AMERICAN UNIVERSITY OF BEIRUT

INVESTOR SENTIMENT DURING THE FINANCIAL CRISIS OF 2008: THE CASE OF MUTUAL FUNDS

by
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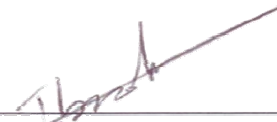
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AN ABSTRACT OF THE PROJECT OF

Manale Labib Mouhayar   for Master of Business Administration
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Title: Investor Sentiment During the Financial Crisis of 2008: The Case of Mutual Funds

Investor Sentiment is an important part of Behavioral Finance, it shows how the investors react to the market. The Financial Crisis that started in 2008 has been the main concern of financial analysts, regulators and economists. In this paper, we are examining the correlation between selected investor sentiment indicators and mutual funds performance, during and after the Financial Crisis in 2008, and whether this relationship is affected by the geographical focus of the fund.

Different studies have brought up the correlation between Investor Sentiment and Mutual Funds. Most papers revealed a positive correlation while others proved the lack of a significant relationship.

Based on an event study methodology, the findings showed that there is a positive correlation between Investor Sentiment and excess returns of Mutual Funds. This relation was also affected by the geographical base of the mutual fund, whether it is focused in the US or not.

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CHAPTER I

INTRODUCTION

Behavioral Finance, an alternative theory to the Efficient Market Hypothesis, challenges the traditional finance theories which assume that investors rationally act in the market. The theory takes into account human behavior and the psychological aspect in financial decision making.

Investors are thus subject to sentiment, but what is sentiment? It is one of the basic principles of behavioral finance; it is defined as the investors' underreaction or overreaction to news about an asset price. Many years ago, researchers were studying whether investor sentiment affects stock prices, but now they are examining how to measure investor sentiment.

In this paper, we are examining the correlation between selected investor sentiment indicators and mutual funds performance, during and after the Financial Crisis in 2008, and whether this relationship is affected by the geographical focus of the fund.

Financial Markets can be bullish, associated with increasing investor confidence and expected increase in prices, or bearish with a decline in the stock market. In addition, there's the trend of measuring uncertainty in the stock market as well, using VIX Index, the Chicago Board Options Exchange Market Volatility Index. It is also known as the fear index, and it is a measure of the implied volatility of S&P 500 index options.

In 2008, this fear index reached a high level, and it was accompanied by the collapse of the financial markets known as the Subprime Mortgage Crisis.

In addition, Behavioral Finance helps in explaining some of the causes of the several crises that happened in the past years. In our study, we are interested in the subprime mortgage crisis of 2008. For this reason, the research is limited to the years 2008, 2009, and 2010.

The remainder of the paper is organized as follows: chapter 2 consists of the literature review and hypothesis. Chapter 3 provides an overview of the data and the methodology used. The empirical results are presented in chapter 4. Chapter 5 concludes the paper by highlighting the major findings.

CHAPTER II

LITERATURE REVIEW AND HYPOTHESIS

A. Efficient Market Hypothesis vs Behavioral Finance

For more than four decades, the financial markets were governed by the Efficient Market Hypothesis, introduced by the economist Eugene Fama in 1970. The theory holds that investors respond rationally to publicly available information, and no investor has the advantage of predicting the return on a stock because all investors have equal access to the information available in the market.

Fama (1970) describes capital markets as follow: "the ideal is a market in which prices provide accurate signals for resource allocation: that is, a market in which firms can make production-investment decisions, and investors can choose among the securities that represent ownership of firms' activities under the assumption that security prices at any time "fully reflect" all available information. A market in which prices always "fully reflect" available information is called 'efficient'".

When markets are efficient, no one can beat them; individual or institutional investors who buy a security they consider it is worth more than the price they are paying for, and similarly, when they sell a security they consider is worth less than the sale price, they will certainly be dissatisfied.

Under the EMH, the investors are assumed to be rational, and they determine stock prices by discounting expected future cash flows. The price of a security includes the information available in the market. If there is good news about this security, its price will increase, and if there is any bad news the price will decrease accordingly. In addition, competition between investors who are seeking abnormal profits take prices back to their ''correct'' value.

The efficient market hypothesis was greatly supported theoretically and empirically. Shleifer (2001) stated "Indeed, the field of academic finance in general, and security analysis in particular, was created on the basis of the EMH and its applications".

EMH was widely accepted until the 1980s, when many anomalies in financial markets were revealed and they could not be explained by the efficient market hypothesis.

Behavioral finance was introduced as an alternative to the EMH theory, taking in consideration the psychological factor in financial decision making, and thus challenging the traditional financial models which assume that the investors will always act rationally in the market.

The behavioral finance theory presents many ways in which investors do not rationally act. Human behavior is the reason for market deviation from the EMH. Singh R. (2009) states that behavioral finance combines psychology and economics to explain why people make irrational decisions when they spend, save, invest, and borrow money. This theory studies how biased and confused people interact in the market with rational arbitrageurs, and how these two groups will affect prices.

The development of behavioral finance theory has been enhanced by the inability of the traditional framework to explain many empirical patterns like the stock market bubbles in Taiwan, Japan and the US (Ritter, 2003). The theory helps in explaining some of the causes of the several crises that happened in the past years.

