac{(\text{Net Income} - \text{Dividends on Preferred Stock})}{\text{Number of Shares Outstanding}}$$

2.3.2.4- Cash Flow Ratios

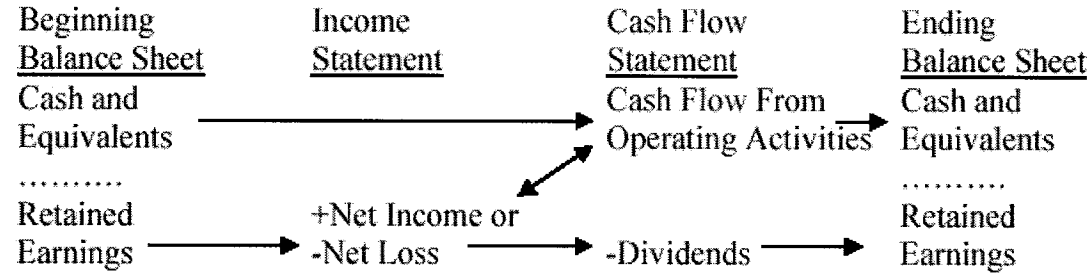
Various groups of professionals make frequent use of financial ratios as a tool for analysis and planning. Foremost among these groups are accountants and auditors. For example, both Albrecht (2003) and Wells (2005) discover that ratio analysis is an important tool in detecting red flags for a fraud examination (Urbancic 2005). While, Yli-Olli (1983) studied the stability of cash flow ratio loadings. He reported that “the cash streams do not load on the same factor as profitability”. He also proved that “applying transformation analysis which the temporal stability of the loading of the cash flow ratios on different factors is very poor”. He concluded that “the cash flow ratios measure different aspects of the firms' performance at different stages of business cycles”. (Yli-Olli, Virtanen & Salmi 1990).

The majority of financial ratios usually focus only on balance sheets and income statements. However, the statement of cash flows (SCF) can also offer useful insights from ratio analysis. Balance sheet ratios can only provide a date-in-time perspective, whereas the SCF represents activity for a continuous

period. Income statements report the results of operations for a period of time, but do not disclose other important changes in resources that result from activities in financing and investing. Thus, the SCF supplies the balance sheet and income statement by additional information regarding an organization's ability to 'operate efficiently, to finance growth, and to pay its obligations' (Urbancic 2005).

In this regard ratio analysis is an effective approach for evaluating SCF information because it reduces financial data to a concise set of key relationships that highlight operations and the results of a company's cash management practices (Urbancic 2005).

Figure 14: Cash Flow Financial Statement Articulation



Source: <http://www.alliedacademies.org/accounting/aafsj-7-3.pdf>

Figure 14 includes the cash flow statement in the articulation process. It suggests articulation of financial statements in a way that uses data from each of the three major financial statements to determine quality of earnings reported in income statements. There is a genuine need for the accounting profession to address a financial statement articulation model that

includes the cash flow statement. This model should make use of data in a good mix from balance sheets, income statements, and cash flow statements to identify true increases and decreases in company value. Contemporary financial analysts realize that manipulation of company earnings has consequences on cash flow and subsequent debt structure and, accordingly, future fixed payment burdens (Dye & Woodbury 2003).

A study done on examining the firm-specific value and risk factors as early predictors of junk bond default. The findings point up that any reduction in equity value tends to increase variation in long-term debt levels, while any decreases in cash flow are found to be statistically significant indicators of higher default probabilities in a logistic model. The result of the model shows the default risk of high-yield securities based on the levels of observable financial variables and notifies investors that a high bond default is generally preceded by a falling equity (Hakim & Shimko 1995).

Free Cash Flow to Sales Ratio (FCFS)

Copland, Koller, and Murrin (1996) define free cash flow in the following way:

“Free cash flow (FCF) is a company’s true operating cash flow. It is the after-tax cash flow generated by the company and available to all providers of the

company's capital, both creditors and shareholders. It can be thought of as the after-tax cash flows that would be available to the company's shareholders if the company had no debt."

Free cash flow shows whether a company is really making money or not. It is the cash flow left over after investment, and can be used by the company to purchase other firms, pay dividends, reduce debt, or buy back stock. Young, aggressive companies typically have negative free cash flow, since they are investing heavily in their futures. As companies mature, though, they should start to generate free cash flow. Generating heaps of free cash flow is one sign of a highly successful company.

The Free Cash Flow as a percentage of Sales also known by Cash King Margin is the Free Cash Flow generated by each sales dollar. It is similar to the net margin criteria except that it is based on free cash flow, a more accurate measure of the money that is actually flowing through a business. The higher the cash king margin is, the more the company is expected to diversify rather than possibly over-invest.

- Formula:

$$\frac{\text{Free Cash Flow}}{\text{Net Sales}}$$

Free Cash Flow to Net Income Ratio (FCFNI)

Free Cash Flow as a percentage of Profit. This is the Free Cash Flow generated by each dollar of profit, and is one measure of earnings quality. The greater is this ratio, the more the company generates cash from its earnings.

- Formula:

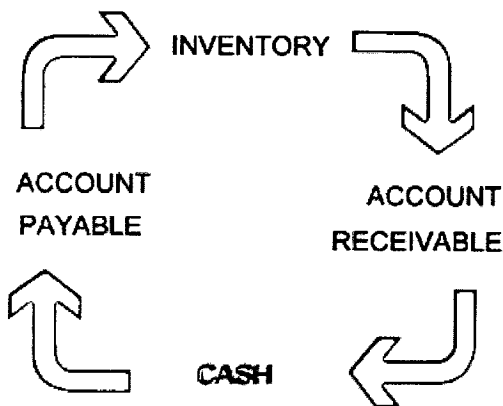
$$\frac{\text{Free Cash Flow}}{\text{Net Income}}$$

Cash Conversion Cycle Ratio (CCC)

The Cash Conversion Cycle usually referred to as the Asset Conversion Cycle or Cash Cycle represents the amount of time between the purchase of materials by a company to produce its end products and the receipt of payment for those end products by customers. In the Supply Chain, it represents the amount of time it takes to turn a dollar spent with a Supplier into a dollar received from an end customer. Managing cash conversion is critical, as it impacts a company's bottom line and cash flow. The CCC is also a good indication of how well a company is managing its working capital. A company with a low CCC is more efficient because it turns its products into cash more efficiently, minimizing the non productive working capital tied up in its business and making more cash available to fund growth and create shareholder value.

The cash conversion cycle is simply the duration of time it takes a firm to convert its activities requiring cash back into cash returns. The cycle is composed of the three main working capital components: Accounts Receivable outstanding in days (ARO), Accounts Payable outstanding in days (APO) and Inventory in days (IOD). The Cash Conversion Cycle (CCC) is equal to the time it takes to sell inventory and collect receivables less the time it takes to pay your payables

Figure 15: Cash Conversion Cycle



Source: <http://www.loanuniverse.com/cashcycle.html>

- Formula:

$$CCC = ARO + IOD - APO$$

Operating Cash Margin Ratio (OCM)

The operating cash margin ratio is somewhat similar to a traditional profit margin ratio except for the use of CFO in place of either net income or operating income as the numerator. Thus, the operating cash margin ratio provides a more robust indicator

of performance based on cash generating ability as opposed to a profit margin ratio with its focus on accrual based accounting income. Essentially, the operating cash margin ratio highlights the timing of cash flows with respect to the timing of sales. Therefore, this ratio can prove useful as part of a process to evaluate cash management performance, as well as, credit granting policies and receivable collections. However, since cash flow margins are likely to exhibit substantial variations among companies in different industries, it is more effective to focus a comparative analysis on companies within the same industry.

- Formula:

$$\frac{\text{Cash Flow from Operation}}{\text{Net Sales}}$$

Earnings Quality Ratio (EQR)

This provides a more realistic indication of the extent of deviation between operating cash flows and reported earnings. Non-cash items such as depreciation, amortization, losses and gains, are a typical cause for normal deviation of CFO from earnings. However, the underlying cause of any potentially abnormal or substantial deviations needs to be investigated. Therefore, during the evaluation process it is important to not only understand that a difference exists and to monitor its direction and size, it is equally important to identify the

underlying cause. For example, based on comparisons over time, an earnings quality ratio that is falling increasingly further below 1.0 could indicate a possible problem such as fictitious receivables or unrecorded payables.

- Formula:

$$\frac{\text{Cash Flow from Operation}}{\text{Net Income}}$$

Asset Efficiency Ratio (AER)

The asset efficiency ratio provides an indication of how well the assets of a company are utilized to generate a cash flow return. As an alternative measure, total property, plant and equipment could be used in place of total assets for the denominator to reflect a company's ability to minimize waste in generating cash flows from operations based on its investment in operational assets. These measures, tracked over a period of time, can provide useful insights especially when the results are compared to other companies in the same industry.

This ratio can be illustrated by a study done on the motives for going private. The purpose of this study is to establish the financial characteristics of firms that have gone private. More specifically, it is concerned with those variables that are indicators of the firms' risk-return tradeoff character and changes in cash flows. It is the real, or perceived changes in those groups

of variables, by investors at the margin that result in changes in the market value of the firm. In addition, there is a proxy for size since it has never been established whether large or small firms are more likely to go private. A probit model was used to distinguish the difference between firms that went private and firms that did not. Major findings were:

(1) The higher the price-earning multiple, the greater the market value to book value ratio and the higher the growth rate the less likely a firm will go private;

(2) The greater the cash flow to total assets, and the higher the dividend yield, the greater the likelihood the firm will go private.

Stated differently, if returns to owners are measured in potential cash such as market value, or growth the firm is more likely to stay public but if the greater returns are measured in cash or cash for dividend payouts, the more likely the firm will go private.

The results further indicate that the ratio of a firm's undistributed cash flow to its total assets is a significant determinant of a firm's decision to go private between 1981 and 1992 (Rao, Waters & Payne 1995).

- Formula:

$$\frac{\text{Cash Flow from Operation}}{\text{Total Assets}}$$

Capital Asset Ratio (CAR)

Capital assets consist of property, plant and equipment used for operations. Cash flow information for capital assets is provided in the investing section of the statement of cash flows. The capital asset ratio shows a company's ability to meet its capital expenditure needs from cash generated by operating activities rather than from financing activities. A ratio of 1.0 or greater means that debt financing is not necessary for capital expenditures. The capacity to replace or update capital assets ultimately determines whether or not a company can successfully compete with others in the same industry. A potential risk that many organizations face is a stagnant or decreasing level of capital spending. Therefore, it is important to monitor how much a company expends on technological advances and new equipment.

The interpretation of the correlation between cash flow and investment is highly controversial. Some argue that it is caused by financial constraints, others by the correlation between cash flow and investment opportunities that are not properly measured by Tobin's Q. The Q-theory of investment (Tobin, 1969; Hayashi, 1982) can be seen as a reformulation of the neoclassical theory, according to which investment demand can be explained by the ratio between the market value of the firm's capital stock and its

replacement cost. Carpenter's and Guariglia's paper uses a panel of 722 UK firms' contracted capital expenditure to capture information about opportunities available only to insiders and thus not included in *Q-Theory*. When this variable is added in investment regressions, the explanatory power of cash flow falls for large firms, but remains unchanged for small firms. This suggests that the significance of cash flow stems from its role in alleviating credit frictions (Carpenter & Guariglia 2003).

- Formula:

$$\frac{\text{Cash Flow from Operation}}{\text{Capital Expenditure}}$$

Current Liability Coverage Ratio (CLC)

This ratio examines the liquidity of the company by providing a measure of the extent to which current liabilities are covered by cash flowing into the business from normal operating activities. The ratio is thought to possess some advantage over balance sheet-based ratios such as the liquidity ratio as a measure of short-term solvency. This is because balance sheet ratios are based on a static positional statement and are therefore subject to manipulation by, for example, running down stock immediately prior to the year end and not replacing it until the next accounting period. Balance sheet based ratios may alternatively be affected by unusual events which cause particular items to be

abnormally large or small. In either case, the resulting ratios will not reflect normal conditions.

In computing the current liability coverage for a company, the amount of cash flows from operations is divided by the total amount of current liabilities. The current liability coverage ratio gives a better clue as to a company's debt management practices than a more traditional earnings-based ratio. The ratio is also a better indicator of a company's actual ability to meet current liabilities than more widely known ratios such as the current ratio and quick ratio. The ratio provides an indication of a company's ability to pay for debts and obligations coming due within one year, including any currently maturing portion of long term debt. As such, the current liability coverage ratio is a liquidity measurement based on a comparison of operating cash flow with near term obligations. In the event a company is not generating enough cash from operations to meet its obligations, then other more costly sources for cash will be required that may increase the risk of default or bankruptcy.

- Formula:

$$\frac{\text{Cash Flow from Operation}}{\text{Current Liabilities}}$$

2.4- US Stock Market

The stock market appears in the news every day. People heed about stocks reaching a new high or a new low, and they also heed daily statements like "The Dow Jones Industrial Average changed by 2 percent today, with advances leading declines by a margin of..."

Obviously, stocks and the stock market are important, but people may find that they know very little about them.

2.4.1- Brief History and Structure

There are eight stock markets in the United States; of which three are the largest national markets – the New York Stock Exchange (NYSE), the NASDAQ Stock Market and the American Stock Exchange (AMEX). The remaining US markets are: Boston Stock Exchange (BSE), Chicago Stock Exchange (CHX), Pacific Stock Exchange (PSE), Cincinnati Stock Exchange (CSE), and Philadelphia Stock Exchange (PHLX) (Reilly 1992).

