

# **WATERFORD INSTITUTE OF TECHNOLOGY**



## **Stock Market Momentum and Overreaction: Evidence from the FTSE and Stock Exchange of Thailand**

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*Presented to*

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## **ABSTRACT**

Two traditional methods of managing equity portfolios involve investing based on price momentum and value-based contrarian investing. The aim of this study is to investigate whether these two contradictory trading strategies are capable of producing excess abnormal returns, and to explore the different explanations given for their profitability.

Both anomalies have been extensively tested in developed markets, such as the US and UK. Yet, evidence of these investment strategies in emerging markets is minimal. Therefore, this study endeavours to address this gap in existing literature through the examination and comparison of a developed and emerging stock market. This study employs models used by De Bondt and Thaler (1985) and Jegadeesh and Titman (1993) to determine the profitability of momentum and contrarian strategies. This involves ranking stocks based on their past 12 month returns and subsequently testing them for one year in the case of momentum and three years for the contrarian strategy.

The evidence shown in past literature and in this paper is clear, momentum and contrarian strategies are able to beat the market. Hence, momentum and contrarian returns can be explained by market inefficiencies. For the momentum strategy, the primary research findings seem to be stronger and less controversial. Whereas, the results regarding the profitability of the contrarian strategy are more sensitive to different methods used in the investigation. Overall, the study agrees with Fama (1998) that anomalies may be due to methodological issues and can disappear with changes in models. For both approaches, the findings of profitability are closely related to weak-form market efficiency, as they imply that future stock prices can be predicted from past return data.

Contradictory to previous studies, the January effect is not found to be a viable explanation for the levels of profitability of these investment methods. However, the levels of risk inherent in each market seem to affect the overall excess returns. The SET, an emerging market, demonstrates higher levels of market risk which thus contributes to greater profitability for both strategies vis-a-vis the developed FTSE. Even though both strategies indicate that the two markets are inefficient, the FTSE appears to be more efficient than the SET market.

## **DEDICATION**

This dissertation is dedicated to Kerry O' Keeffe,  
for all his guidance and inspiration.

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## **ETHICAL DECLARATION**

I declare that this dissertation is wholly my own work except where I have made explicit reference to the work of others. I have read the Structured Masters Programs Research Policy, Procedures and Guidelines (October, 2009) and hereby declare that this dissertation is in line with these requirements. I have discussed, agreed and complied with whatever confidentiality or anonymity terms of reference were deemed appropriate by those participating in the research.

I have uploaded the entire dissertation as one file to Turnitin®, examined my 'Originality Report' by viewing the detail behind the overall 'Similarity Index', and have addressed any matches that exceed 3% when quotations and bibliography are excluded. Any unaddressed matches in excess of 3% are explained by way of additional note submitted separately with the dissertation. I have made every effort to minimise my overall 'Similarity Index' score and the number of matches occurring.

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Tina Byrne

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## **GLOSSARY OF TERMS AND ABBREVIATIONS**

CAPM	Capital Asset Pricing Model
CAR	Cumulative Average Return
EMH	Efficient Market Hypothesis
FTSE	Financial Times Stock Exchange
NASDAQ	National Association of Securities Dealers Automated Quotations
NYSE	New York Stock Exchange
SET	Stock Exchange of Thailand
UK	United Kingdom
US	United States

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# Chapter 1

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## Introduction

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## Chapter One

### INTRODUCTION

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#### **1.1 Chapter Overview**

The purpose of this chapter is to present a general foreword of the dissertation and area of research to the reader. This section will begin with a theoretical background to the Efficient Market Hypothesis. Noise trading and the concept of behavioural finance will then be established. Subsequently, the rationale for the study through the research gap will be highlighted. Ultimately, a preview of the dissertation formation will be specified.

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

The efficient market hypothesis (EMH) is one of the most fundamental issues in financial literature from the time of its founding in the 1950's. The EMH, popularly known as the Random Walk Theory, is the proposal that current stock prices fully reflect available information about the value of the firm, and hence there is no way to earn excess earnings by using this information. (Malkiel,1996)

"Past, present and even discounted future events are reflected in market price, but often show no apparent relation to price changes" (Bachelier, 1900). Bachelier was the first to generate interest in the theory of market efficiency which has become synonymous with finance.

Eugene Fama (1965: 39) was the first to use the term "efficient market". He believed that in an efficient market, "on the average, competition will cause the full effects of new information on intrinsic values to be reflected instantaneously in actual prices".

Many investors try to identify securities that are undervalued, which they expected to increase in value in the future, particularly those securities that will increase more than others.

However, EMH states it is impossible to "beat the market" because stock market efficiency causes existing share prices to always integrate all applicable information at a given instant of time. Wyart and Brouhard (2007) purports that stocks constantly trade at their fair value on stock exchanges, thus making the purchase undervalued stocks or sale of stocks at inflated prices impossible.

Fama (1970) asserts that there are three versions of the Efficient Markets Hypothesis, all differing on what is meant by the term "all available information". The simplest form is known as the weak form. This is where the current price (return) is considered to integrate all the information in past prices (returns). The information contained in a security's past price sequence is completely reflected in the security's current market price. Therefore, as current market prices are a function of random information, there is no way to predict price changes according to this weak form efficiency. Consequently, technical analysis is an ineffective means of investment as the weak form EMH asserts that there is no correlation between the changes in a security's price. However, if a security's past prices tend to repeat themselves, trading strategies, such as the contrarian or momentum investment strategies, can profit from such price consistency. This would therefore violate the weak form EMH, which will be directly examined in this study.

The semi-strong form of the EMH ascertains that current prices swiftly incorporate all publicly available information, including past prices or returns. The implication of this is that neither technical nor fundamental analysis can be used to beat the market. A consequence of this hypothesis is that most arbitrage opportunities are exhausted instantly. This division of EMH advocates that only information that is not publicly available can benefit investors seeking to earn abnormal returns on their investments. Gersdorff and Bacon (2010) find evidence to support the semi-strong version of efficiency in the NASDAQ and NYSE markets in 2007. In addition, Yalama and Celik (2008) identify that the Istanbul Stock Exchange market is efficient in the semi-

strong form, whereas most studies, including Aga and Kocaman (2008) and Buguk and Brorsen (2003) indicate weak form efficiency in the market.

The strongest version of the EMH is where prices reflect all information that can possibly be known, including 'insider information', (Pilbeam, 1998). The strong form of market efficiency postulates that the price of an asset incorporates both public and private information, meaning that investors are being unable to yield excess abnormal returns due to a monopolistic access to information. Consequently, profits exceeding normal returns cannot be made, despite of the quantity of information investors have the use of.

Stock market anomalies aim to find some strategies in predicting stock market returns and consequently earn above average returns. Anomalies use public information regarding stocks which help to predict excess returns. There have been several studies that have suggested the rejection of the EMH based on a number of anomalies. A number of stock market anomalies have proved popular and remain a favourite amongst financial market researchers to test for excess returns in different stock markets.

Such anomalies are increasing in number. There are two central types of stock market anomalies; calendar and fundamental anomalies. The most well known calendar anomalies include the January effect, the day of the week effect and the weekend effect. Fundamental anomalies include the price-earnings effect, the dividend yield effect, the small firm effect and the overreaction effect, (Pilbeam, 1998). Technical anomalies are a third category of anomalies which is rapidly growing. The momentum effect is considered as a technical anomaly. This research will be looking at the studies of the overreaction and momentum effects.

### **1.3 Noise Trader Approach**

This approach is in direct contrast to the EMH, developed by Black in 1986. Noise traders are influenced to purchase shares by factors other than returns. This is what separates these traders from rational traders whose demand for shares is based on the security's return.

Noise traders trade on what is termed 'noise', which they perceive to be justifiable information. When there is an elevated element of noise in the market, the means eliminating anomalies and market efficiency, i.e. arbitrage is not effective. Fama and French (1988) also find evidence of noise trading in markets, thus claiming this as the basis for stock prices' failure to quickly mean revert.

#### **1.4 Behavioural Finance**

According to Shiller (1998) behavioural finance is the study of behavioural principles, which come chiefly from psychology, sociology and anthropology. These behavioural principles include over- and under reaction, representativeness heuristic, perceived irrelevance of history and global culture. Put simply, behavioural finance is the study of the power of psychology on the behaviour of financial practitioners and the following effect on markets, as noted by Sewell (2005).

The momentum and contrarian strategies are strongly linked to more than a few of these principles. Herding behaviour, although individually rational, produces group behaviour that is irrational, has repeatedly been witnessed in the housing market, in the stock market crash of 1987 (Shiller, 1990) and in the foreign exchange market (Frankel and Froot, 1986).

#### **1.5 Rationale for Study**

There is an apparent lack of analysis completed regarding anomalies on the emerging market of the Stock Exchange of Thailand (SET), hence highlighting an interesting research gap. It would be of interest to academics and market participants to understand whether the Thai market is characterised by the overreaction anomaly or is affected by momentum trading. If either anomaly is found to be evident then it will challenge the market's efficiency. Therefore, the primary objective of this research is to identify whether momentum or overreaction occurs in the FTSE and SET markets.



Chan *et al.* (1996, p.1711) state prominently: *"Spelling out the links between momentum strategies and contrarian strategies remains an important area of research"*.

This study aims to update the literature of Rouwenhorst (1999), who in a study of twenty emerging markets asserts that while a momentum investment strategy is profitable in developing markets, it is significantly less lucrative vis-a-vis developed markets. Hence, an imperative aim of this study is to determine whether investment strategies using anomalies are more profitable in developed markets, in line with Rouwenhorst's findings.

In conjunction with these objectives, this study will provide an insight into possible explanations for the named anomalies including the Size effect and the January effect. Papers generally state whether or not an anomaly exists, then give other reasons as to why they exist, such the size or January effects. This study will eliminate the size effect through selecting firms in the top 100 capitalisation of the FTSE and SET indices.

## **1.6 Dissertation Structure**

The remaining sections will be examined in the subsequent order. Chapter Two will detail the contrarian strategy and its competing theory, the momentum effect. This chapter will review the literature on both of the stock market anomalies in developed and emerging markets. The methodology employed in the study will be discussed in Chapter Three. In addition, this section will highlight the advantages and restraints of such a methodology. The primary research findings will then follow in Chapter Four. The findings based on the models discussed in Chapter Three will be outlined in this section, for both markets, the Financial Times Stock Exchange (FTSE) and Stock Exchange of Thailand. Chapter Five will document a comprehensive discussion of the study's findings, within the context of findings from previous literature. Chapter Six will conclude the study, drawing on the findings and affording various recommendations.

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# Chapter 2

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## Literature Review

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## Chapter Two

### LITERATURE REVIEW

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#### **2.1 Chapter Overview**

This chapter sets out a comprehensive review of previous studies on the contrarian and momentum investment strategies. The review includes evidence from developed and emerging markets, such as the US, UK and Asian stock markets. The chapter will also discuss possible explanations of both anomalies, namely the Size effect, time varying risk, the January effect and trading volume.

