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C O N T E N T S

List of Tables

List of Figures

ABSTRACT

The present study empirically examines the short term under and overreaction effect in the Karachi Stock Exchange, Pakistan, in the context of the 2008 Global Financial Crisis considering the period from September 2007 to 2009. This crisis has been considered as the largest and most severe financial event since the Great Depression. The study findings reveal a consistent pattern in relation to prior studies on the subject, reflecting absence of any prominent evidence of short term under or overreaction effect in the case of Karachi Stock Exchange both during and after the financial crisis events. The evidence implies that the stocks that displayed a large price increase (winners portfolio) did not display any significant evidence of overreaction atleast for the first four weeks following the crisis news specifically for the financial sector. While the stocks that displayed large price decline (losers portfolio) did not reveal any kind of significant under or overreaction. The abnormal returns differential overall indicates significant but disproportionate levels of overreaction in the first two weeks and later on underreaction is observed in the financial sector in the short run highlighting the returns reversal for the two portfolios. On the other hand, both the winner and loser portfolios individually do not provide any indication of either under or overreaction. However, the abnormal returns differential signifies some level of underreaction which is insignificant in nature. Thus, the return reversals are particularly pronounced only in case of the financial sector as an after math of the global financial crisis indicating presence of a diminished degree of both under and overreaction after the crisis which may be attributable to the performance persistence behaviour of investors i.e. the momentum effect and the limited international financial market linkages that averted the contagion impact of the subprime financial crisis of 2008.

Keywords: Underreaction; Overreaction; Efficient Market Hypothesis; Event Study; Return Reversals

1. INTRODUCTION

It is a well known fact that often a rise or fall in the price of a stock is related to factors other than the financial performance indicators for example weather or public holidays. In the same way, the arrival of a bad news, even if the news does not directly impact the company's performance, might lead to a rise or decline in the stock price. These fluctuations in the stock prices highlight the anomalies that help to understand the irrational behaviour of the investors. As a result, among other possibilities, the market may over-react or under-react to the non-financial information and events. This overreaction or underreaction behaviour is considered inconsistent with the Efficient Market Hypothesis (EMH). Investors' probable reaction to an anticipated or unanticipated event is considered an important area of research in the field of financial economics. The present study attempts to empirically analyse the investor behaviour associated with the global financial crisis of 2008 in terms of short term under and overreaction in order to better understand the impact and magnitude of financial crisis on the local stock market. It is assumed that there wasn't any adverse impact of the crisis on the local economy due to its limited international linkages.

The cognitive psychologists presented the behavioural anomalies that indicate the presence of financial phenomena including the "overreaction" and "underreaction" which are contrary to the Fama's (1970) Efficient Markets Hypothesis and are considered to be one of the most important challenges to the market efficiency [Shiller (2003)]. Fama (1970), through the EMH, postulated the asymmetry of information to the market participants for the investment decision-making. According to this, the market efficiency is identifiable into three levels comprising the weak, semi-strong, and the strong form. It is believed that there is a presence of weak form of market efficiency if the investor is unable to generate abnormal returns on the basis of past information. While if the investor is able to predict the stock prices based on the past as well as publically available present information, then the market is said to be semi-strong form inefficient. The third level of market efficiency i.e. the strong form, takes into account not only the historical and publically available present information but also the private information (the insider information). Thus, the stock market volatility is highly dependent on the arrival of new information associated with the stocks that causes change in its price.

The extent of absorption of new information and events relevant to the stock of a company in terms of a price change also involves the individual perception of the financial decision maker about particular news. This may result in either underreaction or overreaction by the investor creating market volatility based on the probable future performance of the stock.

The Event Study Methodology is considered a helpful tool in gauging the impact of a particular event on the stock price. It is used to analyse the effect of an event on a specific dependent variable which is usually the stock price of the company to infer the significance of a particular event. As the stock market quickly responds to the major news, so it causes change in the stock price. According to Kothari and Warner (2005), the number of published event studies exceeds 500 and is continuously increasing through adoption of advanced methodologies in many directions. The basic design of an event study, however, has changed little since Ball and Brown (1968) and Fama, Fisher, Jensen, and Roll (1969). In the past, the financial researchers specifically relied on the event study methodology to investigate the possible influence of particular events relating to merging and acquisitions [Jensen and Ruback (1983)], earning announcements [Barklay and Litzenberger (1988)], issue of new debt or equity [Myers and Mujluf (1984)], major macroeconomic announcements and international financial events [McQueen and Roley (1993)]. Some studies have also investigated the stock exchange's reaction to a natural disaster [Javid (2009)] on the stock exchanges.

The Karachi Stock Exchange was established on September 18, 1948 and now is considered among the emerging stock markets of Asia [Javid (2009)]. Subsequently, two other stock markets started operating in Lahore and Islamabad, in 1970 and 1992, respectively. However, KSE still remains the centre of financial activity with 70 to 80 percent of trading volume. In the year 1990, the foreign investors were allowed to make transactions at KSE that brought a tremendous boost in market capitalisation and performance and made KSE the third emerging market in the world ranking. In the 2000's, the introduction and implementation of various laws and policies by the Securities and Exchange Commission (SECP) of Pakistan resulted in the subsequent rise and decline of the KSE 100 Index. A major decline was witnessed in the mid March 2005 due to factors including the withdrawal of funds by carry over trade (COT) financiers, excessive buying in the ready market, and selling in the future market by specific operators. The KSE 100 index dropped from a high of 10,303 as on March 15, 2005 to a low of 6939 as on April 12, 2005 indicating a 32.7 percent decline approximately (source: KSE). Improving gradually, the KSE 100 index recovered and touched the peak of 15,676 in the year 2008. Another major crash was witnessed in the mid September 2008 and the KSE 100 Index closed the year at the lowest level of 5,865 points. It was during the same period when the global economies were undergoing the contagion impact of the subprime financial crisis that started from the United States.

The stock market volatility caused by an unexpected event has been consistently observed throughout the world [Chou (1988)] including Pakistan [Javid and Ahmed (1999)]. This makes it evident that in financial research the analysis impact of events on stock market has been of great importance. The objective of present study is to analyse the response of the financial (Commercial Banking) and non financial sector (Oil and Gas and Chemicals) listed on the KSE 100 Index, towards the global financial crisis of 2008 (September 15th) and the subsequent impact on the stock market behaviour in Pakistan. The event study methodology has been used to determine whether KSE experienced significant abnormal returns in response to this shock in terms of gainers and losers and for this, the overreaction behaviour of the listed firms on KSE 100 Index is analysed around the event.

As the frequency of the occurrence of such financial crisis is increasing around the world so it is becoming imperative to analyse the impact of such crisis on the local markets to facilitate investor decision making through better predictability of returns. This motivates to analyse a trend in the trading behaviour of investors during a global financial crisis news at Karachi Stock Exchange which is major stock market of Pakistan. This allows to test that the trading patterns of a Semi-strong form efficient market prevails in the times of international financial crisis or not. The Karachi stock market index of 100 shares touched its all-time high level of 15,760 points on April 20, 2008. The present study attempts to establish whether the investors at KSE exhibited any under or overreaction in the stock market as an aftermath of the global financial crisis of 2008. Since Pakistan's economy was considered to be less integrated with the world economy, so the perception was that the global financial crisis did not adversely impact the local economy.

The main objective of this study is to analyse the investor behaviour in terms of both under and overreaction to better understand the impact of the global financial crisis of 2008 on the leading local stock market. More specifically the objectives are to examine whether the investors exhibited any under or overreaction in the financial and non-financial sectors of the Karachi Stock Exchange, following the global financial crisis of 2008. The study also investigates the under and overreaction behaviour for the loser and winner portfolios of the financial and non-financial sectors of KSE and see whether there are any winner-loser reversals at the KSE 100 or not. The study analyses a trend in the trading behaviour of investors during 2008 global financial crisis news in order to confirm a trend in the trading patterns of a semi-strong form efficient market in the times of international financial crisis.

The announcement of the Lehman Brothers' demise has been considered as a proxy for this major event. The purpose of this study is also to contribute to the existing short term under and overreaction literature by using daily stock returns data of Karachi Stock Exchange over the period of September 2007 to

2009. This study contributes to the existing literature in examining the under and overreaction hypothesis in an emerging market i.e. KSE, with respect to the global financial crisis of 2008. As noted by Lobe and Rieks (2011), the literature on non-US short-term under and overreaction is limited compared to that on long-term overreaction, so this will help in contributing towards this area of research as well. Also it is highly significant to understand and analyse the impact of the global financial crisis of 2008 on the local economy which is considered among the emerging Asian economies. The present study will also be helpful in assessing the shock absorbing capability of the local market in terms of investor under or over-reaction. This study attempts to identify any underreaction or overreaction in the winner and loser stocks from both the financial and non-financial sectors comprising the KSE 100 Index. It also attempts to draw attention to any evidence of returns reversal in the loser and winner portfolios. At the same time it tests the validity of the efficient market hypothesis, also referred to as the joint hypothesis, which asserts that the financial markets are informationally efficient. This hypothesis doesn't hold true especially in the times of financial crisis as there is probability of excessive aversion to risk-taking as well as excessive optimism in the form of overreaction and underreaction which is mainly attributed to certain anomalies in terms of investor behaviour. These anomalies include among others, the conservatism bias when the investors tend to be slow in adapting to the new information arrival resulting in underreaction. Contrarily, the bias of representativeness places overemphasis on the most recent information that may eventually cause overreaction. Such anomalies in investor behaviour have a certain degree of predictability attached to them which needs to be identified and incorporated in decision making specifically in the event of crisis, which is the purpose of this study.

The remaining sections of the study are arranged as follows. After introduction a brief overview of the market is presented in Section 2. Prior studies on short-term under and overreaction are presented in Section 3, details of the methodology used are presented in Section 4, the findings are discussed in Section 5 and the last section provides the conclusions.

2. OVERVIEW OF FINANCIAL CRISES AND KARACHI STOCK EXCHANGE

2.1. The Global Financial Crisis and the Emerging Economies

The emerging market economies are considered to be in the process of moving from a closed to an open market economy through adoption of policies that boost economic performance levels, transparency and efficiency in the capital market [Lockton (2012)]. The exchange rate system reforms are vital as a stable local currency aids in building foreign investors' confidence. As a result

of foreign investment, huge international capital flows in the form of foreign currency is brought into the local economy that increases the local stock market's volume [Wade (1998); Kotz (2008); Siddiqui (2008a); Jacques (2009)].

