

A STUDY OF BEHAVIOURAL FINANCE:  
INDUSTRY-BASED OVERREACTION AND  
UNDERREACTION IN MALAYSIA

BY

ALYSA WONG TSEU MUN  
CHIA GENG SENG  
CHIN SU TENG  
LEE JIA LING  
WONG KAH YEN

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- (2) No portion of this research project has been submitted in support of any application for any other degree or qualification of this or any other university, or other institutes of learning.
- (3) Equal contribution has been made by each group member in completing the research project.
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Name of Student:	Student ID:	Signature:
1. ALYSA WONG TSEU MUN	11ABB04138	
2. CHIA GENG SENG	11ABB04276	
3. CHIN SU TENG	11ABB05875	
4. LEE JIA LING	11ABB04813	
5. WONG KAH YEN	11ABB04098	

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## LIST OF ABBREVIATIONS

ARR	Average Residual Return
CARR	Cumulative Average Residual Return
EMH	Efficient Market Hypothesis
IPC	Infrastructure Project Company
ISIS	Islamic State in Iraq and Syria
KLCI	Kuala Lumpur Composite Index
MPT	Modern Portfolio Theory
MYR	Malaysia Ringgit
NASDAQ	National Association of Securities Dealers Automated Quotation
NYSE	New York Stock Exchange
RR	Residual Return
S&P 500	Standard & Poor's 500
U.S.	United States

## PREFACE

In this era, stock markets, serving as vital sources of capital, have contributed significantly to the economic growth of a country. In other words, the performance of the stock market may not only influence an investor's wealth, but also a country's wealth. Many financial economists and statisticians believe the stock markets can be served as the well predictors of the future direction of a country's economy.

As a result, the studies on stock market behaviours have been more and more prevalent. However, two conflicting theories exist in explaining the behaviours of stock market, specifically, the Efficient Market Hypothesis (EMH) and Behavioural Finance. Although EMH is still greatly accepted by investors, there are many unexpected events happened such as crisis, likely to challenge the theory. Hence, this study intends to examine the Malaysian stock market irrational behaviours, specifically investors' overreaction and underreaction, in relation to behavioural finance, a relatively new developed field in finance which suggests the stock markets are inefficient due to the investors' irrational behaviours.

With a better understanding of the Malaysian stock market behaviours, the investors see the opportunity excelling in making investments and maximize their investment returns in the stock market, with better investment management skills. Furthermore, researchers can better explain the historical and current conditions of Malaysian stock market, while forecasting the future world economic outlook by employing the behavioural models.

## ABSTRACT

Among the historical studies in relation to stock market, two conflicting theories, namely Efficient Market Hypothesis (EMH) and Behavioural Finance gain great attention and controversy. Despite EMH proposes markets are efficient, Behavioural Finance highlights that market inefficiencies such as overreaction and underreaction serve as one of the sources of market trends or some extreme events such as crisis. Therefore, the primary objective of this study is to show the existence of irrational investor behaviours specifically overreaction and underreaction phenomenon in five different Malaysian industries, namely consumer, plantation, properties, industrial, and trading and services sectors, from 2004 to 2012. This study concludes that overreaction happened during 2008 in properties, and trading and services sectors, while underreaction only happened during 2005 in plantation sector. The empirical result shows that EMH does not hold in Malaysian stock market especially during 2005 and 2008, as investors overreacted and underreacted inefficiently in the market.

## **CHAPTER 1: INTRODUCTION**

### **1.1 Background of Study**

Despite the prevalent joke said “Wall Street indexes predicted nine out of the last five recessions” signifying the economy and the stock market are not the same, the stock markets are well predictors of the business cycle even though they do not often move with the economy in lockstep. As a result, the studies regarding the behaviour of stock market have been more and more significant. Many researchers attempt to examine the stock market behaviour in order to forecast the future stock prices as well as the direction of the economy. However, one must understand that the stock market performance and the investors’ financial decisions are bi-directionally correlated. Generally, in the context of financial decisions, it consists of conflicting theories which gain great attention and controversy, specifically the Efficient Market Hypothesis (EMH) and the Behavioural Finance.

Around the 1970s, the EMH was widely accepted by the financial economists and statisticians. Earlier empirical studies on the behaviour of stock market are based on the assumption of efficient market. The EMH assumes that the economic agents or market participants are “rational” and the stock prices will fully reflect all the information available in the market. Basically, when new information arises, the news spreads very quickly and is incorporated instantaneously into the securities prices without any delay. Thus, all the securities are priced correctly as the market prices reflect the fundamental values of the securities. Besides, EMH is also associated with the idea of “random walk”, a theory which proposes that the past movement or direction of the stock prices cannot be used to predict its future movement as the changes of stock prices are unpredictable and random. Hence, neither technical analysis nor fundamental analysis techniques would help investors to earn excess risk-adjusted returns.

Since the beginning of the twenty-first century, the application of EMH in explaining the stock market behaviours had become far less common, owing to the regular occurrences of stock market anomalies as well as the emergence of Behavioural Finance. The stock market anomalies refer to the deviation or departure from the intrinsic value of securities. Specifically, the price reversal and momentum effect are the major anomalies studied since the 1980s. The price reversal assumes that the prior losers tend to be the future winners over the long run and it is consistent with the overreaction hypothesis. In contrast, the momentum effect proposes that the stock market exhibits significant return continuation in the short run and it is often attributed to the underreaction hypothesis. The discoveries of the market anomalies provide evidence to show that the stock returns are predictable, which seem to be inconsistent with the EMH.

Recently, another group of researchers found that investors are subject to cognitive biases, causing them to behave irrationally when making financial decisions. Therefore, the researchers believe that they can better explain the stock market inefficiencies based on the behavioural finance models. Behavioural finance is a new approach that seeks to explain the stock market behaviours from the behavioural viewpoint. Basically, it focuses on two building blocks, which are cognitive psychology and limit of arbitrage. Cognitive psychology suggests that investors systematically make mistakes in the way they think, which eventually lead to inappropriate investment decisions and price distortions in the financial markets. Typical psychological biases include overreaction, overconfidence, representativeness, anchoring, conservatism, loss aversion, herding, and the like. On the other hand, limit to arbitrage claims that the impact of irrationality on market prices can be substantial and long-standing. This study only emphasizes on the cognitive psychology as the goal is to examine the existence of market inefficiencies as a consequence of the investors' behavioural biases in Malaysian stock market.



The behavioural finance highlighted that the stock market inefficiencies such as overreaction and underreaction resulting from the price reversal and momentum effect, serve as the sources of the market trends or some extreme events like bubbles and crashes. The market overreaction implies that excessive investor optimism or pessimism could cause the stock prices to deviate temporarily from its fair value. This overreaction phenomenon can be supported by the Investor Contrarian Strategy, holding that investors could earn abnormal return by buying the past loser stocks and selling the past winner stocks in the anticipation that the stock prices will reverse. On the contrary, the market underreaction suggests that the securities prices tend to underreact to the unexpected good or bad news. One strategy that is reconciled with the underreaction phenomenon is the strategy of momentum, in which the investors simultaneously buy the former winners and sell the former losers, would eventually obtain abnormal profits.

Many researchers believed that these market inefficiencies can be attributed to the behavioural biases, including overconfidence, representativeness bias, herding, anchoring, and conservatism bias. Many studies reported that overconfidence, representativeness heuristic, and herding are strongly related to the long term reversal effect and the overreaction hypothesis. Overconfidence suggests that market participants tend to be overly confident in the precision of their private information and subsequently trade more frequently than the rational investors, causing the stocks to be overvalued or undervalued. In other words, overconfidence would lead to the market overreaction, which eventually lead to high trading volume, volatility and price distortion in the stock market. On the other hand, representativeness heuristic refers to the tendency of market participants to interpret the future performance of a given firm based on its historical performance, causing the securities to be mispriced. Furthermore, herding implies that market participants tend to follow the majority action as they seek preference for conformity with the market, in the presence of any surprises of events or news. Consequently, it leads to stock market overreaction.

The bursting of dot-com bubble has clearly indicated the existence of stock market overreaction, owing to the investors' behavioural biases. During 1992 to 2000, software was seen a highly profitable investment and the software development companies were strong performers on the stock exchange. Many individual and institutional investors had made a gain in the stock market. Consequently, it created a high degree of confidence level among the investors. Also, many investors believed that these remarkable performance of technology firms tend to reproduced in the following years. Owing to these cognitive biases, investors aggressively invest in the technology stocks, causing a stock market overreaction. In particular, National Association of Securities Dealers Automated Quotation (NASDAQ) stock composite index, which emphasizes on technology stocks, exploded from 600 points to almost 5000 points. However, in March 2000, the dot-com bubble burst when the NASDAQ Composite index, peaked at 5,048.62. When the dot-com bubble collapsed and stock prices fell, investors sell their shareholdings as quickly as possible. Eventually, the NASDAQ Composite index had lost 78% of its value. This case clearly indicated that financial bubble can be the result of market overreaction, due to the irrational behaviours of investors.

Furthermore, one known instance of winner (loser) stock lately happened is Apollo Education Group which traded at NASDAQ. The Group's revenue continued to fall dramatically since 2010, owing to the sharp declines in student enrolment. Investors who subject to the representative bias tend to believe that the Group will continue perform badly in the following years. As a result, Apollo's shares were gradually being ranked as loser stocks, along with constant revenue reductions over the years, especially with 55.1% drops of net income from \$553 million to \$248.5 million on 2010. However, Apollo's shares increased 14.2% as the announced adjusted earnings of \$1.04 per share in the first quarter of 2014 had beaten the Wall Street analyst estimates of \$0.90 per share. Since the expectation on earnings failed to materialize, the share prices are likely to increase as investors recognized that Apollo's shares are undervalued due to the market overreaction. With the share price appreciation, Apollo's shares now are ranked as the winner stock. Thus, it is believed that market

overreaction, as past loser stock transformed into winner stock over time, can be attributed to the representativeness heuristic.

While in Malaysia context, the Kuala Lumpur Composite Index (KLCI) experienced a dramatic fall during January 2013, when the 13<sup>th</sup> General Election was around the corner. The investors were insecure with the outcome of the coming election and chosen to quickly sell off their stocks holding in order to reduce the risks. This is because the stock prices will drop if there are changes in the leading politic party as the changes in regulatory rules and regulation may happen possibly afterwards and affect significantly companies' profits and economy. As a result of the huge shares selling from investors, the Malaysian stock market has experienced a sharp decline and the KLCI has made a loss. Besides, there is a slump in Malaysian stock market in November and December of 2014 due to the recent crash in global crude oil prices. The oil and gas products have significant contribution to the government revenues in Malaysia. The market is worried about the shrink in oil revenues may increase the country's budget deficit as the oil revenues are important for government funding. Consequently, the local stock market tumbled as the crude oil prices continue to decline in the global markets. In short, Malaysian investors may tend to overreact to any news and events (domestic or economical events) and in response to impacting the country's economy. These recent cases have demonstrated the volatility of stock returns in Bursa Malaysia. Hence, it is suspected that overreaction occurs while EMH does not hold, in the Malaysian stock market.

In contrast, several studies revealed that the behavioural biases, specifically the anchoring and conservatism bias, can be the important sources of stock market underreaction. These cognitive biases are closely associated to the conservative decision making. Anchoring assumes that the market participants overly rely on certain reference point, known as "anchor", when making financial decisions. When new information arises, investors insufficiently adjust their initial anchor, causing the market underreaction. On the other hand, conservatism bias refers to the tendency of market participants to update their existing beliefs more slowly and weakly than the

rational way they should be. Since investors do not correctly react and process the new information, it causes market underreaction and returns continuation in the following periods.

The phenomenon of underreaction in stock market as a consequence of the psychological biases is shown clearly in the case of destabilization of Iraq in 2014. The situation in Iraq started to get worsened as more and more cities throughout the region have been subject to the attacks from the Sunni militant group, which led by the Islamic State in Iraq and Syria (ISIS). However, the stock markets did not react negatively toward the destabilization of Iraq. In the second week of June 2014, the Standard & Poor's 500 (S&P 500) only showed a minor drop of 0.7%, after a rally for three weeks, which approximately added 3.8% to the index. Also, the crude oil futures have increased about 5% within first and second week in June. It is observed that the investors did not fully incorporate the new information, but rather to gradually process it over the time, causing an underreaction phenomenon in stock market. Therefore, it is believed that the cognitive biases can cause stock market to behave in an irrational way.

This study presents an in-depth discussion of the stock market inefficiencies, specifically the overreaction and underreaction to the unexpected news or events. The stock market anomalies uncovered in the past few decades pose a major challenge to the assumptions of EMH as it provides significant evidence to show the existence of predictability in stock markets. To meet the challenge, this study is conducted based on the behavioural finance model, which uses behavioural traits to explain the investors' irrationality and stock market inefficiencies. Behavioural finance holds that the emotion and psychology of investors may influence their decisions, causing them to behave in unpredictable or irrational ways. Thus, it is believed that the use of behavioural models can provide better explanation for the stock market behaviour. The main goal of this study focuses on investigating the evidence of stock market inefficiencies, specifically the overreaction and underreaction as a result of the investors' irrationality in Malaysia.

## 1.2 Problem Statement

Studies on behavioural finance effect on the stock price are relatively new field in the financial market. The psychological effects of investor decision have been acknowledged as one of the important determinants of stock prices recently. Therefore, researches on this topic, especially on the empirical testing of behavioural finance are limited as most of the previous studies focus on the theoretical and literature review of this area. For example, Ritter (2003) and Stracca (2004) provided a detailed review on how the psychological traits in investors affect the asset pricing which are against the traditional framework which assumed that investors are rational in efficient market due to their inability to capture the market anomalies. Although the comprehensive methods on testing the behavioural finance have been provided but there are still insignificant numbers of researches paying attention on it.

Apart from that, the traditional finance theory, rational expectation framework implied that the stock price should be equal to the discounted present value of future cash flow which means there should not be any abnormal returns for all investors. Although EMH is still greatly accepted by investors, there are many unexpected events happened that are likely to challenge the theory. For instance, McCarthy, Solomon and Mihalek (2012) argue that Fama's classic EMH does not hold in the recent financial crisis in United States and human behaviour plays an important role in future financial market. Barberis (2011) also mentions that the psychology impact from investor is required to understand the crisis happened which violate the EMH. He argues that the bubble formation of asset prices could be due to the investor beliefs towards the stock market during crisis. If investors are bullish, the bearish one will exit the market and asset prices are most likely to be overvalued.

Despite the recent financial crisis proved that the market is inefficient, there are researchers found that the EMH is still hold. For example, Arthur, Holland, LeBaron, Palmer and Tayler (1996) argued that both the traditional efficient view and traders' behavioural view are valid under different circumstances. Another study from

Malkiel (2011) also supports the statement and critics that the hypothesis does not state that bubbles in stock prices are not likely to be formed. The market theory also does not deny that the investor behaviour will have significant impact on the returns and both efficient market theory and behavioural finance can be coexisting in explaining the recent crisis.