#### **2.2 Contrarian Investment Strategy**

Power and Lonie (1993) assert that the contrarian investment strategy, also known as the overreaction effect, has a claim to be regarded as one of the most important anomalies. The overreaction hypothesis arises from an investors response to surprising company news, either good or bad, which results in a short-term overshooting of the equilibrium value of the share price of the company affected.

According to Nam *et al.* (2001), in an overreaction event the price level is far beyond where it should be. Subhrendu (2004) identifies that the market overreaction hypothesis is attributable to the mispricing of securities in a trading environment where traders may over react to each other's trades.

Daniel *et al.* (1998) suggest that continuous overreaction is based on psychological conclusions, that people are overconfident on the private signals. People outweigh recent information and underweight base rate data. De Bondt and Thaler (1987) find

that as a consequence of this investor overreaction to earnings, stock prices temporarily depart from their underlying fundamental values. One of the earliest observations of over reaction in the market place was made by John Maynard Keynes (1936). He recognises that daily variations of profits had an extremely disproportionate power on the market. "Day-to-day fluctuations in the profits of existing investments, which are obviously of an ephemeral and non-significant character, tend to have an altogether excessive, and even an absurd, influence on the market." (pp. 138)

De Bondt and Thaler (1985) investigate whether investors are inclined to overreact to unexpected events and whether such actions have an effect on stock prices. They test whether market behaviour and the psychology of individual decision making, displayed as overreaction are related more than just on the surface. Their goal is to test whether the overreaction effect was predictive. The authors believe that if stock prices systematically overshoot, then their reversal can be predicted from past return data alone. They suggested two hypotheses. The first states that excessive movements in stock prices will be followed by subsequent price movements in the opposite direction. Their second hypothesis argues that the more extreme the original price movement, the greater the subsequent amendment will be.

De Bondt and Thaler (1985) focus on stocks that have experienced either extreme capital gains or extreme losses over periods up to five years. They use monthly return data for the New York Stock Exchange (NYSE) common stocks between January 1926 and December 1982. They take thirty five of the most extreme 'winners' and thirty five of the extreme 'losers' and form two distinct portfolios of these companies' shares. Then they calculate the average 'test period' performance, in excess of the return on the whole NYSE index, giving equal weight to each of the thirty five companies.

The results are consistent with the overreaction hypothesis, as they identify that most people react excessively to unanticipated and dramatic news events. The thirty five stocks of the loser portfolios outperformed the market by an average of 19.6%. The winner portfolios earned approximately 5% less than the market. The overreaction effect is much larger for losers than for winners.

The returns on the portfolios are mean reverting. The overreaction effect claims that by focusing on stocks that go through more severe return experiences, the succeeding price reversals will be more distinct. As the cumulative average residuals for various arrangements of winner and loser portfolios grow larger, so do the subsequent price reversals.

De Bondt and Thaler (1985) also discover that the average betas of the securities in the winner portfolios are considerably larger than the betas of the loser portfolios. Therefore, the loser portfolios not only outperform the winner portfolios but they are also extensively less risky. Thirty six months after the portfolio creation, the losing stocks had earned approximately 25% more than the winners, even though the winners are considerably more risky.

Further empirical evidence has been carried out by Shiller (1981), Jegadeesh (1990) and Lehman (1990), Bremer and Sweeney (1991) and Chopra *et al.* (1992) who all document what seems to be an overreaction in the respective stock markets. However, there are numerous contrasting arguments, which deny the profitability of a contrarian investment strategy.

Conrad and Kaul (1993) show that the true returns to loser and winner firms have no relation to overreaction. Consistent with these findings, Baytas and Cakici (1999) see no evidence of over reaction in the US.

An assessment of overreaction in the Australian equity market by Brailsford (1992) and Allen and Prince (1995) indicate that there is no proof of performance reversal in loser portfolios and no significant difference between the test period performance of winner and loser portfolios.

Cox and Peterson's (1994) sample includes NYSE, AMEX, and NASDAQ securities with one-day price declines of more than 10%, over a test period from January 1963 to June 1991. Substantial price reversals for NYSE and AMEX firms before October 1987 were identified. The results for NASDAQ stocks indicate significant price reversals subsequent to the event day, both before and after October 1987. They

ascertain that most of these reversals are due to the bid-ask bounce. The study concludes that there is no evidence consistent with the overreaction hypothesis.

Lasfer *et al.* (2003) document stock price behaviour in the periods following stock market stress. They focus on price behaviour using daily market indices from thirty nine stock exchanges. Their results are not consistent with the overreaction hypothesis as they discover positive abnormal price performance up to ten days following positive price shocks.

However, the international evidence on the topic is exceptionally strong. *"The overreaction hypothesis asserts that extreme winners become losers in the ensuing period and vice versa, driven by an initial over reaction to news that is subsequently corrected. If this holds true, then contrarian strategies that are short in past winners and long in past losers should deliver profits"*. (Antoniou *et al.*, 2006, pp. 840)

Antoniou *et al.* (2006) use weekly price observations for all stocks listed on the London Stock Exchange (LSE) between December 1984 and September 2000. The FTSE 100 Price Index is used as a proxy for the market portfolio. The study asserts that contrarian profits for the LSE are statistically and economically significant.

For the UK stock market, Bhaskar and Morris (1984) identify a tendency for analysts to underestimate future earnings. O'Hanlon and Whiddett (1991) carry out an investigation and conclude that UK analysts are prone to under react when predict earnings forecasts. However, this conclusion is based on a relatively small sample of analysts' forecasts. Hussain (1996) makes similar conclusions with regard to UK analysts.

Clare and Thomas (1995) examine the overreaction hypothesis in the UK also. Winner and loser portfolios are formed, and stocks organised into groups according to their performance over one, two, and three years. Their findings indicate that previous losers tend to subsequently outperform previous winners over the period 1955 to 1990, although the difference in performance is economically insignificant.

The UK stock market is also investigated by Campell and Limmack (1997), who test for winners and losers between from January 1979 and December 1990. Their

findings signify that loser companies generate positive abnormal returns. In addition, the smallest loser companies experienced a reversal in their abnormal returns over the next 12 months, but no such reversal existed for the smallest winner companies. Their evidence for over reaction is also supported by Patz (1989) and Capstaff *et al.* (1995).

Dissanaike (1997) looks at impartial methods of return calculation and uses data from 1975 to 1991 for almost 1,000 UK companies. Overall, the evidence appears to be consistent with the overreaction hypothesis.

Akhigbe *et al.* (1998) inspect the overreaction effect using NYSE stocks that gains or loses the most in a single trading day in 1992. Using major losers, price reversals are found to be large enough to be profitable, which can be interpreted as synonymous with the overreaction hypothesis. Furthermore, Larson and Madura (2003) observe NYSE stocks that have incurred a 10 per cent one-day price change between 1988 and 1998. They find over reaction in reply to uninformed events for their sample of gainers and under reaction in response to both informed and uninformed events for the loser stocks.

In addition, Yulong *et al.* (2005) finds noteworthy abnormal returns over two successive days after the event day for gainers and losers in the NASDAQ stock exchange. They document a stronger over reaction effect for the loser stocks. The abnormal returns for NASDAQ stocks were 38 per cent for the gainers and -35 per cent for the losers. The abnormal returns for the duration of the two-day period subsequent to the event day are -1.76 per cent for the gainers and 4.5 per cent for the losers. Both results are substantial at the 0.01 level.

Bowman and Iverson (1998) investigate the behaviour of stock prices in New Zealand, after large weekly price changes. They discover a stock market over reaction that is especially pronounced in the case of price declines. Moreover, the reversal is confined to the week after the overreaction and is larger the bigger the original over reaction is.

Gaunt (2000) maintains over reaction and reversal in the Australian stock market. The study finds evidence of performance reversal for both the rank period loser and

winner portfolios and positive abnormal returns for the arbitrage (loser–winner) portfolio.

DaCosta (1994) offers evidence of over reaction in the case of Brazilian stock exchange as do Leung and Li (1998) in stocks listed on Hong Kong exchange. In a study of the Finnish Stock Exchange, Grinblatt and Keloharju (2000) report that foreign investors appear to follow momentum strategies, while domestic investors- especially less sophisticated households- follow contrarian strategies. Richards (1997) examines most developed equity markets around the world and reported that, on average, there is a twelve month lag before the strategy had any profits in the test period. Also on the Finnish Stock Exchange, Larkomaa (1999) analyses the period 1975 to 1996 to report that overreaction is in effect, producing abnormal returns with holding and testing periods ranging from three to five years.

Baytas & Cakici (1999) examined the US, Canadian, UK, Japanese, German, French, and Italian equity markets and found that loser (winner) portfolios outperformed (under-performed) market portfolios in the next one, two and three year periods, for all countries except for the US, and Canada. Three year arbitrage returns are positive and significant except for the US market. The average return for the arbitrage portfolio ranged from 12.4% in Canada to 94.5% in Japan. They also find an asymmetric effect for winners and losers.

### **2.3 Momentum Investment Strategy**

The momentum investment strategy is the opposite of the overreaction effect and generally works for a rank and hold period of one to 12 months. According to Balvers and Wu (2006) the momentum strategy consists of sorting the portfolios of companies by prior returns, holding those with the best previous performance and short selling those with the worst prior performance generates positive excess returns.

Jegadeesh and Titman (1993) analyse NYSE and AMEX stocks, using three to twelve month holding periods in buying winning stocks and selling poor stocks. This produces significantly positive returns. They expect that US stocks which performed



best over a 3 to 12 month period should continue to perform well over the following 12 months. The study focuses on the years 1965 to 1989, which gives an average return of 12.01% per year, when the stocks are selected based on their past six months returns, and are subsequently held for six months.

The returns of the zero-cost winners minus the losing portfolio of the 36 months following the portfolio formation date are scrutinised during the study. Omitting the first month, this portfolio realises positive returns in each of the 12 months after the formation date. In addition, their results indicate that the relative strength rule profits cannot be attributed to lead-lag effects which are the result of delayed stock price reactions.

The authors believe that early positive and later negative relative strength returns suggest that widespread explanations of return reversals as evidence of overreaction and return perseverance as evidence of under reaction are exceedingly one-dimensional. Therefore, an additional sophisticated model of investor behaviour is needed to explain the observed pattern of returns fully.

One justification for this by Jegadeesh and Titman (1993) is that investors who buy past winners and sell past losers shift prices away from their long-run values in the interim and in so doing cause prices to over react. Otherwise the market can potentially under react to information about the short-term forecasts of a firm but, at the same can over react to information about the firm's long-term projections, given that the nature of the information available about a firm's short-term prospects is less ambiguous than long term forecasts regarding company prospects.

Jegadeesh and Titman (2001) provide further analysis on the investment strategy. They outline significant momentum profits in the eight years subsequent to their previous paper, from 1989 to 1997. They assess the returns of the momentum strategy in the post holding period, in order to gain more information regarding the source of momentum profits. They conclude that positive momentum returns can be connected with post holding period reversals occasionally.

Jegadeesh and Titman (2002) find a momentum strategy that is inconsistent with market efficiency, in contrast with other authors, where momentum profits were produced in efficient markets. This is due to cross-sectional variation in expected returns.