One of the most most important theoretical concepts in behavioral finance is Investor sentiment; where investors rely on their beliefs about the expected cash flows from trading in the market. Sentiment is defined as the market players' optimism or pessimism reflected in any asset or market price.

B. Influence of Investor Sentiment on Financial Markets

Investor sentiment is one of the most important theoretical concepts in behavioral finance, where investors rely on their beliefs about the expected cash flows from trading in the market. Sentiment is defined as the market players' optimism or pessimism reflected in any asset or market price.

Few decades ago, the question was whether investor sentiment affects the stock prices, but nowadays it has changed to be how to measure investor sentiment and quantify its results and effects (Baker and Wurgler, 2007).

In addition to the direct sentiment indicators, many researches were developed around indirect sentiment indicators, which are determined by variables that specify investor sentiment. The indirect sentiment indicators discussed in the paper written by Beaumont at al. (2008) are the closed-end fund discount, the odd-lot balance and mutual fund flows.

1. Investor Sentiment and Market Players

There are two types of investors in the market: rational investors and noise traders. Rational investors have rational expectations about asset returns, whereas the expectations of the noise traders are subject to the influence of sentiment, either by overestimating the expected returns or by underestimating them (Delong at al., 1990).

The uninformed traders or irrational investors act according to their emotions and other psychological reasons. They have emotional reactions that affect the market, sometimes they act on feelings of fear or pessimism, and at other times on hope and overconfidence. When they are in a bull market, where stock prices are rising, they feel confident that prices will keep on increasing and hence they invest more, and this increase in demand for stocks drives stock prices to rise. This is the optimistic reaction that creates market peaks. On the other hand, when investors are pessimistic,

they tend to sell stocks. Other investors become more fearful and also start selling their stocks; this leads to a decrease in stock prices. The market reaches a bottom as more investors are leaving the market.

The rational investors are sentiment – free, they act in the opposite way; they sell when the market is at its peak, and when the others are optimistic and buying, and they buy when the market is at bottom, and the others are selling.

Irrational investors, also known as noise traders, and rational investors trade in the market based on their beliefs. Equilibrium price includes the opinion of rational investors and noise traders, as each group trade in the market based on its beliefs. In the market, assets are risky and usually investors are risky.

De Long et al. (1990) describe the behavior of "rational arbitrageurs who are sentiment-free and irrational traders prone to exogenous sentiment". These market players compete in the market and thus set prices and expected returns. Rational arbitrageurs have limitations regarding costs and risks of trading and short selling. Consequently, prices are not always at their fundamental values. Mispricing is caused by a change in sentiment by the irrational traders and limit to arbitrage from rational investors.

The standard finance model suggests that rational investors force capital market prices to equal the rational present value of expected future cash flows (Baker and Wurgler, 2007). De Long et al. (1990) assume that investors are influenced by sentiment, where the expected future cash flows are not explained by the finance models.

Black (1986) highlighted the importance of the role of noise in financial markets. He contrasted noise with information; information being the relevant news about market risk and return, while noise being irrelevant news. He states that "people sometimes trade on noise as if it were information".

Noise traders usually lose money by trading, while the information traders make money. Noise trading is crucial for having liquid markets; more noise trading means we have more trades, and hence having liquid markets. When we have noise trading, the noise is reflected in the prices; in the sense of having stock prices reflecting the opinion of noise traders and rational traders. Black (1986) believes that the investors having no access to inside information, act irrationally on noise as if it were information and this would give them a certain advantage.

Delong, Shleifer, Summers, and Waldmann (1990) (DSSW) develop a model of asset pricing in which rational investors interact with noise traders in the market. Noise trading as discussed in many papers has an impact or influence on equilibrium prices in the market.

DSSW study the effect of noise trading on equilibrium prices; their model is assuming that noise traders' sentiment cannot be predicted by rational investor, especially when the latter wants to sell any security he holds.

They discuss the four effects of noise trading on financial markets. The first effect is the "hold more" effect; noise traders can have higher expected returns when they are bullish about a certain stock, hence they invest in this risky stock and hold more of it. Their changing sentiment is in fact a risk, for which they get rewarded by getting higher returns.

The second effect is "price pressure effect is when noise traders are bullish, they invest more in the asset. So when the demand for the asset increases, its price will hence increase. Consequently, a higher price means lower expected returns. Moreover, there is the "Friedman" effect: It's also called the buy high-sell low effect. It occurs when noise traders have the worst possible market timing, because of their variable beliefs. The buy the risky asset when other noise traders are buying it; they tend to buy high and sell low, which affect their returns, and most likely they are going to suffer a capital loss.

The last effect if the "create space effect": The noise traders' uncertain future beliefs make the asset risky, so its price will decrease and hence increase its return.

The above mentioned effects have an influence on expected returns and volatility; the hold more and create space effect tend to increase noise traders' expected returns, while the Friedman and price pressure effects tend to decrease noise traders' expected returns.

Friedman (1953) states that noise traders who affect prices have lower expected returns than the sophisticated investors, and will eventually be rejected out of the market. But De Long et al. (1990) argue that noise traders' opinion increase the riskiness of returns to assets. And if they hold more of these assets subject to noise trader risk, they will have high expected returns than sophisticated investors.