Additionally, there have been extremely limited secondary-data studies done on examining overreaction in Malaysia. Ali, Nassir, Hassan and Abidin (2010) studied on how events and news affected Malaysian market in term of overreaction, with only time scope from 1987 to 2006. Besides, no specific study was found to study on industry overreaction specifically in Malaysia. Since there are contradict theories in different researchers in explaining the market anomalies that happened recent years, it is important to study on whether the investor behaviour can have profound impacts towards the stock market in Malaysia.

### **1.3 Objectives of Study**

The objectives of the study are as below:

- The general objective of this study is to show the existence of irrational behaviour among investors in the Malaysian stock market.
- The specific objective of this study is to investigate the existence of overreaction effects which affect the Malaysian stock market in different industries, namely consumer, industrial, plantation, properties, and trading and services sectors from year 2004 to year 2012.

## 1.4 Research Questions of Study

The study has formed a research question, as follows:

- Does overreaction phenomenon exist in the Malaysian stock market, specifically in different industries, namely consumer, industrial, plantation, properties, and trading and services sectors from year 2004 to year 2012?

## 1.5 Hypothesis of Study

The study has also presented null and alternative hypotheses for the main hypotheses formed. The hypothesis is:

H<sub>0</sub>: Malaysian stock market does not exhibit any overreaction effects in different industries, namely consumer, industrial, plantation, properties, and trading and services sectors from year 2004 to year 2012.

H<sub>1</sub>: Malaysian stock market does exhibit any overreaction effects in different industries, namely consumer, industrial, plantation, properties, and trading and services sectors from year 2004 to year 2012.

## 1.6 Significance of Study

The findings from this study have theoretical and empirical implications. Standing from the institutional and individual investors' point of view, this study can serve as a useful guideline for them to manage their portfolio. The study explained the behaviour of stock market from the behavioural perspective, which is known as behavioural finance. Typically, behavioural finance deals with the influence of emotion and psychology on the financial decisions of investors. Therefore, this study will allow investors to have better understanding of the stock market condition in Malaysia as it provides a clear picture of the institutional and individual investors'

actual behaviour and how they differ from each other when they receive the same information. Consequently, it can make investors aware of these behavioural tendencies and increase their insights into the stock market returns. As a result, institutional and individual investors can enhance their stock market predictability and thus, improve their investment strategies and make more accurate analysis in Malaysian stock market. Since this study focuses on overreaction and underreaction phenomenon in stock market, by identifying its existence, investors can have a better insight on what investment strategies in what circumstances, upon any event signal.

From the view of researchers, this study can be served as a foundation for the future research. The study borrows the ideas from previous studies to investigate the behaviour of stock markets on the basis of behavioural finance. According to Toh and Ahmad (2010), behavioural finance is a rapidly growing field in both developed and emerging stock markets. By taking the human psychology into account, it could better explain the conditions of Malaysian stock market. Therefore, it is believed that this study carries specific significance for the further investigation in stock market in consideration of the behavioural factors.

## **1.7 Chapter Layout**

The study basically comprises of five sections: Chapter 1 presents an introduction of study including the background of study, problem statement, objectives, research questions, hypotheses, and significance of the study. Chapter 2 presents the literature review which reviews some theories lie behind the study which are EMH, Market Anomalies, Behavioural Finance, Overreaction and Underreaction. Chapter 3 discusses the proposed methodology of the study, namely its scope of study and research design. Chapter 4 mainly focuses on the data analysis which includes the interpretation of result and discussion of major findings of the study. Lastly chapter 5 files a conclusion with some policy implications, study's limitations and recommendations for future researchers.



## **CHAPTER 2: LITERATURE REVIEW**

### **2.1 Introduction**

This chapter reviews the literatures related to the study. These literatures include the studies emphasized on the stock market overreaction and underreaction, as well as the well-known conflicting theories in stock market, specifically the EMH and Behavioural Finance.

### **2.2 Efficient Market Hypothesis (EMH)**

EMH, one of the traditional finance theories, has been the central of attention of many financial economists and statisticians around 1970s. The EMH assumes that the stock market is efficient, in which the market participants behave rationally and process correctly all the available information, thus a security's price reflects its fundamental value (Sewell, 2011). In other words, no securities are mispriced as all the available information is fully incorporated into the securities prices. Basically, the nature of EMH is built on two pillars (Degutis and Novickyte, 2014). Firstly, in an efficient market, the current market prices reflect all the available information. Secondly, in an efficient market, the market participants are not allowed to earn excess risk-adjusted return. Besides, the EMH framework also asserts the existence of rational market participant (Hamadi, Rengifo and Salzman, 2005). Barberis and Thaler (2003) stated that this rationality assumption can be characterized by two aspects. Firstly, the market participants correctly update their beliefs by fully processing all the relevant information. Secondly, the market participants make normatively acceptable financial decisions.

In order to earn a return higher than the market return, many investors attempt to identify the mispriced securities by using various forecasting techniques, including the technical analysis and fundamental analysis. Technical analysis suggests the use of historical stock prices to forecast the future stock prices, whereas fundamental analysis seeks to emphasize on the company financial information such as earnings and asset values to help investors to choose the undervalued securities (Malkiel, 2003). However, EMH claims that none of these forecasting and valuation techniques are effective for investors to earn abnormal returns (Clarke, Jandik and Mandelker, 2001). This is because a market is said to be “efficient” when the current securities prices fully reflect all the available information (Fama, 1970). As the securities prices adjust quickly to the new information, no one can foreseeably beat the market.

In addition, the EMH suggests that it is extremely difficult and unlikely for investors to profit from predicting the movement of stock prices (Clarke et al., 2001). This is because stock price changes only in the presence of new information. In an efficient market, stock prices fully incorporate all the available information. In other words, the security prices adjust before the investors have time to trade on and profit from the new piece of information. Therefore, it is believed that all the securities are fairly priced. Moreover, Gupta and Yang (2011) proposed that EMH is connected with the idea of “random walk”. This random walk theory implies that the price changes today will only reflect today’s news and it will be independent of the price changes yesterday. Since the new information is unpredictable, the securities prices are expected to change randomly in an unpredictable manner. Hence, there is no room for investors to earn additional risk-weighted returns.

According to Fama (1970), the market efficiency is generally divided into three levels: the weak form, semi-strong form, and the strong form. The weak form of EMH states that the current asset prices fully incorporate the information related to the historical prices only (Dimson and Mussavian, 1998). It implies that it is impossible to profit from analyzing the data on past stock price series. The semi-strong form of EMH asserts that the current asset prices fully reflect the information about the historical

prices and all the current publicly available information (Clarke et al., 2001). In the semi-strongly efficient market, it is believed that nobody can earn excess return by using the information that is publicly available such as the data reported in financial statement, earnings and dividends announcement, announced merger and acquisition plans, change in accounting policy, future expectations on inflation and unemployment, and so on. The strong form of EMH suggests that the current asset prices adjust instantaneously to all possible information in the market, including both public and private information (Degutis and Novickyte, 2014). It means that one should not be able to systematically profit from the trading on insider information.

Over the years, EMH came out as economic terms and reached its peak of popularity at the end of 19<sup>th</sup> century. Many researchers have broadly applied the idea of EMH into the theoretical models as well as the empirical studies of financial markets. Numerous studies have indicated that the stock markets are apparently efficient. In particular, the pioneer studies done by E. Fama have significant contribution to the field of market efficiency. Fama (1965) found a zero correlation for a sample of 30 Dow Jones Industrial stocks. It implies that the historical stock prices cannot be used to increase the investors' expected returns as stock prices follow a pattern called "random walk". Moreover, Fama (1970) defined an efficient market as a market where the current asset prices fully reflect all the information made available to the market participants. In his study, a number of weak, semi-strong and strong form market efficiency tests have been performed and the results obtained have presented evidence in support of EMH. Furthermore, Fama (1998) proven that the idea of EMH still remains valid as the overreaction of securities prices to information is as common as underreaction.

In addition, the evidence in favour of EMH were also provided by the other researchers. Poshakwale (1996) stated that there is weak form efficiency in the Indian stock market. Also, Chan, Gup and Pan (1997) found evidence supporting the existence of weak form efficiency in the stock market of eighteen nations, including Australia, Belgium, Canada, Denmark, Finland, France, Germany, India, Italy, Japan,

Netherlands, Norway, Pakistan, Spain, Sweden, Switzerland, the United Kingdom (UK) and the United States (US). Likewise, similar results were obtained in the study conducted by Dickinson and Muragu (1994) in the Nairobi stock market, as well as Kim and Shamsuddin (2008) in the Asian stock markets, specifically Hong Kong, Japanese, Korean and Taiwanese markets. On the other hand, Groenewold and Kang (1993) analysed the aggregate share price indexes and concluded that the Australian market is in semi-strong form of market efficiency.

### **2.3 Anomalies in the EMH**

The application of EMH in the financial market has been widely accepted for nearly thirty years. Nevertheless, the growing number of anomalies discovered in the stock market poses a major challenge to the EMH as the existence of these anomalies has questioned the validity of EMH. Basically, the stock market anomalies are the deviation of securities prices or returns, in which the patterns of the returns are inconsistent with the EMH (Archana, Safer and Kevin, 2014). The examples of these anomalies include the January Effect, Size Effect, Low Price to Earnings, Momentum Effect, Price Reversal and the like. According to Latif, Arshad, Fatima and Farooq (2011), some of the anomalies could occur once and disappear, or could occur frequently and continuously. Among the market anomalies uncovered over the past few decades, two stand out as they have been receiving a great deal of attention in the study of stock market behaviours. They are long-term returns reversal and short-term returns momentum (Barberis, Shleifer and Vishny, 1998).

According to Malkiel (2003), the long term returns reversal or price reversal implies that former loser stocks tend to outperform the former winner stocks over the period of three to five years. This predictable return reversal pattern is often compatible with the market overreaction hypothesis (Ali et al., 2010). As investors tend to react disproportionately to the new events or new information released, it causes the stock market to overreact in the initial period and correct itself in the following period.

Eventually, the investors would earn abnormal profit because the stocks which have underperformed the market over the past few periods tend to generate higher returns over the subsequent periods. A number of studies have found significant reversal in the stock market at longer horizons. De Bondt and Thaler (1985) analysed the New York Stock Exchange (NYSE) stocks and discovered the long term return reversals effect was a result of the irrational behaviours of market participants. Similarly, Chopra, Lakonishok and Ritter (1992) concluded that there is a strong return reversal pattern in NYSE and the overreaction effect is superior for the small firms. Furthermore, the findings of Poterba and Summers (1988) and Campbell and Limmack (1997) showed statistical evidence that stock returns are negatively autocorrelated, that is, return reversals in the long run, thus supporting the overreaction hypothesis. In addition, Baytas and Cakici (1999) examined the international stock markets and proved the return reversal effect in Canada, the UK, Japan, Germany, France and Italy.

In contrast, the short-term returns momentum asserts that the recent past winners tend to outperform the recent past losers over the subsequent period, specifically three to twelve months (Jegadeesh and Titman, 1993). This momentum effect is consistent with the underreaction hypothesis, which assumes investors tend to underreact the new or unexpected information (Malkiel, 2003). At first, the stock prices exhibit underreaction and then gradually adjust itself to the equilibrium level in the following period. As a result, the former winners (losers) continue to be the future winners (losers) (Archana et al., 2014). Several studies have documented the evidence of short run return continuation, which allow the researchers to reject the random walks theory. Lo and MacKinlay (2011) stated that in the stock market, serial correlations in the short run are not zero and there are many successive moves in the same direction. Moreover, Schnusenberg and Madura (2001) investigated the six US stock market indexes and found evidence in supporting the underreaction hypothesis. Consistently, the findings of Alrabadi (2012) in Amman Stock Exchange also presented the existence of stock market underreaction in the arrival of new information. In addition, Lasfer, Melnik and Thomas (2003) studied the short run price reaction of thirty nine

international stock market indexes and concluded that investors show underreaction toward both the unexpected positive and negative news. Yet, the authors argued that there was reduction in the abnormal returns in the late 1990s.

According to Ali et al. (2010), the long term price reversal pattern and the short term momentum effect are often characterized as the evidence of stock market overreaction and underreaction. The authors argued that these market inefficiencies have explicitly shown the existence of excess volatility and returns predictability in the stock market, appeared inconsistent with the EMH. Together with the other market anomalies such as the January Effect, Size Effect, and Low Price to Earnings, it presents a major challenge to the financial economists and statisticians. To meet these challenges, many researchers conduct their studies by using the models in which some market participants tend to be irrational.

## **2.4 Emergence of Behavioural Finance**

Behavioural finance is a relatively new developed field in finance that combines the behavioural and cognitive psychological theory with conventional economics and finance. It helps to provide explanations to stock market inefficiencies by focusing on the psychological and behavioural factors (Shiller, 2003). Basically it assumes that the emotion and psychology of investors may influence their investment decisions, causing them to behave in an unpredictable or irrational way. Statman (1995) stated that the cognitive factors would influence the individual investors and portfolio managers regarding the financial decision making process in terms of risk assessment and the way they process information and make decisions. As a consequence, the assets prices tend to move further away from their fair values, resulting in securities mispricing.

Shiller (2003) stated that the development of behavioural finance is mainly due to the regular occurrences of market anomalies and the failure of EMH to explain these anomalies. According to Alrabadi (2012), the existence of anomalies has clearly indicated the inefficiencies in stock market. Moreover, Levišauskaitė and Kartašova (2011) proposed that stock market anomalies are primarily caused by the irrational behaviours and decisions of investors, owing to their psychological biases. The market inefficiencies such as overreaction and underreaction as a result of the investors' irrational behaviour, suggest that stock returns are predictable, and thus, it allows investors to beat the market and earn abnormal returns, a situation which violates the assumptions of EMH (Tripathi and Aggarwal, 2009). Therefore, it is believed that the stock markets are not expected to be efficient and the investors tend to behave irrationally at some times. Hence, behavioural finance model seemed to be a better approach to explain the stock markets behaviours.

According to Barberis and Thaler (2003), there are two building blocks for behavioural finance, specifically the cognitive psychology and limit of arbitrage. Cognitive psychology principally refers to how actual behaviours of investors in making financial decisions differ from the rational behaviours assumed in EMH, due to their preferences or self-beliefs (Ritter, 2003). It suggests that the investors would make systematic errors in judgment as a result of some cognitive biases (Lee and Lin, 2006). Subsequently, it could cause the investors to form biased expectations toward the future direction of stock market. Eventually, it leads to excess volatility in the stock market, causing the securities to be mispriced and the stock market to be inefficient. The cognitive biases in financial decision makings involve overconfidence, representativeness, anchoring, conservatism, loss aversion, mental accounting, herding and the like (Lo, 2005). On the other hand, limit to arbitrage claims that the irrational decisions made by the investors can have substantial and long-lived impact on asset prices (Barberis and Thaler, 2003). It assumes that irrational investors tend to misprice the securities and it is difficult for the rational investors to undo the price deviations made by the irrational investors.