Grundy and Martin (2001) find that historically momentum strategies have been profitable in the US and have been since the 1920's, in line with Jegadeesh and Titman (1993). From 1926 to 1995, they find that the average monthly return is 0.44% from using momentum trading strategies. Many studies have found similar evidence to these authors on an international level.

Nonetheless, there is much mixed international evidence regarding the momentum strategy. Durand *et al.* (2006) examine momentum in Australia to cover the period 1980 to 2001, but fail to verify the presence of a momentum effect. Hence, the authors maintain that momentum is time-period specific in the Australian market. Yet, these findings remain at odds with the results of Hurn and Pavlov (2003) who document strong momentum in the period 1974 to 1998.

Hameed and Kusnadi (2002) study the momentum strategy in Thailand, Malaysia, Hong Kong, Taiwan, Singapore and South Korea. Monthly returns over a fourteen year period were used in the study which rejects the profitability of momentum in the six Asian markets. Brown *et al.* (2008) also explores the momentum strategy in Taiwan, South Korea Singapore and Hong Kong. The study uses a combination of momentum and value strategies to find no success in the tandem. The unaccompanied momentum strategy did not yield significant returns either in Taiwan.

Shen *et al.* (2005) focus on both momentum and overreaction effects in thirteen developed and developing markets for the period 1974 to 2000. No evidence of significant momentum profits were identified in the emerging markets. However, momentum profits were apparent in developed markets, but only from 1974 to 1987.

Lui *et al.* (1999) illustrates that the momentum effect is present in UK stocks. From 1977 to 1998, significant momentum profits are found to be present. They discover

that even when systematic risk, size, price, book-to-market ratio, or cash earnings-to-price ratio are separately controlled, momentum profits are not eliminated.

Hon and Tonks (2003) use historical returns of the leading securities in the UK stock market to classify profitable momentum trading strategies as investment tools. The study focuses on forty one years, from 1955 to 1996. The authors discover profitable momentum strategy between 1977 and 1996. However, momentum is not evident during the 1955 to 1976 test period. It is clear from this research that momentum is not a constant feature of the UK stock market, but instead it is only perceptible in particular periods.

Ellis and Thomas (2004) uncover medium-term return momentum in the FTSE 350. The returns of simple momentum strategies consist of 1.4 per cent per month, in the period 1990 to 2003. Even though transaction costs for momentum strategies are considerably higher than previous studies document, momentum returns still exist. Nevertheless, momentum strategies instituted during or after times of market stress yield negative returns. Similarly, Aarts and Lehnert (2005) document the profitability of momentum strategies in UK stock market. The strategy produces significant positive returns, but is less profitable in the FTSE 350 stocks.

Galariotis *et al.* (2007) analyses momentum trading strategies in the UK over a forty year period. Results indicate that momentum profits are intense in shorter formation and holding periods. This suggests that that there is inefficiency in this market in the long term. Schiereck *et al.* (1999) also find abnormal profits for intermediate-term momentum strategies, as well as short- and long-term contrarian strategies, in the Germany equity market.

The findings of Antoniou *et al.* (2006) correspond with the findings of Chordia and Shivakumar (2006) who state that momentum is present in the stock prices of three European exchanges; the UK, Germany and France. Similarly, Rouwenhorst (1998) records that an internationally diversified portfolio of past winners retained larger profits than the loser portfolio by one per cent per month, following the correction for risk. Thus, the twelve EU countries analysed in the study conforms to the momentum effect. The author finds significant momentum payoffs between 1980 and 1995.

Rouwenhorst (1999) discovers abnormal profits of momentum strategies in six out of twenty emerging equity markets. The author documents that past winners outperform past losers with an average excess monthly return of 0.39 per cent and 0.58 per cent when the countries were equally weighted.

Hameed and Yuanto (2000) find that a momentum strategy produces small but statistically significant profits in six Asian stock markets. Kang *et al.* (2002) discover intermediate-term momentum profits in the Chinese stock market.

Furthermore, Gunasekarage and Kot (2007) illustrate that a strong momentum effect is present in the New Zealand market. Based on a six-month portfolio formation period and a six-month holding period, momentum trading generates a monthly return of 1.14 per cent.

Foster and Kharazi (2008) investigate momentum in Iran's emerging Tehran Stock Market. The study uses data on stock prices and volume over the period 1997 to 2002 to find evidence of momentum where past high performers have above-average return over an intermediate (3–12 month) horizon.

Numerous studies have investigated the momentum effect in the Australian market, yet the findings have been conflicting. Hurn and Pavlov (2003) discover strong momentum in the market, whereas Durand *et al.* (2006) ascertain no encouraging support of a profitable momentum trading strategy in the Australian market.

Gaunt and Gray (2003) survey monthly returns on a sample of Australian equities between 1974 and 1998. Their study finds oblique confirmation that maintains positive momentum during this time period. The authors use an approach based on one-month prior returns to learn that the winner decile portfolio out-performs the loser decile portfolio by almost 6% in a one month holding time frame.

A strong momentum effect for the Australian market from 1988 to 2002 is examined by Drew *et al.* (2007). It was found that momentum plays a strong role in providing information about stocks. Past trading volume appears to predict both the magnitude and persistence of price momentum.

Gunasekarage and Wan Kot (2007) examine New Zealand for a momentum anomaly, and establish that there is a strong effect in the market. They find that the best rank and hold periods to be three to six months.

Demir *et al.* (2004) observe the momentum effect over 30, 60, 90 and 180-day horizons from 1990 to 2001. Results demonstrate momentum profits earning a monthly return of 5.34%. Significantly, these findings surpass the general USA results of 1% per month.

## **2.4 Size Effect**

Fama and French (2007) state that a momentum anomaly can be evident in all size groups, from micro to large. However, Brailsford and O'Brien (2008) discover that momentum returns are considerable for larger portfolios only. They report that momentum is in attendance in the top 500 stocks only, and is most considerable amongst the mid-cap stocks. This is a form of the size effect. In their advance examination of the impact of size, the authors cast doubt on the practical implementation of a trading momentum strategy, due to size implications. Thus, they propose that triumphant momentum investment strategies are likely to return 'paper' profits as opposed to produce real investment returns.

Brailsford and O' Brien (2008) inspect the influence of size by running a two-factor model. The largest exposure to the size dynamic originates in small loser portfolios which also have prevalent exposure to market risk. The authors discover that the winner portfolio does not outperform when a variety of risk exposures are accounted for. In contrast, the momentum portfolio's surplus returns are motivated by the under-performance of the loser portfolio.

Additionally, Demir *et al.* (2004) scrutinise the strength of their results to size through the creation of size-neutral quartiles. A pattern materialises whereby the prime results are associated with the smallest portfolios, thus indicating a size effect.

Similarly, Marshall and Cahan (2005) observe the robustness of their results to size and similarly, identify that positive momentum is strongest amid the smallest quartile of securities. In fact, the effect evaporates entirely for the largest quartile.

In sub-sample analysis of their study, Gaunt and Gray (2003) recognise that there is no support of a momentum effect in the top 200 stocks. However, there is strong confirmation of an effect outside these top stocks, which *prima facie* indicates that momentum is determined by smaller firms.

Zarowin (1990) claims that firm size can explain this over reaction, known as the small firm effect. He argues that losers tend to be smaller than winners and when size is controlled there is no significant difference in performance. He also explores the occasions when losers are smaller than winners, and periods when winners are smaller than losers. The results show that when losers are smaller, they outperform the winners. When winners are smaller, they outperform the losers. Therefore, Zarowin concludes that losers' superior performance over winners during the test period is due to size discrepancies. He suggests that the winner-loser anomaly can be subsumed by the size effect. This is similar with the results for the UK market of Clare and Thomas (1995). Here, the losers tended to be small, and the overreaction can be explained by the firm size effect.

However, Dissanaike (2002) finds no evidence that the winner-loser effect in the UK can be subsumed by the size effect, although he reports a size effect within the sample of FT 500 companies. Brailsford (1992) also finds the average size of loser companies to actually be greater than that of winner companies and the average size of the loser and winner portfolios to significantly surpass that of all other companies.

Data from Gaunt (2000) suggests that the differential performance of the loser and winner portfolios may actually be driven by size effect also. Three out of every four firms in the loser portfolio comes from the smallest of the three size portfolios. In addition there is almost no representation in the loser portfolio from those firms classified as large.

Yulong *et al.* (2005) also indicate in their regression analysis that firm size is statistically significant in determining the overreaction effect.

## **2.5 Time Varying Risk**

Chan (1988) rejects the overreaction hypothesis by arguing that De Bondt and Thaler (1987) fail to control for time-varying risk, and when accurately controlled for the overreaction effect ceases to exist. In particular, the study argues that stocks with a series of negative abnormal returns will experience an increase in their equity betas and therefore, their expected returns will increase. Similarly, the winner stocks which experience a series of positive abnormal returns have reduced betas and lower expected returns, as is the same in Ball and Kothari's (1989) study.

Following the study of Chan (1988), DeBondt and Thaler made a methodological change by recalculating the portfolio betas during the test period as an alternative to the formation period. This change led to the determination of a higher beta for the losers, as the beta increased by 0.22. Similarly, Dissanaike (1997) asserts that employing time varying betas do not result in changed empirical conclusions, in agreement with De Bondt and Thaler (1987).

## **2.6 January Effect**

Gu (2003) asserts that the January effect occurs when equity returns are abnormally large during the month of January. Rozeff and Kinney (1976) agree during the month of January, common stock returns are appreciably higher than returns in other months.

The January effect has a number of justifications, including transaction costs, seasonality in risk premium or expected returns, window dressing, a firm's business cycle and year-end transactions of cash or liquidity. In addition, Ritter (1988) ascertains that tax-loss selling effects can explain the abnormally high January

returns. Ligon (1997) suggests this anomaly is associated with higher trading volume during the month of January, in addition to lower real interest rates.

Rozeff and Kinney (1976) ascertain that the January effect is associated with small firms. Similarly, Reinganum (1981), Keim (1983), and Roll (1983) reiterate the prominence which small firms have in the January effect. Therefore, the January effect has a less significant presence in larger firms. Hence the elimination of small firms from this study's primary research.

Conversely, Gu (2003) and Schwert (2003) study the decline of the January anomaly. Both authors conclude that effect is declining, in conjunction with Mehdian and Perry (2002), who maintain that the effect is disappearing completely. These authors all tender Fama's (1970) semi-strong form of market efficiency as a potential explanation.

De Bondt and Thaler (1985), Conrad and Kaul (1993) and Baytas and Cakici (1999) all document the January effect anomaly as a suitable explanation of the high January returns in their contrarian strategies. Consequently, the January effect's slump has imperative implications for all studies based on stock market overreaction.

## **2.7 Trading Volume**

Trading volume refers to the quantity of shares traded during a specific time period for a particular security. Connolly and Strivers (2003) document extensive momentum in the successive week's return when the second week has unusually elevated turnover.

Glaser and Weber (2003) discover an affirmative connection between German market turnover and momentum strategies. The study highlights that the maximum returns are attributed to high turnover winner stocks in comparison to winner stocks with low turnover.