NASDAQ and AMEX are operated by the NASDAQ-AMEX Market Group, a subsidiary formed in 1998 of the National Association of Securities Dealers, Inc. The principal exchange in terms of market capitalization is still the NYSE, although by some measures, such as share volume or total dollar volume, the NASDAQ has continually rankled the NYSE. While NASDAQ

lists considerably more companies than the NYSE, they tend to be smaller firms (Sobel 2004).

NYSE is the largest exchange in the world which was established back in 1792 when 24 brokers signed an agreement to trade from an outside location on Wall Street. The name “New York Stock Exchange” was adopted in 1863, the year in which the exchange moved to the premises that it still occupies today. Trading in stocks listed on the NYSE is conducted as a “centralized continuous auction” at a “designated location” on the trading floor, with brokers representing their customers’ buy and sell orders. An electronic order-routing and reporting system, SuperDot, links member firms all over the world directly to the trading floor of the NYSE. With electronic speed and efficiency, SuperDot can direct market and limit orders to the “specialist post” where each stock is traded or to the member firm’s booth on the trading floor. The NYSE is a continuous auction market in which stock exchange members called specialist post bid and ask prices for several stocks in which they make a market. Specialists must stand at assigned posts on the trading floor (Sobel 2004).

An outdoor market-place until 1921, the name American Stock Exchange was adopted in 1953. Through the years, the AMEX has earned a reputation for innovation, opening the industry to new ideas through the introduction of “state-of-the-

art” trading floor technology and new derivatives products. Based in New York, the exchange provides auction market for stocks and bonds of companies not large enough to qualify for the NYSE. Its listing requirements are less stringent and it encourages the registration of relatively young companies. It also lists a considerable number of foreign stocks. Trading is conducted in an open auction market where free market competition enables buyers and sellers to get the possible price. All trades are made public immediately over a worldwide consolidate tape network. An automated trading system at the AMEX enables brokers to electronically route equity orders directly to the specialist’s post (Sobel 2004).

By using a “blend of screen-based trading technology” and market-maker competition, NASDAQ has greatly influenced the way stocks are traded around the world. NASDAQ is a complex communications network serving the OTC stock market. Using a screen-based system that centralizes trading information, securities firms can compete openly with one another via the computer, no matter where they are located. Unlike the exchanges, it has an electronic rather than a physical trading floor where no limits are imposed on the number of market maker-makers that can compete for business in a security. Through workstation terminals, market-makers enter the prices at

which they are willing to buy and sell securities. They also use these terminals to negotiate trades, execute orders and report transactions. NASDAQ, in turn, sends the trade details to the clearing corporation for clearance and settlement and to information vendors for worldwide dissemination to securities firms, investors and the financial press (Sobel 2004).

2.4.2- Index Descriptions

Indicator series are intended to reflect the overall price or return movements of a group of securities (Lorie, Dodd and Kimpton 1985). The purpose of this section is to briefly review each of the major series and point out how they differ in terms of their characteristics in order to understand their movements over time and why they differ.

2.4.2.1- Dow Jones Average

In 1882 Charles Henry Dow founded Dow Jones & Company with his partner Edward Jones (Madura 2001).

- **Dow Jones Average - 30 Industrial**

Prepared and published by Dow Jones & Co. is one of the oldest and most widely quoted of all the market indicators. The Dow Jones Industrial Average (Figure 16) is comprised of 30 stocks that are major aspects in their industries, and widely held

by individuals and institutional investors. In general, the DOW 30 is intended to include the largest & most well-established ("Blue Chip") publicly-traded Industrial (excluding Transportation or Utility) companies in America. The addition of Microsoft and Intel in 1999 was the first inclusion of NASDAQ Market Stocks to the DOW 30 (Best 2004).

The DJIA is a price weighted average of 30 large industrial stocks (28 NYSE and 2 NASDAQ) that are generally the leaders in their industries. It is derived by totaling the current prices of the 30 stocks and dividing the sum by a divisor adjusted to take account of stock splits and changes in the sample over time (Madura 2001).

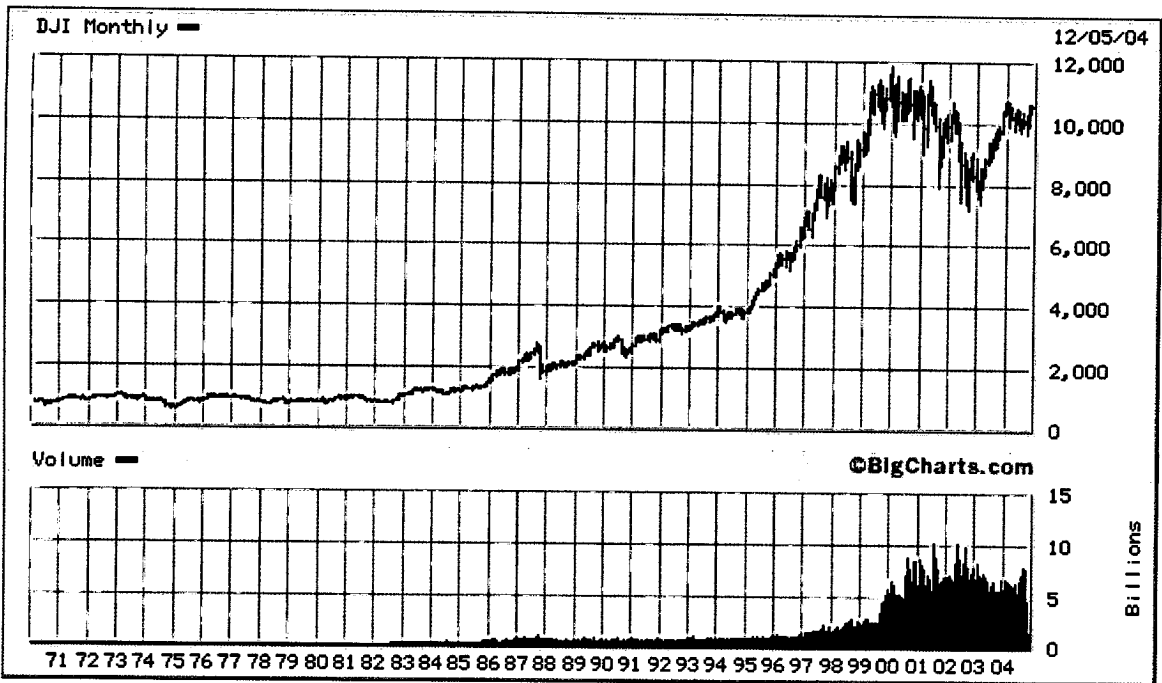
- **Dow Jones Average - 20 Transportation**

Prepared and published by Dow Jones & Co., the Dow Jones Transportation Average represents 20 stocks of the airline, trucking, railroad, and shipping business.

- **Dow Jones Average - 15 Utilities**

Prepared and published by Dow Jones & Co., the Dow Jones Utility index is geographically representative of the gas and electric utilities industries.

Figure 16: DJIA Price Line



Source: www.bigcharts.com

2.4.2.2- Standard & Poor's

- **S&P 500**

Widely regarded as the standard for measuring large-cap U.S. stock market performance, this popular index includes a representative sample of leading companies in leading industries. The S&P 500 Index (Figure 17) was introduced by McGraw Hill's Standard and Poor's unit in 1957. It is used by 97 percent of U.S. money managers and pension plan sponsors. Weighted by market cap, the S&P 500 Index comprises about three-quarters of total American capitalization. Most money managers treat the S&P 500 as a proxy for the US stock market. Three-quarters of money in American index funds is tied to it. Analysts using the Capital

Asset Pricing Model (CAPM) use the S&P 500 as a proxy for the stock market -- and the standard for calculating beta (β , market risk, where the S&P 500 has a beta equal to 1.00) (Best 2004).

Standard & Poor's was the first company to employ a market value index. The S&P 500 Index (broadly used) is calculated by taking the total market value of the 500 stocks in the index, dividing by their weighted average market value during the period 1941 to 1943 and then multiplying by 10 (Madura 2001).

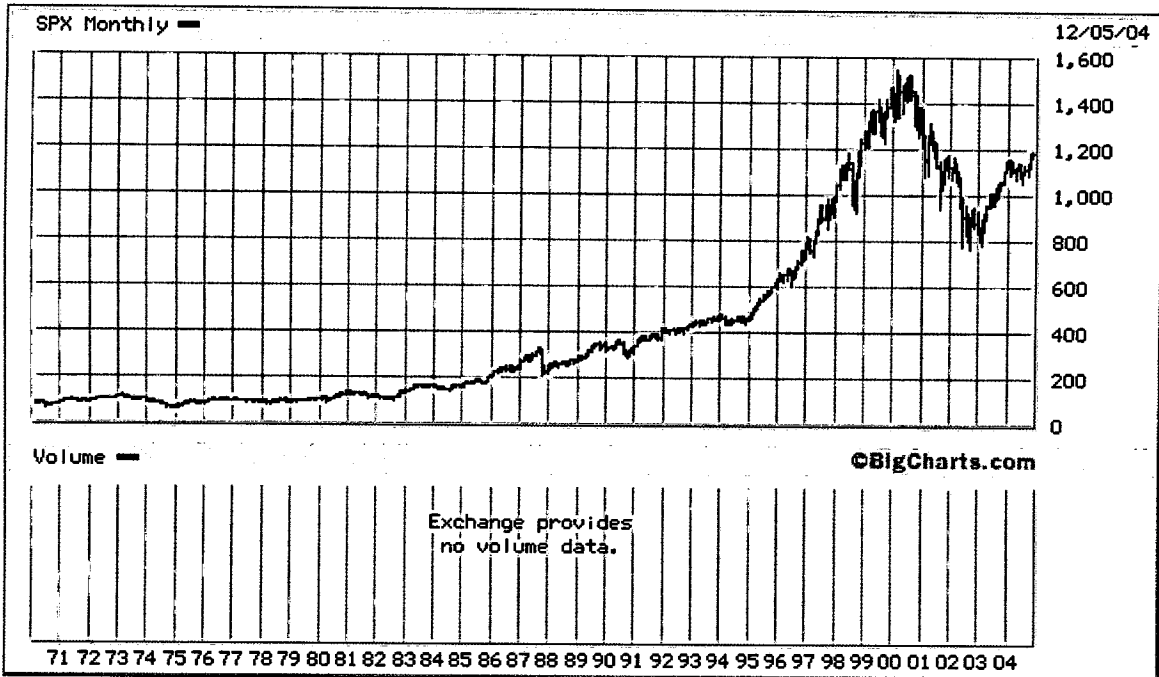
- **S&P MidCap 400**

Measuring the performance of the mid-size company segment of the U.S. market, this index is used by over 95 percent of U.S. managers and pension plan sponsors. \$20 billion is indexed to the S&P MidCap 400.

- **S&P 100**

The Standard & Poor's 100 Stock Index, known by its ticker symbol OEX, measures large company U.S. stock market performance. This market capitalization-weighted index is made up of 100 major, blue chip stocks across diverse industry groups.

Figure 17: S&P Price Line



Source: www.bigcharts.com

2.4.2.3- NASDAQ

NASDAQ is the third-largest market in the world, after the New York and Tokyo exchanges, and handles over 45 percent of all shares traded in the major U.S. markets (Madura 2001).

Today, NASDAQ lists the securities of nearly 4,100 of the world's leading companies and each year, continues to help hundreds of companies successfully make the transition to public ownership (Ingebretsen 2002).

- **NASDAQ Composite**

A comprehensive set of prices indicator for the Over-The-Counter (OTC) market was developed by the National Association of Securities Dealers (NASD). These NASDAQ-OTC price indexes began as of February 5, 1971 with an index value of 100. All domestic OTC common stocks listed on NASDAQ are included in the indexes, and new stocks are included when they are added to the system (The OTC Market 2004). It is a market capitalization weighting of prices for all the stocks listed in the NASDAQ Stock Market (Figure 18). Market capitalization is price per share of stock times the number of shares outstanding (Best 2004). In contrast to the S&P 500 which has about a quarter of its market cap in technology, two-thirds of the NASDAQ Composite market cap is computers, software and telecommunications (telecom) companies.

- **NASDAQ-100**

The NASDAQ-100 Index includes 100 of the largest domestic and international non-financial companies listed on The NASDAQ Stock Market based on market capitalization. The Index reflects companies across major industry groups including computer hardware and software, telecommunications, retail/wholesale trade and biotechnology. It does not contain financial companies including investment companies. The

NASDAQ-100 Index is calculated under a modified capitalization-weighted methodology.

On January 31, 1985, the NASDAQ-100 Index began with a base of 250.00.

On January 1, 1994, the NASDAQ-100 base was reset by division of a factor of 2.00 to 125.00.

- **NASDAQ Financial-100**

The NASDAQ Financial-100 Index includes 100 of the largest domestic and international financial companies listed on The NASDAQ Stock Market based on market capitalization. They include companies classified by the FTSE™ Global Classification System as Financials, which are included within the NASDAQ Bank, Insurance and Other Finance Indexes.

On January 31, 1985, the NASDAQ Financial-100 Index began with a base of 250.00.

- **NASDAQ Bank**

The NASDAQ Bank Index contains NASDAQ listed companies classified according to the FTSE™ Global Classification System as Banks. They include banks providing a broad range of financial services, with significant retail banking and money transmission.

On February 5, 1971, the NASDAQ Bank Index began with a base of 100.00.

- **NASDAQ Biotechnology**

The NASDAQ Biotechnology Index contains companies that are classified according to the FTSE™ Global Classification System as either biotechnology or pharmaceutical which also meet other eligibility criteria. The NASDAQ Biotechnology Index is calculated under a modified capitalization-weighted methodology.