In addition, Lo (2005) stated that the behavioural finance models take into account the irrationalities in investors' behaviour, including all the cognitive factors and emotional issues so as to explain the stock market behaviours. Thus, it allows the situations in which the investors fail to update their beliefs correctly in the presence of new information or the investors update the new information rationally but make improper or questionable choices (Barberis and Thaler, 2003). Furthermore, behavioural models also allow the possibility that market participants may overreact or underreact to the unexpected news, which may lead to the stock return regularities or some extreme events like stock market bubbles and crashes (Sharma, 2014). Therefore, it is believed that taking the behavioural biases, including overconfidence, representativeness, anchoring and conservatism into consideration could provide a better understanding of the stock market inefficiencies (Kaestner, 2006).

## **2.5 Overreaction**

Market overreaction shows that stock prices tend to exhibit reversal behaviour over the long run, that is, the past losing stocks outperform the past winning stocks, suggesting that predictability exists in stock market returns (Maheshwari and Dhankar, 2014). According to Ali et al. (2010), these return reversals are generally resulting from the overreaction effect, in which the irrational behaviours of market participants would eventually lead to abnormal price movements in the stock market. Generally, investors are subject to cognitive biases and it could cause them to overweight the new information and make irrational tradings (Ali, Ahmad and Anusakumar, 2011). In the presence of unexpected good or bad news, investors tend to be overly optimistic or pessimistic about a particular stock, driving the stock price up or down to an unreasonable level. Over a period of time, specifically three to five years, the market corrects its initial price reaction and the stock price slowly reverts back to its fair value, resulting in a return reversal pattern.



Maheshwari and Dhankar (2014) stated that investors adopting the contrarian strategy, which involves buying the prior losers and selling the prior winners, are able to profit from this market overreaction. By knowing that the market tends to overreact to the extremely good (bad) news, the contrarian investors assume the winner (loser) stock prices will be pulled much higher (lower) than its true value (Fung and Lam, 2004). Therefore, they would apply the contrarian strategy by simultaneously buying the losing stocks and selling the winning stocks. Over the long run, the market realized its initial overreaction to the previous information and took corrective action, causing the stock prices move to the opposite direction. Consequently, the former loser stocks would generate higher average returns than the former winner stocks. Tripathi and Aggarwal (2009) claimed that the consistent positive returns earned by the contrarian strategy have clearly indicated the existence of predictability in stock market, in which the investors can make future abnormal returns by using the past information of the securities, seem to be incompatible with the EMH.

Various studies reported findings in favour of the overreaction hypothesis in stock markets. The phenomenon of stock market overreaction was first documented by De Bondt and Thaler (1985). The authors analysed the NYSE stocks and indicated the effect of long term return reversals, appeared consistent to the overreaction hypothesis. Moreover, Chiao and Hueng (2005) observed that overreaction occurs in Japanese stock market. Similarly, Tripathi and Aggarwal (2009) and Joshipura (2010) found the presence of stock market overreaction in the India. Additionally, the study conducted by Chopra et al. (1992), Poterba and Summers (1988), Campbell and Limmack (1997) and Baytas and Cakici (1999) have proven the return reversal effect in the global stock market over the long horizons, which provide significant evidence to show the existence of market overreaction. Furthermore, the results obtained by Mylonakis (2012) also suggested that the overreaction to new information causes the reversion of returns in Athens Stock Exchange. In the case of Malaysia, Ali et al. (2011) showed that Bursa Malaysia was subject to the phenomenon of return reversals and market overreaction. Likewise, Ali et al. (2010) found overreaction effect in Malaysian stock market by employing event study methodology. The authors

investigated the overreaction effects of domestics, economics and international events on Malaysian stock market from 1987 to 2006. The authors argued that Bursa Malaysia tends to overreact to new dramatic events, such as economic crisis and extraordinary political events. Besides, the findings of Huang, Chan, Huang and Chang (2011) revealed that in Taiwanese stock market, the stock prices tend to overreact in response to the political crisis.

In addition, Kaestner (2006) proposed that stock market overreaction can be explained from the behavioural perspective, in which the cognitive bias would affect the investors' investment decisions. A number of literatures have documented that overconfidence seem to be one of the sources of market overreaction. According to Daniel, Hirshleifer and Subrahmanyam (1998), overconfident investors tend to overweight the private information that they have possessed and ignore the public information available in the stock market. As a result, the overconfident investors overreact to their private information signal and invest to a greater extent than usual. Consequently, the irrational trading would temporarily drive the stock prices further away from its true value in the short run. Followed by the long run correction, the stock prices move in the opposite direction and approach to its true equilibrium level.

The study carried out by Daniel et al. (1998) has clearly demonstrated the existence of overreaction in stock market, as a result of the investors' overestimation of the precision of their private information. Similarly, Chuang and Lee (2006) observed that the stock prices strongly overreact to private information and underreact to public information in the presence of overconfident investors by employing a just-identified bivariate moving average representation model. Moreover, Odean (1998) revealed that if investors are overconfident, there is a tendency that the market will overreact to salient, but less relevant information and at the same time, underreact to the statistical and highly relevant information. Conversely, Zaiane and Abaoub (2009) use the model proposed by Daniel et al. (1998) to analyze the existence of overconfidence in Tunisian stock market. The authors found that only one third of the sample supporting the overconfidence theory. Therefore, it is concluded that there is

only little evidence to confirm that Tunisian investors overact to their private information signals as a consequence of overconfidence bias.

On the other hand, many studies have proven that stock market overreaction can arise from the representativeness heuristic. According to Boussaidi (2013), representativeness heuristic refers to the tendency of investors to believe that the remarkable performance of a firm in the past is a representative of the general performance of the particular firm that is more likely to occur in the future. In other words, investors who subject to representativeness heuristic would believe that the past performance of a firm tends to be reproduced. Therefore, investors would exhibit excessive pessimism (optimism), causing market overreaction which drives the stock prices below (above) its fair values, as a consequence of the past negative (positive) earnings announcements. Since the investors have undervalued (overvalued) the stocks, they will be disappointed in the future when their expectation on the reduction (growth) of revenues fails to materialize (Barberis et al., 1998). Subsequently, the stock prices are likely to increase (decrease) and revert back to its true value.

Among these studies, Aguiar and Sales (2010) introduced a methodology based on the Fuzzy Clustering Means Algorithm and suggested that representativeness heuristics can be used to explain the phenomenon of industry-overreaction in the American stock market. Also, the study of Aguiar, Sales and Sousa (2008) has proven the industry-overreaction effect in Brazilian stock market by using the Fuzzy Behavioural Model. In the study of Aguiar et al. (2008), the petrol/petrochemical sector exhibits significant overreaction effect generally from 2001 to 2005 in Brazilian stock market. Besides, Aguiar and Sales (2010) proved that overreaction occurred in three different sectors namely petrol/petrochemical, textile, and steel and iron sectors in American stock market, from 2005 to 2007. Besides, Barberis et al. (1998) used a model of investor sentiment and concluded that investors strongly extrapolate the history performance of firms far into future. In other words, the representativeness heuristic may cause the overreaction in American stock market. Likewise, Kaestner (2006) provided significant evidence that overreaction occurs in

American stock market as a result of the representativeness bias. Additionally, the findings of Lam, Liu and Wong (2010) revealed that investors are likely to exhibit representativeness bias and thus, lead to short-term underreaction and long-term overreaction in Hong Kong stock market, through the application of a separate model, pseudo-Bayesian approach to reflect the investors' biased heuristics. On the contrary, the study done by Boussaidi (2013) argued that there is only a weak evidence to support that the overreaction to the accounting earnings announcement is caused by the heuristic of representativeness among the Tunisian investors. Similarly, Wu, Wu and Liu (2009) found little support for the overreaction hypothesis under representativeness effect. Instead, their results showed the existence of stock market underreaction in Taiwan.

Last but not least, several studies have revealed that herding behaviours could also lead to market overreaction. Herding behaviour refers to the tendency of investors to mimic/imitate the actions of a larger group of investors rationally or irrationally. Typically, in the context of overreaction, they tend to react irrationally. According to Yao, Ma and He (2014), herding results in deviation of stocks prices from its fundamental values upon any surprises in events and news. According to Christie and Huang (1995), herding behaviours cause investors to rely on the collective actions of majority investors, which may already suppress their beliefs or even when they dissent with the actions. Seeking the preference for market consensus, the herding investors believe that the majority decisions are unlikely to occur discrepancy. This preference tends to even magnify the effect of overreaction, as when news arises, they tend to mimic the overreaction effect of majority investors. It is further supported by Brown, Wei and Wermers (2013), commenting that investors herding in response to event surprises leads to sharp stock price overreaction. This has further supported by Iihara, Kato, and Tokinaga (2001) saying that significant return reversals implies that positive returns are due to overreaction caused by herding behaviours among Japanese investors. Authors suggested that investors overreact by following the trend-chasing investment strategies. Besides, somehow the investors may also overestimate or underestimate the level of information in the market (Hott, 2009). Therefore,

investors tend to derive the asset information from the actions of majority, which contributed largely to asset price discrepancy due to overreaction (Hott, 2009).

## 2.6 Underreaction

Market underreaction refers to the tendency of stock prices to underreact to the unexpected news or events, which in turn lead to a momentum in profits over the short horizons (Barberis et al., 1998). According to Archana et al. (2014), the momentum effect suggests that the former winning (losing) stocks have a higher than expected probability of continuing to be the winning (losing) stocks in the short run, as a consequence of the market underreaction. Basically, investors who suffering from the psychological biases do not perfectly and fully process the new information immediately, but rather to integrate the new information gradually over the time. The slow adjustment to the new information would cause the securities prices continue to move in the same direction in the subsequent period, specifically three to twelve months (Jegadeesh and Titman, 1993). In other words, the stock prices continue to rise after the positive earnings announcements, or continue to fall after the negative earnings announcements, resulting in market returns continuation. Eventually, the recent past winners tend to outperform the recent past losers.

Basically, investors can gain advantage of market underreaction by using the strategy of momentum, holding that investors buy the past winning stocks and sell the past losing stocks (Lam et al., 2010). Jegadeesh and Titman (1993) stated that the return continuation was a consequence of stock market underreact to new information and gradually incorporate the information into the securities prices. Investors who recognized the momentum in securities prices can achieve abnormal returns by utilizing the current positive information to predict positive returns in the future (Barberis et al., 1998). This is because the market tends to underreact to the unexpected news or announcements, causing a mispricing of securities in the initial period, and a price correction in the following period. As a result, the investors who

use the momentum strategy would eventually obtain abnormal profits as the recent past winners (losers) tend to be the future winners (winners). Latif et al. (2011) argued that the trends in returns over the short horizons present the evidence of predictability in stock market, contradict to the assumptions made in EMH.

Numerous studies have provided convincing support for the underreaction hypothesis in stock market. Cutler, Poterba and Summers (1991) found reliable evidence that stock prices gradually incorporate information, causing the market underreaction and continuation of stock returns in the short run. Similarly, Chan, Jegadeesh and Lakonishok (1996) reported that stock prices respond slowly to the new information, particularly earnings announcements, suggesting the existence of underreaction in US stock market. Moreover, Rouwenhorst (1998) examined the stock markets in twelve European countries. The author claimed that the stock markets tend to underreact to the new information and the investors are allowed to beat the market and make abnormal returns by applying momentum strategy. Besides, the findings of Lo and MacKinlay (2011), Schnusenberg and Madura (2001), Alrabadi (2012) and Lasfer et al. (2003) showed significant evidence of the underreaction effect in international stock markets. Their studies revealed that the stock markets exhibit trends in returns, in which the stock prices continue to drift in a single direction over the short horizons. Likewise, Chan, Hameed and Tong (2000) analysed the global stock markets and the proven the existence of momentum profits and market underreaction. Furthermore, Ali et al. (2010) detected the underreaction effect to the national election announcement in Malaysian stock market.

According to Kaestner (2006), taking into accounts the behavioural biases, particularly the anchoring and conservatism bias can better explain the phenomenon of stock market underreaction. A few studies have revealed that short run underreaction in stock market can be the result of anchoring. Mc Elroy and Dowd (2007) stated that anchoring is an information-processing bias, in which the market participants overweight their first piece of information when making financial decisions. Generally, investors make decisions by starting with the known

information and set a certain reference point based on that information, known as “anchor” (Ngoc, 2014). Once anchor is set, investors would gradually adjust their original anchors as they tend to underreact the subsequent new information. As a result, the final estimates will stick closely to the investors’ original estimates as the new information is inadequately incorporated (Epley and Gilovich, 2006). This is because investors adjust their anchors insufficiently, thus producing biased estimation for the future. In other words, anchoring effect would lead to excessive moderation in the investors’ decision making process, which eventually causes the underreaction phenomenon in stock market (Aguiar and Sales, 2010).

The findings of Li and Yu (2011) discovered the existence of momentum effect in the US stock market, appeared consistent with the underreaction hypothesis. Also, the authors suggested that the anchoring effect would not only influence the individual stock prices, but also give impact to the entire stock market. Furthermore, Aguiar et al. (2008) employed the Fuzzy Behavioural Model to investigate the Brazilian stock market. The authors argued that stock market underreaction occurs in the textile sector, owing to the anchoring effect. In the case of Taiwan, Liao, Chou and Chiu (2013) examined the anchoring effect in the investors’ trading decisions and proven the existence of stock market underreaction, through the application of the regression models.

On the other hand, several studies have been conducted in attempt to explain how conservatism bias causes underreaction in the stock market. According to Barberis et al. (1998), conservatism bias is a belief perseverance bias, whereby the market participants often overweight their initial beliefs and resist quick changes in their beliefs when new information arises. Owing to this behavioural bias, investors are overconfident about their previous forecasts and tend to put little weight on the new information presented. Basically, the investors would choose to stick to the past information and slowly update their beliefs in the face of new evidence in order to maintain the beliefs close to their prior views (Latif et al., 2011). As a result, the investors fail to react to the new information in a rational way, causing the stock

market underreaction (Ritter, 2003). Subsequently, the stock prices will slowly adjust to that information and return back to its fundamental values. In other words, investors subject to conservatism bias would make conservative judgment, which would eventually lead to the market underreaction.