Also, Korajczyk and Sadka (2004) report that the influence of trading costs results in lower momentum profitability. Conversely, it has been discovered that value and liquidity weighted strategies are robust to trading costs. In addition, Lesmond *et al.* (2004) assert that momentum trading costs have been previously undervalued.

However, in contrast to Korajczyk and Sadka (2004), Lee and Swaminathan (2000) identify that firms with high past turnover ratios produce lower future returns. Past trading volume also forecasts the scale and diligence of the price momentum. These findings confirm that past volume facilitates the resolution of intermediate-horizon under reaction and long-horizon overreaction effects.

## **2.8 Chapter Summary**

Prior literature in relation to the momentum and overreaction effects within both developed and emerging markets have been specified in this chapter. In addition, this section has briefly examined other explanations for findings in favour of these two anomalies. These include the Size effect, time varying risk, the January effect and trading volume.

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# Chapter 3

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Research Methodology

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## Chapter Three

### RESEARCH METHODOLOGY

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#### **3.1 Chapter Overview**

This chapter will examine the methodology utilised in this study. The research objectives which will be studied and the primary research will be explained in this chapter. The objectives will be scrutinised in the research design of the methodology. The methods concerning this research are consistent with techniques which have been previously used in a comprehensive manner within this research area. This chapter will explain the models which will be used and explain the risk adjustment approach.

#### **3.2 Introduction**

The foundation of this study is to scrutinise the consequences of momentum and contrarian trading strategies individually in a developed and an emerging market, namely the FTSE and the SET. The methodology will establish whether a momentum or contrarian based strategy will generate significant excess abnormal returns. These markets will be analysed in perspective of testing the following hypotheses:

H<sub>0</sub>: the null hypothesis advocates that a *momentum investment strategy* will yield significant abnormal returns.

H<sub>1</sub>: The alternative hypothesis declares that a *contrarian trading strategy* will yield significant abnormal returns.

These hypotheses will be tested in the two named markets as there is a considerable lack of data comparing the opposing investment strategies in two such contradictory

markets. Data examining the viability of these trading strategies in the SET is virtually non-existent.

### **3.3 Research Objectives**

The following research objectives will be addressed, stemming from the literature review, and in line with the hypotheses previously outlined.

1. To determine whether a momentum based investment strategy can generate positive abnormal returns in the UK and Thai stock exchanges.
2. To assess if a contrarian investment strategy generates excess abnormal returns for the FTSE and SET.
3. To identify what proportion of abnormal profits can be attributed to the January effect.
4. Can abnormal returns be explained in relation to risk differentials between the winner and loser portfolios?
5. To analyse the viability of a momentum strategy on the FTSE in comparison to the SET.
6. To analyse the viability of a contrarian trading strategy on the FTSE in comparison to the SET equivalent.

### **3.4 Research Design**

Weekly return data will be used for 20 FTSE and 20 SET stocks for fifteen years, from the period between January 1994 and December 2008, for testing the contrarian strategy. There will be four test periods during this time frame. The rank periods will be from January 1994 to December 1996, 1997-1999, 2000-2002, 2003-2005 and 2006-2008. Weekly return data will be used for testing the momentum investment strategy. A period of sixteen years, from January 1994 to December 2009, will be analysed. A 12 month rank and a 12 month hold period will be used to test the momentum strategy in the FTSE and SET. Therefore, there will be a total of fifteen formation periods in this study. The index from each market will also be used.

Winner and loser portfolios will be created on the basis of the return data from the formation periods. The ten largest winners and ten largest losers from the top 100 stocks in each index will be used in each portfolio. The winners and losers are initially based on their market capitalisation. As the smallest companies of each index are eliminated, the criticisms that the Winner Loser effect is based on the Size effect are ruled out.

### **3.5 Formation Period**

Both winners and losers are determined by their excess abnormal returns over a three-year portfolio formation period for the contrarian strategy, and a twelve month portfolio formation period for the momentum investment strategy, both starting in 1994. These excess abnormal returns will be calculated in line with the methodology used by DeBondt and Thaler (1987). The market model used by DeBondt and Thaler (1987) is outlined below:

$$R_{it} = \alpha_i + \beta (R_{mt}) + \varepsilon_{it} \quad (1)$$

DeBondt and Thaler (1987) make the assumption that  $\alpha$  is zero and  $\beta$  is equivalent to one, in their adjusted market model. Hence, the abnormal returns are determined as follows:

$$R_{it} - R_{mt} = \varepsilon_{it} \quad (2)$$

Where

$R_{it}$  is the rate of return on security  $i$  at time  $t$ .

$R_{mt}$  is the rate of return on the market at time  $t$ .

$\varepsilon_{it}$  is the random error.

The third model that will be used to determine the appropriate required rate of return is the Capital Asset Pricing Model (CAPM), as in DeBondt and Thaler's (1987) methodology. A pricing model, first introduced in Markowitz's (1952) evaluation of diversification and portfolio theory, is used to establish the profit an asset will yield. The CAPM determines a theoretically suitable compulsory rate of return from an

asset, given the risk which cannot be diversified. The model calculates investment risk and what return compensates for the risk.

The CAPM was established by Sharpe (1964) and Lintner (1965). These authors ascertain the segregation of a portfolio's risk into two categories of risk, systematic risk and specific (unsystematic) risk. Systematic risk is the threat of market movements. It is risk which is caused by aspects that impinge on the prices of next to all securities, albeit in different magnitudes. Specific risk is the risk which affects a minute number of assets. It corresponds to the element of a security's return that is not affected by market movements. While systemic risk cannot be diversified away, specific risk can be removed through diversification. Consequently, the CAPM was developed as a method to quantify systematic risk for investors.

The CAPM asserts that the anticipated return demanded by investors is equivalent to the rate of a risk-free investment in addition to a risk premium. The investment should not be undertaken if the expected return is not greater than the necessary return.

The CAPM formula is:

Expected Stock Return = Risk Free Return + Beta (Expected Market Risk Premium)

$$\text{Ex-Ante} \quad E(R_i) = R_{ft} + \beta_i [E(R_{mt} - R_{ft})] \quad (3)$$

$$\text{Ex-Post} \quad R_{it} = R_{ft} + \beta_i (R_{mt} - R_{ft}) + \varepsilon_{it} \quad (4)$$

Where

$R_{it}$  is the rate of return on security  $i$  at time  $t$ .

$R_{mt}$  is the rate of return on the market at time  $t$ .

$R_{ft}$  is the risk free rate of return at time  $t$ .

$\beta_i$  is the portfolio's beta.

$\varepsilon_{it}$  is the random error.

Consistent with this model, beta is the solitary pertinent measure of an asset's risk. The systematic risk is measured in the CAPM equation by the beta coefficient, while the specific risk is measured by alpha.

It is necessary to clarify that a number of assumptions are integrated into this model. This includes that all investors are assumed to be rational and risk adverse and that markets are believed to be efficient. Hence, the market can be deemed to be inefficient and abnormal returns considered present once a large error term is apparent in the CAPM equation. This methodology (equation 4 above) is utilised by De Bondt and Thaler (1985) to document the risk adjusted returns of their sample of stocks.

The three models outlined above will be used to rank the stocks of both markets as winners and losers. The author will calculate the abnormal returns for each stock,  $i$ , using equations one, two and four above. Equally weighted average weekly returns of all the stocks on the FTSE or SET will be used for the  $R_{mt}$ .  $R_{t*}$  is taken as the three month risk free British and Japanese interest rates. The Japanese interest rate will be used as a benchmark for the Thai risk free rate. The three month risk free rate is the most consistent with the CAPM, which justly reflects risk free returns.

For each stock in each of the test periods, the study will identify the excess abnormal return ( $\epsilon_{it}$ ). This will be the case for the four contrarian formation periods and the fifteen formation periods for the momentum investigation. Subsequently, for each formation period, the ten principal winners will be allocated to the winner portfolio and the ten biggest losing stocks will be assigned to the loser portfolio.

### **3.6 Test Period**

This step involves testing the winner and loser portfolios that were previously formed. The performance of each portfolio will be studied in three year periods in line with the contrarian strategy, and tested in twelve month periods for the momentum strategy. This step engages both the performance of the portfolio and the market return, using the market model as detailed above.

### **3.8 Cumulative Abnormal Returns (CAR)**

The CAR is determined by aggregating the single weekly abnormal returns for every formation period. These CARs are acquired through the computation of the cumulative average residual returns of all of the securities in each portfolio, for each week in both the formation and test periods.

Subsequently, this computation is used to obtain the Average Cumulative Abnormal Return (ACAR) for both the winner and loser portfolios,  $ACAR_{W(k)}$  and  $ACAR_{L(k)}$ . The overreaction hypothesis asserts that  $ACAR_{L(k)} - ACAR_{W(k)} > 0$ , while the momentum effect claims that  $ACAR_{W(k)} - ACAR_{L(k)} > 0$ .

When a weekly return is missing for a particular stock, then the returns would be calculated up to that point and then the portfolio would be rebalanced. This rebalancing would inevitably incur much larger transaction costs. In reality, this portfolio rebalancing does not provide a realistic portrayal of an investment strategy, as it would be assumed that each portfolio is rebalanced each week. For this reason, this study has eliminated stocks with missing return data, and hence no portfolio requires rebalancing. This elimination of stocks is consistent with a buy and hold methodology. Therefore, as transaction costs are not affected in this study by rebalanced portfolios, transaction costs are not taken into account directly in this study. In addition, both Jegadeesh and Titman (1993) and Korjczyk and Sadka (2004) deem that including these costs do not influence the final result.

### **3.9 Buy and Hold Methodology**

Conrad and Kaul (1993) assert that while the upward bias that is found in the CAR methodology is also evident in a buy and hold method, the bias is much smaller and more constant.

The Holding Period Return (HPR) of a security comprises of compounding the single test period returns. For each test period, the study identifies the holding period return for the stocks of both portfolios, then averages the securities returns.



The average holding period abnormal returns (AHPAR) are found by determining the holding period returns of each stock in both portfolios and subsequently averaging these returns to obtain the buy and hold returns.

### **3.10 Data**

The data for this study has been sourced from the Thompson One Banker database. The FTSE and Stock Exchange of Thailand websites will be used to find a set of twenty companies on each index.

The study will focus on the time frame of January 1994 to December 2008 for the contrarian investment study, whilst the period of study for the momentum investigation will be from January 1994 to December 2009. Stock prices will be taken as the closing price the final trading day of each week. The decision to commence the study from 1994 is attributable to the low volume of data for the FTSE and particularly the SET for this sixteen year period. Also, beginning the study in 1994 allows for a three year gap prior to the start of the Asian financial crisis in 1997. Furthermore, it is the author's aspiration to have the most sizeable and up to date test period as is possible, hence the inclusion of data until December 2009.

DeBondt and Thaler (1987) use a sample of 35 winners and 35 losers in their study. As this study has chosen securities from the top 100 of the FTSE and SET in order to eliminate the small firm effect, it would not have been possible to obtain a total of 70 stocks from 1994 without including the more thinly traded stocks. Consequently, a study of twenty securities from each index will be used.

In conjunction with DeBondt and Thaler (1987), the contrarian test periods will include a three year rank and a subsequent three year hold period. However, a twelve month rank and twelve month hold period will be used for the momentum strategy in line with Jegadeesh and Titman (1993).