On November 1, 1993, the NASDAQ Biotechnology Index began with a base of 200.00.

- **NASDAQ Computer**

The NASDAQ Computer Index contains NASDAQ listed companies classified according to the FTSE™ according Global Classification System as Computer Hardware, Semiconductors, and Software & Computer Services. They include firms that manufacture and distribute computers and associated electronic data processing equipment and accessories, semiconductor capital equipment, manufacturers and distributors of wafers and chips, providers of computer services and IT consultants, Internet access providers, internet software and on-line service providers, and producers and distributors of computer software.

On November 1993, the NASDAQ Computer Index began with a base of 200.00.

- **NASDAQ Industrial**

The NASDAQ Industrial Index contains NASDAQ listed companies not classified in one of the NASDAQ sector Indexes. These include firms that are involved in mining, oil and gas, chemicals, construction and building materials, forestry and paper, steel and other metals, aerospace and defense, diversified industrials, electronic and electrical equipment, engineering and machinery, automobiles and parts, household goods and textiles, beverages, food producers and processors, health, personal care and household products, tobacco, general retailers, leisure and hotels, media agencies, photography, publishing and printing, support services, food and drug retailers, electricity, utilities, and biotechnology and pharmaceutical firms not included in the NASDAQ Biotechnology Index.

On February 5, 1971, the NASDAQ Industrial Index began with a base of 100.00.

- **NASDAQ Insurance**

The NASDAQ Insurance Index contains NASDAQ listed companies classified according to the FTSE™ Global Classification System as Insurance or Life Assurance. They include insurance brokers, non-life insurance, re-insurance, other insurance, and life assurance.

On February 5, 1971, the NASDAQ Insurance Index began with a base of 100.00.

- **NASDAQ Other Finance**

The NASDAQ Other Finance Index contains NASDAQ listed companies classified according to the FTSE™ Global Classification System as Investment Companies, Real Estate, Specialty and Other Finance, or Investment Entities. They include real estate holding and development, property agencies, asset managers, consumer finance, investment banks, mortgage finance, other finance including financial holding companies, security and commodity exchanges, and other financial companies.

On February 5, 1971, the NASDAQ Other Finance Index began with a base of 100.00.

- **NASDAQ Telecommunications**

The NASDAQ Telecommunications Index contains NASDAQ listed companies classified according to the FTSE™ Global Classification as Television, Radio & Filmed Entertainment, Subscription Entertainment Networks, and Telecommunications Services and Equipment. They include independent radio and television contractors, film production, providers of television, media services and programming facilities including those driven by subscription, operators of wireless and fixed-line telecommunication services, and

manufacturers and distributors of digital equipment used in telecommunication.

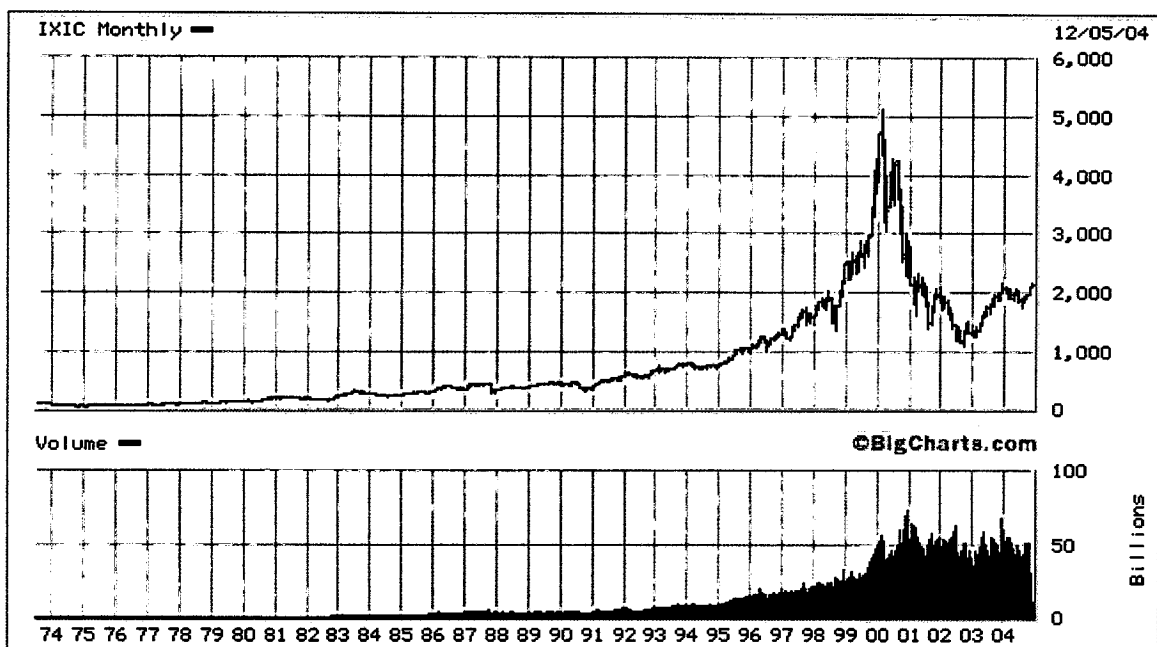
On November 1, 1993, the NASDAQ Utility Index was renamed the NASDAQ Telecommunications Index. The former NASDAQ Utility Index was reset to a base of 200.00, using a factor of 5.74805.

- **NASDAQ Transportation**

The NASDAQ Transportation Index contains NASDAQ listed companies classified according to the FTSE™ Global Classification System as Transport. They include firms that provide air, rail, road, freight, and water transport and their related facilities and services.

On February 1971, the NASDAQ Transportation Index began with a base of 100.

Figure 18: NASDAQ Price Line



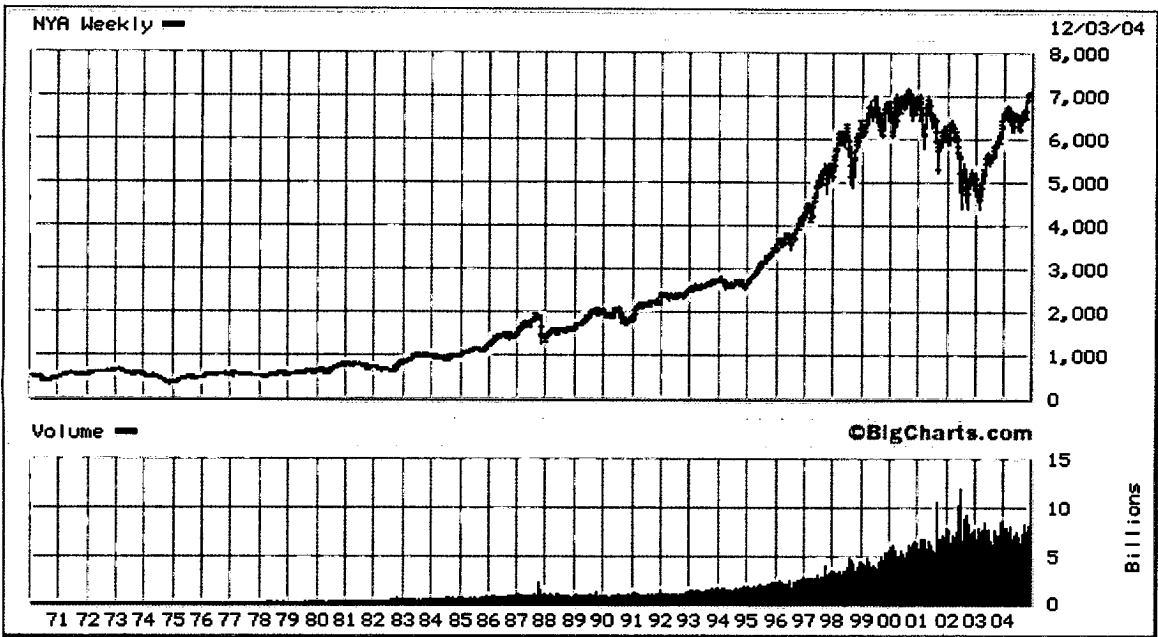
Source: www.bigcharts.com

2.4.2.4- NYSE

In 1966, the NYSE (Figure 19) established the NYSE Composite Index to provide a comprehensive measure of market trends. The indexes consist of a Composite Index of all common stocks listed on the NYSE (3,608 stocks) and four subgroup indexes -- Industrial, Transportation, Utility, and Finance. The indexes are basically a measure of the changes in aggregate market value of NYSE common stocks, adjusted to eliminate the effects of capitalization changes, new listings and delistings. However, because the index is value-weighted, the stocks of large companies still control major movements in the index (NYSE Website).

The NYSE registered as a national securities exchange with the U.S. Securities and Exchange Commission on October 1, 1934. The Governing Committee was the primary governing body until 1938, at which time The Exchange hired its first paid president and created a thirty-three member Board of Governors. The Board included Exchange members, non-member partners from New York and out-of-town firms, as well as public representatives (Best 2004).

Figure 19: NYSE Price Line



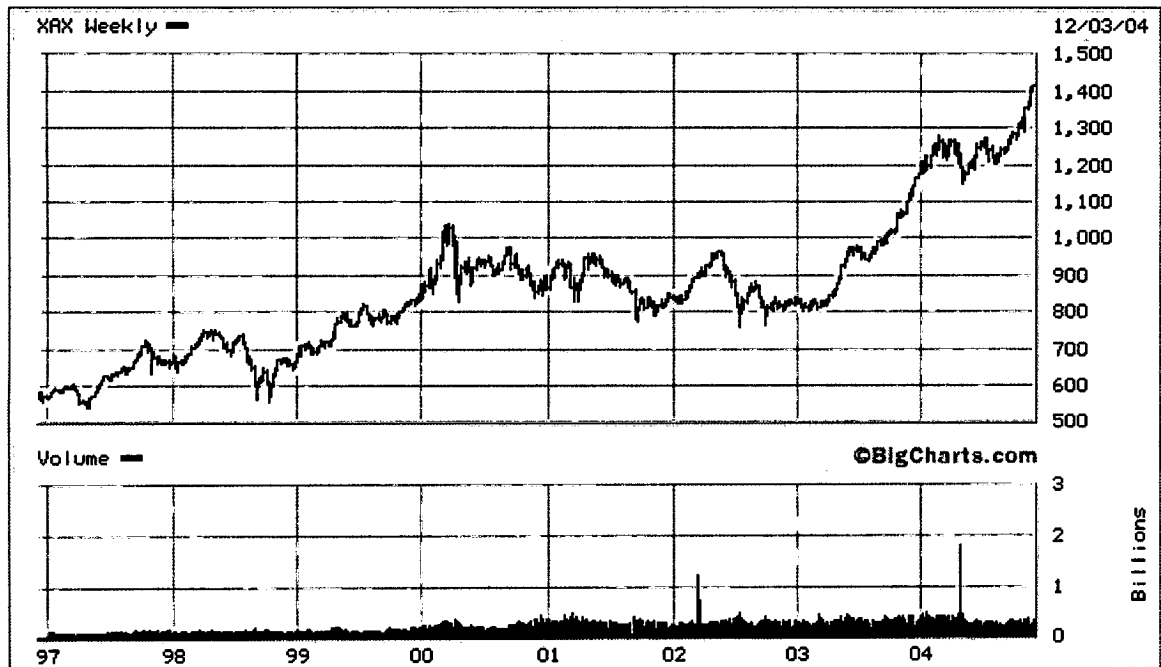
Source: www.bigcharts.com

2.4.2.5- AMEX

The AMEX (Figure 20) developed a Price Change Index in 1966. Starting September 1973, the index created a value-weighted index with a base of 100. Later on, in July 1983, the Market Value Index was adjusted to half of its previous level (a base of 50). The Amex Composite Index reflects the aggregate market value of all its components relative to their aggregate value on December 29, 1995. The index was developed with a base of 550 as of December 29, 1995. Components of the index include the common stocks or ADRs of all Amex-listed companies, REITs, master limited partnerships, and closed end investment vehicles. Each component's market value is determined by multiplying its price by the number of shares

outstanding. The day-to-day price change in each issue is weighted by its market value (as of the start of the day) as a percent of the total market value for all components. Thus, the daily price change for each company influences that day's change in the index in proportion to the company's market value. The level of the Composite Index is not altered by stock splits, stock dividends or trading halts, nor affected by new listings, additional issuances, delistings, or suspensions (Amex Website).

Figure 20: AMEX Price Line



Source: www.bigcharts.com

2.4.2.6- Russell

There are three separate, but overlapping indexes: the Russell 3,000, the Russell 2,000 (Figure 21) and the Russell 1,000.

- **Russell - 3000**

Measures the performance of the 3,000 largest U.S. companies based on total market capitalization, which represents approximately 98 percent of the investable U.S. equity market. As of the latest reconstitution, the average market capitalization was approximately \$5.1 billion; the median market capitalization was approximately \$791.1 million. The index had a total market capitalization range of approximately \$520 billion to \$178 million.