The findings of Barberis et al. (1998) showed that short term underreaction can arise from the conservatism heuristics. The authors applied a parsimonious model of investor sentiment and assumed the investors suffering from the conservatism bias would deduce wrong beliefs, causing the market underreaction over the short horizons. Moreover, Jegadeesh and Titman (1993) found that stock market underreaction in the short run is caused by conservatism heuristics. Similarly, Lam et al. (2010) used a pseudo-Bayesian model and observed that the momentum profit obtained in the Hong Kong stock market under the effect of conservatism bias. The authors stated that the investors tend to overweight the prior information and underweight the new information, causing the underreaction phenomenon. In addition, the study conducted by Wu et al. (2009) in Taiwanese stock market revealed that investors prone to underreact to the corporate earnings announcement in the medium term horizon, as a consequence of conservatism bias.

## **2.7 Hypothesis Development**

According to Salamudin, Ariff and Nassir (1999), Malaysian stock market is described as a semi-strong efficient market. Hence, the securities prices have already reflected all publicly available information and therefore investors cannot earn abnormal return through the use of publicly available information. Another way of speaking, investors can only earn abnormal returns at the possession of internal or private information.



The hypothesis developed in this study is based on Aguiar et al. (2008), and Aguiar and Sales (2010). Aguiar et al. (2008) investigated the existence of overreaction and underreaction of petrol/petrochemical sector in Brazilian stock market from 2001 to 2005, while Aguiar and Sales (2010) examined the occurrence of overreaction in three different sectors namely petrol/petrochemical, textile, and steel and iron sectors in American stock market from 2005 to 2007. As this study aims to examine the overreaction phenomenon in five different sectors in Malaysian stock market, hence similar concept of hypothesis is developed, as follows:

H<sub>0</sub>: Malaysian stock market does not exhibit any overreaction effects in different industries, namely consumer, industrial, plantation, properties, and trading and services sectors from year 2004 to year 2012.

H<sub>1</sub>: Malaysian stock market does exhibit any overreaction effects in different industries, namely consumer, industrial, plantation, properties, and trading and services sectors from year 2004 to year 2012.

## **2.8 Conclusion**

In brief, the literatures review provides a better understanding on the stock market behaviours. It is observed that the stock markets are inefficient and the investors tend to behave irrationally when making investment decisions. Moreover, there are evidences showing that stock market inefficiencies, specifically the overreaction and underreaction can arise from the investors' behavioural biases, which are herding, overconfidence, representativeness heuristics, anchoring, and conservatism bias. Regardless of overall or industry-specific overreaction and underreaction effect, the existence of these market inefficiencies allows the investors to enhance their predictability of stock returns and thus achieve abnormal profits.

## **CHAPTER 3: METHODOLOGY**

### **3.1 Introduction**

In this study, time series analysis is used to examine the overreaction and underreaction phenomenon in five different sectors of Malaysian stock markets. The selected sectors include Consumer sector, Industrial sector, Plantation sector, Properties sector, and Trading and Services sector. Besides, the study also assesses the overall market overreaction effect on a portfolio which combines all 150 stocks from all five sectors.

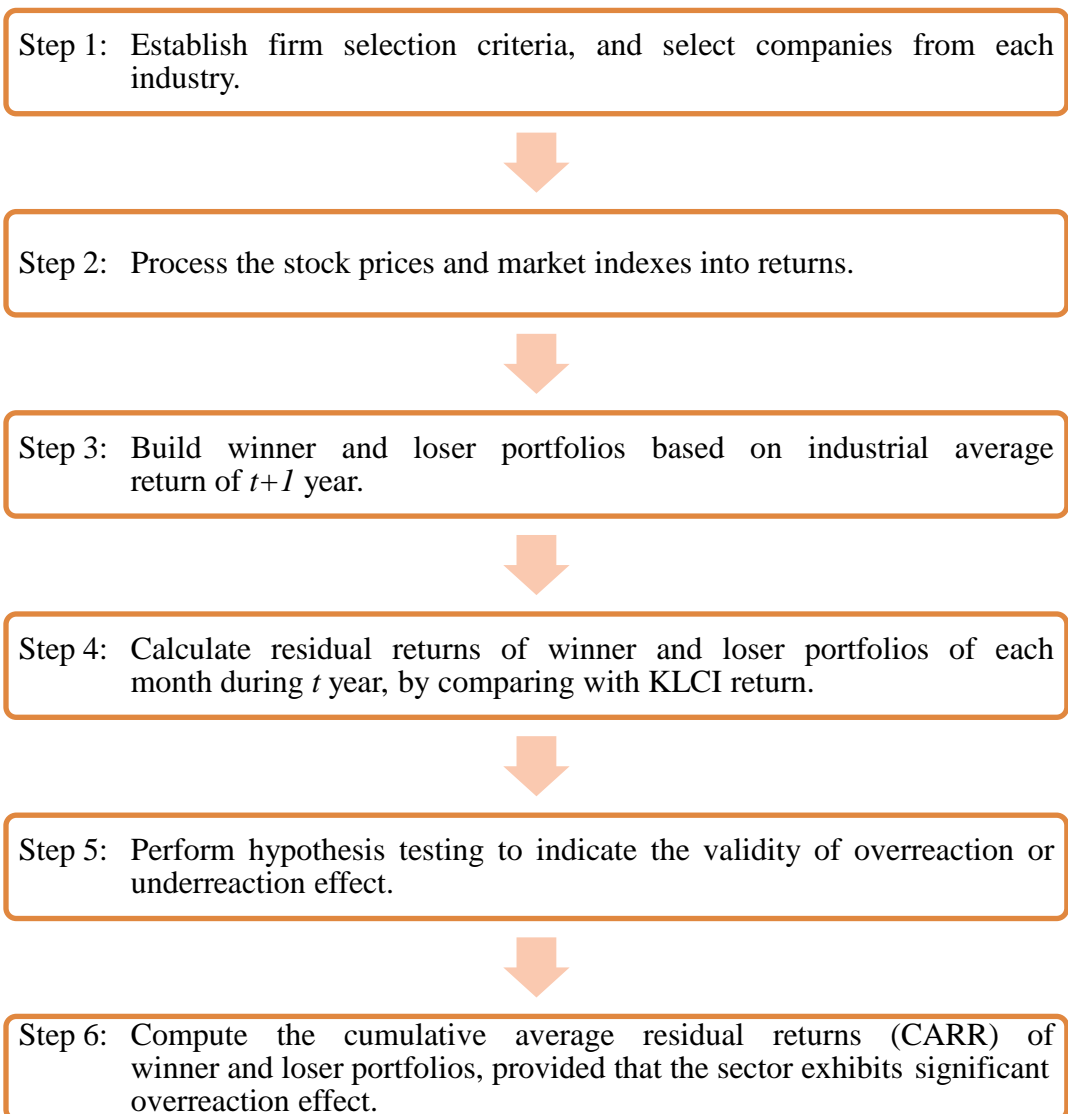
This chapter can be divided into three sections. Section one describes the scope of study. Section two describes the research design of the study providing a detailed analysis on the behavioural model, which includes sample selection, data processing, winner and loser portfolios formation, data analysis, hypothesis testing, and overall industrial-based overreaction effect. Lastly, section three provides a chapter summary.

### **3.2 Scope of study**

The data employed in this study includes prices of 30 most active stocks from five sectors namely consumer, plantation, properties, industrial and trading and services sectors. Also, stock prices are denominated in Ringgit Malaysia currency. Apart from that, indexes of market specifically Bursa Malaysia Kuala Lumpur Composite Index (KLCI) were also collected. All historical data from year 2004 to year 2013 was obtained from Yahoo! Finance. Additionally, the frequency of the both stocks prices and KLCI is in monthly basis. The reason for excluding year 2014 as the research time scope is due to the unavailability of complete monthly prices of some stocks.

### 3.3 Research Design

This study applies and modifies the methodology employed by Aguiar et al. (2008), and Aguiar and Sales (2010) for the analysis of overreaction and underreaction within industries. In the studies of American and Brazilian industrial-based overreaction conducted by Aguiar et al. (2008), Aguiar and Sales (2010), Aguiar (2012), and Aguiar and Belardi (2013), common steps in conducting overreaction study were reviewed and summarized. The steps are listed as follows:



Source: Developed for the research

**Step 1: Establish firm selection criteria, and select companies from each industry.**

Lakonishock, Shleifer and Vishny (1992) commented that most of the investors follow the strategies of actively choosing and trading stocks, instead of merely buying and holding the market stocks or portfolios. When investors trade in active manners by reacting to news, their buying and selling decisions effectively move stock prices (Lakonishock, et al., 1992). Besides, Zhang (2010) pointed out that active trading investors have become a dominant force in capital market increasingly in recent years. In United States capital market, it accounts for over 70% of dollar trading volume. Throughout the study conducted by Zhang (2010), generally active trading is positively correlated with stock price volatility. The correlation is even stronger during the periods of high market uncertainty. Hence, to study overreaction in which investors tend to overreact to uncertain events, active stocks have to be considered in building the portfolios of each sector. In short, understanding the overreaction influences requires an understanding of the behaviours of active stocks with the involvement from active investors.

In addition, there is positive correlation between investor herding behaviour and overreaction influences (Yao et al., 2014). It is supported by Brown et al. (2013), saying that herding by investors in response to events or news leads to sharp stock price overreaction. Herding behaviour refers to the tendency for investors to mimic/imitate the actions of a larger group, rationally or irrationally. When news, either good or bad, is announced, investors tend to follow majority for decision making, and thus leads to a greater effect of overreaction (Iihara et al., 2001). Specifically, investors believe that major decisions are not likely to occur discrepancy. Most importantly, according to Yao et al. (2014), herding behaviour is more prevalent at industry-level and more noticeable under highly uncertain market. The purpose of the study to investigate the Malaysian industry-based overreaction (underreaction) responding to events has been strengthened by Yao's study (2014). Therefore,

choosing active stocks relatively to inactive stocks in dollar volume from each sector helps to understand how the herding behaviours leads to overreaction.

As of 2014, table 3.3.1 summarizes the total number of stocks listed in Bursa Malaysia from Consumer, Industrial, Plantation, Properties, and Trading and Services sector.

Table 3.3.1 Total Number of Stocks of the Selected Sectors

<b>Types of Sector</b>	<b>Number of stocks available</b>
Consumer	134
Industrial	259
Plantation	41
Properties	83
Trading and Services	195

Source: Developed for the research

There are several criteria to select the most active/volatile stocks, such as most active by share volume, most active by dollar volume, and so on. The study chooses 30 most active stocks, in terms of most active by dollar volume, from each sector respectively. The reason for not choosing most active by share volume is that stocks with low price ranges are likely to have larger trading volume, as compared with stocks with high price ranges. This is because investors tend to trade more in term of volume when the stock is cheaper. Therefore, the criterion of most active in trading volume is not good enough to be used. Consequently, the study applies and chooses most active stocks in dollar volume as it considers both trading volume and stock prices.

There are basically two steps applied by the study in stock selection. Bear in mind that these steps were applied independently in each industry. Firstly, the study filtered the all available stocks and only considered the stocks with complete monthly data from 2004 to 2013. This step is to ensure that no missing data in between the time

scope of study which may cause result discrepancies (De Bondt and Thaler, 1985). Secondly, in order to choose the most active stocks over period considered, the study computed the dollar volume of each remaining stocks from first step. It is done by multiplying monthly trading volume and stock prices. Hence, the study computed the average dollar volume of each stock. The top 30 stocks with the highest average dollar volume are selected to form winner and loser portfolios in the study. Appendices 3.2.1, 3.2.2, 3.2.3, 3.2.4, and 3.2.5 provide lists of 30 most stocks by dollar volume of each industries.

The number of stock selected to form portfolio, 30, is based on Modern Portfolio Theory (MPT). Researches on MPT have shown that a well-diversified share portfolio can reduce unsystematic risk effectively to minimal level. According to Statman (1987) which applied MPT to investigate the number of stocks needed to achieve effective diversification, no less than 30 stocks are needed for a well-diversified portfolio. Recent studies such as Jiang (2013) which applied MPT to Thailand equity market showed that 30-stock is the appropriate number to be sufficient to diversify the risk of portfolio. This has also further strengthened by Chong and Phillips (2013), stating that 30 stocks are required when investors aim to achieve average return through risk diversification (as cited in Jiang, 2013).

Additionally, it is necessary to justify why these five sectors (consumer, plantation, properties, industrial and trading and services sectors) have been selected to be investigated on overreaction and underreaction effect. There are total of ten sectors of listed companies in Malaysian stock exchange, listed as follows:

- Construction
- Consumer
- Finance
- Industrial
- Infrastructure Project Company (IPC)
- Mining
- Plantation

- Properties
- Technology
- Trading and Services

Appendix 3.2.6 specifies the companies' stocks listed in KLCI and which sector each stock belongs to, as of 2014. While table 3.3.2 summarizes the number of stocks listed in KLCI according to its respective industry.

Table 3.3.2 Number of Stocks and Industries listed in KLCI

<b>Types of Sector</b>	<b>Number of stocks available</b>
Trading and Services	13
Finance	7
Plantation	3
Consumer	3
Industrial	2
Properties	1
IPC	1
<b>Total</b>	<b>30</b>

Source: Developed for the research

To be specific, the study chooses the five sectors as targeted sectors based on 2 criteria. At first, there must be at least a stock from the industry to be listed in KLCI. Hence, among the ten industries, construction, mining, and technology sectors had been eliminated from the option, as referring to table 3.3.2. Specifically, KLCI is a capitalization-weighted stock market index which comprises of 30 known companies on the Bursa Malaysia. KLCI is widely being used as a major stock market index as it tracks the performance of 30 largest companies by capitalization (Ali et al., 2010). As the study has to compare the portfolio returns with market returns in order to demonstrate the portfolio performance later, matching between the sample industry

and KLCI stocks' industry has to be done. It is to ensure that the comparability between portfolio and market index.

Secondly, there must be at least 30 stocks with complete data from year 2004 to year 2013, in order to be selected as sample industry, as to perform data analysis without any result discrepancies. Out of the seven remaining sectors, IPC and finance sectors were then excluded from sample industry. This is because IPC industry only has six companies listed in Bursa Malaysia. Besides, despite the amount of finance companies listed in KLCI, finance sector has less than 30 stocks with complete data from 2004 to 2013, as some of the listed companies were only established in recent years. As a result, only five sectors which are consumer, properties, plantation, industry, and trading and services industries, have fulfilled two criteria and chosen as sample industry.