The "financial crisis of 2008" is a term that represents a range of events like crashes in the housing market, banking sectors and the subsequent recession [Siddiqui (2008b)]. The US sub-prime mortgage market crisis that surfaced in August 2007, quickly spread around the world resulting in a huge financial meltdown including bankruptcies of banks and insurance firms in many countries [*The Economist* (2008); Felton and Reinhart (2008)] including the emerging market economies (EME) which are characterised as transitional. The financial turmoil of United States that started in the mid-summer 2007 due to severe liquidity and credit crunch initially seemed to be limited to the financial markets and institutions in the United States and Western Europe. The world economy as a whole managed to maintain its momentum due to the buoyant economic growth that was witnessed by the emerging markets as well as the resource-rich developing economies that enjoyed a commodity boom. But these globalised economies were unable to resist the series of events that hit major financial institutions on the Wall Street, in mid-September 2008, for long. It changed their fate through the fear of food scarcity, fuel shortage and increasing inflation which was completely overtaken by a greater fear of possible worldwide recession and depression engulfing all economies in the developing world, including emerging market economies in Eastern Europe, Latin America and Asia, as well as low-income developing countries in Africa and Asia with limited financial market linkages. Further, more recently it has been increasingly acknowledged that financial crisis is adversely affecting the economies of the emerging markets [Siddiqui (2009)].

2.2. The Karachi Stock Exchange: An Overview

Pakistan has been classified as an emerging market. There are three stock exchanges in Pakistan with KSE being the most liquid and biggest in terms of market capitalisation and trading volume. KSE had been awarded the best performing emerging stock market of the world in 2002 by the Business Week. Like all other markets the investment decisions are backed by some fundamental economic rationales or technical indicators.

Karachi Stock Exchange (Guarantee) Limited (KSE) was established on September 18, 1947. It was incorporated on March 10, 1949 when only five companies were initially listed with a total paid-up capital of 37 million Rupees. The first index introduced in KSE was based on fifty companies known as KSE 50 index. The KSE 100 Index was introduced on November 1, 1991 as a result of growth in number of listed companies and trading activities. The computerised trading system called Karachi Automated Trading System (KATS) was introduced in 2002 with a capacity of 1 million trades per day and the

ability to provide connectivity to an unlimited number of users. An all share index was introduced in 1995 which became operational on September 18, 1995. To address the needs of investor community two other indices were also introduced namely, KSE 30 Index and KMI 30 Index. It is currently the biggest and most liquid stock exchange in Pakistan. During the years 2011 and 2012, due to consistent rise in its indices, the KSE was declared as the best emerging market for financial year 2011-12. It was the development and reduction of discount rates by 2 percent by the SBP that had led the way to index striking historical level of 16,630 on 3rd December 2012. KSE is a semi-strong form efficient market. A brief review of the performance of KSE 100 is presented in the appendix.

2.3. The Financial and Non-financial Sectors: An Overview

The banking sector of Pakistan has been used as proxy for the financial sector. It includes the State Bank of Pakistan (SBP), commercial banks, specialised banks, Development Finance Institutions (DFIs), Microfinance banks and Islamic banks. This sector went through drastic changes since the country's independence in 1947 but kept on playing a pivotal role in the growth of the local economy. Before 1971, the government had encouraged the development of commercial banks in the private sector, however, later in 1974, it adhered to the nationalisation policy. In the 1990s policy reforms were introduced to improve the performance of the nationalised banks through privatisation. As of September 2012, the banking sector comprised of 5 public sector banks, 2 specialised banks, 17 private sector banks, 7 foreign banks, 5 Islamic banks and 8 micro finance banks. Presently there are 18 commercial banks listed on the Karachi Stock Exchange 100 Index.

The non-financial sector also includes the oil and gas sector which is an important and very large sector of the KSE which is mainly comprised of the blue chip companies. The Fuel and Energy sector is a blend of four sub-sectors: Refining, Oil and Gas Marketing, Oil and Gas Exploration, and Power Generation. There are in total 27 companies in this sector. The rate of dividend payments in this sector is variable in nature and a rising trend in profitability and retained earnings is observed. Market capitalisation and size are the result of an effective utilisation of surplus funds for growth opportunities, showing productive results in this sector. The major highlights of the performance of this sector are presented in the appendix. The other major non financial sector is the chemicals sector which is another highly capitalised sector of the KSE with 32 companies listed on it. There was a massive surge in market capitalisation and a decrease in the rate of dividends from 2004–2005 in this sector. During the last few years, a constant rise in market capitalisation figures is seen while dividends continue to dwindle. The trend of profitability was upwards throughout and peaked in 2009. The pace of increase in retained earnings was completely

compliant with profitability during this period. Strong figures in the market-to-book value ratio indicate that there is much investment potential in this sector. The investment opportunities were properly capitalised and the resulting extraordinary surge in the size of the companies and a market capitalisation was recorded from 2004 to 2008 in the chemicals sector of the economy.

The Karachi stock market index of 100 shares touched its all-time high level of 15,760 points on April 20, 2008. The main focus of the study is to establish whether the investors at KSE exhibited any under or overreaction in the stock market as an aftermath of the global financial crisis of 2008. Since Pakistan's economy was considered to be less integrated with the world economy so the global financial crisis did not adversely impact the local economy.

The present study examines the short term under and overreaction by using daily stock returns data of Karachi Stock Exchange over the period of September 2007 to 2009. This time period is considered by creating the pre and post event windows for the sake of analysis. It will provide a better understanding of the trading behaviours of investors after the crisis. It would be interesting to understand and analyse the impact of the global financial crisis of 2008 on the local economy which is considered among the emerging Asian economies. The present study will also be helpful in assessing the shock absorbing capability of the local market in terms of investor under or over-reaction.

3. REVIEW OF RELATED LITERATURE

A major area of research on stock markets focuses on testing for the validity of the Efficient Market Hypothesis (EMH), i.e., testing whether the price of a security fully and rapidly reflects the available information about the stock. Prior studies have the main aim of determining whether price movements are predictable and exhibit any recognisable pattern. As surveyed by Fama (1970), stocks tend to follow random walk and thus fail to indicate any specific pattern. The review of the literature is divided into sub-sections; the Efficient Market hypothesis (EMH) is reviewed in Section 3.1, the EMH Hypothesis, and investor under and overreaction behaviours in Section 3.2. The empirical literature on the event studies is presented in Section 3.3.

3.1. The Efficient Market Hypothesis (EMH)

Fama (1970) has presented the most famous paper on this subject as *Efficient Capital Markets* which contains both the theory and the evidence of the EMH. Fama has argued that stock prices are the aggregated probabilities of the future outcomes of the corresponding companies given the best possible information at hand. According to Fama, for the market to be efficient, it has to fulfil the following assumptions: (1) Investors are rational and wealth

maximising. (2) No buyer or seller can affect the price himself. (3) All information is available to all investors and there are no transaction costs.

Fama has divided the market efficiency into three categories as being weak, semi-strong and strong efficient. The weak-form efficient market is where all the historical information is reflected in the price of the stock. According to this, it is impossible to gain an abnormal return since the prices follow a random-walk process. The rationale behind this is that if investors could use historical prices to find a trading strategy that both gives an abnormal return and is economically significant then everyone would use it. Therefore the abnormal return will disappear and tend to the normal return. Under some conditions statistically significant abnormal returns can be found even under the weak form of market efficiency.

Semi-strong form of market efficiency not only includes all historical information but also the new publicly available information that is received by the market. For example, an interim report, an extra dividend payout or a government report that can affect the value of some stocks. Event studies are often used to measure semi-strong markets. In this strong form of market efficiency all information is included. The price reflects not only all the historical prices but also all the public and private information. In the strong form the market price follows a random walk since no information can help in predicting the price movement either upward or downward. The implication is that the private information is not worth anything since it cannot be used to gain an abnormal return. In the real world the possibility to gain abnormal return has led to a more semi-efficient than strong form of efficient markets.

3.2. Stock Market Anomalies—The Under and Overreaction

The financial markets have become increasingly volatile and instable worldwide. Shiller (1981) says that this excessive volatility is caused because the stocks are more volatile than the fundamentals require. Lo and MacKinlay (1990) find that excessive volatility violates random walk, so, there may be a human element adding to volatility. The analysis of information about the behaviour of financial markets helps to learn about the behaviour of investors and analysts. In corporate finance, the behavioural approach has been calling attention to attitudes such as the excessive aversion to risk-taking as well as to excessive optimism in the form of overreaction and underreaction. These two anomalies are briefly explained below.

3.2.1. *Anchoring Heuristics and Underreaction*

The heuristic of anchoring proposes that people often relate themselves to elements or conditions of reference in order to make decisions. These results in excessive moderation in decision making, highlighting the underreaction phenomenon, in which former winners tend to be future winners and former

losers, tend to be future losers. The underreaction is caused due to the Conservatism Bias. As generally people tend to be slow in adapting to new information, so the new information is priced-in gradually (stepwise) rather than at a single step.

3.2.2. *Representativeness Heuristic and Overreaction*

During decision-making, the investors under the influence of the heuristic of representativeness tend to produce extreme predictions, or overreaction, in which former losers tend to be winners in the future and vice-versa. It is an ability to overemphasise the most recent that may cause overreaction, creating excessive volatility e.g. continuing trends, then reversals.

3.3. The Event Study Literature

The event study methodology has become a useful tool for measuring the magnitude of abnormal performance at the time of an event. It provides a measure of the unanticipated impact of an event by providing evidence relevant for understanding corporate policy decisions. According to Javid (2009), in the area of corporate finance, there have been most successful application of event studies like mergers and acquisitions [Jensen and Ruback (1983)]; earning announcement [Barklay and Litzenberger (1988)], issue of new debt or equity [Myers and Mujluf (1984)] and announcements of macroeconomic variables such as trade deficit [McQueen and Roley (1993)].

The event study methodology has been used in several studies to assess the effect of the US stock market crash in October 1987 and related crash in the Far East later in January 1998. This has led to several studies conducted on these events [Jong, Kemmna, and Klock (1992); Claessens, Djankov, Fan, and Lang (2000)]. Even the effect of natural disaster on the insurance firms have been investigated by Angbazo and Narayanan (1996) and Shelor, Anderson and Cross (1992).The studies in the past include lots of event studies like Kothari and Warner (2005), Campbell, Lo, and MacKinlay (1997) and MacKinlay (1997). These studies are based on specific types of events rather than focusing on all events at once. The methodology is explained in detail in the next chapter.

3.4. The Stock Market Reactions Explained

Barberis, Shleifer, and Vishny (1998) BSV argue that once the investors form beliefs they will become reluctant to change this prior and will tend to under weigh the arrival of new information. Their theory assumes that prices are driven by a single representative agent and that agent exhibits the cognitive biases of conservatism and representativeness. Under the influence of conservatism, investors tend to underweigh the arrival of new evidence when updating their beliefs, so their past beliefs tend to persist. Keynes (1964) made the earliest observation about overreaction in the capital markets by arguing that

the ephemeral and nonsignificant daily fluctuations in the profits of existing investments actually create an altogether excessive, and even an absurd, influence on the market. Similarly, Williams (1956) has noted that the prices are based too little on long-term dividend paying power and too much on current earning power. Moreover the work of Kahneman and Tversky (1982) typified the excessive reaction to current information which seemed to characterise all the securities and futures markets in a precise way.