### **3.11 Limitations**

This research has several caveats. This study focuses on the emerging stock exchange of Thailand, which has not been widely studied in the perspective of momentum and contrarian strategies. Consequently, this study tenders a novel approach to momentum and contrarian strategies. However, while the FTSE and SET were chosen to be representative markets, they may not provide a holistic approach to both small and large developed and emerging markets. Resource constraints and time also limit this study from conducting further analysis on other markets of interest, which may have provided a more holistic investigation.

Another limitation of the study is the size of the chosen sample. Due to the fact that many of the Thai companies listed in the SET 100 are thinly traded and were not publicly floated until after 1994 has led to a smaller than anticipated sample size of 20 stocks, as opposed to the 70 used by DeBondt and Thaler (1987). Jegadeesh and Titman (1993) and (2001), as well as Rouwenhorst (1998) and (1999) also use ample samples of data from several markets in comparison to the more constrained dataset in this study. Jegadeesh and Titman (1993) also uses returns over a 25 year period, whilst this study inspects momentum for a comparatively diminutive period of only sixteen years.

The results achieved could be attributable to hefty bid-ask spreads or illiquid stocks. Hence, it may not be appropriate for a trader to expect to acquire these returns in reality. Transaction costs are not taken into account and may have a significant effect on the overall results, but this study will account for them indirectly. Transaction costs include trading commission, short sale borrowing cost and bid-ask spreads. Jegadeesh and Titman (1993) assume that total transaction cost for a round-trip trade is one percent. However more recent studies show that this may underestimate the true transaction costs. Li *et al.* (2007) demonstrate that the total transaction cost can be as high as 6.71% for losers and 3.77% for winners. Therefore, it can be complex to establish these exact costs as they can fluctuate depending on whether the investor is a financial institution or a private investor.

A further restriction of the DeBondt and Thaler model for testing overreaction is that the hypothesis does not attempt to mathematically explain the excess volatility in stock prices, but rather it only attempts to prove its existence and offer a heuristic explanation.

### **3.12 Research Timetable**

Table 3.1 summarises the planned schedule for the completion of this dissertation:

**Table 3.1:**

Research Schedule	
<b>Month</b>	<b>Action</b>
December 2009	Research Proposal
February 2010	Completion of Literature Review
May 2010	Data Collection Completion of Methodology Chapter
June 2010	Completion of Findings Chapter
July 2010	Completion of Discussion and Conclusion Chapters
August 2010	Thesis Submission

### **3.13 Chapter Summary**

This chapter has detailed the methodology which will be applied in order to assemble and evaluate the primary research of this study. This is in tandem with the hypothesis that will be tested in addition to the research questions to be addressed. Furthermore, this chapter has summarised the research approach and data for the study. Subsequently, the limitations of the primary research and research timetable are outlined.

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# Chapter 4

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Research Findings

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## Chapter Four

### RESEARCH FINDINGS

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#### **4.1 Chapter Overview**

This chapter reports on the study's primary research findings. Results of both the contrarian and momentum based strategies are specified, for the FTSE and SET indices individually. The findings accounted for in this section have been generated through the methodology demonstrated in Chapter Three, employing data obtained from the Thompson One Banker database.

#### **4.2 Overreaction Hypothesis**

The test period abnormal returns for the adjusted market model, market model and the CAPM are illustrated in Table 4.1 and Table 4.2<sup>1</sup>. Table 4.1 specifies the average abnormal returns for the contrarian trading strategy from 1994 to 2008 for the FTSE market, using a three-year ranking period and three year test period. The average abnormal returns of the three models for the SET are highlighted in Table 4.2.

The cumulative results of Tables 4.1 demonstrate that the overreaction hypothesis does not hold for the FTSE when using the adjusted market model or the CAPM. By means of the adjusted market model, as in De Bondt and Thaler (1985), the strategy was not successful due to the average loss of 10% per annum. The overreaction hypothesis anticipates negative returns for the winner portfolio throughout the test period. However, when using the adjusted market model, only two of the four test

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<sup>1</sup> Appendices 2 and 3 expand on these findings.

periods maintain the expected sign and therefore have an average of 3.9% greater than the market return, which thus contributes to the failure of the strategy. It must be noted that this illustrates a large reversal from 43.8% excess abnormal return within the rank period.

Similarly, in line with the overreaction hypothesis, the loser portfolio should maintain positive returns for the test period. However, the adjusted market model presents merely two positive returns of the four periods. As the loser portfolio maintains a negative 6.1% average return, there is consequently a level of price continuation for losers in the FTSE market. Nonetheless, the decrease in the loser portfolios under performance from the rank to test periods is quite considerable.

The market model is the only profitable model for the contrarian investment strategy. The risk adjusted strategy yields a statistically significant average abnormal return of 4.37% per annum, as indicated in Table 4.1.

**Table 4.1**

Average FTSE Abnormal Returns for Test Period (Contrarian)

<u>Model</u>	<u>Winner</u>	<u>Loser</u>	<u>L-W</u>
Adjusted Market Model	0.0393	-0.0613	-0.1006
Market Model	-0.0357	0.0079	0.0436
CAPM	0.0459	-0.0713	-0.1172

This return, which is an excess abnormal return, is attributable to the second and third test periods. These test periods coincide with the overreaction hypothesis, which states that  $L-W > 0$ . These periods maintain average abnormal profits of 22.27% and 26.35% respectively. However, in stark contrast to these exceptional returns, test periods one and four exhibit profound losses of 19.67% and 11.47%. Hence, these two periods do not contribute to the profitability of the strategy.

Both the winner and loser portfolios preserve an extensive quantity of reversal from the rank period to the test period. The winner portfolio moved from earning 37.63% excess abnormal returns, to 3.57% less than the market. Similarly, the loser portfolio

has an average abnormal return of 0.79%, which had originally produced a return 35.54% less than the FTSE return. These figures also signify that the success of the strategy can be principally due to the winner portfolio's return reversal.

**Table 4.2**

Average SET Abnormal Returns for Test Period (Contrarian)

<u><b>Model</b></u>	<u><b>Winner</b></u>	<u><b>Loser</b></u>	<u><b>L-W</b></u>
Adjusted Market Model	0.1037	-0.2302	-0.3339
Market Model	-0.1056	0.0212	0.1268
CAPM	-0.1086	-0.3179	-0.2093

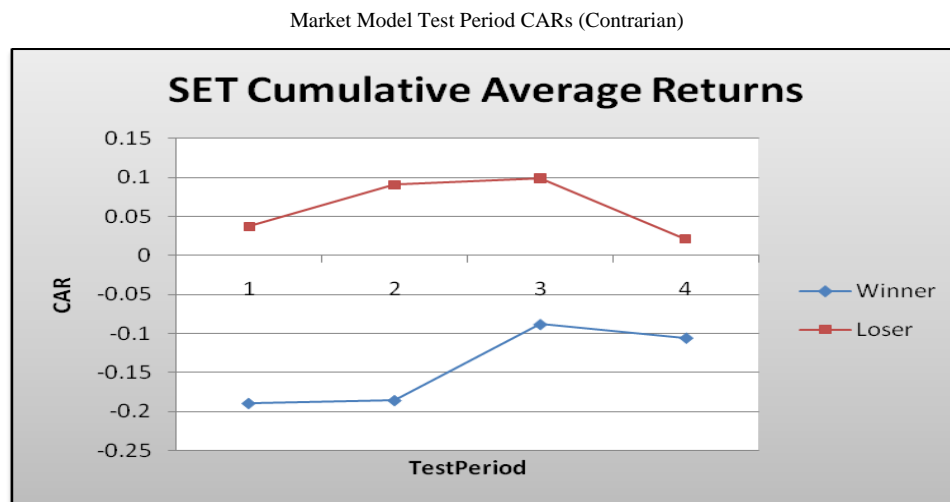
Results of the Stock Exchange of Thailand are compiled in Table 4.2, which illustrates that the Loser minus Winner investment strategy is not profitable for the SET when using the adjusted market model, as the average return is a substantial negative 33.3%.

These results from the SET clearly signify that the contrarian investment strategy is not profitable in this market, even less than on the FTSE. Similar to the FTSE findings, winners converted to losers in only two of the test periods. The winner portfolios produced an average return of 10% more than the market. While this illustrates a degree of reversal from the rank periods 64.7% average return, the positive test period return constitutes the failure of the overreaction hypothesis. This is somewhat comparable to the turnaround of the loser portfolios from 71.8% below the market to 23% less than the market return. While this is a venerable reverse in returns, it is not sufficient to deem this strategy beneficial. In addition, a measure of price continuation is apparent for the loser portfolio in this sample also.

However, consistent with findings from the FTSE, the market model is the only model which finds the contrarian strategy to be a profitable method of investment. Once risk is taken into account using the market model, the contrarian strategy yields 12.68% excess abnormal returns. This return is principally generated from the winner return of -10.56%, in preference to the 2.12% average abnormal return for the loser portfolio, as illustrated in Figure 4.1. The loser portfolio preserves average returns

greater than that of the winner portfolio is the first three of the four test periods. The cumulative excess abnormal returns for the loser portfolio for these test periods equal 29.62%. This is almost completely offset by the fourth time period's negative average return of 21.14%.

**Figure 4.1**



Both portfolios demonstrate substantial return reversal from the rank to test periods. Similar to the market model results for the FTSE, the winner portfolio sustains a larger reversal than the loser portfolio, moving from an excess abnormal return of 60.49% to -10.56%. The loser portfolio also demonstrates reversal, but not to the same extent as the winners. This portfolio progressed from 62.58% negative return to 2.12% average excess abnormal return.

Taken as a whole, both markets exemplify the contrarian strategy as a profitable method of investment when the market model is applied. Through the employment of the adjusted market model, both markets display average abnormal returns below that of each respective market. Hence, based on these findings, results for the market model are inconsistent with the EMH, while the adjusted market model finds that previous returns cannot be used to aid an investor to earn returns in excess of the market.

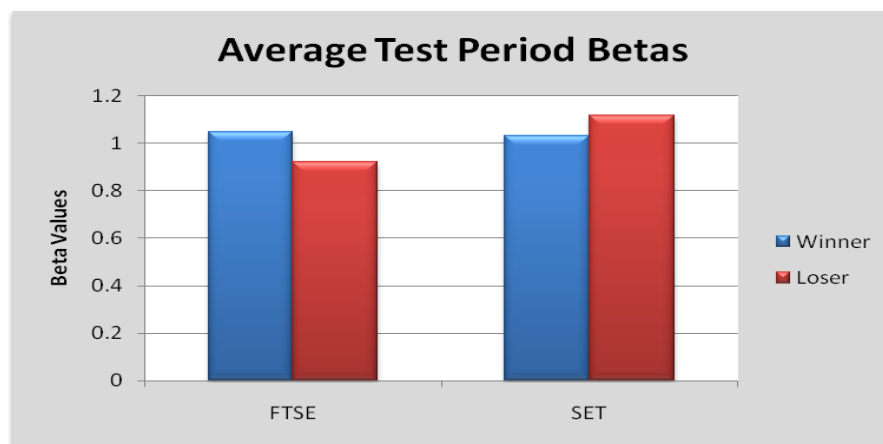


However, these results do not accurately account for the innate extra risk in the portfolios. Therefore, the CAPM is used to compensate for this risk<sup>2</sup>. When both the CAPM and EMH hold true, the possibility of abnormal returns is eradicated. However, the overreaction hypothesis states that  $\alpha_L > \alpha_W$  and  $\alpha_{L-W} > 0$  when overreaction is apparent in the market.