## **Step 2: Process the stock prices and market indexes into returns.**

The behavioural model deals with monthly stock returns and stock market returns. The study considers both capital gains and dividend gains, as the stock prices that employed are the adjusted prices which were available in Yahoo! Finance. Adjusted price refers to the price that has been amended by including any distributions and corporate actions that occurred such as dividends. It provides a relatively accurate track record of stocks' performance. In this step, monthly stock prices and the monthly KLCI generated from Yahoo! Finance are transformed into monthly returns by using the following equations:

Monthly stock return is calculated as:

$$r_j = \frac{(P_{j+1}^i - P_j^i)}{P_j^i}$$

Where  $r_j$  is the financial return of stock  $i$  at the end of month  $j$   
 $P_j^i$  is the price of stock  $i$  at the end of month  $j$ , and  
 $P_{j+1}^i$  is the price of stock  $i$  at the end of month  $j+1$ ,



Monthly KLCI return is calculated as:

$$r_j^{\text{KLCI}} = \frac{(\text{INDEX}_{j+1} - \text{INDEX}_j)}{\text{INDEX}_j}$$

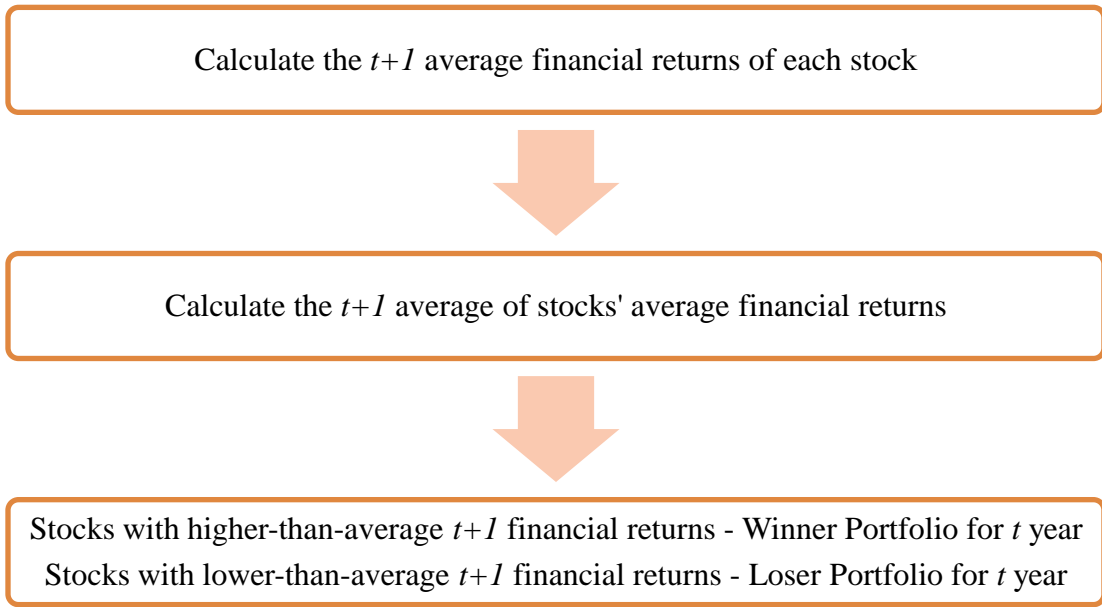
Where  $r_j^{\text{KLCI}}$  is the financial return of the KLCI in the month  $j$ ,  
 $\text{INDEX}_j$  is the index of KLCI in the month  $j$ , and  
 $\text{INDEX}_{j+1}$  is the index of KLCI in the month  $j+1$ .

The use of KLCI return is to calculate the residual return of portfolios formed by comparing portfolio return with KLCI return, which will be discussed in following steps.

**Step 3: Build winner and loser portfolios based on industrial average return of  $t+1$  year.**

In this step, the study classified the stocks into winner and loser portfolios based on their financial performance at the end of  $t+1$  year. For each year, winner portfolio will be formed with a combination of promising group of stocks, and the loser portfolio will be formed with a combination of non-promising group of stocks. The classification of stocks into promising and non-promising stocks portfolio was made in the period from 2004 to 2013.

Since the collected data frequency is in monthly, average financial returns of  $t+1$  year for each stock have been calculated at first. The study then ranked all the 30 stocks from high to low based on their average financial returns. Subsequently, for every  $t+1$  year, an average value of average financial returns of each stock has been computed with the purpose of grouping promising stocks and non-promising stocks into winner and loser portfolios respectively at  $t$  year. The stocks with higher average financial returns is to be grouped as winner portfolio for  $t$  year, and the group with lower average financial returns is to be grouped as loser portfolio for  $t$  year. The steps of forming winner and loser portfolio are summarized as follows:



Source: Developed for the research

The idea implies for using  $t+1$  year in building winner and loser portfolios is to identify the future winner stocks and future loser stocks. By identifying them, the study then investigates how the winner and loser stocks in  $t+1$  year were performed during  $t$  year. It provides an insight regarding the previous stock performance. Did the stocks perform well (poor) before they transformed into loser (winner) stocks in the future? The overreaction and underreaction hypotheses can be answered in this sense.

**Step 4: Calculate residual returns of winner and loser portfolios of each month during  $t$  year, by comparing with KLCI return.**

Using the classification of winner and loser portfolios in step 3, in order to visualize the overreaction (underreaction) effect, the study has to show the magnitude of how loser (winner) portfolios outperform winner (loser) portfolios. To perform that, residual returns of both winner and loser portfolios for each month of  $t$  year were calculated. Residual return describes the financial return generated by a portfolio over a period of time that differs from the market return. According to overreaction studies conducted by Aguiar et al. (2008), and Aguiar and Sales (2010), the monthly residual

returns of both winner and loser portfolios were calculated, according to the equations listed as follows:

$$RR_{t,j}^W = r_{t,j}^W - r_{t,j}^{KLCI}$$

Where  $RR_{t,j}^W$  is the residual return of the winner portfolio in the month  $j$  of the year  $t$ ,  
 $r_{t,j}^W$  is the financial return of the winner portfolio in the month  $j$  of the year  $t$ , and  
 $r_{t,j}^{KLCI}$  is the financial return of the KLCI (as market index) in the month  $j$  of the year  $t$ .

$$RR_{t,j}^L = r_{t,j}^L - r_{t,j}^{KLCI}$$

Where  $RR_{t,j}^L$  is the residual return of the loser portfolio in the month  $j$  of the year  $t$ ,  
 $r_{t,j}^L$  is the financial return of the loser portfolio in the month  $j$  of the year  $t$ , and  
 $r_{t,j}^{KLCI}$  is the financial return of the KLCI (as market index) in the month  $j$  of the year  $t$ .

From the residuals returns corresponding to the 12 months of each year, the average residual returns of the winner portfolio  $ARR_t^W$  and of the loser portfolios  $ARR_t^L$  are calculated from year 2004 to 2012. The idea is mainly to study the effect of overreaction (underreaction) on yearly basis. The average residual returns were calculated using equations listed as follows:

$$ARR_t^W = \frac{1}{n} \sum_{i=1}^n RR_{t,j}^W$$

Where  $ARR_t^W$  is the average residual return of winner portfolio in the year  $t$ ,  
 $RR_{t,j}^W$  is the residual return of winner portfolio in month  $j$  of the year  $t$ , and  
 $n$  is the number of month in the year  $t$ .

$$ARR_t^L = \frac{1}{n} \sum_{i=1}^n RR_{t,j}^L$$

Where  $ARR_t^L$  is the average residual return of loser portfolio in the year  $t$ ,  
 $RR_{t,j}^L$  is the residual return of loser portfolio in month  $j$  of the year  $t$ , and  
 $n$  is the number of month in the year  $t$ .

The study then investigates for evidence of overreaction by comparing the performance of the winner and loser portfolios during the study period.

$$ARR_t^W - ARR_t^L$$

Referring to the overreaction phenomenon, overreaction happens when the former loser stocks tend to outperform the former winner stocks. Hence, if  $ARR_t^W - ARR_t^L$  shows a negative value, it basically indicates that loser portfolio has higher average residual return than winner portfolio. It can be interpreted as loser portfolio has outperformed winner portfolio during the  $t$  year. On the other hand, if  $ARR_t^W - ARR_t^L$  provides a positive value, it means the former winner portfolio maintained its outstanding performance in the stock markets than former loser portfolio. The market is then appeared to be underreacted during the  $t$  year.

**Step 5: Perform hypothesis testing to indicate the validity of overreaction or underreaction effect.**

The study uses parametric t-test for two independent samples, in order to test if the difference between average residual returns is statistically meaningful. According to Aguiar et al. (2008), Aguiar and Sales (2010), Aguiar (2012), and Aguiar and Belardi (2013), the null and alternative hypotheses are as follows:

$$H_0: ARR_t^W - ARR_t^L = 0$$

$$H_{1(A)}: ARR_t^W - ARR_t^L < 0$$

$$H_{1(B)}: ARR_t^W - ARR_t^L > 0$$

Null hypothesis proposes that the sector does not exhibit neither overreaction nor underreaction characteristics throughout the year. On the other hand, alternative hypothesis A proposes that the sector does exhibit overreaction effects meaningfully throughout the year, as winner portfolio underperforms loser portfolio with lower residual returns. While alternative hypothesis B proposes that the sector does exhibit underreaction effects meaningfully, as winner portfolio outperforms loser portfolio with higher residual returns. The null hypothesis will be rejected if the t-statistics figure is lower than the significance level.

The test statistics is listed as follows:

$$T\text{-statistics} = \frac{ARR_t^W - ARR_t^L}{\sqrt{\frac{S_{ARR_t^W}^2}{n_{ARR_t^W}} - \frac{S_{ARR_t^L}^2}{n_{ARR_t^L}}}}$$

Where  $ARR_t^W$  is the average residual returns of winner portfolio,

$ARR_t^L$  is the average residual returns of loser portfolio,

$S_{ARR_t^W}^2$  is the standard deviation of average residual return of winner portfolio,

$S_{ARR_t^L}^2$  is the standard deviation of average residual return of loser portfolio,

$n_{ARR_t^W}$  is the number of months taken into account in calculating winner yearly average residual returns, and

$n_{ARR_t^L}$  the number of months taken into account in calculating loser yearly average residual returns.

**Step 6: Compute the cumulative average residual returns (CARR) of winner and loser portfolios, provided that the sector exhibits significant overreaction effect.**

According to Aguiar and Sales (2010), providing that the sector exhibits significant overreaction (underreaction) characteristics, the cumulative average residual returns for winner portfolio ( $CARR_n^W$ ) and for loser portfolio ( $CARR_n^L$ ) from year 2004 to 2012 have to be calculated, in order to investigate the overall overreaction effect during the period considered. The  $CARR_n^W$  and  $CARR_n^L$  are calculated based on equations listed as follows:

$$CARR_n^W = \sum_{i=1}^n ARR_t^W$$

Where  $CARR_n^W$  is the cumulative average residual return of winner portfolio from 2004 to 2012  
 $ARR_t^W$  is the average residual return of winner portfolio in year  $t$ , and  
 $n$  is the number of year from year 2004 to 2012

$$CARR_n^L = \sum_{i=1}^n ARR_t^L$$

Where  $CARR_n^L$  is the cumulative average residual return of loser portfolio from 2004 to 2012  
 $ARR_t^L$  is the average residual return of loser portfolio in year  $t$ , and  
 $n$  is the number of year from year 2004 to 2012

### **3.4 Conclusion**

All tests and methods that employed to examine overreaction (underreaction) effect in this study have been explained in detailed manner. It comprises of sample (active stocks) selection, data (stock prices and KLCI) collection from Yahoo! Finance, data processing, winner and loser portfolios formation for each year, some mathematical-based methods to demonstrate the performance of the portfolios by comparing actual return with market return (KLCI), and hypothesis testing to examine if the result is statistically meaningful. The methodology employed in this study is an adaptation and a modification of studies conducted by Aguiar et al. (2008), and Aguiar and Sales (2010), in studying industrial overreaction effects. Hence, the next chapter discusses the descriptive analysis of the findings of the study.

## **CHAPTER 4: DATA ANALYSIS**

### **4.1 Introduction**

In this chapter, the methodology proposed in chapter 3 is utilized in forming portfolios of different sectors which are Consumer sector, Industrial sector, Plantation sector, Properties sector, and Trading and Services sector. Besides, another portfolio which comprises of all 150 stocks from five different sectors is formed to assess the overreaction effect in overall market. Subsequently, tests for overreaction (underreaction) hypothesis are performed by assessing the winner and loser portfolios. Next, hypothesis testing at 1%, 5%, and 10% significance level were performed to verify the results of the finding. Findings are to be explained and interpreted independently according to each sector.

This chapter can be divided into 2 sections. Section one describes the descriptive analysis which interprets the results obtained and discusses the main findings, while last section provides a summary of this chapter.

### **4.2 Descriptive Analysis**

#### **4.2.1 Interpretation of Results**

Share prices from five different sectors were obtained to calculate the returns for period ranging from 2004 to 2012. The data are used to form winner and loser portfolio for period  $t$  based on the average return in the period of  $t+1$ . By compared with the market index which is KLCI index, the residual return for each year is acquired to determine the effect of underreaction or overreaction.



The main findings of the study show that overreaction does exist in the Malaysia stock market for both properties and trading and services sector during 2008 where the global financial crisis exploded. Justification of the overreaction is to be explained in the next section.

The average residual returns,  $ARR^W$  and  $ARR^L$  as well as their differences for each sector are tabulated as below together with their t-statistics at the 1%, 5%, and 10% significance level. Referring to the hypothesis that proposed in Chapter 3, hypothesis testing was performed as follows:

Table 4.2.1.1 Hypothesis Testing

	<b>Overreaction</b>	<b>Underreaction</b>
<b>H<sub>0</sub></b>	$ARR_t^W - ARR_t^L = 0$	$ARR_t^W - ARR_t^L = 0$
<b>H<sub>1</sub></b>	$ARR_t^W - ARR_t^L < 0$	$ARR_t^W - ARR_t^L > 0$
<b>Decision Rule</b>	The value of $ARR_t^W - ARR_t^L$ is only significant when t-statistics < the significant level	The value of $ARR_t^W - ARR_t^L$ is only significant when t-statistics > the significant level
<b>Significance level: 10%</b>	-1.363	1.363
<b>Significance level: 5%</b>	-1.796	1.796
<b>Significance level: 1%</b>	-2.718	2.718

Source: Developed for the research

Table 4.2.1.2: Average Residual Returns and T-Statistics - Trading and Services

<u>Sector</u>				
<b>Year</b>	<b>ARR<sup>W</sup> (%)</b>	<b>ARR<sup>L</sup> (%)</b>	<b>ARR<sup>W</sup> – ARR<sup>L</sup> (%)</b>	<b>T-statistics</b>
2004	-0.4403	-0.8710	0.4307	0.2682
2005	-2.0143	-0.6613	-1.3529	-0.6299
2006	1.7958	2.2321	-0.4364	-0.2578
2007	0.7885	0.6624	0.1261	0.0519
2008	-3.7148	-0.2171	-3.4975	-2.9635*
2009	0.4456	1.2943	-0.8487	-0.3177
2010	0.5388	1.0114	-0.4726	-0.3405
2011	1.6355	0.2978	1.3377	0.5809
2012	0.1499	0.0775	0.0724	0.0518

Source: Developed for the research

*Note.* \*, \*\*, \*\*\* indicate significance at 1%, 5%, 10% respectively.