In the past various researches have provided evidence of market under or overreaction. DeBondt and Thaler (1985) have found that the extreme winners stocks subsequently underperformed the market while the extreme losers stocks subsequently outperformed the market. In their study, which is based on three-year examination period, the portfolio of losers significantly outperformed the portfolio of winners by 24.6 percent. At the same time, their sample of winners have exhibited underreaction by providing positive cumulative abnormal returns three to twelve months into the examination period, but showed overreaction through negative cumulative abnormal returns from month 18 to month 36.

DeBondt and Thaler (1987) have reexamined investor overreaction through controlling for firm size and variance in systematic risk and provided evidence that supported the overreaction hypothesis. They also get results in favour of the overreaction hypothesis for the January effect that give unusual returns in January.

3.4.1. *The Semi-strong form and Market Reactions*

According to the semi-strong form market efficiency theory the stock prices quickly reflect all publicly available information, implying that no overreaction effect should exist. Fama (1970, 1991) has documented strong evidence in support of the semi-strong market efficiency hypothesis. On the other hand, Conrad and Kaul (1988) and Lo and MacKinley (1988) have found significant empirical results inconsistent with the efficient market hypothesis. The finance researchers generally consider the latter phenomena as market efficiency anomalies rather than outright rejections of the efficient market hypothesis. Among these so-called market efficiency anomalies is the issue of stock market under and overreaction which involves individual investors' psychology in the decision-making process. The combined effect is that investors tend to either underreact or overreact to an unexpected new information. They are likely to underbid or overbid a firm's stock and then later reverse themselves. Researchers believe that this phenomenon is especially evident for significant and negative events.

3.5. The Reaction Hypothesis: Under and Overreaction

The response of the stock prices towards new information has led to the development of many hypotheses. Investors' strong response to unfavourable

and favourable information has been postulated by the overreaction hypothesis. According to this, investors temporarily price securities below (above) their new intrinsic values on the release of unfavourable (favourable) news. On the other hand, the underreaction hypothesis postulates that investors do not respond strongly enough to unfavourable and favourable information. That is the investors temporarily price securities above (below) their new intrinsic values on the release of unfavourable (favourable) news. Brown, Harlow, and Tinic (1988) developed the uncertain information hypothesis which predicted that the stock prices would rise after extreme stock price decreases or increases. It suggests that the incorporation of a risk premium into the stock prices by the investors, for the stocks that confronted favourable or unfavourable new information to compensate for a brief period of uncertainty caused by the event. After the resolution of uncertainty, the stock prices converge towards their post-event intrinsic values.

Several studies provide support for these hypotheses. Atkins and Dyl (1990) have used data from 1975 to 1984 based on 500 randomly selected trading days to assess the three largest losers and the three largest winners. The two-day average abnormal returns following the initial price change are positive and significant, and the rebound is sustained over the thirty-day post-event period for the losers. While, the two-day average abnormal returns are negative and significant for the winners.

The results of Bremer and Sweeney (1991) have confirmed the overreaction hypothesis by examining the losers only. A one-day price change triggers of −10 percent or smaller has been used by them to identify their sample of events, which is composed of Fortune 500 companies, from 1962 through 1986. Cox and Peterson (1994) have considered a twenty-day period to study large one-day stock price decreases and subsequent returns. They have used five-year intervals to analyse stock price overreaction over time by partitioning their sample period from January 1963 to June 1991. Their results are consistent with the efficient markets hypothesis when a three-day event window is considered for the post-event returns associated with New York Stock Exchange (NYSE) securities, but when a twenty-day event window is considered, the returns are consistent with the underreaction hypothesis. Howe (1986) has assessed stock price changes of 50 percent or higher by using a weekly holding period. There is overreaction in the short run but underreaction in the long run for his sample of losers. However, there is overreaction in both the short run and the long run for his sample of winners.

The overreaction phenomenon over the short run and long run was also analysed by Brown and Harlow (1988). Their evidence has supported the overreaction hypothesis in the short run and the underreaction hypothesis in the long run just like Howe (1986). Further evidence that supported the uncertain information hypothesis for losers and winners is provided by Brown, Harlow, and Tinic (1988). Several factors, including the underlying information causing

the initial stock price movements may have attributed to the disparity of results among these studies.

Evaluating weekly returns, Lo and MacKinlay (1990) have analysed if overreaction leads to the contrarian profits. Based on their results, the authors have found that less than 50 percent of the profits are generated by the stock market overreaction. Moreover, the authors have suggested that contrarian profits might not be solely driven by stock market overreaction and presented the lead lag effect as a primary contributor. However, Jegadesh and Titman (1995) do not support this view about contrarian profits and their generation by the lead lag effect. In their study, they have ranked the stocks using past one-week returns, a similar strategy to that of Lo and MacKinlay (1990), and for the following week the contrarian portfolio is held. Significant contrarian profits are reported for a bigger sample of stocks which is employed over the period from 1963 to 1990. A decomposition of the contrarian profits has revealed that the overreaction of stock prices to firm-specific information attributed to a majority of the profits. Providing further support, Da, Liu and Schaumburg (2010) have recently discovered that contrarian returns arise as a result of investor overreaction in response to the arrival of firm-specific news on discount rate as well as liquidity shocks.

Kang, Liu, and Ni (2002) witnessed short-term contrarian returns for the Chinese stock market. The loser minus winner portfolio which is formed based on the past 1-week return generated significant returns for only the holding period of 1 week. There are mainly positive returns observed from weeks 2 to 26 and none of the returns are significant. Wang, Burton and Power (2004) evidenced significant returns for only the first week after portfolio formation and insignificant returns for weeks 2 to 20. Contrarily, Chou, Wei and Chung (2007) have found highly significant contrarian returns for the Tokyo stock exchange based on one-month formation and holding periods from 1 to 24 months.

Griffin, Kelly and Nardari (2010) have used data from 28 developed and 28 emerging markets to see if there are any substantial trading profits in the semi- strong form efficient markets. Their results show that return momentum is substantially larger in the developed markets. Their findings suggest that the emerging markets do not under or overreact to news contained in the past returns any more than in developed markets. It is concluded that the emerging markets incorporate past market and portfolio returns into prices slightly better than the developed markets. The 56 stock markets are covered with loser minus winner portfolios constructed, based on 1-week holding and formation periods. Some of the highest average weekly returns for the contrarian portfolio are recorded for Argentina, Zimbabwe, Canada and Pakistan. Overall, for the 26 developed stock markets returns are significant for 21 and for the 17 emerging markets they are significant for 14.

Mohd Arifin and Power (1996) and Ali, Ahmed, and Anusakumar (2011) have considered the Malaysian stock market for their respective studies. Afrin and Power (1996) have used a sample of 47 stocks to investigate overreaction using weekly data from 1990 to 1994. The KLSE composite index has been used to construct the winner and loser portfolios based on the top and bottom 10 stocks. Over a period of ten weeks the average cumulative excess return (ACER) are examined. The results have indicated the existence of return reversals as the winner stocks exhibit negative returns for weeks one to three, and the loser stocks yield positive returns throughout the ten weeks,. Also for the ten weeks the ACER of the loser minus winner stocks is also positive. However, as the *t*-value and/or *p*-value are not provided by the authors, so the statistical significance of the ACER could not be assessed. Nevertheless, for one week following portfolio formation, the CER *p*-value indicates that the returns are positively significant with the conclusion that there is 'statistically significant' overreaction for the first two weeks.

Ahmad and Tjan (2004) have claimed that there existed overreaction in Malaysian Stock Exchange and find that winner and loser stocks experienced return reversals. However, there are negative and insignificant returns for the loser minus winner portfolios. As stipulated by De Bondt and Thaler (1985), to justify the presence of overreaction, the difference between the loser and winner portfolios has to be significantly positive. A sample of top 10 best and worst performing stocks is tested for the year 1997. The holding period of 1, 2 and 3 weeks is considered. The effect of the 1997 Asian financial crisis is also investigated by dividing the sample into pre-crisis (January to June 1997) and crisis (July to December 1997) periods. For the pre-crisis period, the returns have remained negatively significant at the 5 percent level for the 2-week holding period with a return of –7.88 percent. During the crisis, contrarian returns are positive but insignificant with the highest return of 2.99 percent for the 2-week holding period. An unprofitable contrarian strategy is evidenced overall for the year 1997.

Recently, short-term overreaction in the Malaysian stock market is also studied by Ali, Nassir, Hassan, and Abidin (2010). Their study has focused on analysing the market reaction to 13 individual events that took place between January 1987 and December 2006 (such as the announcement of a general election). Their results are over all inconclusive with evidence of overreaction for some events e.g., political events but not for others, like international events.

The underreaction and overreaction hypothesis is also investigated in some of the international markets, which are Spain [Alonso and Rubio (1990)], Canada [Kryzanowsky and Zhang (1992)], Australia [Brailsford (1992)], UK [Clare and Thomas (1995)], Japan [Chang, *et al.* (1995)], Hong Kong [Akhigbe, *et al*. (1998)], Brazil [DaCosta and Newton (1994), Richards (1997)], New Zealand [Bowman and Iverson (1998)], China [Wang, *et al*. (2004)], Greece [Antoniou, *et al.* (2005)] and London [Spyrou, *et al*. (2007)].

3.6. The Hypothesis Formulation

It has been largely observed that an unexpected event may result in stock market volatility everywhere around the world. According to Javid (2009), the volatility caused by an event has a much longer life than the event itself. This behaviour has been consistently observed in a large number of studies including a few for Pakistan [Chou (1988); Javid and Ahmed (1999)]. The objective of present study is to capture the response of KSE to global financial crisis of 2008 and impact on the stock market behaviour in Pakistan. In the standard event study methodology, it is tested to determine whether KSE experienced significant abnormal returns in response to this shock.

In order to test for under and overreaction in the financial and non-financial sectors, the excess returns are compared between winner and loser portfolios against the following hypothesis;

Hypothesis 1: Investors did not either under-weigh or over- weigh the financial crisis news

H_1: $CAR_L = CAR_W$

Hypothesis 2: Investors under-weighed the 2008 financial crisis news

H_2: $CAR_L < CAR_W$ Under- reaction (if magnitude < 0)

Hypothesis 3: Investors over-weighed the 2008 financial crisis news

H_3: $CAR_L > CAR_W$ Over-reaction (if magnitude > 0)

Where,

CAR_L = Cumulative Abnormal Return for Losers

CAR_W = Cumulative Abnormal Return for Winners

This implies that if there is no difference in the Cumulative Abnormal Returns of the winner and loser portfolios then there is no evidence of overreaction in the stock market. However if the cumulative abnormal returns of the loser portfolio exceeds that of the winner portfolio then there is evidence of overreaction. There is a possibility that various sectors may react differently to the same news and for that purpose both the financial and non-financial sector have been considered to see the impact of the same news [Kutan and Muradoglu (2012)]. The commercial banking sector has been used as a proxy for the financial sector while the oil & gas and chemicals sector have been used as a proxy for the non-financial sector. This sector selection criterion is in line with the methodology adopted by Ali, Ahmad, and Anusakumar (2011)]. Hence, the acceptance of the Null Hypothesis would lead to the conclusion of absence of Overreaction and the rejection would prove otherwise in each of the selected sectors.