2. *Individual vs Institutional Sentiment Indicators*

Many financial variables have been used to measure investor sentiment. Brown and Cliff (2004, 2005) examined different direct and indirect sentiment indicators. Beaumont et al (2008) discussed direct measures of private (or individual) and institutional sentiment, as well as indirect measures of sentiment, focusing particularly on flows of mutual funds.

To measure direct sentiment, Brown and Cliff (2004) focused on the American Association of Individual Investors (AAII) sentiment index survey and the Investors Intelligence (II) service to distinguish between different types of investors. They identified three kinds of sentiment: private investors, institutional investors, and newspaper writers.

The AAII sentiment survey measures what percentage of individual investors is bearish, bullish or neutral (in the short run). The II takes into consideration the evaluation of newsletter writers, whether it's bullish, bearish or neutral.

Brown and Cliff (2004) interpret the AAII as an indicator for private (individual) investor sentiment but they interpret the II as an institutional sentiment indicator.

Concerning the assessment of whether investor sentiment predict returns on a certain stock, both Brown and Cliff (2004) and Fisher and Statman (2000) mainly found that investor sentiment follow return more than it anticipates them.

On the other hand, Swaminathan (1996) also studies the relationship between closed-end fund discounts and expected returns on small firms. Following Lee et al.(1991), he finds that closed-end fund discounts, which stand for individual investor sentiment, can forecast future excess returns on small firms, but cannot predict returns on large firms. The discounts have a strong forecasting power regardless of other variables like the dividend yield, the term spread and the default spread. This result therefore confirms the hypothesis of Lee et al. (1991) claiming that individual investors are major shareholders only in small firms and closed-end funds. He also finds that discounts include information about future earnings growth of small and large firms, and expected inflation, and hence the discounts reflect the rational expectations of investors, rather than irrational sentiment.

Lee at al (1991) study whether changes in closed-end funds prices and discounts are caused by the variations in individual investor sentiment. They state that changes in closed-end fund discounts and small firms' returns are negatively correlated; the theory they tested proved that discounts are low when investors are optimistic about the future returns, and high when investors are pessimistic. Small firms and closed-end funds are usually owned by individual investors, Lee et al. (1991) suggest that stock prices are affected by non-fundamental factors like investor sentiment and noise trading.

Beaumont at al. (2008) use daily aggregate mutual fund flows of domestic US equity funds as a measure for investor sentiment. They follow Lee et al. (2002) to determine how investor

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sentiment can affect stock prices return and market volatility. They found an asymmetric reaction of volatility to sentiment; volatility increases more when investors are bearish than when they are bullish.

De Long at al. (1990) claim about closed-end funds as an application of their model. Usually, when noise traders are optimistic about the returns of a certain security, then the security's price will be driven up relative to fundamental values. In the case of closed-end funds, noise traders' optimism will make funds sell at smaller discounts, while their pessimism will decrease the prices, and hence the funds will sell at larger discounts.

C. Mutual Funds and their performance

1. Overview of Mutual Funds

Over the past two decades, mutual funds have become one of the most popular investments for individual investors. A mutual fund is an investment vehicle that pools money or funds from many investors to invest in securities such as stocks, bonds, and money market. A mutual fund's portfolio is operated by the fund's portfolio managers, under the supervision and regulation of the Securities and Exchange Commission (SEC).

There are 3 types of U.S. mutual funds: open-end, closed-end, and unit investment trust. The most common type is the open-end mutual fund; it is willing to buy back its shares from its investors at the end of every business day at the net asset value (NAV), and it has unlimited number of shares. Closed-end funds usually issue shares only once through an IPO. This type of funds has a limited number of shares, so an investor in this fund cannot sell his shares back to the fund, as it is the case with open-end funds, rather he must sell the shares to another investor in the market. The price he receives may be different from net asset value; If the price is more than the NAV then it is sold at premium, and if the price is lower than NAV then it is at a discount.   The performance on mutual

funds will be mainly determined by its NAV; the net asset value represents the fund's market value per share, it is the price at which investors trade shares with a fund company. Mutual funds offer many benefits, such as diversification, daily liquidity, and professional investment management, as well as some disadvantages like the fees, and the unpredictability of income.

During the past decade, the mutual fund sector has been growing so fast in many European countries (Jordan and Kaas, 2002). Total mutual fund assets are $14 trillion, in the USA more than $7.4 trillion are invested in mutual funds. Also, more than half a trillion dollars are invested in mutual funds in Canada, Argentina, Brazil, and Mexico. In Europe, more than $4.6 trillion are invested in mutual funds (Investment Company Institute, 2004).
Mutual funds are important financial services in developing countries as well, such as India, Indonesia,and Malaysia (Ramasamy and Yeung, 2003).

2. *Mutual Funds and Investor Sentiment*

Many researches focus on the behavior of mutual fund investors and how their sentiment affects mutual fund returns. Goetzmann et al. (1999) were the first to evaluate the effect of behavioral factors and investor sentiment on the change of mutual fund flows. Brown et al. (2002) also support this correlation, and propose to use mutual fund flows as a measure of investor sentiment .

Many papers argue about closed-end fund discounts as a measure of sentiment. Lee et al. (1991), Swaminathan (1996), and Neal and Wheatley (1998) assert that closed-end fund discounts measure investor sentiment, while others papers like the ones written by Elton et al. (1998) and Chen et al. (1993) did not support this finding and rather they provide evidence to the contrary.