Table 4.2.1.3: Average Residual Returns and T-Statistics - Properties Sector

<b>Year</b>	<b>ARR<sup>W</sup> (%)</b>	<b>ARR<sup>L</sup> (%)</b>	<b>ARR<sup>W</sup> – ARR<sup>L</sup> (%)</b>	<b>T-statistics</b>
2004	-1.1172	-3.0010	1.8838	1.1022
2005	-3.1716	-3.3782	0.2067	0.1369
2006	3.5029	0.5850	2.9179	1.1351
2007	1.3486	5.7675	-4.4188	-0.9279
2008	-4.2063	-0.7614	-3.4449	-2.0487**
2009	1.7777	2.0085	-0.2308	-0.0728
2010	1.4407	0.3684	1.0723	0.4340
2011	0.4506	0.3031	0.1475	0.0751
2012	0.2503	-0.7602	1.0105	0.6539

Source: Developed for the research

*Note.* \*, \*\*, \*\*\* indicate significance at 1%, 5%, 10% respectively.

Table 4.2.1.4: Average Residual Returns and T-Statistics - Industrial Sector

<b>Year</b>	<b>ARR<sup>W</sup> (%)</b>	<b>ARR<sup>L</sup> (%)</b>	<b>ARR<sup>W</sup> – ARR<sup>L</sup> (%)</b>	<b>T-statistics</b>
2004	1.8517	0.2859	1.5657	0.3787
2005	-1.8953	-1.5424	-0.3529	-0.1930
2006	0.6559	1.2844	-0.6286	-0.3017
2007	-0.9843	-0.4367	-0.5475	-0.3068
2008	-3.2010	-3.6215	0.4205	0.0860
2009	2.1363	4.8361	-2.6998	-0.9293
2010	0.3083	1.3217	-1.0133	-0.6555
2011	0.5071	2.7069	-2.1998	-0.6902
2012	2.1161	-0.3054	2.4215	1.2472

Source: Developed for the research

*Note.* \*, \*\*, \*\*\* indicate significance at 1%, 5%, 10% respectively.

Table 4.2.1.5: Average Residual Returns and T-Statistics - Consumer Sector

<b>Year</b>	<b>ARR<sup>W</sup> (%)</b>	<b>ARR<sup>L</sup> (%)</b>	<b>ARR<sup>W</sup> – ARR<sup>L</sup> (%)</b>	<b>T-statistics</b>
2004	-0.5664	-1.2189	-0.5664	-0.5956
2005	-0.6655	-0.5562	-0.1094	-0.1045
2006	-0.4852	-0.6404	0.1552	0.0877
2007	-2.1031	-0.7380	-1.3651	-0.6180
2008	0.4644	1.5591	-1.0948	-0.7837
2009	1.7485	-0.6504	1.7485	1.2756
2010	1.0635	0.6508	0.4126	0.2229
2011	1.2024	-0.4730	1.6754	1.1382
2012	1.7281	0.4318	1.2963	0.9385

Source: Developed for the research

*Note.* \*, \*\*, \*\*\* indicate significance at 1%, 5%, 10% respectively.

Table 4.2.1.6: Average Residual Returns and T-Statistics - Plantation Sector

Year	ARR <sup>W</sup> (%)	ARR <sup>L</sup> (%)	ARR <sup>W</sup> – ARR <sup>L</sup> (%)	T-statistics
2004	-0.2513	0.8885	-1.1398	-0.4458
2005	0.4195	-1.2110	1.6305	1.5112***
2006	0.9380	0.6033	0.3347	0.4001
2007	1.6405	3.6783	-2.0378	-0.7922
2008	-0.5563	0.6005	-1.1568	-0.5706
2009	-0.6931	-0.1339	-0.5592	-0.4845
2010	2.6292	1.1071	1.5220	0.7288
2011	0.3650	0.5968	-0.2318	-0.1943
2012	-0.0350	-0.2744	0.2394	0.1734

Source: Developed for the research

*Note.* \*, \*\*, \*\*\* indicate significance at 1%, 5%, 10% respectively.

Table 4.2.1.6: Average Residual Returns and T-Statistics - All Five Sectors

Year	ARR <sup>W</sup> (%)	ARR <sup>L</sup> (%)	ARR <sup>W</sup> – ARR <sup>L</sup> (%)	T-statistics
2004	0.0048	-0.9207	0.9255	0.5594
2005	-1.9034	-1.2842	-0.6192	-0.5876
2006	1.4621	0.6524	0.8097	0.6560
2007	0.2152	1.9737	-1.7586	-0.7516
2008	-2.4561	0.3558	-2.8119	-3.4954*
2009	1.1194	1.5223	-0.4029	-0.2446
2010	0.9909	1.1799	-0.1889	-0.1333
2011	0.7747	0.8002	-0.0254	-0.0191
2012	0.8045	-0.1295	0.9340	0.8552

Source: Developed for the research

*Note.* \*, \*\*, \*\*\* indicate significance at 1%, 5%, 10% respectively.

Table 4.2.1.2 indicates the existence of significant overreaction for trading and services sector in the year of 2008 with their average return of loser portfolio more than the winner portfolio for the particular year significant at 1% confidence level. Another evidence to support that the effect of overreaction does exist in the trading and services sector for the year ranging from 2004 to 2012 is that their  $CARR^L = 3.8261\%$  for the loser portfolios is more than their  $CARR^W = -0.8153\%$  for the winner portfolios.

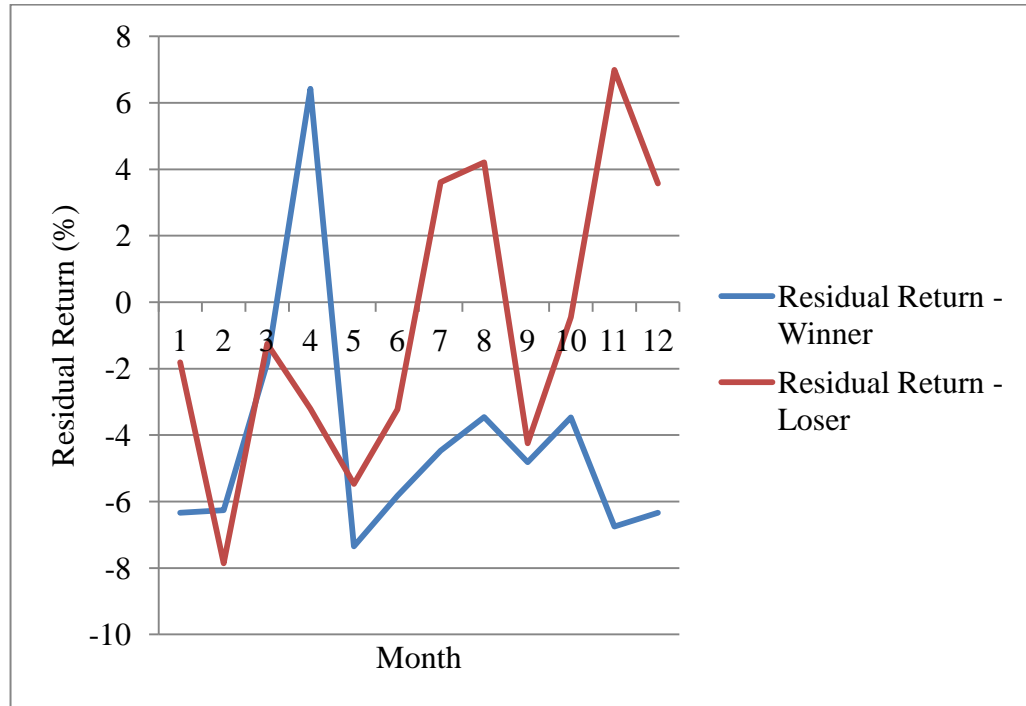
Similarly, referring to Table 4.2.1.3, the properties sector exhibits a significant overreaction characteristic in the year of 2008 as well with its significant negative value of  $ARR^W - ARR^L$  at 5% significance level. Therefore, CARR for properties sector has been computed to assess the overall overreaction effect in properties sector. As a result, with the  $CARR^L = 2.0477\%$  of their loser portfolios significantly outperform the  $CARR^W = 0.9854\%$  of their winner portfolios, signifying that the properties sector is robustly being influenced by overreaction effect over the nine years sample period. Furthermore, in Table 4.2.1.7, the result for all sectors employed in the study has been shown. It is observed that the overreaction effect can be clearly seen in the year of 2008, significant at 1% significance level.

Except for properties, and trading and services sectors, as shown in Table 4.2.1.4, 4.2.1.5 and 4.2.1.6, the rest of the sectors (industrial, plantation and consumer) do not show significant overreaction effect for the sample period of nine years. Nevertheless, referring to Table 4.2.1.6, an underreaction phenomenon is observed in plantation sector in the year of 2005 with its positive value of  $ARR^W - ARR^L$ , significant at 10% significance level.

To ease the view of significant overreaction effect for the sectors at particular years, Figures 4.2.1.1 and 4.2.1.2 have been plotted illustrating the outstanding stock performance of loser portfolio as compared to winner

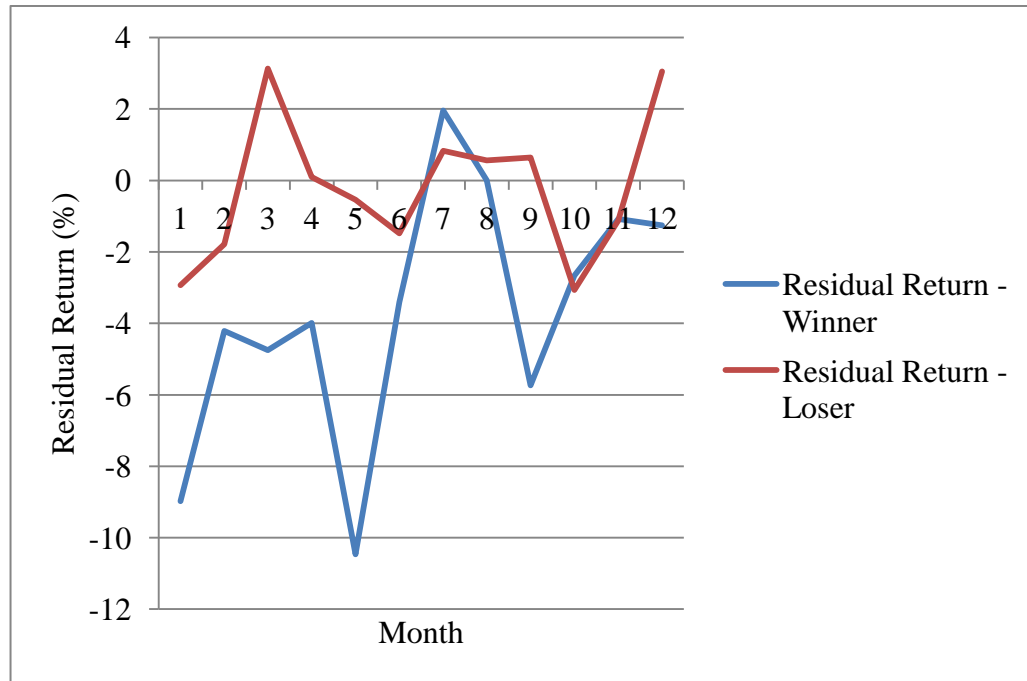
portfolio in properties and trading and services sectors respectively during 2008.

Figure 4.2.1.1: 2008 Monthly Residual Return - Properties Sector



Source: Developed for the research

Figure 4.2.1.2: 2008 Monthly Residual Return - Trading and Services Sector

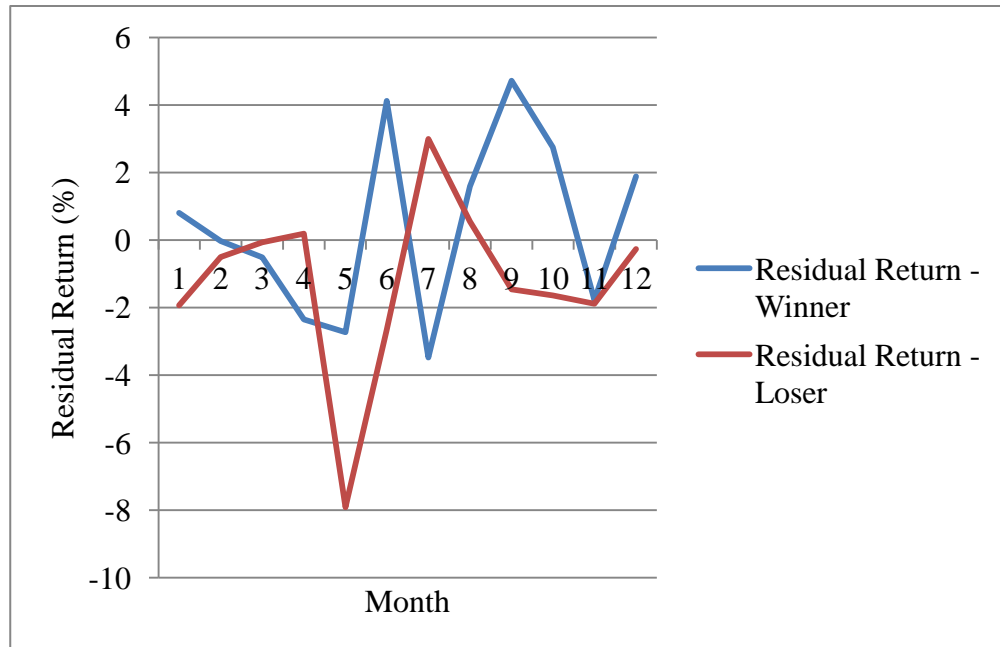


Source: Developed for the research

By plotting the monthly residual returns of the winner portfolio,  $RR^W$  and the loser portfolio,  $RR^L$  for the year of 2008, it is clearly shown that the effect of overreaction exists in the trading and services sector and properties sector for the particular year when the loser portfolio outperform the winner portfolio with higher residual returns.