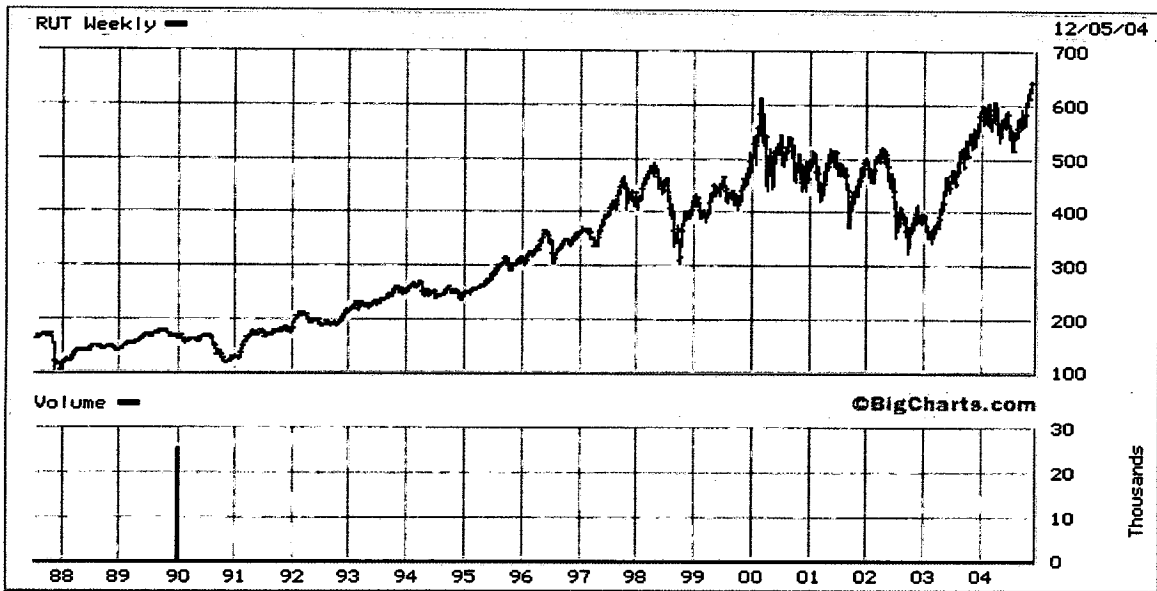
- **Russell - 2000**

Measures the performance of the 2,000 smallest companies in the Russell 3000 Index, which represents approximately 8 percent of the total market capitalization of the Russell 3000 Index. As of the latest reconstitution, the average market capitalization was approximately \$580 million; the median market capitalization was approximately \$466 million. The largest company in the index had an approximate market capitalization of \$1.5 billion.

- **Russell - 1000**

Measures the performance of the 1,000 largest companies in the Russell 3000 Index, which represents approximately 92 percent of the total market capitalization of the Russell 3000 Index. As of the latest reconstitution, the average market capitalization was approximately \$14.1 billion; the median market capitalization was approximately \$4.1 billion. The smallest company in the index had an approximate market capitalization of \$1.6 billion (Russell Website).

Figure 21: RUSSELL Price Line



Source: www.bigcharts.com

2.4.2.7- Wilshire

- **Wilshire 5000 Equity**

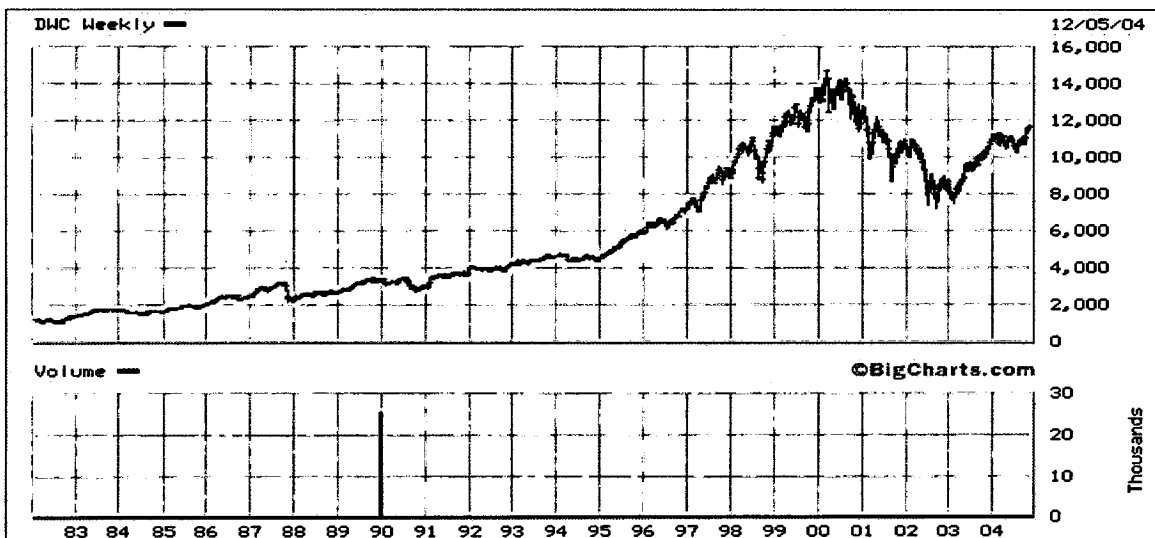
The Wilshire 5000 (Figure 22) Equity Index measures the performance of all U.S. headquartered equity securities with

readily available price data. Over 7,000 capitalization weighted security returns are used to adjust the index. It is a value-weighted index published by Wilshire Associates of Santa Monica, California. It derives the dollar value of 5,000 common stocks, including all NYSE and AMEX issues, plus the most active stocks on the OTC market (NASDAQ). The specific weighting of about 79.50 percent NYSE, 0.6 percent AMEX and 19.9 percent NASDAQ gives the NYSE the greatest influence because of its highest market value. The index was created in December 1970. The base value is its December 31, 1980 capitalization of \$1,404.596 billion (Wilshire Website).

- **Wilshire 4500 Equity**

The Dow Jones Wilshire 4500 Completion Index, created in 1986, is a subset of the Wilshire 5000 Composite Index and excludes components of the S&P 500.

Figure 22: WILSHIRE Price Line



Source: www.bigcharts.com

Table 7: Index Comparison

BROAD MARKET INDEX COMPARISON						
Index	Wilshire 5000	Wilshire 4500	Dow Jones Industrials	S&P 500	NYSE Composite	Nasdaq Composite
Measurement objective	Broad market	Extended market	Broad market	Broad market	NYSE Exchange	Nasdaq Exchange
Number of stocks	5,400+	4,900+	30	500	2,300+	7,400+
Distribution by Market Cap						
NYSE	79.5%	60.3%	85.6%	84.6%	100.0%	0.0%
AMEX	0.6%	2.0%	0.0%	0.2%	0.0%	0.0%
Nasdaq	19.9%	37.7%	14.4%	12.2%	0.0%	100.0%
Weighting	Market cap	Market cap	Price	Market cap	Market cap	Market cap
Reconstitution	Monthly+	Monthly+	Replacements	Replacements	Daily	Daily
Established	Dec 1970	Dec 1983	May 1896	Jan 1928	Jan 1939	Feb 1971
Style Indexes	Yes	No	No	Yes	No	No
Percent of Market	100%	21%	25%	79%	78%	20%

Source: <http://www.wilshire.com/Indexes/Comparisons.html>

This table highlights the essential US Indexes with a little assessment on each one. It shows the essential structure of each Index, comparing them with each other. For example, Wilshire 5000 is a 100 percent US market compare to a 78 percent of NYSE, where the remaining 22 percent are from International market. Both of them use the market cap or value-weighted (equal to Number of shares outstanding x Current market price) in weighting them, comparing to Dow Jones who uses the price-weighted (Arithmetic average of current prices). Also, this table shows the percentage distribution of the listed companies among the three equity market. For example, Wilshire 5000 is a 79.5 percent NYSE, 0.6 percent AMEX and the remaining 19.9 percent NASDAQ.

Chapter 3

RESEARCH MODEL AND METHODOLOGY

Introduction

This chapter discusses the techniques used to develop the research model. This model will help the investor to make better decisions based on the company financial reliability. It elaborates on the methodology related to the model development and process. It is followed by the techniques that allow testing the reliability and validity of the model.

The study is based on the theoretical analysis, sample data and observations that have been analyzed by financial markets. The data is based on a sample of 100 listed NASDAQ companies measured during the crash period.

The study uses the financial ratios in an attempt to answer the research question of whether these ratios could be utilized for making a better rational investment decision.

3.1- Research Model

Binary Logistic Regression Model (BLRM) was first applied by Ohlson (1980) to predict corporate financial distress. It is superior to linear probabilistic model where normality

assumptions are not met. It guarantees the estimated probability to lie between zero and one. The dependent variable measures the reliability of financial. It takes the value of zero if the sample firm falls into financial reliable and one otherwise (Tsun-Siou, Yin-Hua & Rong-Tze 2003).

Logistic regression is more efficient than discriminant analysis or regular regression analysis.

- Unlike discriminant analysis, logistic regression does not assume continuous, normally distributed predictors.

- Unlike regression analysis, logistic regression does not run into the problem of predicting negative probabilities for group membership.

In studies that include a two-group dependent variable, many researchers prefer logistic regression for a number of reasons (Hair, Anderson, Tatham, and Black 1998). First, multiple discriminant analysis relies on strictly meeting the assumptions of multivariate normality and equal variance-covariance matrices across groups. Logistic regression does not face these strict assumptions and is robust when these assumptions are not met. Second, it has the ability to incorporate non-linear effects. Finally, it has a straightforward statistical test.

Logistic regression is intended to *predict probabilities* that are between 0 and 1. Values between 0 and 1 would be difficult to predict by a linear regression analysis, because the range usually is not limited.

The research model will be presented in the following logistic regression equation:

$$Y = A + B_1X_1 + B_2X_2 + B_3X_3 + \dots B_nX_n$$

When predicting group membership, logistic regression approaches the task in a similar manner to multiple regression. The log of Y estimate of the logistic regression is the odd of FR (Financial Reliable) group, which is used to derive the probability.

Probability of FR = f (Liquidity and Activity Ratios, Leverage Ratios, Profitability Ratios, Cash Flow Ratios).

This implies that the probability of company's reliability is a function of the following financial ratios: Liquidity and Activity Ratios, Leverage Ratios, Profitability Ratios, and Cash Flow Ratios

That is why logistic regression applies a *special technique*: It is worth mentioning that odds and probabilities of events provide the same information, but in different forms. It is easy to convert odds into probabilities and vice versa (Sharma, 1996).

$$\text{Odd}_{(\text{event})} = \text{Prob}_{(\text{event})} / \text{Prob}_{(\text{no event})}$$

$$\text{or } \text{Odd}_{(\text{event})} = \text{Prob}_{(\text{event})} / [1 - \text{Prob}_{(\text{event})}]$$

Then, in deriving the probability of an event based on the odd of an event the following equation applies:

$$\text{Prob}_{(\text{event})} = \text{Odds}_{(\text{event})} / (1 + \text{odds}_{(\text{event})})$$

Based on the above, the Y estimate of the logistic regression can be expressed as follows:

$$\text{Odd (FR)} = \text{Ln}(Y) = A + B_1X_1 + B_2X_2 + B_3X_3 + \dots + B_nX_n$$

And to convert into probability:

$$\text{Odd (FR)} = \text{Prob}_{(\text{event})} / [1 - \text{Prob}_{(\text{event})}]$$

The log of the Y estimate in the logistic regression equation computes the odd of an event (group). The procedure applied to convert the Log of Y estimate into odd of an event is by raising e to the power of the predicted Y value of logistic regression:

$$\text{Odd of event} = e^{\text{Ln}(Y)} ; \text{ where } (e = 2.71828)$$

Replacing the value of Y estimate with the logistic regression equation, e will read:

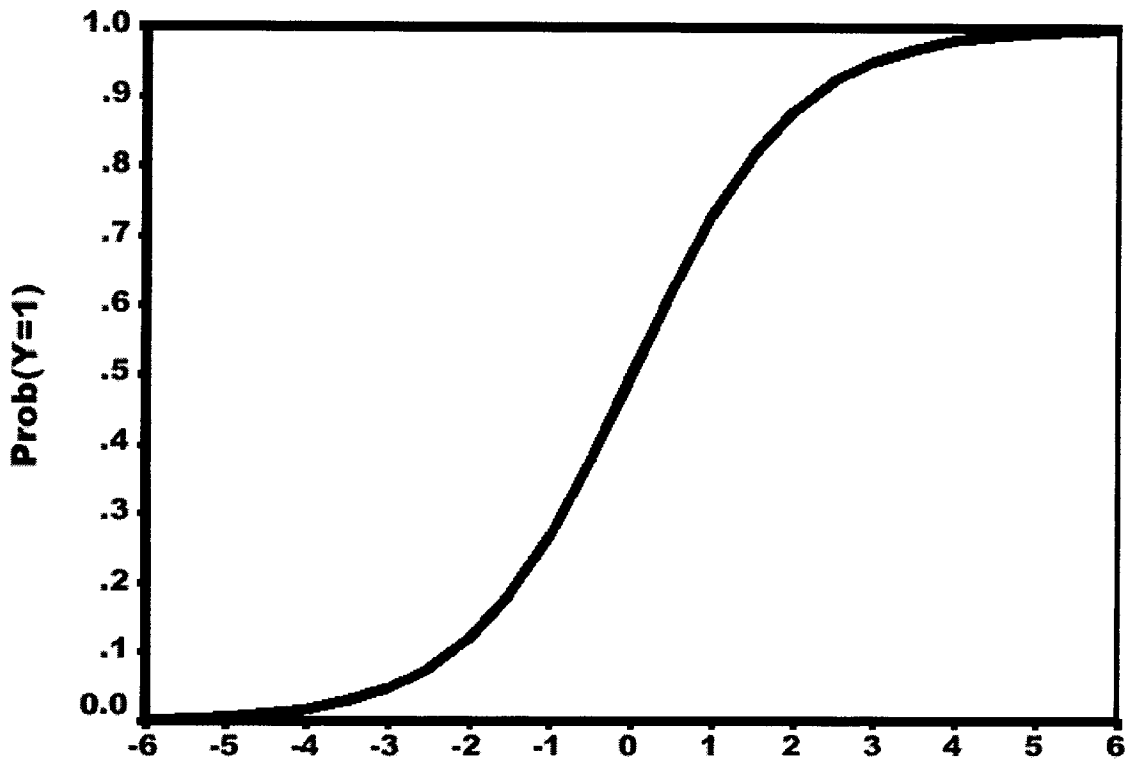
$$\text{Odd (event)} = e^{A + B_1X_1 + \dots + B_nX_n}$$

Then, the probability of an event is expressed as follows:

$$\text{Prob} = \frac{e^Y}{1 + e^Y} = \frac{e^{A+B_1X_1+\dots+B_nX_n}}{1 + e^{A+B_1X_1+\dots+B_nX_n}}$$

Based on the characteristics of log, the relationship is reflected in an S-shaped curve (logistic curve) that is inherently nonlinear (Sharma, 1996). Because of this unique relationship, the techniques applied to estimate, assess, and interpret results follow a different approach.