Swaminathan (1996) and Lee et al. (1991) studied the effect of individual investor sentiment on expected returns of small firms, by using closed-end fund discounts as a proxy for individual

sentiment, and observe that individual investor sentiment can forecast small firms returns and not on large companies. On the other hand, Elton et al (1998) provide opposing evidence for the hypothesis of Swaminathan (1996) and Lee et al. (1991). They argue that including the closed-end fund discount index in an asset pricing model does not prove that the sentiment is priced, and that investor sentiment has no power in predicting returns.

Zweig (1973) claims that the discounts on closed-end funds revealed expectations of individual investors. While Beaumont et al. (2008) test the effects of sentiment on stock return and conditional volatility. They use mutual fund flows of US equity funds as a measure of investor sentiment.

Brown (1999) examines if investor sentiment is related to the volatility of closed-end funds returns by using closed-end funds discounts. He concludes that deviations from the mean level of sentiment and volatility are positively and strongly related.

Ederington and Golubeva (2011) study the effect of risk perceptions on the behavior of investors by analyzing the equity mutual funds flows. They state that aggregate net equity fund flows are negatively and strongly correlated with changes in the expected stock market volatility measured by VIX.

D. Overview of Financial Crisis in 2008

Many events affected the stock market throughout the years, like the Great Crash in 1929, the Black Monday Crash in October 1987, the Internet Crisis in 2000 or the dot-com bubble, and the subprime mortgage crisis in 2008. Each of these events had its own implications and effects on the market; in our research we will focus on the subprime mortgage crisis.

When investors have excess emotions, this will lead to unexpected rises or declines in prices. The periods of extraordinary increase in price are called "bubbles", and those related to price

declines are called "crashes". During a bubble, the stock returns are much higher than the mean or average return.

The collapse of financial markets in 2008, or the subprime mortgage crisis, is one of the huge financial crises. The reason behind this collapse is mainly due to subprime lending which is giving loans to customers having poor credit history. There was a significant increase in housing prices before the subprime crisis, followed by a large decline of stock markets.

The economy was experiencing a deep recession after the dotcom bubble crisis in 2000, followed by September 11 attacks in 2001. To stimulate the economy, central banks around the world created liquidity through a reduction in interest rates. Bianco (2008) stated that after the crash of the 2000 dotcom bubble and the subsequent recession in 2001, the Federal Reserve reduced short-term interest rates from 6.5% to 1%. In response, investors aimed at high returns through riskier investments. Besides, the lenders were also ready to take great risks, and thus approved giving subprime mortgage loans to borrowers with poor credit. The increase in demand drove the housing bubble to highest levels in the summer of 2005, which ultimately collapsed in August of 2006. A housing bubble happens when there is an increase in real estate properties valuation followed by a decline in home prices, and consequently having a mortgage loan that has a higher value than the value of the real estate property itself. Demyanyk and Hemert (2008) claim that since 2005, signs of an eventual near crisis were already apparent from the deterioration of the subprime mortgage market.

This crisis affected badly a great number of companies involved in the subprime market and the housing market, it also affected mortgage lenders and banks. Investors who hold stocks that were affected by this crisis eventually experienced losses. Regarding mutual funds, most of them spread their assets across a diversified portfolio of securities. Many funds were affected in different ways and some more drastically than others.

E. Hypothesis

As per the above previous empirical research regarding investor sentiment, we need to find out if The Investor Sentiment Indices we are studying have a positive effect on the returns of mutual funds for the years 2008, 2009, and 2010. Therfore, we have the following hypothesis:

Hypothesis 1: Mutual Funds Performance is positively affected by the changes in Investor Sentiment.

To continue our test, we need to examine if the geographical focus of the mutual funds have an effect on the association between investor sentiment and mutual funds returns. We test if this positive relation is negatively moderated by the US focused dummy variable as mentioned in hypothesis 2 below:

Hypothesis 2: US focused mutual funds dummy will negatively moderate the positive association between mutual funds performance and changes in Investor Sentiment.

In other words, we want to check if globalization of the mutual funds can affect the association tested in hypothesis 1.

CHAPTER III

DATA AND METHODOLOGY

A. Data Selection

Data on Mutual Funds returns and Investor Sentiment indices are examined and analyzed to test the relation between investor sentiment and fund performance, and to check whether this relationship is affected by the geographical focus of the funds.

The data related to Mutual Funds was extracted from Bloomberg, by looking for US Mutual Funds, their Assets under Management figure indicating the size, their inception date, their industry focus, their geographic focus, and their asset class focus.

The preliminary data consisted of a list of 5000 funds, with inception dates ranging from 1927 till 2011, and size ranging from $230,000 to $129.8 Billion. Then to have a reasonable sample size, I decided to choose the funds whose sizes are greater than $1 Billion, so I ended up with a list of 1130 funds, with inception dates starting from 1935 till 2010, and sizes from $1 Billion to $129.8 Billion. Out of these 1130 funds, 591 are geographically focused in the United States, and the remaining are internationally distributed, in Japan, Taiwan, India, South Korea, Brazil, Germany, Russia, Latin and North American regions, and many others. Their Asset Class focus is debt, equity, or asset allocation. And their industry focus is spread over different sectors, like financial services, energy, health/ biotechnology, Real Estate, Energy, Utility, and internet/telecommunication, etc.