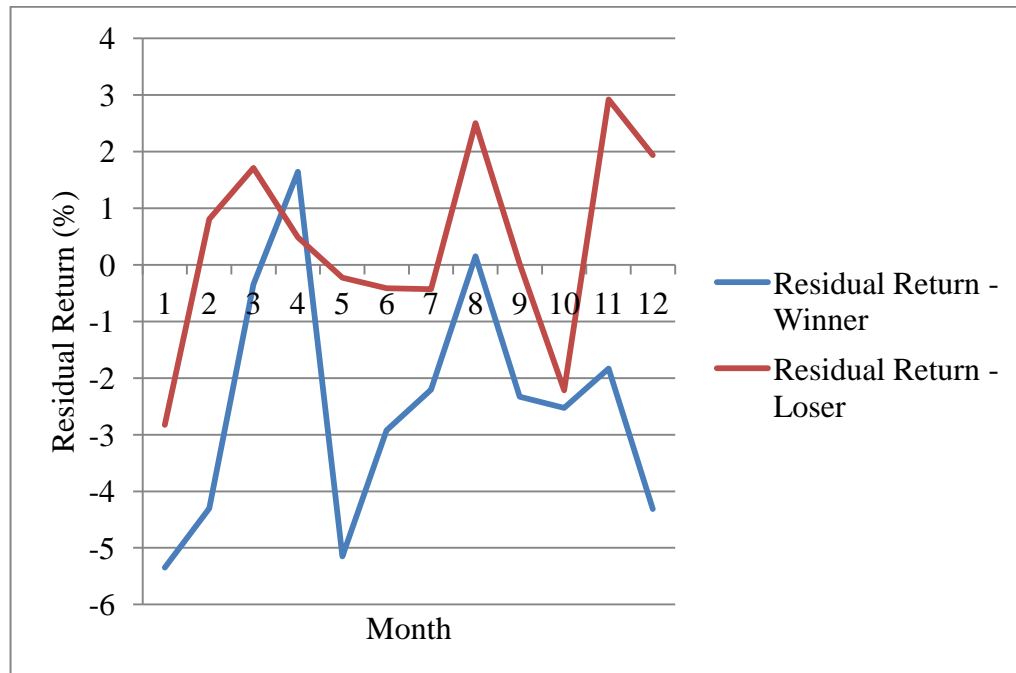
Whereas in the following Figure 4.2.1.3, the underreaction effect is obvious as the residual return of the winner portfolio still outperform the loser portfolio during 2005 in Plantation sector. Lastly, Figure 4.2.1.4 illustrates that all 150 selected stocks demonstrate the overall effect of overreaction in year 2008, as loser portfolio performed better than winner portfolio.

Figure 4.2.1.3: 2005 Monthly Residual Return - Plantation Sector



Source: Developed for the research

Figure 4.2.1.4: 2008 Monthly Residual Return - All Five Sectors



Source: Developed for the research



## 4.2.2 Discussions on Major Findings

The results of the model clearly show that overreaction effect exists in Malaysia stock market as overall in the year of 2008. The main reason for the effect to take place during the particular year is due to the Global Financial Crisis 2008 that has implied shock to the Malaysian stock market. This basically signifies that Malaysia investors generally exert overreact response to the crisis. This can be explained by the contraction in Malaysia economy as the result of the global economic downturn during the year of 2008. Ibrahim (2010) mentioned that Malaysia as a highly open economy, is not insulated from the effect of crisis and thus experienced the reduction in GDP as the result of the deterioration of global economic condition and correction in major commodity prices. The downfall of the Malaysia economy during the crisis undermined the confidence level of investors to the stock market and led to subsequent negative impacts to the stock market. This is agreed by Osili and Paulson (2009) who mentioned that the systemic crisis will have significant effect to the investor behaviour especially during their decision making in buying or holding the stock. In the case of Malaysian stock market, significant overreaction behaviour can be observed only in the year 2008 which means that investors tend to modify and change their previous investing behaviours and decisions more than they should, when they react to the extreme bad news during crisis. Therefore, when they overreact to the latest information and drive down the stock prices disproportionately, the underpriced stocks tend to rebound after some times. The average residual return of loser portfolio will then exceed the previous winner and subsequently becomes the winner in later date.

In the model that being applied, herding can be observed when choosing the stocks for each sector with high dollar trading volume. To justify it, the investors during the global financial crisis 2008 have the tendency to make their stocks buy-or-hold decision following the majority group of investors in

the stock market. This is due to the investor's belief that majority decision is unlikely to be wrong, especially when the investor has less experience to deal with such crisis during that time. The research from Tai (2014) also indicates that in United States (U.S.) and Chinese stock market, the investor herding behaviour in responding to the crisis tends to create overreaction effect to the stocks. Another research from McCarthy, Solomon and Mihalek (2012) explains that the behaviour of irrational investors during crisis causes the stock market to overreact during the crisis resulted in high volatility in the stock prices. Therefore, the behavioural finance principle is used to better explain on the reaction of investors towards the crisis in this study.

Specifically, loser portfolio has been undervalued during the crisis and reversed in the subsequent period after investors realized that they have overly undervalued those stocks. In contrast, for winner portfolio, investors have been overly optimistic about these stocks and pushed the prices above what they should have been. Prices reverse in the subsequent period once investors realize of the overvaluation. These results are therefore consistent with overreaction hypothesis, which states that extreme movement in stock prices will be followed by subsequent price movement in the opposite direction. The results also show that loser has significantly outperformed winner 1% and 5% in properties and trading and services sectors respectively in 2008. As there is extremely limited number of studies conducted on industry-based overreaction, additionally with different grouping of industries in different countries, it is hard to align the results of this study with previous researches. Generally, the results are still consistent with those reported by Michayluk and Neuhauser (2006), Tai (2014), and McCarthy (2012), where evidences were found suggesting investors overreact in time of crisis as overall. However, statistical evidences were employed to support the occurrence of significant overreaction effects in both industries.

Table 4.2.2.1: Gross Exports, Imports and Trade Balance, Malaysia from 2007Q1 to 2009Q2

Value (RM Million)	2007				2008				2009	
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2
Gross exports (f.o.b.)	138,125	145,005	158,532	163,492	151,798	175,169	185,234	151,293	121,472	129,128
Gross imports (c.i.f.)	117,065	122,383	130,273	135,093	124,972	134,525	143,474	118,639	88,802	102,611
Trade balance	21,059	22,622	28,259	28,399	26,826	40,644	41,759	32,654	32,670	26,517
<b>% annual change</b>										
Gross exports (f.o.b.)	1.0	1.3	0.9	7.6	9.9	20.8	16.8	-7.5	-20.0	-26.3
Gross imports (c.i.f.)	5.5	1.7	2.0	10.9	6.8	9.9	10.1	-12.2	-28.9	-23.7
Trade balance	-18.3	-1.0	-3.8	-5.9	27.4	79.7	47.8	15.0	21.8	-34.8

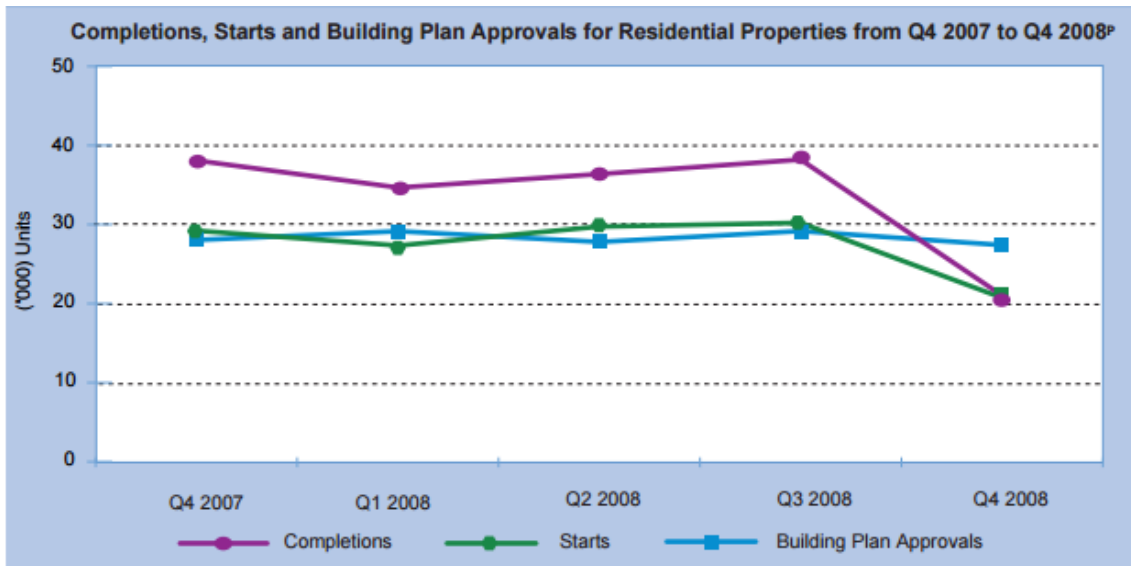
Adapted from: “The Global Financial Crisis and the Malaysian Economy: Impact and Responses” by Abidin, M. Z., and Rasiah, R., 2009, *United Nations Development Programme*, p. 22.

Table 4.2.2.2: Number of Residential Units, Malaysia from 2007Q4 to 2008Q4

	Q4 2007	Q1 2008	Q2 2008	Q3 2008	Q4 2008 <sup>a</sup>
Completions (units)	38,080	34,663	36,378	38,210	21,058
Starts (units)	29,209	27,339	29,723	30,208	20,571
Building Plan Approvals (units)	28,048	29,150	27,794	30,452	27,403

Adapted from: “Property Market Stock Report” by Valuation and Property Services Department, 2008, p. 10.

Figure 4.2.2.1: Number of Residential Units, Malaysia from 2007Q4 to 2008Q4



Adapted from: “Property Market Stock Report” by Valuation and Property Services Department, 2008, p. 10.

As for the result of trading and services sector having significant overreaction effect during the global financial crisis 2008, this can be explained by the contraction in import and export of Malaysia during late 2008, caused the loss of investor confidence to the particular sector. Table 4.2.2.1 shows that both imports and exports face a significant reduction during the fourth quarter of 2008. The trend of trade reduction is the main channel for the global financial crisis to undermine the Malaysia economy at that time. During that time, the trend in falling exports shows a continuous decline in aggregate demand from external effects, which is the main channel through which the global financial crisis has penetrated the Malaysian economy. As a result, when investors’ lost their confidence with the companies’ performance in the sectors, they tended to overreact irrationally by selling off their holding stocks, causing the stock prices to be disproportionate.

Whereas for the properties sector, although Malaysia banking industry is not affected much by the subprime lending crisis, the subsequent effect from the crisis will still affect the consumer confidence and their decision making of the properties market players. During late 2008, Malaysia property sector shows a sign of weakening which subsequently affected the listings of two largest Real Estate Investment Trusts in Bursa Malaysia Valuation and Property Services Department (2008). With the attack of financial crisis and reduction in the housing demand, the property developers were forced to delay their major property development project, contributing to the slowdown of the industry during the year. Evidently, Table 4.2.2.2 indicates that the supply of properties in Malaysia decreased during the fourth quarter of 2008 statistically as a result of the subsequent effect from financial crisis, and also graphically shown in Figure 4.2.2.1. Therefore, as referring to Figure 4.2.1.1 previously, loser portfolio has substantially outperformed winner portfolio especially since the third quarter of 2008, and increasingly outperformed during the last quarter of 2008. This is because the investors have low confidence to the particular sector in 2008 causing them to overreact to the subprime crisis news and create disproportionate stock prices. Overall, this study suggests that Malaysian stock market overreacts to economic crisis. The reason for the overreaction could be due to abnormal economic activity that taken place during the crisis period. The EMH does not hold during the period as investors behave irrationally instead.

Furthermore, since underreaction effect has been observed in year 2005 in plantation sector. The results show that winner has still outperformed loser in the 2005 which is consistent with underreaction behaviour. It can be possibly explained by the announcement of Ringgit Malaysia de-peg from U.S. dollar which causes a large impact to the capital flow within the country and subsequently affected the stock market. Back in 1997, Malaysia Ringgit (MYR) was trading free float at 2.50 MYR to a dollar. Later that year, East Asian Financial crisis struck and MYR depreciated down by 60% trading in

between 3.80 to 4.40 MYR to dollar. Hence, a decision had been made by Tun Sri Dr Mahathir to peg MYR to US dollar at 3.80 MYR to a dollar. For several years Malaysia was trading at MYR3.80/USD till 2005 where MYR de-peg to USD causing MYR to appreciate to around \$3.745/USD subsequently. Right after the announcement of de-peg news, the analyst observed an appreciation of MYR which was deemed as good news for import-based companies as they can obtain cheaper raw materials (Netto, 2005). Whereas for other firms might find foreign debt generate lower cost as they only required to repay smaller amount of ringgit after it appreciated (Netto, 2005). As for investors, it appeared to be good news for them and they make their stock buy-hold decision based on this. However, for plantation sector companies which are the exported base firm, they may receive lower revenue in U.S. dollar followed by the appreciation in MYR. This has become an adverse impact for them as they are only able to exchange for lower MYR from their U.S. dollar revenues. Therefore, investors tend to underreact the announcement of de-peg, and expect that the former winning (losing) stocks have a higher than expected probability of continuing be the winning (losing) stocks in the short run.

## **CHAPTER 5:**

### **DISCUSSION, CONCLUSION AND IMPLICATIONS**

#### **5.1 Summary of Statistical Analysis**

Table 5.1.1 Summary of the Statistical Result and Findings

	Consumer	Industrial	Plantation	Properties	Trading & Services	All sectors
2004						
2005						
2006						
2007						
2008						
2009						
2010						
2011						
2012						

Source: Developed for the research

As a summary of the study's result, plantation sector of the stock market exhibits underreaction reactions (represented in red-coloured column) during 2005, in response to the un-peg of Ringgit Malaysia from U.S. dollar. While those columns coloured in yellow show overreaction phenomenon in properties, trading and services sectors and overall market. Investors tended to overreact to the market in response to 2008 Global Financial Crisis. Therefore, it is proven that Malaysian investors tend to react disproportionately upon any surprises in events or news, rather than reacting

rationally in efficient market. In another word, investors react irrationally and EMH does not hold in Malaysia.

## **5.2 Policy Implications**

The policy implications of the study can be divided into two aspects, which are for investors, and for researchers.

### **5.2.1 Investors**

Standing from both institutional and individual investors' point of view, this study can act as their guidelines in managing securities or portfolios. Overall, the statistical evidence shows that overreaction and underreaction are technically possible in Malaysian stock market. In another word, it provides readers a clear fact that behavioural psychological factors do influence investors in their investment decisions, causing them to behave in an unpredictable or irrational way. Besides, knowing the actual behaviours of investors provides a good insight on how market players tend to behave in certain events. It basically means that investors can earn abnormal profit in short term specifically by adopting specific investment strategies. In specification, the importance of capturing overreaction and underreaction is that it justifies which option of investment strategy to be used, namely Contrarian Strategies is for overreaction phenomenon, while Momentum Strategies is for underreaction phenomenon.