Figure 23: The Logistic Probability Form



Source:

http://www.soc.umn.edu/~knoke/pages/NotesS8811_LogisticRegression2005.pdf

The companies' financial ratios will be applied in the logistic regression model to predict the financially unreliable firms versus the financially reliable firms. The predicted group will be compared with the actual group of that firm. The answers will be tallied to check the percentage of correctly classifying

both groups. The over-all hit ratio is the weighted average of correctly classifying both groups (Sharma 1996).

3.2- Sampling and Data Source

The selection of NASDAQ Market is due to the availability of the data. It is important to note that the usefulness of the proposed methodology is unrestricted by the fact that it is applied only to the United States. The types of data that are employed in this study are also available in other countries.

The sample used for analysis is a secondary data. Secondary data are available e.g. from databases and newspapers. The sample is limited to securities identified by Center for Research in Security Prices (CRSP) and Morningstar Website.

In the NASDAQ Market, there have been a number of bankruptcies which, although undesirable for supervisors and policyholders, is reasonable in a statistical sense. With the low of 1,979.25 on January 01, 2002, the NASDAQ Composite Index lost over 52 percent of 4131.15 reached on January 01, 2000 (Discussed chapter 2, page 16). The NASDAQ Composite consists mainly of stock related to the so-called "New Economy," i.e., the Internet, software, computer hardware, telecommunication and so on. A main characteristic of these companies is that their price-earning-ratios (P/Es), and even more so their price-dividend-

ratios, often came in three digits. Opposed to this, so-called “Old Economy” companies, such as Ford, General Motors and Daimler-Chrysler, had P/Es of the order of 10. The difference between Old Economy and New Economy stocks was the expectation of future earnings; investors expected an enormous increase in, for example, the sale of Internet and computer related products, rather than in car sales and were hence more willing to invest in Cisco rather than in Ford, notwithstanding the fact that the earning-per-share of the former is much smaller than for the latter (Johansen and Sornette 2000).

In this project, the classifications are based on the assessment of historical changes in stock prices in our selection of companies for the period 2000-2002, and therefore having January as the selected month. We have chosen this month primarily out of simplicity, since statistical data are compiled at the end of a calendar year. Many studies have used the same starting month, which increases the comparability of our study to those (De Bondt & Thaler 1987).

The major weak and strong points of a company are described in that assessment as indications of lower or greater percentage price change than the NASDAQ trends change (negative 52 percent) for that period. The companies are classified into one of the two possible groups: financially

unreliable (where the firm price movements is greater than the NASDAQ trends change; coded in the logistic regression with 1), or financially reliable (where the firm price movements is lower than the NASDAQ trends change; coded in the logistic regression with 0). A disadvantage of this approach is that the assessment text might not fully describe the actual situation of a company.

The question that should be asked is whether stock price is a reliable measure of the value of a share? To be reliable, the source or the measuring instrument must show the same or approximately the same result independent of who undertakes the study and the point of time chosen. This means that the source or the instrument has to give the same result at repeated studies (Bhana 2002).

In order to fulfill the above requirements, the suggested sample consisted of 100 companies split equally into two (Appendix 2). The first group contains the firms that are considered financially unreliable (50 NASDAQ listed companies). The second one comprises the remaining half of the sample and considered financially reliable.

After screening the number of companies, the variables used consists of 31 financial ratios (Appendix 3) collected over a period of ten years (1994-2003). The data was gathered from Morningstar.com. It was ascertained that failing firms (FUR)

exhibited significantly different ratio measurements than businesses which were successful (FR). Historical accounts specifically cite the use of ratios in predicting bankruptcy (DeVaney 1994).

The 2000 cutoff was chosen to avoid the lack of data which may reflect the fact that several of these firms were not publicly traded at the same time. Thus, the ratios contained in this model are determined at the year 2000 prior to the market crash and after several years of boosted market.

There is no generally accepted theoretical base on picking or selecting variables for prediction models, so an exploratory stance has usually been taken. In this study, however, a framework model guided the selection of variables since we are dealing with financial ratios only.

- **Dependent Variable**

The dependent variable (DV) was the soundness of the stock which was defined as the stocks that are adversely or less affected during the crash period. The dependent variable is defined as the healthy stocks having a return over the year 2000-2002 less than the NASDAQ return over that period. It classifies companies into financially unreliable (FUR) versus financially reliable (FR) that are measured by using a dummy variable:

- **Financially Reliable (Healthy Stocks)** **0**
- **Financially Unreliable (Unhealthy Stocks)** **1**

- **Independent Variables**

The independent variables (IV) in this study describe measures of financial performance, including liquidity/activity, leverage, profitability and cash flow ratios. These variables were elaborated previously under the financial ratios section.

3.3- Testing Reliability

In testing the reliability of the model, five statistics measures are of critical importance to the procedure:

3.3.1- Log-Likelihood Ratio

Maximum likelihood estimation of the logistic regression parameters maximizes the equation's log-likelihood (LL) function. Usually this numerical value is negative, because the function to be maximized is an inverted parabola in hyper-space whose largest value lies below 0 on the vertical (dependent variable) axis. Computer packages differ in reporting either this LL value, or minus twice the value (-2LL), which has distributional properties enabling to apply Chi-Square

distributions. A well-fitted model will have a small $-2LL$ value. It is a perfect fit when $-2LL = 0$.

The significance of the model is tested by computing the difference of Log-Likelihood between the model with that of the null by applying a Chi-Square distribution with degrees of freedom equal to the difference between the degrees of freedom of the model minus the degrees of freedom of the null. The equation is:

$$\text{Chi-Square} = 2 * [LL_{\text{model}} - LL_{\text{null}}]$$

3.3.2- Hosmer and Lemeshow Test

The H&L test divides the sample into deciles based on the predicted probabilities. The observed and expected number of observations falling into the two dependent variable categories (0 and 1) are summarized in a 10-row by 2-column crosstab. Next, a Chi-Square test statistic with 8 degrees of freedom is computed from this table. If the probability of the test statistic is .05 or less, we reject the null hypothesis of no difference between observed and predicted values of the dependent variable. If $p > .05$, then we fails to reject the null hypothesis of no difference, implying that the model's parameter estimates fit the data at an acceptable level. Although the model may not explain a large proportion the dependent variable's variation in the population, it is probably more than none (Knoke 2005).

3.3.3- Coefficient of Determination

Cox and Snell (1989) proposed a generalization of the Ordinary Least Squares (OLS) regression coefficient of determination:

$$\mathbf{R}^2 = 1 - \left(\frac{\mathbf{L}_0}{\mathbf{L}_1} \right)^{\frac{2}{N}}$$

Where L_0 is the log-likelihood for the “intercept-only” equation, L_1 is the log-likelihood for an equation with one or more predictors, and N is the sample size.

Nagelkerke (1991) proposed adjusting this coefficient by rescaling it according to the largest value that R-Square can achieve, thus enabling the measure to reach a maximum of 1.0:

$$\overline{\mathbf{R}}^2 = \frac{\mathbf{R}^2}{\mathbf{R}_{\max}^2} = \frac{\mathbf{R}^2}{1 - (\mathbf{L}_0)^{\frac{2}{N}}}$$

Both coefficients should be viewed as purely descriptive statistics that provide a rough approximation for judging a model’s predictive efficacy (Knoke 2005).

In general, the interpretation of R^2_{logit} is similar in multiple regressions to the coefficient of determination (R^2) with values ranging between 0 and 1. When R^2_{logit} approaches 0, the model fits poorly. When R^2_{logit} approaches 1, the model is a perfect predictor.

3.3.4- Hit Ratio

A T (student) test will be performed regarding the classification procedures to determine the level of significance of hit ratio. The following formula is applied to a two-group analysis:

$$T = [P - 0.5] / [0.5 (1 - 0.5) / N]^{1/2}$$

Where P = hit ratio = proportion correctly classified, N = sample size.

SPSS logistic regression uses its estimated equation to decide that if the expected probability is <.50, then predicted score is 0; if the expected probability >.50, then predicted value is 1. The percentages of correctly predicted cases are then calculated and displayed in a classification table. The higher the ratio, the better is the model. If the equation “completely explains” the variation of the dependent variable, all cases would fall on the main diagonal and the overall percentage correct would be 100 percent.

3.3.5- Significance of ‘B’ Coefficient

The significance of the coefficients of the logistic equation is another procedure to test the fit of the overall model. There are two techniques:

3.3.5.1- Wald Test

Wald test uses the standardized value of logistic regression coefficients in determining the significance of the model. The standardized Z value is found by dividing the coefficient (B value) divided by the standard error of the value (Tabachnick & Fidell 1996).

$$\text{Wald test} = \text{Coefficient} / \text{Standard error of Coefficient}$$

The result of the equation is a Z statistic value, which is assessed using normal distribution. A coefficient is significant if it exceeds the value 1.96 on both sides, using 5 percent level of significance. Raising the value of Wald test statistic to power 2 converts it into Chi-Square distribution, which is applied by the SPSS package (Tabachnick & Fidell 1996):

$$\text{Wald test} = [\text{Coefficient} / \text{Standard error of Coefficient}]^2$$

The Chi-square critical value is $(1.96)^2 = 3.841$ and the B coefficient value is significant if its Chi-square Wald test exceeds 3.841.

3.3.5.2- Interval Estimates of B Coefficient

Constructing a confidence interval of B value is a useful tool in assessing the reliability of logistic regression model. The interval estimate of the B coefficient is set at 5 percent level of

significance. The interpretation of the interval estimate is significant if the interval does not include 1.

3.4- Testing Validity

It is important to distinguish between the processes of internal validation, which aims to make estimates from a single dataset as reliable as possible, and external validation, which involves evaluation of prognosis on completely independent test data.

In general, the validation of the results is accomplished with the use of the holdout sample in the assessment of its predictive accuracy. The procedure applied to predict the group of holdout observations is the same as the one used in the case of wise diagnostic. Then, the hit ratio is computed to check the predictive accuracy of the logistic regression model by comparing it to the hit ratio of the analysis sample.

3.5- Examining Data

When examining data, three main components of a study affects the effectiveness and outcomes of its findings.

3.5.1- Missing Data

A study of the missing data pattern helps to find and correct remedies. The following are common remedies procedures used in research:

- i- Use the observations with complete data only.
- ii- Delete case and/or variable of missing data.
- iii- Imputation methods: A procedure of estimating the missing values such as using the mean, or regression estimate is applied as a substitute to the missing data.

3.5.2- Identifying Outliers

Outlier is a term applied to observations that are of unique characteristics and are different from other observations. Outliers are detected on four levels: univariate, bivariate, multivariate and model fit.

- i- Univariate detection: examines the distribution of the individual variables independently. The case with a score of 2.5 standard deviations or more is investigated.
- ii- Bivariate detection: examining pairs of observations through the use of scatter plot. The case that falls outside the 90 percent range is investigated.
- iii- Multivariate detection: Mahalanobis D^2 is used to assess the position of each case on a multivariate level.

iv- In predictive models, outliers can be defined as those cases that do not fit well in the model. Their expected values may differ significantly from the actual values. Such cases are identified after the analysis is done. As a result, outliers are either deleted or retained based on their characteristics.

3.5.3- Assumptions of Multivariate Analysis

The analytical sophistication of multivariate techniques places complex assumptions on data to ensure the statistical requirements. In this area, logistic regression is robust when these assumptions are not met.

There are three basic assumptions:

- i- Normality: refers to the shape of the data distribution for metric variables (Iversen, & Gergen, 1993)
- ii- Homoscedasticity: the dependent variable exhibits equal levels of variance across independent variables.
- iii- Linearity: a basic assumption for all multivariate analysis is that the correlation between variables is linear. Applying transformation techniques can solve remedies for non-linear correlation (Devore & Peck, 1993).

Chapter 4

DATA ANALYSIS AND CONCLUSION

Introduction

This chapter discusses the results obtained in the study. It addresses the techniques of the research plan that include the procedures to assess the overall fit, reliability and validity of the model (portrayed in chapter 3). In addition, it highlights the assumptions underlying the techniques, such as drawing the characteristics of sample data, sample selection, variables selected in the model and testing the reliability and the validity. This chapter ends with a brief discussion to our investigation.