The CAPM risk adjusted returns highlight that the average betas are higher for the loser portfolio in the SET market, as displayed in Figure 4.2. Hence, it can be assumed that the loser portfolio maintains a greater deal of inherent risk than the winner portfolio for the SET. Indeed, the beta difference highlights that the loser portfolios are riskier than the winner portfolios by 8.35%. However, it is essential to note that winner portfolio also contains reasonably risky stocks, as the winner portfolio is more than 3% riskier than the market. Therefore, it can be assumed that both of the SET portfolios are relatively susceptible to market movements.

**Figure 4.2**

FTSE and SET Average Test Period Betas (Contrarian)



<sup>2</sup> Appendices 2 and 3 illustrate the risk adjusted returns for the FTSE and SET.

Conversely, on the FTSE market, it is the winner portfolio which holds the higher test period beta, which is 12.36% larger than the loser portfolio's average beta. The loser portfolio contains defensive stocks as it maintains an average beta of less than one.<sup>3</sup>

However, when focusing on the market model and CAPM results, the most distinguished point is the strategy's move from yielding positive abnormal returns to becoming an unsuccessful investment strategy when returns are corrected for risk using time-varying betas. Therefore, when one beta is used for the entire test period the strategy exhibits significant excess abnormal returns. Conversely, when the returns incorporate time-varying betas, the findings illustrate no support in favour of the contrarian strategy, thus satisfying the EMH, similar to the findings of the adjusted market model.

#### **4.3 Momentum Strategy**

Table 4.3 and Table 4.4 report the average abnormal returns for the three methodological models explained in Chapter Three. With regards to the momentum strategy in the FTSE market, the employment of the adjusted market model shows the momentum investment strategy to be successful for the FTSE market. The overall strategy has earned 1.51% more than the market. Yet, only seven of the test periods are in line with the momentum strategy. Both the winner and loser portfolios for the FTSE sustain an element of return reversal. The winner portfolio returns has declined from 22.2% to 0.7% excess abnormal return. During the rank periods, the loser portfolio has a negative average return of 22.42%, moving to negative 0.7% in the test period. Yet, in addition to a degree of reversal, both portfolios on the FTSE illustrate a level of continuation.

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<sup>3</sup> Appendix 9 demonstrates contrarian strategy beta computations.

**Table 4.3**

Average FTSE Abnormal Returns for Test Period (Momentum)

<u>Model</u>	<u>Winner</u>	<u>Loser</u>	<u>W-L</u>
Adjusted Market Model	0.0076	-0.0074	0.0151
Market Model	-0.0190	0.0168	-0.0359
CAPM	0.0048	-0.0093	0.0142

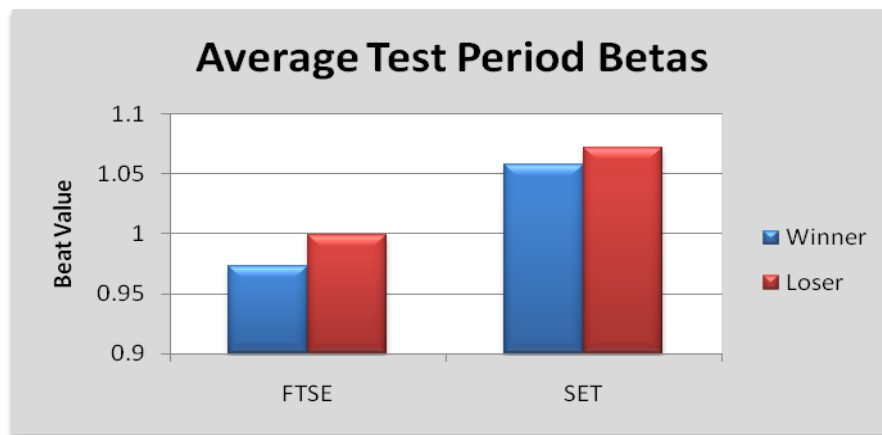
Even though the adjusted market model signifies momentum profitability, it would be anticipated that these profits would decline when adjustment for risk is taken into account. Hence, the investment strategy becomes totally ineffective when the market model is used to generate findings. The introduction of risk caused the abnormal return to diminish to -3.59%. Both portfolios contribute equally to this result. It can be noted that only seven of the 15 test periods illustrate positive average returns for the winner portfolio. The momentum investment strategy would anticipate that the winner average returns would be greater than that of the loser portfolio in each test period. Therefore, in only seven of the 15 tested time frames did the momentum theory signify profitability. The unsuccessful nature of this strategy when utilising the market model can be summed up by the 23% unsupportive reversal in returns for the winner and loser portfolios equally.

However, when time-varying betas are used to account for each portfolio's risk, the momentum strategy again signifies profitability on the FTSE market. The excess abnormal return of 1.42% is only marginally smaller than that found by the adjusted market model.

The average betas of both markets are higher for the loser portfolio in both the rank and test periods, illustrated in Figure 4.3. However, during the test period the portfolio is less than one, hence the portfolio is less volatile than the market. Yet, even though the loser stocks appear to be riskier, as the beta is below one, it indicates that this is a defensive portfolio, as too is the winner portfolio.

**Figure 4.3**

FTSE and SET Average Test Period Betas (Momentum)



Both portfolios exhibit a degree of reversal from the rank to testing periods. The FTSE winner portfolio held an average abnormal return of 21.52% above the market during the rank period, which dropped to 0.38% for the test period. The loser portfolio declined in an almost identical manner. The average abnormal loser return for the rank stage was 21.84% less than the market, which subsequently moved to the more attractive 0.36% below the market.

Returns for the SET, compiled in Table 4.4, specify that, similar to the FTSE returns, the momentum method of investment yields significant average excess abnormal returns when the adjusted market model or the CAPM methodologies are employed.

**Table 4.4**

Average SET Abnormal Returns for Test Period (Momentum)

<u>Model</u>	<u>Winner</u>	<u>Loser</u>	<u>W-L</u>
Adjusted Market Model	0.0294	-0.0485	0.0780
Market Model	-0.0124	0.0063	-0.0187
CAPM	0.0247	-0.0360	0.0607

The employment of the adjusted market model highlights an average excess abnormal momentum strategy return of 7.8%. In two thirds of the tested time frames the theory of the Winner minus Loser investment strategy is positive. The success of this

investment method is due to the loser portfolio returns. However, the loser portfolio experienced a significant level of reversal, as did the winner portfolio. Yet, both portfolios retained some level of continuation from the rank to the test periods.

Also consistent with the FTSE results, the use of the market model results in a negative momentum return. In this market, the strategy earns a return of -1.87%. This result is due to the average abnormal test period return of -1.24% for the winner portfolio. In addition, the considerable reversal in returns, from negative 34.43% to negative 0.63% for the loser portfolio, and the 32.65% winner portfolio reversal have contributed significantly to the failure of the market model momentum strategy.

On the other hand, equal to findings on the FTSE, the introduction of the CAPM equation provides substantial excess abnormal returns of 6.07%. Ten of the 15 test periods maintain a positive average return, consistent with the momentum strategy. Comparable to the previous findings, the winner and loser samples demonstrate evidence of reversal, while at the same time retaining a measure of continuation. The loser portfolio displays a large reversal from -34.99% for the rank period to -3.6% during the testing time frame. Return reversal for the winner portfolio is less encouraging as the positive average abnormal rank period return declined from 30.8% to 2.47% for the test period. This considerable reversal significantly affected the overall profitability of the strategy.

The SET stocks display higher risk than the FTSE stocks. The SET winner and loser portfolios both maintain an average beta greater than one, for both the rank and testing periods. For the duration of the rank time frame, the winner portfolio exhibits a greater level of risk than the loser stocks. However, this reverts completely for the test stage, with the loser demonstrating an average of 1.43% more risk than the winner portfolio<sup>4</sup>. Overall, both portfolios move to a greater degree than the market.

However, in order to ascertain which holding period is the most successful for the momentum strategy, Table 4.5 presents the Winner minus Loser cumulative average returns for a three, six, nine and 12 month test period.

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<sup>4</sup> Betas are outlined in Appendix 10.

**Table 4.5**

CAPM Cumulative Average Abnormal Returns (W-L) 1994-2009

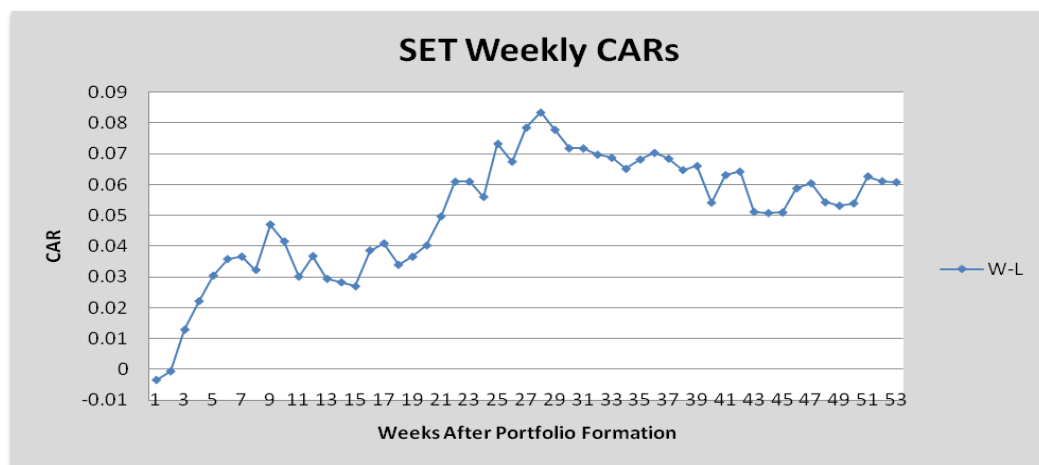
Strategy	3 months	6 months	9 months	12 months
FTSE	-0.0195	-0.0082	0.0065	0.0142
SET	0.0293	0.0674	0.0660	0.0607

These excess abnormal returns use time-varying betas to assess risk. The 12 month test period, which is used in this study, proves to be the least profitable in the Thai market, signifying a drop in returns from the six month holding period. This decline in CAR from the six to 12 month test periods can be identified in Figure 4.4. From  $t=27$  until  $t=53$  displays a substantial reduction in returns followed by a subsequent levelling off. This suggests that the momentum investment strategy would be better suited to a short-term, six month, holding period. In contrast to these findings, the FTSE returns monotonically increase with the length of the holding period.

Table 4.5 determines that the Winner minus Loser method of investment is positive for all four strategies. All four strategies identify the success of a momentum investment strategy. In addition, continuation is evident in the SET sample, as all returns are greater than zero.