4. DATA AND METHODOLOGY

In this section the methodological framework and details of the sample data is presented.

4.1. Data

The sample data for the stock price and stock index are obtained from the Karachi Stock Exchange (KSE) and Securities and Exchange Commission of Pakistan (SECP) websites for the period September 2007 to 2009. This data is used to obtain the daily and weekly returns of an individual stock.

4.1.1. *Historical Prices*

The historical closing prices are used to calculate the abnormal returns for the sample of companies listed on the KSE 100 Index. The daily data is obtained from KSE and SECP websites. The daily closing prices are then used to get weekly returns for the time period considered for the study i.e. from 01-09-2007 to 10-09-2009.

4.1.2. *Portfolio Formation*

The first week's returns prior to the event date are considered for the creation of the winner and loser portfolios. The data is collected for the three largest sectors of the KSE 100 Index namely; Commercial Banking, Oil & Gas and Chemicals sector. The sample is divided into two sub-periods. The whole sample period consisted of 515 trading days in which the first consists of 260 trading days from September 1, 2007 through September 15, 2008 and the second period is composed of 255 trading days from September 23, 2008 through September 10, 2009.

4.1.3. *Index Choice*

The index chosen for the study is the KSE 100 Index. This index is chosen because it reflects the broad index that covers the entire Pakistani stock market. A brief history of the KSE 100 Index performance from 2002–2012 is graphically presented in the appendix.

4.2. Methodology

In the methodology section the study explains the mechanism for conducting an event study and the justification of applying this methodology. The calculation of abnormal returns, the statistical calculations and tests used are also presented.

Event studies have often been used in the past to look at many issues in finance especially that involve any news or happenings that affect or impact a firm's market value. The news could be about policy or regulatory change,

earning announcements, stock splits or even a natural disaster. Event studies consider the semi-strong form of the efficient markets hypothesis.

The event study methodology is used to see the speed of adjustment of prices to any new information. The cumulative performance of stocks is averaged over time considering the time before and after the event [MacKinlay (1997)]. Many researchers believe that event studies are a good procedure for evaluating market efficiency on specific events. Fama (1970), being one of these researchers, states that: "The cleanest evidence on market-efficiency comes from event studies, especially event studies on daily returns". Further Binder (1998) states: "The event study methodology has, in fact, become the standard method of measuring security price reaction to some announcement or event." In event studies one has to make some assumptions using the models. Firstly it is assumed that markets are efficient and stocks reflect all relevant information [Fama (1970)]. Also it is assumed that the event is unanticipated where abnormal returns are the result of the reaction. If the event is expected, the price reaction from it has already happened. An advantage of this methodology is that it has the ability to detect abnormal performance and the results are easy to interpret which makes them very useful.

4.2.2. *Event Study Procedure*

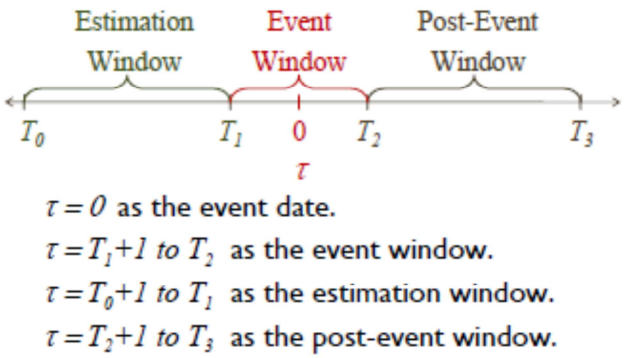
Following the procedure of an event study according to MacKinlay (1997), the steps involved in carrying out the study include Definition of Event, Selection Criterion, Normal and Abnormal Returns, Defining Estimation Procedure and Defining the testing framework**.** These are presented below in detail.

4.2.3. *Definition of Event*

The first step in conducting an event study is to define the event that is being examined and the time period under consideration. This time period is chosen to be larger than the period of interest to be able to examine the period surrounding the event. Choosing a short window might arise the concern of not all information being captured while selection of a long event window is more likely to capture irrelevant information. The results are therefore less sensitive to the choice of model with short window [Hessler and Eliass (2009)].

4.3. Time Line for the Event Study

To investigate the investor overreaction at the KSE the same event window methodology has been used as employed by Ali, *et al.* (2011) and Spyros, *et al.* (2007). The event date under consideration is 15th September 2008 (Lehman Brothers' demise). A pre event window is created based on 250 days prior to the event for the portfolio formation (Top Gainers and Losers). The post event window under 4onsideration stretched to 1, 2, 3, 4, 12, 24, 36 and 52 weeks.



4.4. Selection Criterion

The companies selected for the study are listed on the KSE 100 Index. Two main sectors namely financial and non-financial sectors are chosen to represent the index.

4.5. Formation of Winner and Loser Portfolios

The winner, loser and loser-winner portfolios are constructed similarly to the method used by Iihara et al. (2004). First, the stocks are ranked according to the past week's return. Then the top and bottom one third of the stocks are used for portfolio construction rather than deciles or quintiles due to the smaller number of stocks compared to studies in other markets. The top one third is classified as winner stocks and the bottom one third are classified as loser stocks. Equally weighted winner and loser portfolios are then constructed using these selected stocks. The portfolios are held for the following *H* weeks, where *H* takes the value 1, 2, 3, 4, 12, 24, 36 or 52. The portfolio returns are calculated accordingly to assess whether there is any overreaction. Under the overreaction hypothesis, the ACAR of the loser minus winner portfolio should be greater than zero when overreaction is present. While, according to the underreaction hypothesis, the ACAR of the loser minus winner portfolio should be less than zero to indicate any presence of underreaction.

4.6. Expected, Actual and Abnormal Returns

In order to measure the impact of the event, the actual return and the expected returns are used. The observed return is calculated from each company's historical return by using the following formula,

$$R_t = \frac{P_t - P_{t-1}}{P_{t-1}}$$

R_t = Return of security at day *t*, P_t = Price of stock at day *t*, P_{t-1} = Price of stock at day *t*-1

In order to calculate the abnormal returns, the expected returns are required. The expected returns are the ones that could be received if the event has not taken place. There are several models that are employed to calculate the expected returns including the Capital Asset Pricing Model (CAPM), market model, index model and the constant mean model. For the purpose of the current study the Risk Adjusted Market model is used which is explained below.

$$E(R_{it}) = \alpha_i + \beta_i R_{mt}$$

where, $R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it}$

so, $R_{it} = E(R_{it}) + \varepsilon_{it}$

$E(R_{it})$ = Expected Return of security *i* at day *t*, R_{mt} = Market Return at day *t*, α_i= Intercept of the regression β_i = Beta of the market, ε_{it} = Error Term.

The difference between the observed return and the expected return is then used to compute the abnormal return for firm *i* with event date *t*.

$$AR_{it} = R_{it} - E(R_{it})$$

AR_{it} = Abnormal Return of security *i* at day *t*,
R_{it} = Observed Return of security *i* at day *t*
$E(R_{it})$ = Expected Return of security *i* at day *t*,

The Cumulative Abnormal Return (CAR) is then computed by summing the abnormal returns for stock *i* from t_1 time to t_2.

$$CAR(t_{i1}, t_{i2}) = \sum_{t=t_1}^{t_2} AR_{it}$$

CARs are calculated over the next *H* weeks indicating the various holding periods (where *H* takes the value 1, 2, 3, 4, 12, 24, 36, or 52). CAR is simply the sum of abnormal returns over *H* weeks. Finally, the average cumulative abnormal return (ACAR) is computed for the winner and loser stock portfolios as follows:

$$ACAR_{pt} = \frac{1}{N} \sum_{i=1}^{N} CAR(ti1, ti2)$$

$ACAR_{pt}$ = average CAR for portfolio *p*,
N = the test periods
CAR_p = is the cumulative abnormal return for portfolio *p*.

4.7. The Testing Framework

The ACAR for the arbitrage portfolio considers the difference between the loser and winner stock portfolios (i.e., $ACAR_{loser} - ACAR_{winner}$). As dictated by the overreaction hypothesis, if there is significant return for the arbitrage portfolio ($ACAR_{loser} - ACAR_{winner} > 0$), then overreaction is present in the market. On the other hand if there are no significant returns and then there is indication of underreaction portfolio ($ACAR_{loser} - ACAR_{winner} < 0$) For the

efficient markets, the Efficient Market Hypothesis (EMH) implies that the difference should be zero ($ACAR_{loser} - ACAR_{winner} = 0$).

For testing the results, present study has the following null and alternative hypothesis;

H_1: $ACAR_L = ACAR_W$
H_2: $ACAR_L < ACAR_W$ (Underreaction if magnitude < 0)
H_3: $ACAR_L > ACAR_W$ (Overreaction if magnitude >0)

4.8. The Test of Significance

To test the significance of ACAR results, the two-sided t-test is used. Since there are more than 30 ACARs so the two-sided test is used for both negative and positive values at a 5 percent level. The critical values are + –1.96 so we reject our null hypothesis when the absolute t-values are larger than 1.96.

$$t_t = \frac{CAAR - H_0 Value}{\sigma_t^2 / \sqrt{n}}$$

$$\sigma_t^2 = \sqrt{\frac{\sum_t^n (CAAR_t CAR_t)^2}{n-1}}$$

ACAR = Average Cumulative Abnormal Return.
CAR = Cumulative Abnormal Return for each stock.
H_0 Value = Zero since the null hypothesis is that there is no abnormal return.
σ_t^2 = Variance.
n = Number of observations.

5. EMPIRICAL RESULTS AND DISCUSSION

The event study methodology results are presented in this section. The section 4.1 discusses descriptive statistics of the financial and the non-financial sectors.

5.1. Summary Statistics of Data

The sample includes in all 36 stocks with 18 stocks from the Commercial Banking sector representing the financial sector while 9 stocks each from the Oil and Gas and Chemicals sector representing the non-financial sector. In all, 106 weeks are considered based on 52 pre-event and 54 post-event weeks with a formation period and various holding periods following the crisis. The descriptive statistics for the entire sample are presented in the following Table 5.1 in terms of the weekly returns and abnormal returns.