 After that I extracted the daily Net Asset Value (NAV) for each of the 1130 funds, since the beginning of the fund, though I decided to limit the study to the years 2008, 2009, and 2010, and take into consideration only end of month figures.

As for the Investor Sentiment indexes, I have chosen the following: the American Association of Individual Investors (AAII) Bull-Bear, Investor Intelligence Bull-Bear, NYSE Arms Index (NYAARMS Index), NYSE Advances/Declines (ADLN Index), NYSE Highs (NWHLNYHI

Index), NYSE Lows (NWHLNYLO Index), Equity Put/Call (PCRTEQTY Index), VIX Index, and SPX Index. These indices are chosen based on academic interest in them. We also extracted the data from Bloomberg, the figures started since 1990, but as with the mutual funds, I am interested in the data related to the years 2008 till 2010. The definition of Investor Sentiment Indices is as follows:

- *1. American Association of Individual Investors (AAII) Bull-Bear:*

The AAII Bull Ratio is a sentiment index created using the AAII sentiment survey in which

the American Association of Individual Investors (AAII) asks its members about their view on the

of the stock market direction in the short term on a weekly basis. This sentiment indicator tells us

whether the market in general is optimistic or pessimistic, based on the percentage of members who

are bullish and the percentage of members who are bearish.

The AAII Bull Ratio is computed by dividing the percentage of bullish investors by the sum of the

percentage of bullish and bearish investors, after excluding neutral traders.

A high ratio means that there are more bullish than bearish traders, while a low ratio number means

that there are more bearish than bullish traders.

- *2. Investor Intelligence Bull-Bear (SENTIIBL and SENTIIBR indices):*

It is a sentiment indicator published weekly by "Investors Intelligence" after surveying market

professionals as they deal daily with the financial markets. It is computed as follows:

$$\text{Bull/Bear Ratio} = \frac{\text{Bullish Investment Advisors}}{\text{Bearish Investment Advisors}}$$

To measure sentiment, Investors Intelligence includes a chart of the Bull/Bear Spread.

- *3. NYAARMS Index or NYSE Arms Index:*

The Arms Index (Trin) uses the ratio of advancing issues to declining issues to signal when the market is extremely overbought or oversold. The Arms Index compares the relation of advancing issues to declining issues, as well as the relation of advancing volume to the declining volume, which is the total volume of all stocks that closed higher on the day versus the total volume of all stocks that closed lower. It is calculated using the following formula:

(Advancing / Declining Issues) / (Advancing / Declining Volume).

Since individual interpretation can be relatively volatile, the Arms Index is usually displayed as a 10-day simple moving average plotted on a scale. When the moving average falls below 0.80, the market is said to be overbought, and when this average reaches 1.20, the market is considered oversold. The Arms Index is usually plotted along with the New York Stock Exchange (NYSE) Index. An Arms Index value less than 1 usually indicates a bullish sentiment, and a value above 1 indicates that the sentiment is bearish.

- *4. ADLN Index:*

ADLN is Advance Decline Index - New York Stock Exchange Advancing Stocks minus Declining Stocks.

- *5. NWHLNYHI Index (52 Week Highs NYSE) and NWHLNYLO Index (52 Week Lows NYSE):*

Technical analysts usually compare the current trading price of a certain stock to its 52-week range, in order to get a broad sense of how the stock is doing and how much the price has fluctuated. This information may indicate the potential future range of the stock and how volatile its price is.

- *6. PCRTEQTY Index: Equity Put/Call*

The Put/Call options volume ratio is one of the most reliable indicators of the market.

Daily and weekly volumes of puts and calls in the U.S. stock market are being tracked to be able to determine the feelings of traders. When speculation in calls is too high, the put/call ratio will be low. When speculation in puts is too high then the investors are bearish, and the put/call ratio will be high.

- *7. VIX Index:*

VIX is a trademarked ticker symbol for the Chicago Board Options Exchange Market Volatility Index, a popular measure of the implied volatility of S&P 500 index options. It is referred to as the fear index, and it is a measure of the market's expectation of stock market volatility over the next 30-day period. The VIX is calculated in real-time by the Chicago Board Options Exchange. It is a weighted blend of prices for a range of options on the S&P 500 index.

- *8. SPX Index:*

It is one of the ticker symbols of S&P 500 which is one of the most commonly followed equity indices, and it is included in the Index of Leading Indicators. Many mutual funds, exchange-traded funds, and pension funds, are designed to track the performance of the S&P 500 index. This index is the most important of the many indices owned and maintained by Standard & Poor's; S&P 500 refers to the index and to the 500 companies that have their common stock included in the index.

In addition, I retrieved the CRSP1 and CRSP2 indices from the Center for Research in Security Prices (CRSP) database. CRSP provides a broad range of indexes that can be used as benchmarks of market performance. Data was extracted on daily basis upon availability, and then only end of month records were selected.

B. Methodology

The above data will be used to test how investor sentiment affects the performance of mutual funds, and whether the geographic focus of the funds has any effect on performance and investor sentiment.