4.1- Sampling and Data source

The objective of the logistic regression analysis is to evaluate the predictive ability of the individual variables. Financial data for the year prior to market crash is used for this purpose. Appendix 2 presents the distribution of stocks and indicates that they are fairly evenly distributed with respect to the grouping variables. The total number of stocks is 100 of which 50 are considered as financially reliable while the

remaining as financially unreliable. The financial ratios (Appendix 3) for each company were entered into the SPSS as the independent variables. Each company was coded as 1 if it was considered as financially unreliable, adversely affected with the crash (2000-2002); and coded as 0, if it was considered as financially reliable, favorably affected with the crash.

4.2- Testing Reliability

We find, among our studied firms in Table 8, that the proportion of firms within each group is approximately the same. This table shows the predictive power of the model. In category 0 there is only one misclassified case leading to 98 percent accuracy for the FR (Financially Reliable) group. While in category 1, there are 3 misclassified cases leading to 94 percent accuracy for the FUR (Financially Unreliable) group. Overall accuracy of the model is 96 percent, which is a good result. In other words, a hit ratio of 96 percent explains the variation of the dependent variable, and predicts the firm financial reliability.

Table 8: Multiple Regression Accuracy

Classification Table for FURFR
The Cut Value is .50

		Predicted		Percent Correct
		0	1	
Observed	0	49	1	98.00%
	1	3	47	94.00%
Overall				96.00%

To create a reliable measure, we used the predicted values from the model estimated in Table 9. All remained variables (Current Ratio, Quick Ratio, Receivables Turnovers, Days Sales Outstanding Ratio, Expense Ratio, Return on Assets, Capital Asset Ratio, and Current Liability Coverage Ratio) that are included in the equation proved to be significant as can be seen in Table 9. This table reports the parameter estimates (B coefficient), the Wald Chi-Square values (greater than 3.841), and the significance for assessing the relative importance of variables in the model (less than 5 percent). These relatively identical parameter estimates indicate a good model fit (refer to the Testing Reliability section).

Table 9: Financial Reliability Prediction Model

Variable	B	S.E.	Wald	df	Sig
CR	-3.8897	1.5731	6.1139	1	.0134
QR	7.0354	2.7578	6.5079	1	.0107
ART	-.4857	.1905	6.5025	1	.0108
DSO	-.0780	.0334	5.4458	1	.0196
ER	-9.6143	4.5598	4.4457	1	.0350
ROA	-.3091	.1730	3.1903	1	.0741
CAR	1.2558	.6704	3.5094	1	.0610
CLC	-15.3474	6.8200	5.0641	1	.0244
Constant	21.3725	8.9315	5.7262	1	.0167

To assess the relative importance of these variables, we move to the Wald Chi-Square statistic which is greater than 3.841 with a significant lower than 5 percent. In particular, the Current Ratio, Quick Ratio, Account Receivable Turnover, Days Sales outstanding, Expense Ratio and the Current Liability Coverage Ratio are the most important variables screening these characteristics. On the other hand, the Return on Assets and the Capital Asset Ratio shows a relative importance but can be effective in combination with the other variables. The estimated model is as follows:

$$FR = 21.3725 - 3.8897(CR) + 7.0354 (QR) - 0.4857 (ART) - 0.0780 (DSO) - 9.6143 (ER) - 0.3091 (ROA) + 1.2558 (CAR) - 15.3474 (CLC).$$

As the model was constructed on predetermined framework that the guided variable selection, six out of eight have a

negative sign while only two have a positive sign. Negative signs indicate that the firm is more financially reliable or healthy. The CR (Current Ratio) and the QR (Quick Ratio) indicates that the lower the liquidity the greater the company moves from a financial reliable position to unreliable position. This is shown through the different sign between CR (negative sign) and QR (positive sign) in Table 9. Usually the Current Ratio is always greater than the Quick Ratio because the second does not include inventory and prepaid expenses. The negative signs of ART (Receivables Turnover) and DSO (Days Sales Outstanding) indicates that the companies facing difficulties in collecting receivables in relation to sales try to manipulate the financial reliability either by reducing the collection period or increasing the company's internal collection efficiencies. The ER (Expense Ratio) is negatively related to the probability of financial reliable. This suggests that failed companies' management had lower operating efficiency, and hence, lower management quality than that of surviving companies. The same ROA (Return on Assets) has a negative impact on the probability of reliability, meaning that failed finance companies or financially unreliable has lower profitability. On the contrary, the CAR (Capital Asset Ratio) is positively correlated with the probability due to the negative sign of the denominator (Capital Expenditure); this

implies that the healthy firms are expanding their capital expenditures from cash generated by operating activities rather than financing activities, leading to a lower servicing on external borrowing. Finally, the CLC (Current Liability Coverage Ratio) is negatively correlated indicating that failed companies had poorer solvency rate. Therefore, the company is unable to obtain a much borrowing as surviving companies to finance its investments. This may also imply that healthy firms were able to meet their near term obligations internally better than distressed ones.

The model, based on categorized data, is indicated to be valid according to standard measures of Hosmer and Lemeshow Test. Where H&L test chi-square = .1634 for df = 8 with $p = 1 > 0.5$.

Table 10: Hosmer and Lemeshow Goodness-of-Fit Test

Group	Observed	Expected	Observed	Expected	Total
1	10.000	10.000	.000	.000	10.000
2	10.000	10.000	.000	.000	10.000
3	10.000	9.997	.000	.003	10.000
4	10.000	9.865	.000	.135	10.000
5	8.000	8.022	2.000	1.978	10.000
6	2.000	2.098	8.000	7.902	10.000
7	.000	.017	10.000	9.983	10.000
8	.000	.000	10.000	10.000	10.000
9	.000	.000	6.000	6.000	6.000
10	.000	.000	14.000	14.000	14.000
		Chi-Square	df	Significance	
Goodness-of-fit test		.1634	8	1.000	

Generally, The R-Square value represents the proportion of explained variation that is explained by the independent variables. The more explain variation in the dependant variable, the higher the R-Square value. Table 11 shows the Log-Likelihood ratio, Cox and Shell R^2 and Nagelkerke R^2 that are applied to test the goodness of fit of our models.

Table 11: Test of Goodness of Fit

-2 Log Likelihood	138.62944
-2 Log Likelihood	18.559
Cox & Snell - R^2	.699
Nagelkerke - R^2	.932

The first Log-Likelihood value (-2LL) in Table 11 (equal to 138.62944) represents the total variations in the model before including the predictor variables. In testing the reliability, a well-fitted model will have a -2LL value that reaches zero. In our model, the Log-Likelihood decline from 138.62944 to a low of 18.559. This explains the model efficiency.

Furthermore, the level of the COX & SNELL R-Square (0.699) and NAGELKERKE R-Square (0.932) demonstrate good consistency between the independent variables and the dependent variable. The Cox & Snell R^2 is designed as an interpretation of multiple R-Square based on the likelihood. This R-Square value cannot reach 1 (Newsom 2004). It is computed as follows:

$$\text{Cox \& Snell } R^2 = 1 - \left[\frac{-2LL_{null}}{-2LL_k} \right]^{2/n}$$

Where the *null* likelihood is the logistic model with just the constant and the *k* likelihood contains all the predictors in that model. *n* is the sample size.

The Nagelkerke R^2 is a modification of the Cox & Snell measure, dividing the Cox & Snell coefficient by its maximum value, yielding a coefficient between 0 and 1. Consequently, the Nagelkerke R^2 is higher than the Cox and Snell R^2 to make 1 a possible value for R-Squared (Newsom 2004).

$$\text{Nagelkerke } R^2 = \frac{1 - \left[\frac{-2LL_{null}}{-2LL_k} \right]^{2/n}}{1 - (-2LL_{null})^{2/n}}$$

So, the Cox & Snell R^2 is an attempt to imitate the interpretation of multiple R-Square based on the likelihood, but its maximum can be (and usually is) less than 1.0, making it difficult to interpret using a 100 percent result. Thus, in our model, we are going to take the Nagelkerke R^2 measure that ranges between 0 and 1 to achieve a better indicator of 93.2 percent of efficiency suggesting that the selected financial ratios (Table 9) explains 93.2 percent of the firm financial reliability.

4.3- Internal Validity of the Model

The internal validity was tested by taking the selected variables (eight ratios) and applying them on a new sample (holdout), using the enter method in logistic regression. As already mentioned in the testing validity section, the validity is established if the logistic regression function performs at an acceptable level in classifying observations that were not used in the estimation process. Then, the hit ratio is computed to check the predictive accuracy of the logistic regression model by comparing it to the hit ratio of the analysis sample.

A new 100 independent listed company (Appendix 4), obtained from the NASDAQ market, is put in the model to check whether or not the selected financial ratios are capable to predict the output financial reliability.

The sample study correctly classifies 98 percent of the strong and 94 percent of the weak companies, while the holdout sample correctly classifies 94 percent of the strong and 96 percent of the weak companies (Table 12). The holdout Hit Ratio is almost identical to that of the sample study, having a 96 percent (Table 8) for the analysis while a 95 percent for the validity test (Table 12).

Table 12: Multiple Regression Internal Validity

Classification Table for FURFR
The Cut Value is .50

		Predicted		Percent Correct
		0	1	
Observed	0	47	3	94.00%
	1	2	48	96.00%
Overall				95.00%

Table 13: Financial Reliability Internal Validity

Variable	B	S.E.	Wald	df	Sig
CR	-.4477	.8064	.3081	1	.5788
QR	1.6086	.9397	2.9301	1	.0869
ART	-.0099	.0672	.0219	1	.8824
DSO	-.0097	.0232	.1760	1	.6748
ER	-.5722	2.1723	.0694	1	.7923
ROA	-.3143	.1067	8.6715	1	.0032
CAR	-.4242	.2823	2.2578	1	.1329
CLC	-2.3291	1.0186	5.2285	1	.0222
Constant	-1.0018	1.9142	.2739	1	.6007

However, the main financial indicators (Table 13) of the selected financial variables in the sample study (Table 9) have been derived to determine the robustness of the holdout model using a Nagelkerke R^2 accuracy of 91.6 percent (Table 14).

Table 14: Internal Validity Goodness of Fit

Cox & Snell - R^2	.687
Nagelkerke - R^2	.916

4.4- Limitations

There are some practical problems associated with the prediction model. The main limitations of this study are:

1. Quality of data

Secondary data used in the analysis were taken from Morningstar.com which cannot be tested. This problem is kept to a minimum, but can never be totally eliminated.

2. Lack of external validity

Only internal validation is considered in this analysis. External validation is disregarded due to the lack of data. Our study focused on the NASDAQ market is selecting the variables of the model using the internal validity in order to eliminate confounding variables. Besides, the limitation of data availability on other markets unable to test the results externally.

3. Study period

In our study, the company's financial ratios of year 2000 is selected as a cutoff period due to the inability to take a trend analysis using the average financial ratios over several years, prior and after the market crash. This drawback is because the majority of the companies did not go public at the same year.

4.5- Conclusion and Recommendation

4.5.1- Conclusion

In view of all the uncertainty and irrationality in the market, it would be appropriate to ask the question: “Would not investors be wise to sell their stocks and stock funds and wait until the outlook improves?” That could turn out to be the right strategy if things get awful enough, whereas for long-term investors, it does not make a lot of sense. First of all, it does not get any easier to time the markets i.e. to go and buy a stock at a low price then selling it at profit, after a crisis. Markets often bottom out amid horrible news on profits or when military conflicts are front-page news. Missing just a few days of sharp market rebounds when the market recovers can be vary damaging to investors’ returns and confidence.

Bear markets are painful, and the past few years have been the worst bear market in more than 25 years. Although the United States government has promised an economic recovery, indicators show the contrary. No one can foretell for sure how such tragedies will pan out, but we should continue to believe in the impact and usefulness of financial ratios and guidelines as predictors of firm’s healthiness. When predicting the future of financial markets, investor must keep in mind the importance of psychological factors and their effects on the market. Investors

are a primary part of financial markets and thus their behavior and attitudes have proven to significantly affect the volatility of financial markets.

Before discussing the statistical measures that should be taken, in order to ensure that all the fraud and misconduct that occurred during the past seven to eight years, there are two very essential steps that people should take on their own before asking regulators to take corrective measures. First, people should not stop believing that the market is going to roar back up, as if it were some sort of spirited bull penned up in the NASDAQ center waiting for the chance to rampage back to its high levels. Second, people should restore their fundamental values of honesty, equity, and charity; that have been lost. In modern life, investors have seen a dangerous drift away from these fundamental values toward a single-minded devotion to maximizing profit.

The primary objective of this study is to develop a financial reliable prediction model for public firms using the company financial ratios, via logistic regression analysis.

According to the standardized coefficients for the logistic regression, the unreliable financial companies differ significantly from financial reliable companies in the following respects: lower cash or liquidity, lower receivable turnovers, lower operating efficiencies, lower profitability, and less solvency and

borrowing quality. The developed model contains eight statistically financial variables: Current Ratio (CR), Quick Ratio (QR), Receivables Turnover (ART), Days Sales Outstanding (DSO), Expense Ratio (ER), Return on Assets (ROA), Capital Asset Ratio (CAR), and Current Liability Coverage Ratio (CLC). The model indicates that CR, ART, DSO, ER, ROA and CLC are negatively related to the firm's healthiness (FR), whereas QR and CAR are positively related. These variables cover the aspects solvency (CR, QR, ART, DSO, and CLC), leverage (ER, and CAR), and profitability (ROA). Thus, by comparing companies to the financial profile of this study of financial reliable firms, investors may profit by purchasing shares of firms that indicate high potential for these aspects.