Table 5.1

Descriptive Statistics for the Total Sample (%)

	Mean	Standard Deviation	Kurtosis	Skew-ness	Mini-mum	Maxi-mum	Sum
Average Weekly Returns (All Sectors)	0.0083	0.136	306.73	17.30	-0.08	2.42	2.69
Abnormal Returns (All Sectors)	0.0094	0.173	120.20	8.93	-0.60	2.42	3.04
Financial Sector							
Winners	–0.0014	0.018	8.60	–1.56	–0.08	0.05	–0.08
Losers	–0.0011	0.018	1.47	–0.47	–0.05	0.04	–0.06
Non-Financial Sector							
Winners	–0.0002	0.014	1.90	–0.40	–0.05	0.03	–0.01
Loser	0.0016	0.019	2.26	–0.89	–0.06	0.04	0.09

There are 376 weekly observations for the entire sample with 515 working days. The data has a mean average return of 0.0083 while it has an abnormal return of 0.0093.The standard deviation for the average return is 0.136 and for the abnormal return was 0.173. The kurtosis, which is measure of the "peakedness" of the probability distribution, has a value of 306.7 for the average return and 120.2 for the abnormal return. Similarly the skewness, which is the measure of the extent to which a probability distribution of a real-valued random variable leans to one side of the mean, is positive for both the variables. This means that the average returns are positively skewed with a value of 17.3 and the abnormal returns are also positively skewed with a value of 8.9. The average return has a minimum value –0.08 and a maximum value of 2.42 while the abnormal return has a minimum value of –0.60 and a maximum value of 2.42. For the financial sector, the winner portfolio has a negative mean value of -0.0014 while the losers' portfolio has a negative value of –0.0011. The standard deviation for the winners is 0.0178 and for the losers it is 0.0181. The kurtosis has a value of 8.602 for the winners and 1.469 for the losers' portfolio. The data is found to be negatively skewed both for the winners and losers portfolio with a value of –1.56 and –0.47 respectively. The winners' portfolio has a minimum value of –0.083 and a maximum value of 0.050 while the loser portfolio has a minimum value of -0.048 and a maximum value of 0.041. For the non-financial sector, the winner portfolio has a negative mean value of –0.0002 while the loser portfolio has a positive value of 0.0016. The standard deviation for the winners is 0.0143 and for the losers it is 0.0188. The kurtosis has a value of 1.90 for the winners and 2.26 for the losers' portfolio. Similarly the data is negatively skewed both for the winners and losers portfolio with a value of –0.40 and -0.89 respectively. The winner portfolio has a minimum value of –0.046 and a maximum value of 0.035. The loser portfolio has a minimum value of –0.056 and a maximum value of 0.039.

The weekly average cumulative abnormal returns from t = –250 and t = +260 for the winners and loser portfolios in the pre- and post-crisis period are reported in the Table 5.2 revealing the results for the winner, loser, and loser-winner portfolios during the formation and various holding periods. Portfolio for the winner (loser) is assembled choosing the best (worst) performing stocks on the basis of the previous one week return. Whereas, the portfolio returns are calculated for the *H* holding periods. The column titled 'formation period' presents the portfolio abnormal returns for the week *t-52*. The other columns provide the average cumulative abnormal returns (ACAR) for 8 holding periods ranging from 1 to 52 weeks. The associated t-statistic for the sample is mentioned in the braces.

Table 5.2

ACAR (%) for Winner, Loser and Loser-Winner Portfolios for the Financial Sector

Portfolio	Formation Period	Holding Period (Weeks)							
		1	2	3	4	12	24	36	52
Winner	0.06	–0.04	–0.04	–0.01	–0.01	0.06	0.07	0.04	–0.01
t-stat	(–4.35) *	(–1.31)	(–1.15)	(–0.37)	(–0.30)	(1.98) *	(2.33) *	(1.40)	(–0.20)
Loser	–0.21	0.01	0.01	0.01	0.005	–0.005	–0.01	–0.005	0.002
t-stat	(–4.32) *	(0.69)	(0.84)	(0.30)	(0.27)	(–0.27)	(–0.42)	(–0.26)	(0.14)
Loser–Winner	**–0.27**	**0.05**	**0.05**	**0.02**	**0.01**	**–0.06**	**–0.08**	**–0.05**	**0.01**
t-stat	**(–0.09)**	**(1.96) ***	**(1.99) ***	**(0.67)**	**(0.57)**	**(–2.15) ***	**(–2.76) ***	**(–1.66)**	**(0.33)**

* Statistical Significance at the 5 percent level.

Comparison between the formation and holding period returns reveal prominent reversals especially for loser portfolios. For the formation period, the winner stocks has a significantly positive return of 0.06 which turns into insignificant negative returns for the next four holding periods indicating return reversals. This is followed by significant positive returns in the 12th and 24th week i.e. 0.06 and 0.07 at five percent level of significance. The 36th and 52nd weeks fail to indicate any significant returns. On the other hand, the loser stocks exhibit significantly negative returns followed by positive but insignificant returns for the next four holding periods indicating some level of reversals. Negative but insignificant returns are seen later in the 12th, 24th and 36th weeks following the event i.e. –0.005, –0.01 and –0.005. Thus the loser portfolio returns performance indicates absence of any significant return reversals for all the 52 weeks following the crisis news. The ACAR differential of loser and winner portfolio has a negative but insignificant value of –0.27 for the formation period. Yet there is evidence of overreaction for the next four weeks out of which the first two weeks show significant overreaction with 0.05 percent ACAR at the five percent level of significance. The next two holding periods i.e. 12th and 24th weeks

indicate negative but significant ACAR of –0.06 and –0.08 respectively which signifies the presence of underreaction in the financial sector following the crisis news. Overall, there are disproportionate levels of reversal for both the winner and loser portfolios. The reversals extend up to 4 weeks for the both the portfolios, but weaken for holding periods exceeding 4 weeks. This implies that the return reversals for the winner and loser stocks are more severe in time period immediately following the crisis news and later on it fades out. Bremer and Hiraki (1999) have also observed such reversals in the winner and loser portfolios' returns. The results of the study can also be related to those of Khaneman and Tversky (1982) in which individual investor are found to focus more on unexpected bad news rather than good news. It appears in this study that investors have a propensity to overestimate the possible effects of negative news than the positive news in the stock market. This could be one of the reason for greater overreaction and subsequent reversals for stocks.

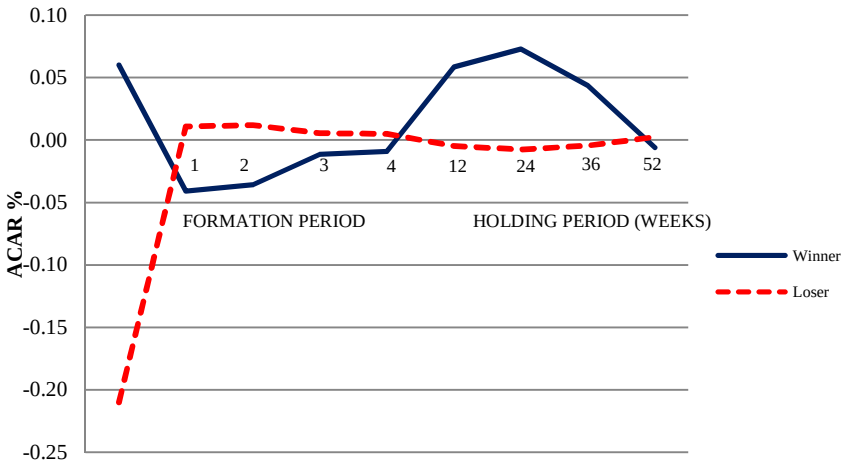
Table 5.2 also sheds light on the differences in ACAR among the loser and winner for the various holding periods. The undereaction hypothesis is supported if the resultant ACAR is negative but if its positive then there is evidence of overreaction. The result indicates presence of significant overreaction in the first two weeks with ACAR of 0.05 percent at 5 percent level of significance. Similarly there is evidence of undereaction in the 12th and 24th week with ACAR of –0.06 percent and –0.08 percent at 5 percent significance level. Overall, the results present strong evidence in support of both under and overreaction for the financial sector stocks. From these findings it could be incurred that particularly for the financial sector stocks, if the arbitrage portfolio is held for 4 weeks or less then the contrarian strategy could be profitable.

The findings of the study are consistent with that of Griffin, Kelly and Nardari (2010) who suggest that the emerging markets do not under or overreact to news contained in the past returns any more than in developed markets. It is concluded that the emerging markets incorporate past market and portfolio returns into prices slightly better than the developed markets. The results are also in line with the study of Mohd, Arifin and Power (1996) that discovered significant overreaction only for the week 1 and week 2.

In any case, the findings broadly corroborate the findings of the earlier study in that overreaction is present in KSE 100 Index [Ali, Ahmed, and Anusakumar (2011); Ahmad and Tjan (2004)], where the loser minus winner portfolio do not yield any positive returns and their study is conducted only for the year 1997. The results are consistent with those of Mohd, Arifin and Power (1996).

A graphical presentation of the average cumulative abnormal returns (ACAR) for the financial sector is shown below.

Fig. 5.1. ACAR (%) for Winner, Loser and Loser-Winner Portfolios for the Financial Sector



The average weekly cumulative abnormal returns from t= –250 and t=+260 for the losers and winners of the non-financial sector are presented in Table 5.3. Similar methodology is adopted for creating the calculating the winner and loser portfolio stocks. The 'formation period' provides the portfolio abnormal returns for the week *t-52*. Rest of the columns show the average cumulative abnormal returns (ACAR) for 8 holding periods from 1 to 52 weeks after the portfolio formation along with the associated t-statistic.