To be able to do so, I prepared a Panel Data including the following: the monthly dates for the years 2008, 2009, and 2010, the ticker for each of the 1130 funds I am studying, and their corresponding fund performance, followed by the CRSP1 and CRSP2 on a monthly basis. I also added the investor sentiment previously mentioned: the American Association of Individual Investors (AAII) Bull-Bear, Investor Intelligence Bull-Bear, NYSE Arms Index (NYAARMS Index), NYSE Advances/Declines (ADLN Index), NYSE Highs (NWHLNYHI Index), NYSE Lows (NWHLNYLO Index), Equity Put/Call (PCRTEQTY Index), VIX Index, and SPX Index.

C. Discussion of Variables:

To determine the relationship between investor sentiment and performance, and whether geographical focus will moderate this relationship, we did a regression analysis.

After screening the data for the investor sentiment indices I have, I noticed that some of them are inadequate, so I decided to exclude them. So I was left with only three investor sentiment indices: VIX Index, NYAARMS Index, and PCRTEQTY Index.

Then I conducted the test three times, to be able to do the test for each of the above mentioned indices.

The dependent variable is the excess return for the mutual funds, it is measured as the difference between the mutual fund returns and the returns on the CRSP equally weighted index. The independent variables used are discussed here:

Investor sentiment: This is the measure of each of the following investor sentiments: VIX Index, NYAARMS Index, and PCRTEQTY Index. To be more accurate I used the change in investor sentiment. Here, I am examining if the change in these particular investor sentiment indices will affect the returns of mutual funds.

US Focused: This is a dummy variable to verify whether the mutual fund is operating in the US or not. If it is US focused it takes the value 1, otherwise it takes the value 0.

Equity Dummy: It is another dummy variable to check if the mutual fund is an equity fund or not. It takes the value of 1 if it is an equity fund, if not, then zero.

Logarithm of the size of the fund: Due to the inconsistency of the sizes of the mutual funds, we need a smoothening measure for the regression results to be logical. The size of mutual funds subject to our study varies from $1 Billion to $129.8 Billion.

Age: This variable is about the age of the fund; they have different inception dates starting from 1935 till 2010, so their age varies from 2 to 77 years.

Interaction Variable: I added an additional variable as an interaction term between the US focused dummy variable and the measure of each of the three investor sentiment. The interaction term is the relationship among three or more variables, usually a dependent variable and an independent variable, moderated or modified by a third variable. In our regression, the dependent variable is the fund excess return, the independent variable is the investor sentiment, either VIX, or NYAARMS, or PCRTEQTY, moderated by the US focused dummy variable.

Year dummy variable: The last dummy variables are for the years 2008 and 2009.

CHAPTER IV

EMPIRICAL RESULTS

To test the validity of the hypotheses stated previously, I have performed simple descriptive statistics tables for the data. Then I have conducted three regression tests.

In each of the three tests, the dependent variable is the fund return, and the independent or explanatory variables, differ according to the investor sentiment we are testing, as previously discussed.

A. Descriptive Statistics

I made some descriptive statistics tables for the data collected about the indices and Mutual Funds Performance and size.

Table 1: Descriptive Statistics

	Mean	Median	St.deviation	Min	Max
VIX	29.07	25.77	10.26	17.59	59.89
NYAARMS	1.01	0.98	0.29	0.55	1.81
PCRTEQTYIndex	0.69	0.69	0.13	0.45	1.22
Fund Perf	22.14	18.93	14.00	0.75	119.30
Size	5,591.95	1,968.88	15,395.84	0.12	190,185.31

The VIX Index has an average of 29.07 and a median of 25.77. The standard deviation is 10.26, with a minimum value of 17.59 and a maximum value of 59.89 which is much higher than the median.

The NYAARMS Index has a mean of 1.01, a median of 0.98 and a standard deviation of 0.29.

The figures are not very dispersed, since they range between 0.55 and 1.81.

The PCRTEQTY Index's average is equal to its median of 0.69, so it is normally distributed with a low standard deviation of 0.13.

Of all three indices presented in the table, VIX Index has the highest mean, median, and standard deviation.

The average of funds performance is 22.14, the median is 18.93 with a standard deviation of 14. The range of funds performance is from a minimum of $ 0.75 billion to a maximum of $119.30 billion, showing a big difference in the fund performance, which might be due to the industry focus and the size of each fund. The size of the funds has an average of 5,591.95, a median of 1,968.88 and a standard deviation of 15,395.84. The funds size ranges between 0.12 and 190,185.31.

Table 2: Descriptive Statistics per year

	VIX			NYAARMS			PCRTEQTYIndex		
	2008	2009	2010	2008	2009	2010	2008	2009	2010
Mean	31.59	31.79	23.84	1.02	1.07	0.93	0.77	0.69	0.61
Median	25.91	27.64	23.52	0.99	1.02	0.93	0.73	0.68	0.60
St.deviation	13.36	8.45	4.94	0.25	0.36	0.23	0.17	0.09	0.08
Min	17.83	21.68	17.59	0.55	0.57	0.60	0.59	0.59	0.45
Max	59.89	46.35	34.54	1.56	1.81	1.22	1.22	0.84	0.73

In table 2, the statistics figures are prepared for the years 2008, 2009, and 2010.