**Figure 4.4**

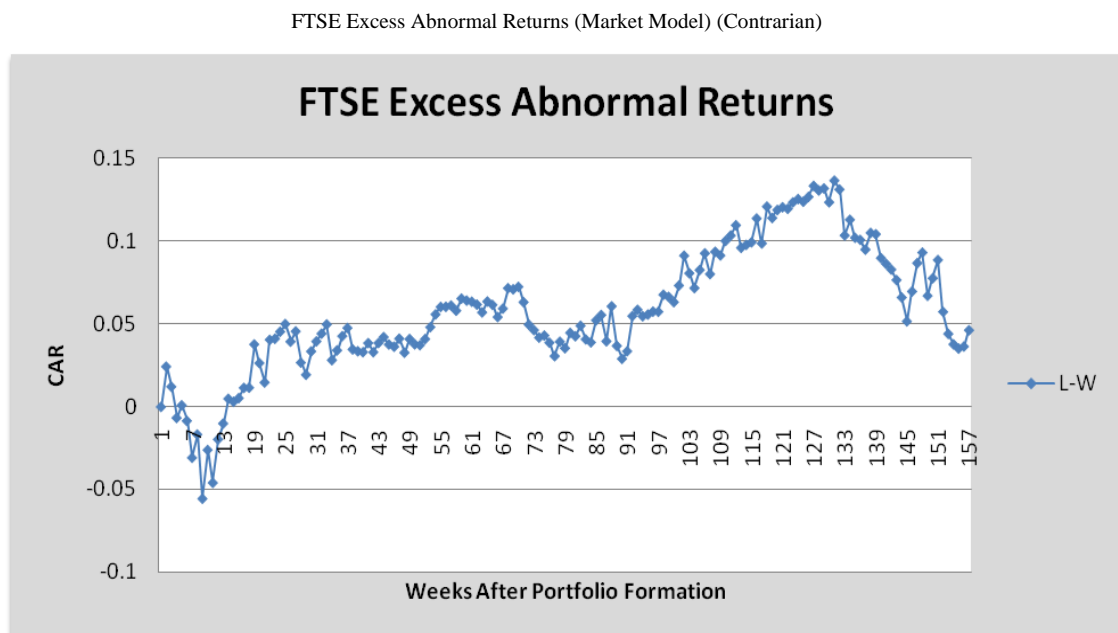
SET Cumulative Average Abnormal Returns (Momentum)



#### **4.4 Hybrid Investment Strategy**

This hybrid investment strategy is an investment vehicle that combines two different kinds of investment methods. This study advises stock market investors to exploit a combination momentum and contrarian strategies, thus creating a powerful hybrid of the two. Figure 4.5 portrays the cumulative excess abnormal returns yielded on the FTSE market through the contrarian method of investment. The strategy is ineffective from  $t=4$  until  $t=13$ , which represents the time from the end of January to the beginning of April in the first year of investment. This period signifies a loss of 0.34%, which represents the only time where the strategy is unsuccessful throughout the three year test period. Therefore, utilising a momentum strategy during this period, from week four until week 13, would strengthen the investor's overall excess abnormal returns.

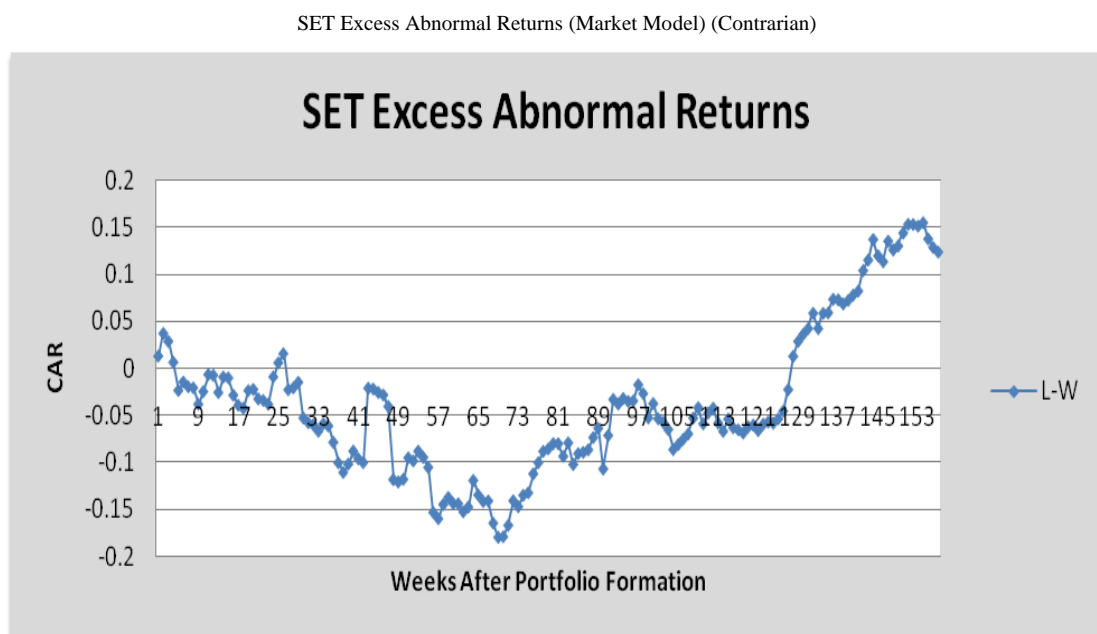
**Figure 4.5**



In addition to this, the contrarian strategy seems to falter subsequent to where  $t=128$ . Therefore, terminating the strategy at week 128 would realise excess abnormal returns of 13.05% per annum, a total of 8.43% higher than a strategy which fulfills the 157 weeks in total.

Figure 4.6 displays comparable results in conjunction with the SET market. an overall futile pattern emerged from  $t=4$  until  $t=127$ . This overall loss represents 2.92%. therefore, is the investor shortened the contrarian holding period to week 127 to week 157, excess abnormal returns would increase to 14.68%, a considerably generous return. Furthermore, employing a momentum strategy until week 127 would further boost these abnormal returns.

**Figure 4.6**



#### **4.5 January Effect**

In order to test the robustness of the findings outlined above, it is essential to identify whether any excess average returns are earned during the month of January. This will determine whether or not the success of the momentum and contrarian strategies can in fact be accredited to the January Effect anomaly.

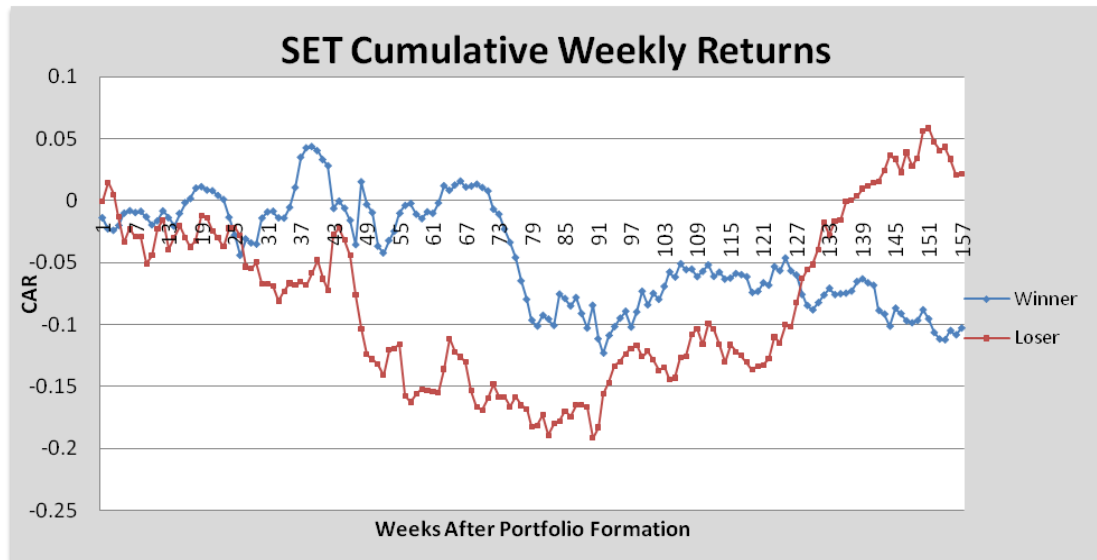
With regards to the contrarian strategy, the January effect investigation will surround the market model, as this is the only methodology which discovered average



abnormal returns above the market. The SET weekly CARs for both portfolios are demonstrated in Figure 4.7<sup>5</sup>.

**Figure 4.7**

SET Winner and Loser Portfolio Average Weekly Returns (Contrarian)



The January cumulative average returns are denoted by  $t=4$ ,  $t=56$  and  $t=107$ . The January excess abnormal returns in the loser portfolio equate to -1.32%, -1.66% and 0.87%. Hence, none of these returns seem to be qualitatively diverse from the loser portfolio's excess returns when taken as a whole. Therefore, there is no significant January Effect transforming the contrarian abnormal returns on the SET market. Appendix 15 illustrates the average FTSE contrarian returns for the four test periods, and identifies that the January Effect does not influence the FTSE results for the contrarian strategy.

Figure 4.8 demonstrates the cumulative weekly FTSE excess returns generated for the contrarian strategy using the market model. The January excess abnormal returns for the loser portfolio equate to -0.63% ( $t=1$ ), 0.01% ( $t=56$ ) and 0.43% ( $t=107$ ). These January returns are in no way significantly different than returns for the subsequent

<sup>5</sup> Average weekly return information for FTSE and SET are presented in Appendices 6 and 7.

months. Therefore, it seems that there is no degree of the January Effect anomaly inherent in the contrarian strategy returns.