Table 5.3

ACAR (%) for Winner, Loser and Loser-Winner Portfolios for the Non-Financial Sector

Portfolio	Formation Period	Holding Period (Weeks) 1	2	3	4	12	24	36	52
Winner	0.20	0.0020	0.0052	0.0047	0.0050	0.0067	0.0064	0.0064	0.0057
t-stat	(4.04) *	(0.26)	(0.67)	(0.60)	(0.64)	(0.85)	(0.82)	(0.82)	(0.73)
Loser	0.92	0.003	0.004	0.002	0.002	0.004	0.004	0.005	0.003
t-stat	(0.06)	(1.09)	(1.52)	(0.79)	(0.71)	(1.51)	(1.33)	(1.68)	(1.04)
Loser - Winner	**0.72**	**0.001**	**–0.001**	**–0.003**	**–0.003**	**–0.003**	**–0.003**	**–0.002**	**–0.003**
t-stat	**(–3.98) ***	**(0.83)**	**(0.85)**	**(0.19)**	**(0.08)**	**(0.66)**	**(0.51)**	**(0.86)**	**(0.31)**

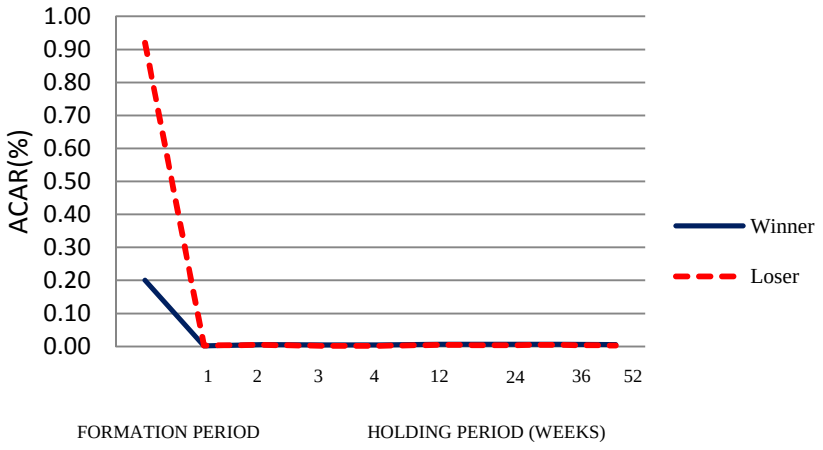
* Statistical Significance at the 5 percent level.

For the non-financial sector, comparison between the formation and holding period returns do not reveal any prominent reversals either of the portfolios. For the formation period, only the winner stocks had significant positive returns. During the holding period, the ACAR remains positive and insignificant not only for the winner stocks but also for the losers stocks. For the winner portfolio, there is a strong positively significant return in week *t*–52(at the 5 percent level), and displays similar positive returns up to week 52 which are statistically insignificant. However, a gradually increasing positive trend in returns can be observed for holding periods of 12 weeks. Similarly, there are notable positive returns through all the weeks. The 52-week holding period has the highest return (0.067 percent) in the 12th week. Moreover, returns for all holding periods are statistically insignificant at the 5 percent level. Overall, there are no signs of any reversals for the winner and loser portfolios. Persistence of positive trend is observed during the 8 holding time periods.

The table also explains the differences in ACAR between the loser and winner portfolio for the various period of holding. The study found negative ACARs during the entire holding period except for the week 1. The returns are particularly negative from week 2 to 52 with returns ranging from –0.001 to -0.003 which are insignificant at the level of 5 percent. Overall, the results of this study present strong evidence in support of absence of under or overreaction for the winner and loser portfolio. These results endorse the findings of Ahmad and Tjan (2004), where the loser minus winner portfolio does not yield any significant returns.

A graphical presentation of the average cumulative abnormal returns (ACAR) for the non-financial sector is shown below.

Fig. 5.2. ACAR (%) for Winner, Loser and Loser-Winner Portfolios for the Non-Financial Sector



6. CONCLUSION AND PRACTICAL IMPLICATIONS

The financial sector has developed in different ways among countries for a variety of reasons. But the general trend has been towards financial liberalisation and financial innovation with increasingly liberal stance in terms of reforms allowing this sector to diversify its activities. The mismanagement of this liberty leads to financial crisis as of year 2008.

The purpose of this study is to analyse the investor behaviour in terms of overreaction to better understand the impact of the global financial crisis of Year 2008 on the local stock market. It also aimed at contributing to the short term under and overreaction literature by using daily stock return data of Karachi Stock Exchange for the period of September 2007 to September 2009. This time period is considered as the pre and post event window for the sake of analysis. It is significant to understand the impact of the global financial crisis of 2008 on the local economy which is considered among the emerging Asian economies. The study helps to analyse the shock absorbing capability of the local market in terms of investor overreaction.

The under and overreaction hypothesis postulates that investors respond too strongly to unfavourable and favourable information. That is, on the release of unfavourable (favourable) news, investors temporarily price securities below (above) their new intrinsic values. Support for these hypotheses could be found in several studies like Atkins and Dyl (1990), Bremer and Sweeney (1991), and Howe (1986).

For the purpose of the study, the event study methodology is employed by adopting a strategy similar to the study of Lo and MacKinlay (1990). The historical closing price is used to calculate the abnormal returns for the sample of companies listed on the KSE 100 Index. The major findings for the financial sector show that the returns reversal is particularly prominent for periods from 1 to 4 and 52 weeks with returns ranging from 0.33 to 1.92 percent. In addition, highly significant returns (at the 5 percent level) are found for 12 and 24 weeks. Though the returns are only marginally significant for the weeks 1, 2, 12, 24 and 36 weeks and insignificant for weeks 2, 4 and 52, nevertheless the ACARs remain positive through the first four weeks and then in the 52nd week. By 52 weeks, winner stocks yielded a negative return of 0.01 percent and loser stocks yielded a slightly higher return of 0.002 percent. Overall, the results presented strong evidence in support of both under and overreaction for the financial sector.

In case of the non-financial sectors, the negative ACARs are found throughout the holding periods except for the week 1 indicating underreaction but which was not significant. The returns are particularly negative from week 2 to 52 with returns ranging from –0.001 to –0.003 which are insignificant at the level of 5 percent. Overall, the results presented strong evidence in support of presence of underreaction or overreaction for the non-financial sector. These

results are consistent with the findings of Ahmad and Tjan (2004), where the loser minus winner portfolio did not yield any positive returns. The findings reveal that there are not any pronounced reversals for the post-crisis period which indicates a diminished degree of any reaction after the crisis period which may be attributable to the cautionary behaviour of investors.

It could be inferred from the findings that in the case of Pakistan, the financial sector has limited linkages with the global financial market as there is less financial liberalisation and financial innovation. So, the absence of a well-developed financial market especially the secondary market averted Pakistan from the direct impact of the financial or banking crisis at large. Thus it is concluded that Pakistan remained well-insulated against the contagion in the international financial markets.

6.1. Implications of the Study

The aim of the present study is to explore the investor behaviour in relation to the under and overreaction as a result of the global financial crisis of the year 2008. The present study is helpful to the local institutional as well as individual investors. As the institutional investors are considered to be the notable participants and key players of any stock market due to their large holdings of shares of companies, the findings of the present study will be of great advantage to the institutional investors in administering and devising a safe and secure investment strategy, especially, in times of global financial crisis in the future. The study may also be helpful to the institutional investors in realising the importance of any global event in the future. Besides their focus on the domestic events such as local interest rates, T-bill rates, terrorism attacks, etc., they need to be aware of the global happenings in order to better align their investment objectives with the global events to minimise the risk of their investments. As these individual investors are also the important players of the stock markets, the results of the study can also be helpful to them in adhering to the buy and hold strategy to minimise risk and to avoid any losses.

The present findings may also prove to be advantageous for the Securities and Exchange Commission of Pakistan (SECP) in devising policy to control the volatility in the stock markets of Pakistan. It has been observed in the data period under study i.e. from September 2007 to September 2009 that after September 15, 2008 which is a referral point for the global financial crisis; the stock trading was temporarily closed in Pakistan. Thus, the SECP may use the results of the study to devise a mechanism which shall help absorb the effects of global financial events / crises in the future. In lei of this the trading in the stock markets may not need to be temporarily terminated and eventually this will build investor's confidence and reduce volatility in the stock markets.

Additionally, the results of the study may be valuable for the different sectors of the Pakistan economy as the data for three sectors i.e. Banking, Oil

and Gas, and Chemicals is analysed to assess the impact of this particular global event. Also, the management of them economic sectors may seek guidance from the results of the present study in formulating various strategies for the returns associated with their stocks by helping the companies retain their shareholders in the long run.

APPENDIX

Fig. 1.1. The KSE at a Glance from 2008-2012

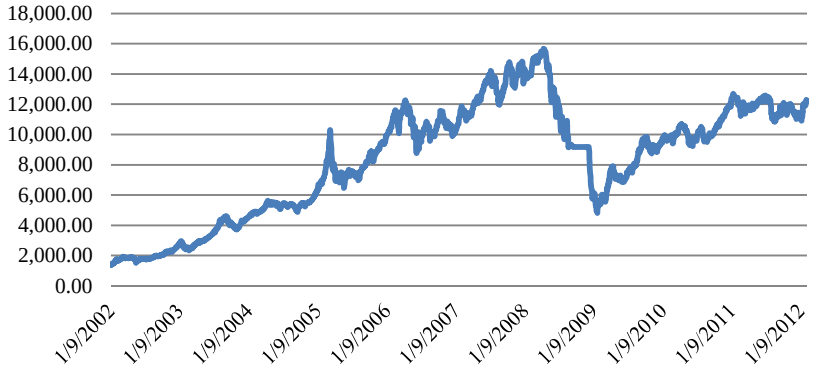


Table 1.1

The Highlights of the Banking System

(in Million Rs)

	2004	2005	2006	2007	2008	2009	2010	2011
Total Assets	3,038,234	3,347,065	3,937,632	4,722,143	5,088,662	5,940,397	6,499,838	7,380,057
Deposits	2,218,354	2,648,514	2,987,217	3,581,905	3,848,720	4,400,710	4,978,672	5,662,953
Total Equity	167,949	281,186	406,702	549,259	599,237	670,117	686,890	795,507

Source: Economic Survey of Pakistan.

Table 1.2

The Highlights of the Fuel and Energy Sector

Years	DY Ratio	Profitability in Rupees	Size in Millions	Retained Earnings in Millions	Market to Book Value	Market Capitalisation in Billions
2010	9.45	7.9	444884	182848	1.13	1134.7
2009	5.65	5.4	277918	159524	1345	1098.18
2008	4.15	6.5	182954	169210	1.47	1081.48
2007	3.03	4.9	114089	161779	1.74	890.84
2006	3.5	4.3	108973	97082	2.13	485.75
2005	8.06	2.1	94725	58359	1.9	191.54
2004	9.15	1.9	89745	49875	1.1	104.48

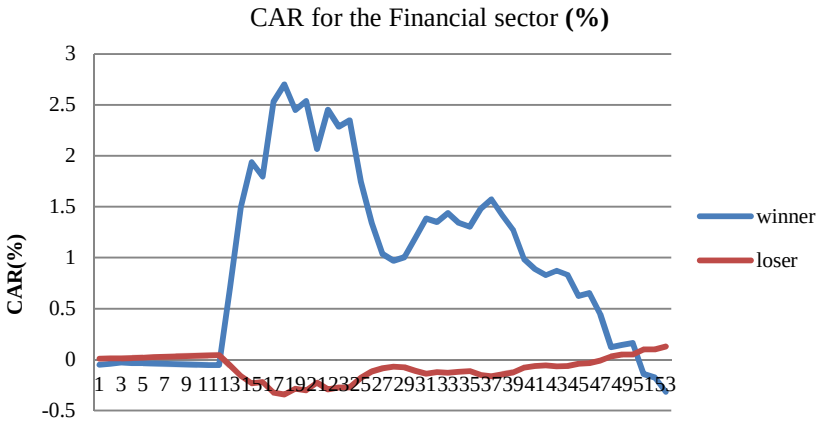
Source: Economic Survey of Pakistan.