In the year 2008, The VIX index in 2008 has a mean of 31.59, a median of 25.91, a standard deviation of 13.36. The volatility ranges between 17.83 and 59.89. In 2009 , it has a mean of 31.79, a median of 27.64 and a relatively low standard deviation of 8.45, thus the figures are close to the mean, with a minimum value of 21.68 and a maximum value of 46.35.

As for the year 2010, the volatility index has a mean of 23.84, a median of 23.52, a small standard deviation of 4.94. The volatility ranges between 17.59 and 34.54.

This index has a close average of 31.59 and 31.79 in the years 2008 and 2009, but the average has increased to 23.84 in 2010. Its standard deviation in 2008 is relatively high, indicating a dispersion of observations.

In addition, NYAARMS index has lower figures; in 2008 it has an average of 1.02, a median of 0.99, and a standard deviation of 0.25, and a minimum value of 0.55 and a maximum of 1.56. In the year 2009, the average is 1.07, the median 1.02, a standard deviation of 0.36, a minimum of 0.57 and a maximum of 1.81. And in 2010, NYAARMS index has an average of 0.93, equal to the median, which implies a normal distribution of data, and a standard deviation of 0.23, and a minimum value of 0.60 and a maximum of 1.22.

Moreover, the lowest figures belong to PCRTEQTY Index having in 2008 a minimum of 0.59 and a maximum of 1.22. Its median is 0.73, less than its average of 0.77, and a standard deviation of 0.17. In 2009, PCRTEQTY index, has a mean of 0.69, a median close to the mean of 0.68, a low standard deviation of 0.09, a minimum of 0.59 and a maximum of 0.84. For the year 2010, PCRTEQTY Index has a minimum of 0.45 and a maximum of 0.73. Its mean is 0.61, median is 0.60, and a standard deviation of 0.08.

Table 3: US Focused vs Non US Focused Analysis

	US Focused		Non-US Focused		T-test
	Mean	**St.Deviation**	**Mean**	**St.Deviation**	
Total Performance	21.78	14.55	22.54	13.33	0.0000

The number of US focused funds is 16488, while the Non-US focused funds are 14328; the number of US mutual funds operating in the US is greater than those operating outside. The US focused funds have a mean of 21.78 and a standard deviation of 14.55, while the funds having a geographical focus outside the US have an average of 22.54 and a standard deviation of 13.33. The t-test is almost zero, it is significant.

The funds focused outside the US have a greater mean then those operating in the US; this might be due to diversification. One of the main advantages of investing in mutual funds is diversification; one can invest in one fund and have access to a diversified portfolio of different stocks and bonds, different sectors and different countries. This is a way of managing risk

B. Regression Interpretation

Three different regressions were conducted for each of the three indices we are studying, and the results are presented below.

The first regression is done using the dependant variable fund excess returns, with the following independent variables: Investor sentiment VIX, US focused variable, Equity dummy, Log (Size), Age, interaction term between US dummy variable and VIX, and the dummy variables of the years 2009 and 2010.

The variables are evaluated for their influence, which is reflected by the sign and magnitude of the coefficient, and for their significance by verifying their corresponding probability. The coefficients that will be considered are those that have a probability less than 10%.

Table 4: Returns on Mutual Funds and VIX

Variable	Coefficient	Standard Error	t-Statistic	P-Value
Intercept	-0.849828	0.179716	-4.728728	0
VIX-VIX(-1)	-0.118596	0.003952	-30.00603	0
USFOCUSED	0.224109	0.037615	5.958022	0
EQUITYDUMMY	0.489391	0.129528	3.778254	0.0002
LOG(SIZE)	-0.056304	0.014831	-3.796455	0.0001
AGE	0.000365	0.00234	0.156125	0.8759
USFOCUSED*(VIX-VIX(-1))	0.079536	0.005369	14.81359	0
Y2009	1.492202	0.046425	32.14194	0
Y2010	0.819593	0.04624	17.72489	0

Regression Statistics	
R-squared	0.076429
Adjusted R-squared	0.076182
F-statistic	309.8183
Prob(F-statistic)	0

From the results shown in Table 5, we can observe that the change in investor sentiment VIX and returns on mutual funds are negatively correlated, as the coefficient is -0.118596.

As previously mentioned, the VIX Index is referred to as the fear index, and it measures the market's expectation of stock market volatility. We can then infer that when volatility increases, the mutual funds performance decreases. This coefficient's probability is almost equal to zero, so volatility has a significant effect on returns. So Hypothesis 1 is accepted.

For the US focused variable, it has a coefficient of 0.224109, and a probability of nearly zero.

As for the equity dummy, it also shows a positive and relatively high correlation since the coefficient is 0.489391, and it is significant since the probability is 0.02 % which is less than 10%. As for the interaction term between the US focus dummy and the investor sentiment measure, the coefficient is 0.079536, and a significant probability of approximately zero; we can infer here that this variable is negatively moderating the "positive" association between VIX Index and the returns of mutual funds. This interaction effect does verify the second hypothesis. The R-squared measures the proportion of change in the dependent variable explained by the change in independent variables; here 7.6% of the variance in returns was explained by the different independent variables. The F-statistics is 309.8183, which is a high number and different from zero, then the test is significant.