The model demonstrated a fairly high prediction capability of 96 percent overall (Table 8), with an R-Square of 93.2 percent (Table 11). In general, the components of the predicted ratios could be readily identified by an investor. Indeed, the application of financial ratios supports several basic skills such as keeping records, thinking analytically, and setting goals. As investors begin to understand that meeting one or more of the ratio guidelines could help in avoiding unhealthy firms or the propensity for unreliability, the use of financial ratios and guidelines should be reinforced. As investors gain understanding

of the use of financial ratios, they will want to make comparisons of ratio values using information from past records and to set goals for the future. Financial ratio guidelines have been referred to by practitioners as "rules of thumb" which suggests that the guidelines should be easy to remember and apply. Our results support that recommendation.

4.5.2- Recommendations

This study was conducted with the objective of exploring what impact the firm financial ratios have on the company stock. In fact, any important move must be caused by an underlying fundamental factor. Investors should search for the right investment by studying all the company fundamental aspects. Thus, the fundamental investment process that a trader may face is not losing money, but achieving desired financial goals and objectives. In order to achieve such results, it is necessary that several recommendations be expressed.

To begin with, it is necessary for investors to have a clear understanding of their investment goals, time horizon, and risk tolerance level in order to create a meaningful investment policy. They must consider all issues surrounding them, both locally and globally. Investors must adopt as broad a frame as possible when making investment decisions.

Subsequently, investors must be able to remain relaxed and objective during their investment process, they must avoid the emotions of hope, greed and fear. Hope is often associated with unrealistic expectations and causes an investor to stick to a losing stock magnifying unnecessary losses. Greed causes investors to buy at the wrong time and to risk excessive amounts of money. Whereas fear prevents an investor from buying at a time when the market presents the best opportunities to buy and prompts him or her to sell at the worst possible time.

Further, when investors are subject to all possible means of sources, from analysts to the media, they should assess whether the advice or information is appropriate for their individual investment objectives, financial situation and particular needs before making any investment decisions on the basis of such general advice. Investing entails some degree of risk. Therefore, investors should be aware of the risks involved before engaging in any investment. Using a disciplined risk management approach can be helpful. They must also consider the fact that past performance is not necessarily indicative of future results and that the future holds uncertain expectations and predictions.

Without an adequate structural model that explains the company financial position, this endogenous problem is impossible to resolve. Therefore, it would have been interesting

in our study to include the effect of the financial ratios on the company financial reliability, which in return will be considered when valuing a certain stock.

As far as possibilities for future research are concerned, more theoretical and empirical research is needed in order to explain the actually observed corporate financial reliability. It appears important to incorporate a firm's financial ratios with the effects of organizational decision-making corporate risk management i.e. the risk that managers undertake in their decisions analysis and budgets. Proving that it would be of great interest to analyze the profitability of a company financial reliability with its forecast-based risk management strategies in order to find out whether the firms' managers are indeed able to "beat the markets" or whether the adoption of such strategies is largely due to illusion of control.

Although, future research could involve ratios, socio-economic factors, behavioral finance and interaction variables that do significantly alter the result, in order to have a broad combination of factors that have significant impact on the company stock in determining its financial reliability. It would also be of interest to perform a cut off point in order to correctly classify reliable finance company from unreliable one i.e. a high percentage of correct classification of both reliable and

unreliable companies, and a relatively low expected cost of misclassification.

Another regards concerning future research, it would be interesting to investigate the American stock market efficiency by including stocks from all the lists on Wilshire 5000 and choosing a longer time period of study than ours. Yet another idea is to study if, and how, drastic occurrences affect stock market efficiency.

Appendix 1

UBS/Gallup Poll Index of Investor Optimism

	OVERALL INDEX
03 May	42
03 April	66
03 March	5
03 February	9
03 January	38
02 December	52
02 November	41
02 October	29
02 September	60
02 August	52
02 July	46
02 June	72
02 May	90
02 April	89
02 March	121
02 February	92
02 January	115
01 December	88
01 November	84
01 October	86
01 September	50
01 August	76
01 July	74
01 June	85
01 May	90
01 April	81
01 March	82
01 February	77
01 January	96
00 December	106
00 November	130
00 October	132
00 September	147
00 August	160
00 July	143
00 June	149
00 May	155
00 April	140
00 March	150
00 February	168

00 January	178
99 December	174
99 November	148
99 October	139
99 September	160
99 August	149
99 July	166
99 June	146
99 May	163
99 April	168
99 March	151
99 February	167
98 December	141
98 September	147
98 June	160
98 March	161
97 December	151
97 September	151
97 June	152
97 February	128
96 November	125
96 October	124

Source:

http://www.ubs.com/1/ShowMedia/about/research/indexofinvestoroptimism/pressroom/5/uspressroom/archive?contentId=27363&name=index0503_us.pdf

Descriptive statistics of the data

Name	Description	Sector	Industry	Type	\$ @ Year 2000	\$ @ Year 2002	Return
^IXIC	NASDAQ Composite				4131.15	1,979.25	-52%
AFFX	Affymetrix Inc	Healthcare	Biotechnology & Drugs	FUR*	81.5	37.63	-54%
INCY	Incyte Corporation	Healthcare	Biotechnology & Drugs	FUR	44.83	19.47	-57%
APLX	Applix Inc	Technology	Software & Programming	FUR	17.38	1.37	-92%
IBIS	IBIS Technology Corp	Technology	Semiconductors	FUR	48.38	15.13	-69%
MRVC	MRV Communications Inc	Technology	Electronic Instruments	FUR	30.43	4.81	-84%
COMS	3Com Corp	Technology	Computer Networks	FUR	48.81	6.49	-87%
ACTU	Actuate Corp	Technology	Software & Programming	FUR	21.63	5.35	-75%
ADPT	Adaptec Inc	Technology	Semiconductors	FUR	57.19	15.31	-73%
ADCT	ADC Telecommunications Inc	Technology	Communications Equipment	FUR	57.19	5.06	-91%
AETH	Aether Systems Inc	Technology	Software & Programming	FUR	86.75	10.56	-88%
AMEN	AMEN Properties Inc	Technology	Computer Services	FUR	21.5	2.72	-87%
AMIC	American Independence Corp	Financial	Insurance (Miscellaneous)	FUR	75.75	5.22	-93%
ANAD	Anadigics Inc	Technology	Semiconductors	FUR	72	12.83	-82%
ANLT	Analytical Surveys Inc	Services	Business Services	FUR	116.25	4.8	-96%
AAPL	Apple Computer Inc	Technology	Computer Hardware	FUR	111.94	23.58	-79%
MSFT	Microsoft Corp	Technology	Software & Programming	FR**	58.28	34.62	-41%
CERN	Cerner Corp	Technology	Computer Networks	FR	20.44	49.8	144%
BBBY	Bed Bath & Beyond Inc	Services	Retail (Specialty)	FR	33	33.68	2%
KRON	Kronos Inc	Technology	Software & Programming	FR	56.63	50.12	-11%
EXPD	Expeditors International	Transportation	Misc. Transportation	FR	43.19	57.15	32%
ACMR	A.C. Moore Arts & Crafts Inc	Services	Retail (Specialty)	FR	5.5	30.01	446%
ALEX	Alexander & Baldwin Inc	Transportation	Water Transportation	FR	21.38	27.05	27%
AMHC	American Healthways Inc	Healthcare	Healthcare Facilities	FR	4.75	29.87	529%
ADSK	AutoDesk Inc	Technology	Software & Programming	FR	33.38	38.6	16%
CHRW	C.H. Robinson Worldwide Inc	Transportation	Misc. Transportation	FR	19.56	28.77	47%
AMWD	American Woodmark Corp	Capital Goods	Constr. - Supplies & Fixtures	FR	23.5	54.1	130%
AMGN	Amgen Inc	Healthcare	Biotechnology & Drugs	FR	23.5	54.34	131%
ANSS	Ansys Inc	Technology	Software & Programming	FR	11.06	25.06	127%
ADSX	Applied Digital Solutions Inc	Technology	Communications Equipment	FUR	82.19	4.45	-95%

ASCL	Ascential Software Corp	Technology Services	Software & Programming	FUR	17.36	57.25	17.36	-70%
ASKJ	Ask Jeeves Inc	Services	Business Services	FUR	3.24	138	3.24	-98%
ASPT	Aspect Communications Corp	Technology	Software & Programming	FUR	4.2	60.75	4.2	-93%
ASYT	Asyst Technologies Inc	Technology	Semiconductors	FUR	13.94	68.69	13.94	-80%
BEAS	BEA Systems Inc	Technology Services	Software & Programming	FUR	15.5	72.63	15.5	-79%
NXTL	Nextel Communications Inc	Services	Communications Services	FUR	11.67	103.5	11.67	-89%
BRCM	Broadcom Corp	Technology	Semiconductors	FUR	47.7	285.5	47.7	-83%
BVSN	Broadvision Inc	Technology	Software & Programming	FUR	23.58	111.94	23.58	-79%
CACS	Carrier Access Corp	Technology	Communications Equipment	FUR	6.13	63.5	6.13	-90%
CLSTE	CELLSTAR CORP	Technology	Communications Equipment	FUR	17	191.25	17	-91%
CKFR	CheckFree Corp	Technology	Computer Services	FUR	18.98	104.94	18.98	-82%
CELL	Brightpoint Inc	Technology	Communications Equipment	FUR	6.19	43.65	6.19	-86%
APOL	Apollo Group Inc	Services	Schools	FR	44.25	20.06	44.25	121%
ARDNA	Arden Group Inc	Services	Retail (Grocery)	FR	59	36	59	64%
ABFS	Arkansas Best Corp	Transportation	Trucking	FR	29.75	12.56	29.75	137%
ARRO	Arrow International Inc	Healthcare	Medical Equipment & Supplies	FR	40.17	29.47	40.17	36%
BMET	Biomet Inc	Healthcare	Medical Equipment & Supplies	FR	38.38	17.06	38.38	125%
BOBE	Bob Evans Farms Inc	Services	Restaurants	FR	25.33	15	25.33	69%
CDIS	Cal Dive International Inc	Energy	Oil Well Services & Equipment	FR	23.71	16.63	23.71	43%
CDWC	CDW Corp	Services	Retail (Catalog & Mail Order)	FR	55.1	34.52	55.1	60%
CAKE	Cheesecake Factory Inc	Services	Restaurants	FR	23.21	9.96	23.21	133%
PLCE	Children's Place Retail Stores Inc	Services	Retail (Apparel)	FR	28.14	18	28.14	56%
CTAS	Cintas Corp	Services	Personal Services	FR	49.3	34.83	49.3	42%
MLNM	Millennium Pharmaceuticals Inc	Healthcare	Biotechnology & Drugs	FUR	23.74	139.94	23.74	-83%
CMGI	CMGI Inc	Financial	Misc. Financial Services	FUR	1.61	163.22	1.61	-99%
CNET	CNET Networks Inc	Technology	Computer Services	FUR	9.35	61.44	9.35	-85%
CMVT	Comverse Technology Inc	Technology	Communications Equipment	FUR	23.15	153.94	23.15	-85%
CNXT	Conexant Systems Inc	Technology	Semiconductors	FUR	15.96	65.06	15.96	-75%
CMTN	Copper Mountain Networks Inc	Technology	Communications Equipment	FUR	19.3	535	19.3	-96%
CMOS	Credence Systems Corp	Technology	Semiconductors	FUR	19.35	80.5	19.35	-76%
CREE	Cree Inc	Technology	Semiconductors	FUR	29.95	87.25	29.95	-66%
CPH	Critical Path Inc	Services	Business Services	FUR	11.68	347.5	11.68	-97%
COLM	Columbia Sportswear Co	Consumer Cyclical	Apparel/Accessories	FR	44.25	20.06	44.25	121%
LNCR	Lincare Holdings Inc	Healthcare	Healthcare Facilities	FR	29.42	17.06	29.42	72%
CPRT	Copart Inc	Services	Retail (Specialty)	FR	24.41	13	24.41	88%
COST	Costco Wholesale Corp	Services	Retail (Specialty)	FR	44.84	44.5	44.84	1%
CUNO	Cuno Inc	Capital Goods	Misc. Capital Goods	FR	32.41	20.5	32.41	58%
DSCP	Datascope Corp	Healthcare	Medical Equipment & Supplies	FR	35.22	40.25	35.22	-12%

EDMC	Education Management Corp	Services	Schools	FR	14.25	36.25	14.7%
JDSU	JDS Uniphase Corp	Technology	Communications Equipment	FUR	188	9.52	154%
LVL	Level 3 Communications, Inc	Services	Communications Services	FUR	85.13	5.85	-95%
DTPI	DiamondCluster International Inc	Services	Business Services	FUR	85.5	14.46	-93%
DCLK	DoubleClick Inc	Services	Advertising	FUR	270.44	12.58	-83%
MSGI	Media Services Group Inc	Services	Business Services	FUR	925.05	25.25	-95%
HLIT	Harmonic Inc	Technology	Communications Equipment	FUR	102	12.56	-97%
INSP	InfoSpace Inc	Technology	Computer Services	FUR	531.88	22.5	-88%
ICGE	Internet Capital Group Inc	Financial	Misc. Financial Services	FUR	4000	26.4	-96%
EASI	Engineered Support Systems Inc	Capital Goods	Misc. Capital Goods	FR	12.13	33.85	-99%
BBOX	Black Box Corp	Technology	Computer Networks	FR	66.09	54.95	179%
FAST	Fastenal Co	Basic Materials	Misc. Fabricated Products	FR	42.44	65.94	-17%
GLYT	Genlyte Group Inc	Technology	Electronic Instruments	FR	20.13	31.18	55%
HSIC	Henry Schein Inc	Healthcare	Medical Equipment & Supplies	FR	12.63	37.62	198%
JBHT	JB Hunt Transport Services Inc	Transportation	Trucking	FR	13.44	24.53	83%
LABL	Multi Color Corp	Services	Printing Services	FR	5.75	19	230%
LANC	Lancaster Colony Corp	Consumer NonCyclical	Food Processing	FR	32.88	36.25	10%
MATW	Matthews International Corp	Basic Materials	Misc. Fabricated Products	FR	27.5	48	75%
MXIM	Maxim Integrated Products Inc	Technology	Semiconductors	FR	49.06	59.14	21%
CPWR	Compuware Corp	Technology	Software & Programming	FUR	37.06	11.53	-69%
MNST	Monster Worldwide Inc	Services	Advertising	FUR	138.94	44.29	-68%
INLD	Interland Inc	Services	Communications Services	FUR	111.88	22.7	-80%
ALCO	Alico Inc	Consumer NonCyclical	Crops	FR	16.38	32.17	96%
ANSI	Advanced Neuromodul Systems	Healthcare	Medical Equipment & Supplies	FR	10	33	230%
BIIB	Biogen Idec	Healthcare	Biotechnology & Drugs	FR	31.08	63.94	106%
NATI	National Instruments Corp (Texas)	Technology	Computer Peripherals	FR	25.33	38.67	53%
OFIX	Orthofix International NV	Healthcare	Medical Equipment & Supplies	FR	12.75	36.39	185%
NVLS	Novellus Systems Inc	Technology	Semiconductors	FR	41.1	45.99	12%
ORLY	O'Reilly Automotive Inc	Services	Retail (Specialty)	FR	21.5	35.13	63%

* Financial UnReliable, Coded as 1, Unhealthy Stocks.