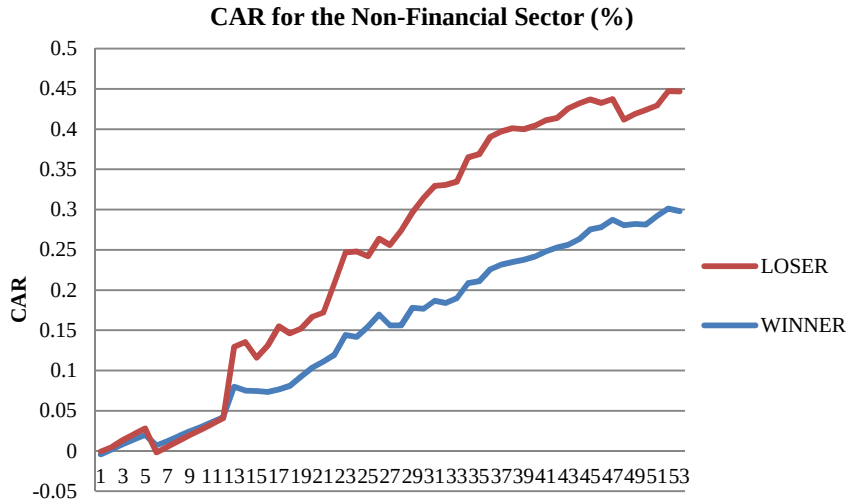
Table 1.3

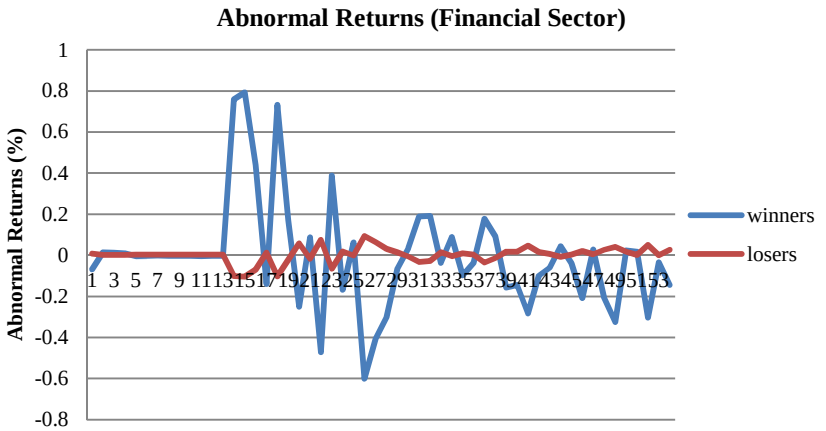
The Highlights of the Chemicals and Pharmaceutical Sector

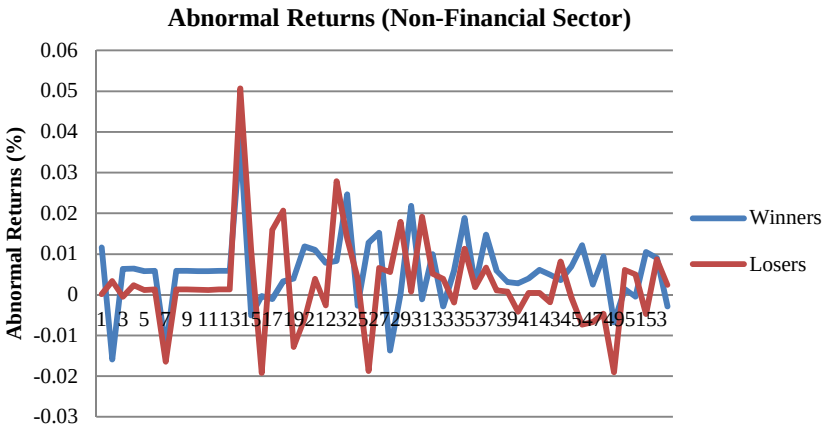
Years	DY Ratio	Profitability in Rupees	Size in Millions	Retained Earnings in Millions	Market to Book Value	Market Capitalisation in Billions
2010	5	8.3	255733	68470	2.09	258.39
2009	5.51	10.1	211217	58925	2.24	241.41
2008	6.14	7.6	166685	41442	2.44	221.9
2007	5.18	8.1	149175	36331	2.94	171.5
2006	3.8	7.4	143112	31887	2	158.74
2005	5.01	2.3	130348	18507	1.9	108.2
2004	7.57	2.9	123451	14640	1.3	50.75

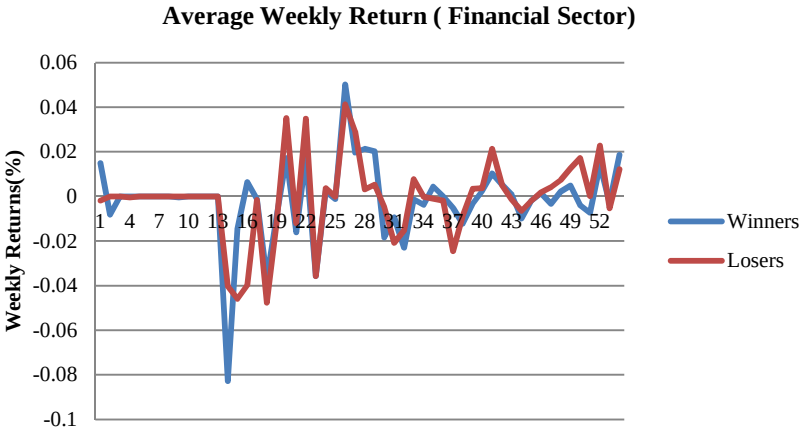
Source: Economic Survey of Pakistan.

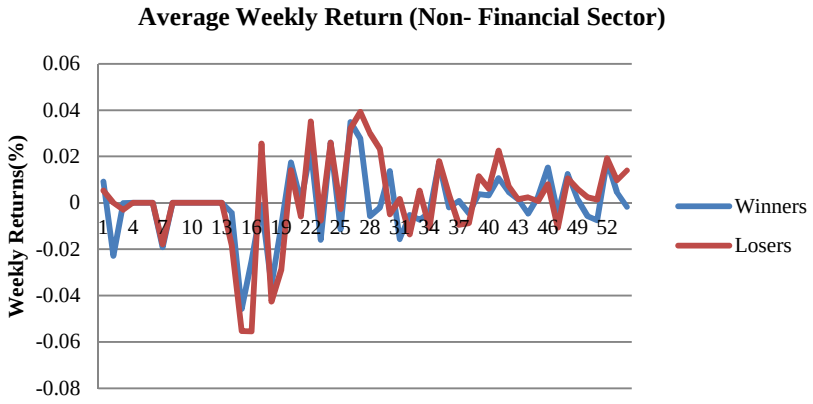


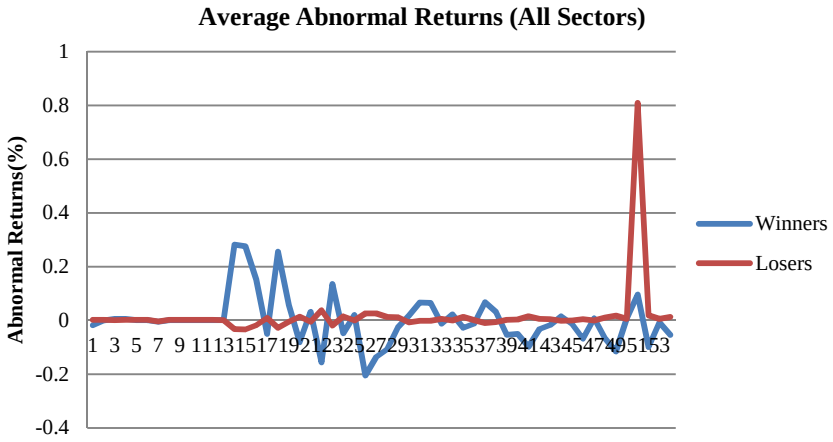



Abnormal Returns (Financial Sector)
Abnormal Returns (%)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
winners
losers


Abnormal Returns (Non-Financial Sector)
Abnormal Returns (%)
0.06
0.05
0.04
0.03
0.02
0.01
0
-0.01
-0.02
-0.03
Winners
Losers


Average Weekly Return (Financial Sector)
Weekly Returns(%)
0.06
0.04
0.02
0
-0.02
-0.04
-0.06
-0.08
-0.1
1 4 7 10 13 16 19 22 25 28 31 34 37 40 43 46 49 52
Winners
Losers





REFERENCES

Ahmad, Z. and S. Tjan (2004) Short-run Overreaction, Stock Prices and Investors' Irrationality in the Kuala Lumpur Stock Exchange. *International Journal of Management Studies* 11, 1–19.

Akhigbe, A., T. Gosnell, and T. Harikumar (1998) Winners and Losers on NYSE: A Reexamination Using Daily Closing Bid-ask Spreads. *Journal of Financial Research* 21, 53–64.

Ali, N., A. M. Nassir, T. Hassan, and S. Z. Abidin (2010) Short-run Stock Overreaction: Evidence from Bursa Malaysia. *International Journal of Economics and Management* 4, 319–333.

Ali, R., Z. Ahmad, and S. V. Anusakumar (2011) Stock Market Overreaction and Trading Volume: Evidence from Malaysia. *Asian Academy of Management Journal of Accounting and Finance* 7, 103–119.

Alonso, A. and G. Rubio (1990) Overreaction in the Spanish Equity Market. *Journal of Banking and Finance* 14, 469–48.

Angbazo, L. A., and R. Narayanan (1996) Catastrophic Shocks in the Property-Liability Insurance Industry: Evidence on Regularity and Contagion Effects. *The Journal of Risk and Insurance* 63:4, 619–637.

Antoniou, A., E. C. Galariotis, and S. I. Spyrou (2005) Contrarian Profits and the Overreaction Hypothesis: The Case of the Athens Stock Exchange. *European Financial Management* 11, 71–98.

Atkins, A. B. and E. A. Dyl (1990) Price Reversals, Bid-ask Spreads, and Market Efficiency. *Journal of Financial and Quantitative Analysis* 25, 535–47.

Ball, R. and P. Brown (1968) An Empirical Evaluation of Accounting Income Numbers. *Journal of Accounting Research* 6, 159–178.

Barberis, Nicholas C., Andrei Shleifer, and Robert W. Vishny (1998) A Model of Investor Sentiment. *Journal of Financial Economics* 49, 307–343.

Barklay, M. J. and R. H. Litzenberger (1988) Announcement Effect of New Equity Issues and Use of Intraday Price Data. *Journal of Financial Economics* 21:1, 71–109.