In case of overreaction phenomenon, the investors can employ Contrarian Strategies by selling past winner stocks and buying past loser stocks, upon any surprises in any domestics, economics or international events and news. The strategies tend to be even applicable during economy crisis, as the study shows significant overreaction effect in Malaysian stock markets during 2008



Global Financial Crisis. In case of underreaction phenomenon, the investors can apply Momentum Strategies by selling past loser stocks and buying past winner stocks upon event shocks. The study also suggests the investors should know the past performance of the stocks or portfolios before applying any investment strategies in order to beat the market.

### **5.2.2 Researchers**

From the view of researchers, this study can be served as a foundation of study for future research especially in the study of industry overreaction. By borrowing the ideas from previous studies such as Aguiar et al. (2006), Aguiar and Sales (2010), to investigate the industry overreaction and underreaction effect on the basis of behavioural finance, this study proposes and modifies the methodology by adopting alternative method in choosing stocks from each industry. This is because the behavioural model proposes that herding behaviours tend to cause overreaction in the market. Therefore, the study chooses the most active stocks in terms of dollar volume as actively trading stocks have become a dominant force in capital market increasingly (Zhang, 2010). Besides, behavioural finance is a rapidly growing field in both developed and emerging stock markets (Toh and Ahmad, 2010). Hence, researchers should consider serving this study as a basis and employ them to study if loser portfolios outperform winner portfolios causing overreaction phenomenon in the past, and thus allowing the prediction of future behaviours, in different countries and time scope.

### **5.3 Limitations of Study and Recommendations for Future Research**

Due to resources constraints, the study is unable to outperform in several aspects. Therefore, readers should consider some limitations of the study as well. The limitations are acknowledged but they do not detract from the significance of findings but merely provide platforms for future research.

As the study uses monthly based data to investigate overreaction effect of each year from 2004 to 2012, it solely focuses on capturing the overreaction or underreaction effect that persists for at least a year long only. Hence, the overreaction of investors' behaviour towards the Global Financial Crisis can be observed clearly in properties and trading and services sectors during 2008, as the crisis has taken place continuously from 2008 to 2009 in Malaysia. Nevertheless, from the other aspect, the overreaction phenomenon was hardly to be detected in annual basis as it may due to those economics, domestics or international events only happened for few months. The reason behind for choosing monthly data is because Yahoo! Finance provides costless data for the study, yet incomplete daily or weekly data was provided by Yahoo! Finance. Hence, the study then aims to investigate overreaction on annual basis rather than relying on the limited weekly or daily data.

Therefore, it is strongly recommended to employ daily or weekly frequency of data for future study. It provides a better overview if the market was overreacted or underreacted towards events and news. For instance, the future study could investigate if the 11<sup>th</sup>, 12<sup>th</sup> and 13<sup>th</sup> general elections that have taken place during March 2004, March 2008, May 2013 bring any overreaction effect to the Malaysian stock market in respect to each sector, as the overreaction effects (if any) only persisted for two to three months after the pooling sessions started in the research conducted by Ali et al. (2010). Besides, employing daily or weekly data is recommended as different time periods information may show different

characteristics of investors in stock market returns. In addition, limitation of data can be solved by employing other databases such as DataStream for a complete set of daily or weekly data, if research cost is bearable.

## **5.4 Conclusion**

As a summary, the study aims to show the existence of irrational behaviour specifically overreaction and underreaction, among investors in the Malaysian stock market. Based on the findings, it can be concluded that on annual basis, 2008 Global Financial Crisis caused overreactions phenomenon to take place in properties, trading and services sectors, as well as in overall market. Besides, underreaction effect also happened during 2005 in plantation sector. Overall, evidences of short term overreaction behaviour presented by this study propose that Malaysian Stock Market is not consistent with the EMH in the short run. The results show that investors are able to earn abnormal profit by employing Contrarian Strategies or Momentum Strategies depending on the market situation. So, this study concludes that Malaysian stock market may not be always efficient in the short run, as EMH does not hold in Malaysia all the time.

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APPENDICES

Appendix 3.2.1: 30 Selected Stocks in Consumer Sector

Listed Companies' Stocks	Stock Number
ACOUSTECH BHD	7120.KL
AJINOMOTO (M) BHD	2658.KL
BONIA CORPORATION BHD	9288.KL
BRITISH AMERICAN TOBACCO (M)	4162.KL
CAB CAKARAN CORPORATION BHD	7174.KL
CARLSBERG BREWERY MALAYSIA BHD	2836.KL
DUTCH LADY MILK INDUSTRIES BHD	3026.KL
EMICO HOLDINGS BHD	9091.KL
FARMS BEST BHD	9776.KL
FRASER & NEAVE HOLDINGS BHD	3689.KL
GUINNESS ANCHOR BHD	3255.KL
HONG LEONG INDUSTRIES BHD	3301.KL
HUME INDUSTRIES BHD	5000.KL
HUP SENG INDUSTRIES BHD	5024.KL
HWA TAI INDUSTRIES BHD	8478.KL
KHEE SAN BHD	6203.KL
KUANTAN FLOUR MILLS BHD	8303.KL
LATITUDE TREE HOLDINGS BHD	7006.KL
LII HEN INDUSTRIES BHD	7089.KL
NESTLE (M) BHD	4707.KL
ORIENTAL HOLDINGS BHD	4006.KL
PAN MALAYSIA CORPORATION BHD	4081.KL
PELIKAN INT.CORPORATION BHD	5231.KL
PPB GROUP BHD	4065.KL
PROLEXUS BHD	8966.KL
QL RESOURCES BHD	7084.KL

TAKASO RESOURCES BHD	7071.KL
TAN CHONG MOTOR HOLDINGS BHD	4405.KL
UMW HOLDINGS BHD	4588.KL
YEE LEE CORPORATION BHD	5584.KL

Source: Developed for the research

Appendix 3.2.2: 30 Selected Stocks in Industrial Sector

Listed Companies' Stocks	Stock Number
ABRIC BHD	7061.KL
CAHYA MATA SARAWAK BHD	2852.KL
COASTAL CONTRACTS BHD	5071.KL
DELLOYD VENTURES BHD	6505.KL
DRB-HICOM BHD	1619.KL
EG INDUSTRIES BHD	8907.KL
FIMA CORPORATION BHD	3107.KL
HARVEST COURT INDUSTRIES BHD	9342.KL
JASA KITA BHD	8648.KL
KECK SENG (M) BHD	3476.KL
KIAN JOO CAN FACTORY BHD	3522.KL
KOSSAN RUBBER INDUSTRIES BHD	7153.KL
LAFARGE MALAYSIA BERHAD	3794.KL
OKA CORPORATION BHD	7140.KL
PESONA METRO HOLDINGS BHD	8311.KL
PETRONAS GAS BHD	6033.KL
PNE PCB BHD	6637.KL
PRESS METAL BHD	8869.KL
PRICWORTH INTERNATIONAL BHD	7123.KL
SCIENTEX BERHAD	4731.KL
SKP RESOURCES BHD	7155.KL

STONE MASTER CORPORATION BHD	7143.KL
SUPERMAX CORPORATION BHD	7106.KL
TA ANN HOLDINGS BHD	5012.KL
TECNIC GROUP BERHAD	9741.KL
TOP GLOVE CORPORATION BHD	7113.KL
UCHI TECHNOLOGIES BHD	7100.KL
WAH SEONG CORPORATION BHD	5142.KL
WEIDA (M) BHD	7111.KL
WTK HOLDINGS BHD	4243.KL

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Source: Developed for the research

Appendix 3.2.3: 30 Selected Stocks in Plantation Sector

Listed Companies' Stocks	Stock Number
ASTRAL ASIA BHD	7054.KL
BATU KAWAN BHD	1899.KL
BLD PLANTATION BHD	5069.KL
BOUSTEAD HOLDINGS BHD	2771.KL
CEPATWAWASAN GROUP BHD	8982.KL
CHIN TECK PLANTATIONS BHD	1929.KL
DUTALAND BHD	3948.KL
FAR EAST HOLDINGS BHD	5029.KL
GENTING PLANTATIONS BERHAD	2291.KL
GOLDEN LAND BERHAD	7382.KL
GOPENG BHD	2135.KL
HARN LEN CORPORATION BHD	7501.KL
IJM PLANTATIONS BHD	2216.KL
IOI CORPORATION BHD	1961.KL
KLUANG RUBBER CO (M) BHD	2453.KL
KRETAM HOLDINGS BHD	1996.KL

KUALA LUMPUR KEPONG BHD	2445.KL
KULIM (M) BHD	2003.KL
KWANTAS CORPORATION BHD	6572.KL
MALPAC HOLDINGS BHD	4936.KL
MHC PLANTATIONS BHD	5026.KL
NEGRI SEMBILAN OIL PALMS BHD	2038.KL
NPC RESOURCES BHD	5047.KL
PINEHILL PACIFIC BERHAD	1902.KL
PLS PLANTATIONS BERHAD	9695.KL
RIVERVIEW RUBBER ESTATES BHD	2542.KL
SUNGEI BAGAN RUBBER CO (M) BHD	2569.KL
TDM BHD	2054.KL
TSH RESOURCES BHD	9059.KL
UNITED PLANTATIONS BHD	2089.KL

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Source: Developed for the research

Appendix 3.2.4: 30 Selected Stocks in Properties Sector

Listed Companies' Stocks	Stock Number
A & M REALTY BHD	5959.KL
ASIAN PAC HOLDINGS BHD	4057.KL
DAIMAN DEVELOPMENT BHD	5355.KL
DAMANSARA REALTY BHD	3484.KL
EASTERN & ORIENTAL BHD	3417.KL
ECO WORLD DEVELOPMENT GROUP BER	8206.KL
GLOBAL ORIENTAL BERHAD	1147.KL
GUOCOLAND (MALAYSIA) BHD	1503.KL
HUA YANG BHD	5062.KL
IJM LAND BERHAD	5215.KL
ISKANDAR WATERFRONT CITY BERHAD	1589.KL



KSL HOLDINGS BHD	5038.KL
LAND & GENERAL BHD	3174.KL
LBS BINA GROUP BHD	5789.KL
MAH SING GROUP BHD	8583.KL
MALTON BHD	6181.KL
MK LAND HOLDINGS BHD	8893.KL
MKH BERHAD	6114.KL
MUI PROPERTIES BHD	3913.KL
NAIM HOLDINGS BHD	5073.KL
PJ DEVELOPMENT HOLDINGS BHD	1945.KL
SBC CORPORATION BHD	5207.KL
SELANGOR PROPERTIES BHD	1783.KL
SHL CONSOLIDATED BHD	6017.KL
SP SETIA BHD	8664.KL
TALAM TRANSFORM BERHAD	2259.KL
TANCO HOLDINGS BHD	2429.KL
TROPICANA CORPORATION BERHAD	5401.KL
UEM SUNRISE BERHAD	5148.KL
YTL LAND & DEVELOPMENT BHD	2577.KL

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Source: Developed for the research

Appendix 3.2.5: 30 Selected Stocks in Trading and Services Sector

Listed Companies' Stocks	Stock Number
AEON CO. (M) BHD	6599.KL
.KL AMWAY (M) HOLDINGS BHD	6351.KL
AXIATA GROUP BERHAD	6888.KL
BORNEO OIL BHD	7036.KL
DAGANG NEXCHANGE BERHAD	4456.KL
DIALOG GROUP BHD	7277.KL

FABER GROUP BHD	1368.KL
FITTERS DIVERSIFIED BHD	9318.KL
GENTING MALAYSIA BERHAD	4751.KL
GEORGE KENT (M) BHD	3204.KL
HAP SENG CONSOLIDATED BHD	3034.KL
HUBLINE BHD	7013.KL
KUMPULAN PERANGSANG SELANGOR	5843.KL
MALAYAN UNITED INDUSTRIES BHD	3891.KL
MALAYSIA AIRPORTS HOLDINGS BHD	5014.KL
MALAYSIAN BULK CARRIERS BHD	5077.KL
MARCO HOLDINGS BHD	3514.KL
MEDIA PRIMA BHD	4502.KL
MMC CORPORATION BHD	2194.KL
MULPHA INTERNATIONAL BHD	3905.KL
PARKSON HOLDINGS BHD	5657.KL
PERDANA PETROLEUM BERHAD	7108.KL
PETRONAS DAGANGAN BHD	5681.KL
POS MALAYSIA BHD	4634.KL
SALCON BHD	8567.KL
SCOMI ENERGY SERVICES BHD	7045.KL
SUMATEC RESOURCES BHD	1201.KL
TELEKOM MALAYSIA BHD	4863.KL
YINSON HOLDINGS BHD	7293.KL
YTL CORPORATION BHD	4677.KL

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Source: Developed for the research

Appendix 3.2.6: 30 Listed Stocks in KLCI and their Respective Industry

Listed Companies' Stocks	Stock Number	Industry
AMMB HOLDINGS BHD	1015.KL	Finance

ASTRO MALAYSIA HOLDINGS BHD	6399.KL	Trading-Services
AXIATA GROUP BHD	6888.KL	Trading-Services
BRITISH AMERICAN TOBACCO (M)	4162.KL	Consumer
CIMB GROUP HOLDINGS BHD	1023.KL	Finance
DIGI.COM BHD	6947.KL	IPC
FELDA GLOBAL VENTURES HLDG BHD	5222.KL	Plantation
GENTING MALAYSIA BHD	4715.KL	Trading-Services
GENTING BHD	3182.KL	Trading-Services
HONG LEONG BANK BHD	5819.KL	Finance
HONG LEONG FINANCIAL GROUP BHD	1082.KL	Finance
IHH HEALTHCARE BHD	5225.KL	Trading-Services
IOI CORPORATION BHD	1961.KL	Plantation
KUALA LUMPUR KEPONG BHD	2445.KL	Plantation
MAXIS BHD	6012.KL	Trading-Services
MALAYAN BANKING BHD	1155.KL	Finance
MISC BHD	3816.KL	Trading-Services
PUBLIC BANK BHD	1295.KL	Finance
PETRONAS CHEMICALS GROUP BHD	5183.KL	Industrial
PETRONAS DAGANGAN BHD	5681.KL	Trading-Services
PETRONAS GAS BHD	6033.KL	Industrial
PPB GROUP BHD	4065.KL	Consumer
RHB CAPITAL BHD	1066.KL	Finance
SIME DARBY BHD	4197.KL	Trading-Services
SAPURAKENCANA PETROLEUM BHD	5218.KL	Trading-Services
TENAGA NASIONAL BHD	5347.KL	Trading-Services
TELEKOM MALAYSIA BHD	4863.KL	Trading-Services
UEM SUNRISE BHD	5148.KL	Properties
UMW HOLDINGS BHD	4588.KL	Consumer
YTL CORPORATION BHD	4677.KL	Trading-Services

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Source: Developed for the research