** Financial Reliable, Coded as 0, Healthy Stocks.

Appendix 3

Code	Ratio	Definition
Part I : Liquidity & Activity		
CR	Current Ratio	Current Assets / Current Liabilities
QR	Quick Ratio	(Cash + Marketable Securities + Accounts Receivable) / Current Liabilities
WC	Working Capital Ratio	Current Assets – Current Liabilities
WCS	Working Capital per Dollar of Sales Ratio	Working Capital / Revenues
WCTA	Working Capital to Total Assets Ratio	Working Capital / Total Assets
ART	Receivables Turnover	Sales / Accounts Receivable
ITR	Inventory Turnover	Cost of Sales / Inventory
FAT	Fixed Asset Turnover	Sales / Fixed Assets
AU	Asset Utilization Ratio	Sales / Total Assets
DSO	Days Sales Outstanding Ratio	(Accounts Receivable / Total Credit Sales) x Number of Days
PPR	Payable Period Ratio	(Accounts Payable / Annual Purchases on Account) x Number of Days
Part II : Leverage		
FLR	Financial Leverage Ratio	$r_e = (d/e)(r_a - r_d) + r_a$
DTE	Debt to Equity Ratio	(Total Debt / Total Equity)
EQTA	Equity to Asset Ratio	(Total Equity / Total Assets)
DTA	Debt to Asset Ratio	(Total Debt / Total Assets)
DTFA	Debt to Fixed Asset Ratio	(Total Debt / Total Fixed Assets)
LDTA	Long Term-Debt to Total Assets Ratio	(Total Long Term Debt / Total Assets)
EM	Equity Multiplier Ratio	(Total Asset / Total Equity)
ER	Expense Ratio	(Total Operating Expenses / Total Assets)
Part III : Profitability		
NPM	Net Profit Ratio	Net Income / Sales
ROA	Return on Assets	Net Income / Total Assets
ROE	Return on Equity	Net Income / Equity
EPS	Earning per Share	Net Income / Share

Part IV : Cash Flow

FCFS	Free Cash Flow to Sales Ratio	Free Cash Flow / Net Sales
FCFNI	Free Cash Flow to Net Income Ratio	Free Cash Flow / Net Income
CCC	Cash Conversion Cycle Ratio	DSO + DIO - DPO
OCM	Operating Cash Margin Ratio	Cash Flow from Operation / Net Sales
EQR	Earnings Quality Ratio	Cash Flow from Operation / Net Income
AER	Asset Efficiency Ratio	Cash Flow from Operation / Total Assets
CAR	Capital Asset Ratio	Cash Flow from Operation / Capital Expenditures
CLC	Current Liability Coverage Ratio	Cash Flow from Operation / Current Liabilities

Descriptive statistics of the Internal Testing

Name	Description	Sector	Industry	Type	\$ @ Year 2000	\$ @ Year 2002	Return
^IXIC	NASDAQ Composite				4131.15	1,979.25	-52%
ABGX	Abgenix, Inc.	Healthcare	Biotechnology & Drugs	FUR*	124.5	31.68	-75%
AEIS	Advanced Energy Industries Inc	Technology	Electronic Instruments	FUR	59.5	26.9	-55%
ALKS	Alkermes Inc	Healthcare	Biotechnology & Drugs	FUR	57	25.25	-56%
ALTR	Altera Corp	Technology	Semiconductors	FUR	52.44	22.57	-57%
AMAT	Applied Materials Inc	Technology	Semiconductors	FUR	126.5	45.5	-64%
EPAY	Bottomline Technologies (DE) Inc	Technology	Computer Services	FUR	36	9.5	-74%
BRCD	Brocade Communications Systems Inc	Technology	Computer Storage Devices	FUR	174.87	39.01	-78%
CALP	Caliper Life Sciences Inc	Technology	Scientific & Technical Instr.	FUR	68.5	16.56	-76%
CIEN	Ciena Corp	Technology	Communications Equipment	FUR	58.37	15.68	-73%
EPNY	E.piphany Inc	Technology	Software & Programming	FUR	235	8.43	-96%
ACDO	Accredo Health Inc	Healthcare	Healthcare Facilities	FR**	30.75	47.26	54%
APPB	Applebee's International Inc	Services	Restaurants	FR	27.69	33.5	21%
AVTR	Avatar Holdings Inc	Services	Real Estate Operations	FR	16.63	23.6	42%
CEPH	Cephalon Inc	Healthcare	Biotechnology & Drugs	FR	35.75	73.21	105%
CHIR	Chiron Corp	Healthcare	Biotechnology & Drugs	FR	45	43.99	-2%
ERTS	Electronic Arts Inc	Technology	Software & Programming	FR	101.06	60.98	-40%
ESRX	Express Scripts Inc	Services	Retail (Drugs)	FR	64	46	-28%
GNTX	Gentex Corp	Consumer Cyclical	Auto & Truck Parts	FR	26.40	27.20	3%
INTU	Intuit Inc	Technology	Software & Programming	FR	60.25	41.01	-32%
LSTR	Landstar System Inc	Transportation	Trucking	FR	39.93	75.55	89%
LPTH	Lightpath Technologies Inc	Technology	Semiconductors	FUR	170.83	33.17	-81%
PCCC	PC Connection, Inc	Services	Retail (Catalog & Mail Order)	FUR	35	14.2	-59%
PCYC	Pharmacyclics Inc	Healthcare	Biotechnology & Drugs	FUR	43.06	9.6	-78%
PCLF	Pinnacle Systems Inc	Technology	Computer Hardware	FUR	42.47	8.75	-79%
PRSF	Portal Software Inc	Technology	Software & Programming	FUR	245.47	10.35	-96%
POCI	Precision Optics Corp Inc	Technology	Scientific & Technical Instr.	FUR	100	4.69	-95%
PCTI	PC-Tel Inc	Technology	Communications Equipment	FUR	59.5	10.11	-83%
PLUG	Plug Power Inc	Technology	Electronic Instruments & Cont.	FUR	75	9.07	-88%

ORCL	Oracle Corp	Technology	FR	25.53	17.72	-57%
PRXL	PAREXEL International Corp.	Healthcare	FR	11.63	15.29	-48%
PDCO	Patterson Companies Inc	Healthcare	FR	42.25	14.3	23%
PAYX	Paychex Inc	Services	FR	40	39.6	-6%
PRGO	Perrigo Co	Healthcare	FR	8.13	35.21	-12%
PZZA	Papa Johns International Inc	Services	FR	26.75	12.54	54%
PENN	Penn National Gaming Inc	Services	FR	9.5	28.16	5%
PFGC	Performance Food Group Co	Consumer NonCyclical	FR	25.25	29.8	214%
PPDI	Pharmaceutical Product Dev.	Healthcare	FR	12.31	34.72	38%
PIXR	Pixar	Services	FR	34.88	31.25	154%
PCLN	Priceline.Com Inc	Technology	FUR	320.31	35.34	1%
PRTL	Primus Telecommunications Group	Services	FUR	37	37	-88%
PGNX	Progenics Pharmaceuticals Inc	Healthcare	FUR	38.75	0.64	-98%
PILL	Proxymed Inc	Technology	FUR	62.75	28.16	-56%
PDLI	Protein Design Labs Inc	Healthcare	FUR	147.2	21.45	-85%
POSO	Prosoft Training	Services	FUR	69.25	30.29	-58%
QGEN	QIAGEN NV	Technology	FUR	59.38	7.5	-87%
XING	Qiao Xing Universal Telephone Inc	Services	FUR	82	19.96	-76%
QLGC	QLogic Corp	Technology	FUR	34.38	5.17	-85%
QCOM	Qualcomm Inc	Technology	FUR	185.5	52.27	-72%
PLMD	Polymedica Corp	Healthcare	FUR	179.31	51.98	-71%
QSII	Quality Systems Inc	Technology	FR	21.25	18.8	-12%
RAVN	Raven Industries Inc	Technology	FR	7.5	16.1	115%
RCRC	RC2 Corp	Consumer Cyclical	FR	14.75	22.5	53%
RLRN	Renaissance Learning Inc	Technology	FR	4.75	12.74	168%
RBIN	R & B Inc	Consumer Cyclical	FR	11.68	30.43	161%
RARE	Rare Hospitality International Inc	Services	FR	5.38	6.9	28%
REXI	Resource America Inc	Services	FR	19.69	23.61	20%
RESP	Respironics Inc	Healthcare	FR	7.38	9.29	26%
ROST	Ross Stores Inc	Services	FR	8.38	35.31	321%
QSFT	Quest Software Inc	Technology	FR	17.38	32.28	86%
QUOT	Quotemith.com Inc	Financial	FUR	102.38	22.7	-78%
RADS	Radiant Systems Inc	Technology	FUR	91.13	19.17	-79%
RSYS	Radisy Corp	Technology	FUR	42	13.45	-68%
RDWR	Radware Ltd	Technology	FUR	53	20.11	-62%
RMBS	Rambus Inc	Technology	FUR	55.31	12.67	-77%
RNWK	RealNetworks Inc	Technology	FUR	69	8.88	-87%
			FUR	115.75	6.35	-95%

RFMD	RF Micro Devices Inc	Technology	FUR	78.13	22.78	-04%
RYAN	Ryan's Restaurant Group Inc	Services	FR	8.5	21.65	-71%
SEIC	SEI Investments Co	Services	FR	19.95	44.65	155%
SHPGY	Shire Pharmaceuticals Group PLC	Healthcare	FR	30	35.51	124%
SHFL	Shuffle Master Inc	Services	FR	9.25	15.68	18%
SMTC	Semtech Corp	Technology	FR	51.88	40.15	70%
SCSC	Scansource Inc	Technology	FR	41.63	49.73	-23%
SCHN	Schnitzer Steel Industries Inc	Basic Materials	FR	18.88	14	19%
SCHL	Scholastic Corp	Services	FR	30.78	49.89	-26%
SCHS	School Specialty, Inc	Consumer Cyclical	FR	14.38	22.15	62%
POOL	SCP Pool Corp	Consumer Cyclical	FR	26.31	26.7	54%
RCC	Rural Cellular Corp	Services	FUR	91.13	22.7	1%
SONE	Security First Technologies Corp	Technology	FUR	81.25	18	-75%
SBTV	SBS Broadcasting SA	Services	FUR	50	17	-78%
SCMM	SCM Microsystems Inc	Technology	FUR	61.13	15.63	-66%
RNAI	Sirna Therapeutics Inc	Healthcare	FUR	70.31	4.97	-74%
STMP	Stamps.com Inc	Services	FUR	82.25	7.62	-93%
TERN	Terayon Communication Systems	Technology	FUR	61.5	9.15	-91%
TIBX	TIBCO Software Inc	Technology	FUR	147.88	15.83	-85%
TMWD	Tumbleweed Communications Corp	Technology	FUR	80.5	5.5	-89%
TUTS	Tut Systems Inc	Technology	FUR	54.06	2.31	-93%
SIAL	Sigma-Aldrich Corp	Basic Materials	FR	29.69	40.86	-96%
SKYW	Skywest Inc	Transportation	FR	28.66	25.44	38%
SRCL	Stericycle Inc	Services	FR	17.88	58.92	-11%
SWFT	Swift Transportation Co Inc	Transportation	FR	17.5	22.59	230%
TSCO	Tractor Supply Co	Services	FR	16.25	35.6	29%
SONC	Sonic Corp	Services	FR	28.13	35.15	119%
STLY	Stanley Furniture Co	Consumer Cyclical	FR	17.75	24.22	25%
SBUX	Starbucks Corp	Services	FR	24.66	20.42	36%
STRT	Strattec Security Corp	Consumer Cyclical	FR	33.63	36.2	-17%
STRA	Strayer Education Inc	Services	FR	21.19	47.46	8%
						124%

* Financial UnReliable, Coded as 1, Unhealthy Stocks.

** Financial Reliable, Coded as 0, Healthy Stocks.

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