Binder, J. (1998) The Event Study Methodology Since 1969. *Review of Quantitative Finance and Accounting* 11.

Bowman, R. G. and D. Iverson (1998) Short-run Over-reaction in the New Zealand Stock Market. *Pacific-Basin Finance Journal* 6, 475–491.

Brailsford, T. (1992) A Test for the Winner–loser Anomaly in the Australian Equity Market: 1958–1987. *Journal of Business Finance and Accounting* 19, 225–241.

Bremer, M. and R. J. Sweeney (1991) The Reversal of Large Stock Price Decreases, *Journal of Finance* 46, 747–54.

Brown, K. C. and W. V. Harlow (1988) Market Overreaction: Magnitude and Intensity. *Journal of Portfolio Management* 14, 6–13.

Brown, K. C., W. V. Harlow, and S. M. Tinic (1988) Risk Aversion: Uncertain Information and Market Efficiency. *Journal of Financial Economics* 22, 355–85.

Campbell, J. Y., A. W. Lo, and A. W. MacKinlay (1997) *The Econometrics of Financial Markets*. Princeton, New Jersey: Princeton University Press.

Chang, R., D. McLeavey, and S. Rhee (1995) Short-term Abnormal Returns of the Contrarian Strategy in the Japanese Stock Market. *Journal of Business Finance and Accounting* 22, 1035–1048.

Chou, P. H., K. C. Wei, and H. Chung (2007) Sources of Contrarian Profits in the Japanese Stock Market. *Journal of Empirical Finance* 14, 261–286.

Chou, R. (1988) Volatility Persistence and Stock Market Valuation: The Empirical Evidence Using GARCH. *Journal of Applied Econometrics* 56:3, 701–714.

Claessens, S. S., J. Fans Djankov, and L. Lang (1996) The Benefits and Costs of Internal Markets, Evidence from Asian Financial Crisis. World Bank. (Unpublished Working Paper).

Clare, A. and S. Thomas (1995) The Overreaction Hypothesis and the UK Stock Market. *Journal of Business Finance and Accounting* 22, 961–973.

Conrad, J. and G. Kaul (1988) Time Variation in Expected Returns. *Journal of Business* 61, 409–425.

Cox, D. R. and D. R. Peterson (1994) Stock Returns Following Large One-day Declines: Evidence on Short-term Reversals and Longer-term Performance. *Journal of Finance* 49, 255–67.

Da, Z., Q. Liu, and E. Schaumburg (2010) Decomposing Short-term Return Reversal. (SSRN Working Paper).

DaCosta Jr., N. C. A. (1994) Overreaction in the Brazilian Stock Market. *Journal of Banking and Finance* 18, 633–642.

De Bondt, F. M. and R. Thaler (1985) Does the Stock Market Overreact? *Journal of Finance* 40, 793–805.

DeBondt, W. F. M. and R. H. Thaler (1987) Further Evidence on Investor Overreaction and Stock Market Seasonality. *Journal of Finance* 42, 557–80.

Fama, E. (1970) Efficient Capital Markets: A Review of Theory and Empirical Work. *Journal of Finance* 25, 383–417.

Fama, E. F. (1991) Efficient Capital Markets: II. *Journal of Finance* 46, 1575–1617.

Fama, E. F., L. Fisher, M. C. Jensen, and R. Roll (1969) The Adjustment of Stock Prices to New Information. *International Economic Review* 10:1, 1–21.

Felton, A. and C. Reinhart (ed.) (2008) *The First Global Financial Crisis of the 21st Century*.

Griffin, J. M., P. J. Kelly, and F. Nardari (2010) Do Market Efficiency Measures Yield Correct Inferences? A Comparison of Developed and Emerging Markets. *Review of Financial Studies* 23:8, 3225–3277.

Hessler, A. and D. Eliass (2009**)** Insider Trading is the Regulatory Change a Toothless Tiger? University of Gothenburg.

Howe, J. S. (1986) Evidence on Stock Market Overreaction. *Financial Analysts Journal* 42, 74–77.

Iihara, Y., H. K. Kato, and T. Tokunaga (2004) The Winner-loser Effect in Japanese Stock Returns. *Japan and the World Economy* 16, 471–485.

Jacques, M. (2009) Global Recovery Rests on a Fresh US Approach to China. *The Guardian*, 13th Feb.

Javid, Y. Attiya (2009) The Response of the Pakistani Stock Market to a Cataclysmic Event. (MPRA Paper No. 37565).

Javid, Y. Attiya and Ayaz Ahmed (1999) The Response of Karachi Stock Exchange to Nuclear Detonations. *The Pakistan Development Review* 38:4, 778–786.

Jegadeesh, N. and S. Titman (1993) Returns to Buying Winners and Selling Losers: Implications for Stock Market Efficiency. *Journal of Finance* 48, 65–91.

Jegadeesh, N. and S. Titman (1995) Overreaction, Delayed Reaction, and Contrarian Profits. *Review of Financial Studies* 8, 973–993.

Jensen, M. C. and Richard S. Ruback (1983) The Market for Comparative Control: The Scientific Evidence. *Journal of Financial Economics* 11:1–4, 5–50.

Jong, Frank De A. Kemmna and T. Klock (1992) The Contribution to Event Study Methodology with an Application to the Dutch Market. *Journal of Banking and Finance* 16, 11–36.

Kahneman, D. and A. Tversky (1982) The Simulation Heuristic. In D. Kahneman, P. Slovic, and A. Tversky (eds.) *Judgement under Uncertainty: Heuristics and Biases* (pp. 201–208). New York: Cambridge University Press.

Kang, J., M.-H. Liu, and S. X. Ni (2002) Contrarian and Momentum Strategies in the China Stock Market: 1993–2000. *Pacific-Basin Finance Journal* 10:3, 243–265.

Keynes, J. M. (1936) *The General Theory of Employment, Interest and Money*. London: Macmillan.

Keynes, J. M. (1964) *The General Theory of Employment, Interest and Money*. New York: Harcourt, Brace, Jovanovich.

Khotari, S. P. and J. B. Warner (2005) Econometrics of Event Studies. Chapter 1. In B. Espen Eckbo (ed.) *Handbook of Corporate Finance*: *Empirical Corporate Finance*. Elsevier/North Holland.

Kotz, David (2008) Contradictions of Economic Growth in the Neoliberal Era. *Review of Radical Political Economy*, Vol. 40, No. 2.

Kryzanowski, L. and H. Zhang (1992) The Contrarian Strategy Does Not Work in Canadian Markets. *Journal of Financial and Quantitative Analysis* 27, 383–395.

Kutan, A. M., G. Muradoglu, and B. G. Sudjana (2012) IMF Programmes, Financial and Real Sector Performance, and the Asian Crisis. *Journal of Banking and Finance* 36:1, 164–182.

Lo, A. and C. MacKinlay (1990) When are Contrarian Profits Due to Stock Market Overreaction? *Review of Financial Studies* 3:2, 175–206.

Lo, A. W. and C. MacKinlay (1988) Stock Market Prices Do Not Follow Random Walks: Evidence from a Simple Specification Test. *Review of Financial Studies* 1, 41–66.

Lobe, S. and J. Rieks (2011) Short-term Market Overreaction on the Frankfurt Stock Exchange. *The Quarterly Review of Economics and Finance* 51:2, 113–123.

Lockton, D. (2012) Cognitive Biases, Heuristics and Decision-making in Design for Behaviour Change. (Working Paper).

MacKinlay, A. C. (1997) Event Studies in Economics and Finance. *Journal of Economic Literature* 35:1, 13–39.

McQueen C. and R. Vance (1993) Stock Prices, News and Business Conditions. *Review of Financial Studies* 6:3, 683–707.

Mohd Arifin, N. and D. M. Power (1996) Some Evidence of Short-run Market Overreaction for the Kuala Lumpur Stock Exchange. *Capital Market Review* 4, 21–32.

Myers, S. C. and N. S. Majluf (1984) Corporate Financing and Investment Decisions When Firms have Information That Investor do not Have. *Journal of Financial Economics* 13:2, 87–221.

Redelmeier, D. A. (2005) The Cognitive Psychology of Missed Diagnoses. *Annals of Internal Medicine* 142, 115–120.

Richards, A. (1997) Winner–loser Reversals in National Stock Market Indices: Can They Be Explained? *Journal of Finance* 52, 2129–2144.

Ritter, Jay R. (2003) Behavioural Finance. *Pacific-Basin Finance Journal* 11:4, 429–437.

Shah, Anuj K. and Daniel M. Oppenheimer (2008) Heuristics Made Easy: An Effort-Reduction Framework. *Psychological Bulletin* 134:2, 207–222.

Shelor, R. M., D. C. Anderson, and M. L. Cross (1992) Gaining from Loss: Property-Liability Insurance Stock Values in the Aftermath of 1989 California Earthquake. *The Journal of Risk and Insurance* 59:3, 476–488.

Shiller, R. (2003) From Efficient Markets Theory to Behavioural Finance. *Journal of Economic Perspectives* 17, 83–104.

Shiller, R. J. (1981) Do Stock Prices Move Too Much to be Justified by Subsequent Changes in Dividends. *American Economic Review* 71, 421–435.

Siddiqui, Kalim (2008a) India's Obsession with Economic Growth. (in Norwegian), *Klassekampen*, 26th August, (pp 8-9), Oslo, Norway.

Siddiqui, Kalim (2008b) Recent Global Financial Crisis. (in Norwegian), *Klassekampen*, 20th October (pp. 16), Oslo, Norway.

Siddiqui, Kalim (2009). The Political Economy of Growth in China and India. *Journal of Asian Public Policy (JAPP)* 1:2, 17–35.

Spyros, S., K. Kassimatis, and E. Galariotis (2007) Short term Overreaction, Underreaction and Efficient Reaction: Evidence from the London Stock Exchange. *Applied Financial Economics* 17, 221–235.

Strong, N. (1992) Modelling Abnormal Return: A Review Article. *Journal of Business, Financing and Accounting* 09.

The Economist (2008) Capitalism at Bay. 18th October, pp. 13-14, London: The Economist.

The Economist (2008) When Fortune Frowned—A Special Report on the World Economy. 11th October, pp. 33-36, London: The Economist.

Tversky, A. and D. Kahneman (1974) Judgement under Uncertainty: Heuristics and Biases. *Science* 185, 1124–1131.

Wade, Robert (1998) The Asian Debt and Development Crisis of 1997. *World Development* 26:8, 1535–1553.

Wang, J., B. M. Burton, and D. M. Power (2004) Analysis of the Overreaction Effect in the Chinese Stock Market. *Applied Economics Letters* 11:7, 437–442.

Williams, J. B. (1956) *The Theory of Investment Value*. North Holland. Amsterdam.