Table 5: Returns on Mutual Funds and NYAARMS

Variable	Coefficient	Standard Error	t-Statistic	P-Value
Intercept	-1.009638	0.181799	-5.553589	0
NYAARMS-NYAARMS(-1)	0.871771	0.065826	13.24356	0
USFOCUSED	0.205116	0.038044	5.391552	0
EQUITYDUMMY	0.491554	0.131069	3.750355	0.0002
LOG(SIZE)	-0.051465	0.015006	-3.429636	0.0006
AGE	0.000334	0.002368	0.140921	0.8879
USFOCUSED*(NYAARMS-NYAARMS(-1))	-0.238114	0.089824	-2.650898	0.008
Y2009	1.760156	0.04647	37.87752	0
Y2010	1.001966	0.046747	21.43381	0

Regression Statistics	
R-squared	0.054334
Adjusted R-squared	0.054082
F-statistic	215.1079
Prob(F-statistic)	0

The second test has the same dependent and independent variables as the previous one, except for the investor sentiment index, which is here the NYAARMS or the Arms index. As shown in table 6, NYAARMS and fund returns are positively and strongly correlated; when NYAARMS increases, the mutual funds returns also increases, and when NYAARMS decreases, the returns decrease as well. So we can accept Hypothesis 1. The US focused variable has a coefficient of 0.205116 and zero probability, so the funds that operate in the US have a positive impact on their performance. The equity dummy shows a positive correlation and a significant probability of 0.02%. The interaction term between US focus and NYAARMS has a coefficient of -0.238114 and a probability of 0.8%, so the coefficient is significant, and an increase in NYAARMS is followed by a decrease in the fund returns, thus the interaction term has a negative impact on the correlation, which confirms the second hypothesis. The R-squared is 0.054334, then 5.43% of the changes in returns were explained by the independent variables I studied. Moreover, the high F-statistic of 215.10 shows that the test is significant and the different coefficients in the model are correlated.

Table 6: Returns on Mutual Fund and PCRTEQTYINDEX

Variable	Coefficient	Standard Error	t-Statistic	P-Value
Intercept	-0.976028	0.182224	-5.356197	0
PCRTEQTYINDEX-PCRTEQTYINDEX(-1)	0.636541	0.152661	4.169641	0
USFOCUSED	0.207137	0.038131	5.432252	0
EQUITYDUMMY	0.491349	0.131384	3.739791	0.0002
LOG(SIZE)	-0.051923	0.015042	-3.451846	0.0006
AGE	0.000337	0.002373	0.141846	0.8872
USFOCUSED*(PCRTEQTYINDEX-PCRTEQTYINDEX(-1))	-2.185278	0.208614	-10.47523	0
Y2009	1.708768	0.046467	36.77389	0
Y2010	0.94908	0.046746	20.30293	0

Regression Statistics	
R-squared	0.049777
Adjusted R-squared	0.049523
F-statistic	196.121
Prob(F-statistic)	0

The third investor sentiment we want to test its correlation with fund performance is the PCRTEQTY index, or the equity put to call ratio. The result of the test is shown in table 7 above, where PCRTEQTY index and performance of funds have a positive correlation justified by the coefficient of 0.636541 and the probability of approximately zero. The geographical focus variable has a coefficient of 0.207137 and an almost zero probability, so it is significant and has a positive correlation. The interaction effect between the geographical focus and the investor sentiment has a negative coefficient of -2.185278 and a significant zero probability. Here also we can infer that the

positive correlation between PCRTEQTY index and the mutual funds performance is negatively

moderated by the geographical focus of the fund. Both Hypothesis 1 and Hypothesis 2 are accepted

here.

In addition, the R-squared is 0.049777, thus 4.97% of the changes in returns were explained

by the explanatory variables. Furthermore, the F-statistic is relatively high 196.1210, so it can be

stated that the test is significant and the coefficients in the model are interrelated.

CHAPTER V

CONLUSION

Investor sentiment is one of the basic principles of behavioral finance; it's when investors underreact or overreact to news about asset prices in the market. Financial markets can be bullish or bearish , associated with increasing or declining investor confidence.

Many studies evaluated the effect of investor sentiment on the flows of mutual funds, and they used closed-end fund discounts as a measure of sentiment.

In this paper, we examined the relationship between investor sentiment indicators and the performance of the mutual funds in the US during the years 2008, 2009, and 2010. Previous literature proved the correlation between those indicators and stock performance, but our study was about mutual funds performance, in the period of a recent crisis which is the subprime mortgage crisis in 2008.

The objective of this study has been to evaluate whether the investor sentiment in the market can have a positive association with mutual funds returns in the US during and after the Subprime Mortgage Crisis. Three regression analyses were applied on the following indices: VIX Index, NYAARMS Index, and PCRTEQTY Index.

We found a strong correlation between performance and the different investor sentiment indicators we tackled. Moreover, we studied the effect of geographical focus on performance, and we found that there is some kind of correlation between the funds' performance and whether it is operating in the US or outside. For the mutual funds operating in the US, we observed from the test results that they moderate the correlation between investor sentiment and the performance of mutual funds.

For further assessment, more indices could be studied to check whether the results of this study can be applied on a larger number of indices. Also, this study can be done over different periods and years to verify its implications.

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