**Figure 4.8**

Market Model FTSE Winner and Loser Portfolio Average Weekly Returns (Contrarian)

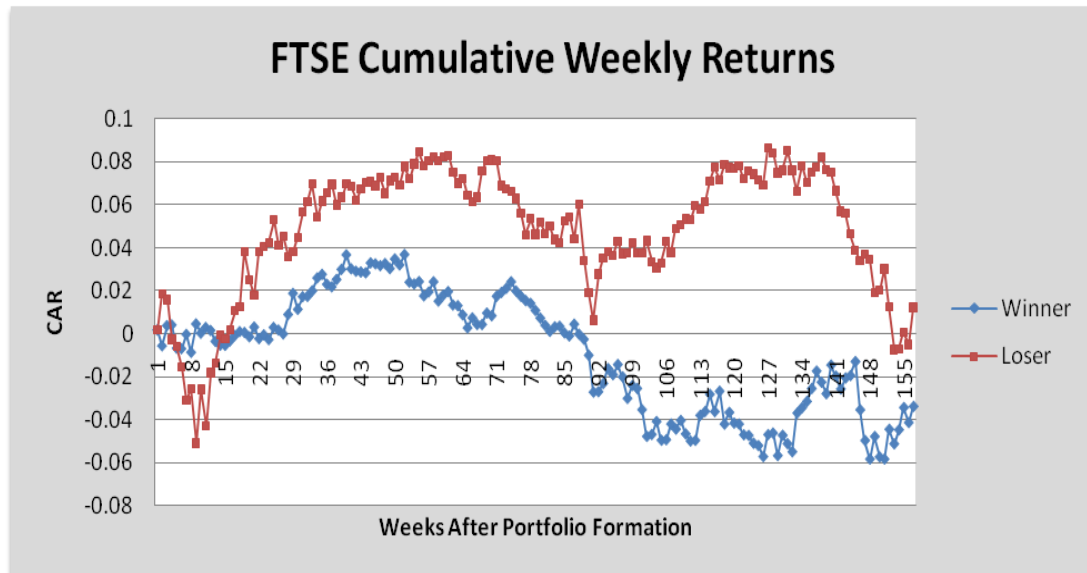
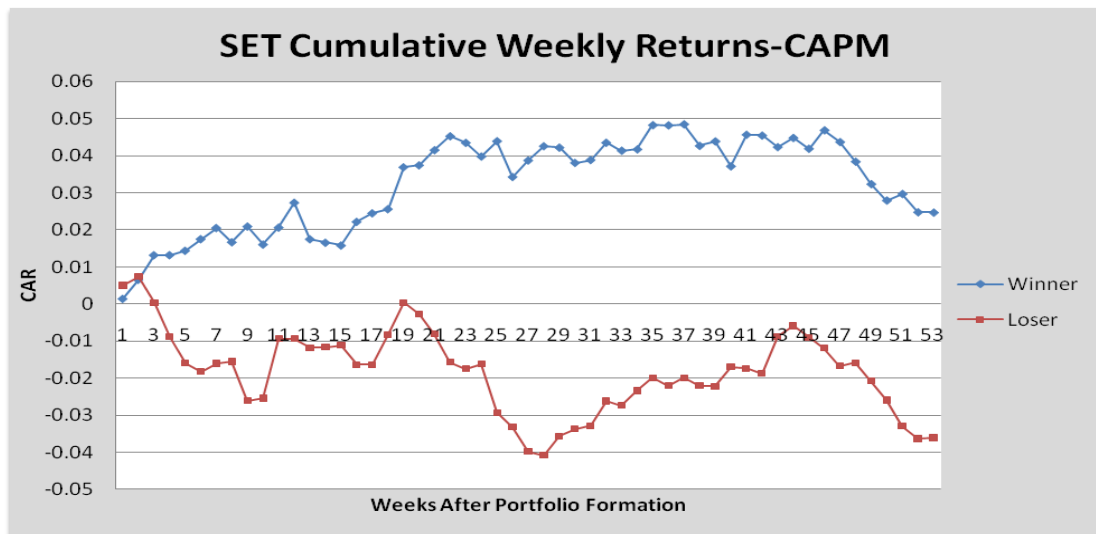


Figure 4.9 depicts the weekly average excess abnormal returns for the SET generated by the CAPM equation. After taking the specific stock risk into account, the average return for January, where  $t=4$ , amounts to 2.2%. The January effect is not in effect in this market as the average January excess abnormal returns are in fact smaller than that of any other month. Hence, the January Effect does not influence the SET momentum returns when using a risk adjusting model.

In addition, the FTSE weekly average excess abnormal returns are presented in Appendix 8. This graph also indicates that the January excess abnormal returns amount to 1.76%, which is common to the returns exhibited for the subsequent months.

**Figure 4.9**

SET Winner and Loser Portfolio Average Weekly Returns-CAPM (Momentum)



Consequently, none of the findings outlined above indicates that the January effect is evident in the SET or FTSE. Hence, the results of both markets for the two strategies are not driven by the January effect.

#### **4.6 Chapter Summary**

This chapter has provided results from the primary research in conjunction with the various models outlined in Chapter Three. Overreaction is evident in both the FTSE and SET markets when the market model is employed using a three-year rank and test period. However, the use of the adjusted market model and CAPM question the robustness of the overreaction strategy. Once either of these models is applied, the contrarian strategy proves to be an unsuccessful method of investment in both markets.

However, using a 12 month rank and test time frame, the momentum investment strategy illustrates results in direct opposition to those of the contrarian strategy. The market model rejects momentum as a profitable means of investment in both markets. Conversely, the adjusted market model results demonstrate average abnormal returns greater than both the FTSE and SET returns. The robustness of these findings is tested

with the introduction of time-varying beta risk adjustments. The average abnormal returns remain profitable, providing evidence that momentum is evident in the FTSE and SET markets.

The primary research findings also highlight the profitability of a hybrid combination of contrarian and momentum strategies. Evidence from both markets indicates that this method is capable of generating considerable excess abnormal returns, greater than the abnormal returns produced by each strategy independently.

In addition, this chapter deals with the issue of the January Effect. The abnormal January returns appear to be consistent with returns for the other 11 months. Hence, the January Effect does not manipulate the quality of the results highlighted in the chapter.

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# Chapter 5

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# Discussion

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## Chapter Five

### DISCUSSION

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#### **5.1 Chapter Overview**

The role of this chapter is to amalgamate the primary research findings which have been reported in Chapter Four. Implications of these findings will be highlighted in this chapter also, in addition to details of future research.

#### **5.2 Overreaction Hypothesis**

Previous empirical works surrounding developed and emerging markets have identified the presence of a profitable contrarian investment strategy, thus accepting the alternative hypothesis. However, the robustness of the contrarian profits identified in the previous chapter is questionable, as the success or failure of the investment strategy is excessively dependent on the employed methodologies, as is highlighted by Fama (1998). De Bondt and Thaler (1985) report similar excess abnormal returns for the adjusted market model and CAPM methodologies, which is similar to this study, which identifies comparable losses from these methods.

The contrarian strategy investigation acquires past losers and sells past winners for three years. The portfolios of 20 stocks achieved market model average cumulative excess returns of 4.36% on the FTSE and 12.68% on the SET for the duration of the test period. These results are consistent with Dreman and Lufkin's (1997) assertion that contrarian strategies earn higher returns than the market over time. Therefore, investor's treatment of past winners and losers is not efficient. These results were

generated by the respective winner portfolios. The SET winner portfolio developed during the first and second test periods, while its FTSE counterpart expanded during the second test period. Statistically, the performance of the FTSE loser portfolio was almost indistinguishable from market performance. Contrarian investing on the FTSE is most successful from 2000 to 2005. The 1994 to 2008 period incorporates a worldwide financial adversity and the booming financial period prior to this debacle. Particular attention must be paid to the FTSE, a particularly prominent financial market, during this time period. Between 2000 and 2005, the majority of contrarian profits of this strategy were earned, 48.63% of the total excess abnormal returns. Yet, during the fourth test period, 2006 to 2008, a time of international financial hardship, both the winner and the loser portfolios maintained average returns less than the market, thus contributing to a large loss of earnings for the overall strategy of 11.47%. This rationale is akin to Larkomaa's (1999) Finnish contrarian profits, which appear to centre on the portfolios formed during the latter half of the 1980's, a period of boom for the Helsinki Stock Exchange.

DeBondt and Thaler (1985) show the first evidence that contrarian strategy can earn abnormal profits in the long-term. This study reports that the loser portfolio of the developed FTSE market outperformed the market by 0.79%, considerably less than the 19.6% recorded by De Bondt and Thaler (1985). However, the results of the winner portfolios are quite similar. De Bondt and Thaler's (1985) winner portfolio earned approximately 5% less than the market, while the winner portfolio of the FTSE yielded an average return of 3.57% below the market. Therefore, the overreaction effect present in the FTSE is asymmetric, as it is a great deal larger for winner portfolios. This is notably comparable to De Bondt and Thaler (1985) and Dissanaiké (1997), both of which record asymmetry in portfolio returns. Winner stocks on the FTSE underperform by 3.57% while the loser portfolio over performs by 0.79% on average during the test period. Hence, the difference in the cumulative average residual between the two portfolios is equivalent to 4.36% for the 15 year period. In addition, this indicates that investors overreact more to good news rather than bad news.

Kryzanowski and Zhang (1992) advocate that the success of De Bondt and Thaler's (1985) contrarian investment strategy is limited to the US stock market. In contrast,

the primary research of this study indicates that both markets, the SET and FTSE, exhibit levels of contrarian profits and considerable reversals. Yet, it must be noted that both loser portfolios maintain a degree of continuation, which is also similar to Kryzanowski and Zhang's findings on the Canadian stock market.

Even though the return reversals reported are quite considerable, there are relatively weak in comparison to previous studies. Hence, for this reason, the primary research results are comparable to Larkomaa's (1999) investigation of the contrarian effect in Finland, classifying considerably weak return reversals on the Finnish stock market also. However, the adjusted market model and CAPM were applied to the Finnish data, on the contrary to this study.

Additionally, the cumulative FTSE contrarian returns depicted in Figure 4.5 indicates that there is a disappearance in the effect, yet this can only be assumed without knowledge of the winner and loser portfolios over the next time period. However, while this evidence illustrates that while the overall degree of overreaction is declining on the FTSE, it is unquestionably perceptible in the second and third holding periods, accumulating almost 50% average returns. This is consistent with much of the existing international evidence. Given the extent of the profitability of the strategy in these two testing periods, the economic significance of the results cannot be ignored.

However, Conrad and Kaul (1998) propose that contrarian strategies net statistically significant profits during the 1926 to 1947 period only. Furthermore, Jones (1993) finds that the profitability of contrarian portfolios is a pre-WW II phenomenon. While it has been identified that the contrarian strategy enables excess returns to be earned utilising the market model, the strategy has failed to profit from 1994 to 2008 under the guidance of other models, namely the CAPM and adjusted market model. Hence, the author would recommend specific research surrounding this topic, utilising an extensive sample period incorporating data from the early 1900's to 2010. To add robustness to such a study, the employment of several methodological methods is suggested, such as the Three Factor Model, which is recommended by Fama and French (1996) to be more appropriate than the CAPM.



### **5.3 Momentum Strategy**

The momentum strategy offers enhanced returns for all the holding periods than its contrarian counterpart. Yet, the methodologies used offer mixed results. In the sample under inspection, the market adjusted momentum strategy appear to produce statistically significant aggregate excess abnormal returns of 7.8% in the Thai market and 1.51% on the FTSE market, relative to the overall respective markets, which is the anticipated outcome given the existing literature on momentum. Therefore, the null hypothesis of this study can be accepted. Thus, investors weight prior information exceptionally heavily.

The FTSE primary research findings concur with those of Ellis and Thomas (2004) and Aarts and Lehnert (2005). In the FTSE market the momentum strategy is symmetric, as the winner and loser portfolios contribute equally to the strategy's success. Likewise, when examining the portfolios of Jegadeesh and Titman's (1993) research separately, it confirms that the winner portfolio outperform the index by 0.56% each month, whereas loser portfolio earns 0.67% less than the market per month. These results suggest that both winners and losers contribute virtually equally to momentum profits. This is similar to the CAPM risk-adjusted returns in the Thai market, yielding 6.07% symmetrically between the two portfolios. This is contrast to the 1.42% excess abnormal FTSE return for the same time frame.

Momentum strategy is, contrary to contrarian strategy, most profitable in medium time horizon. Hameed and Kusnadi (2002) assert that a momentum strategy can earn excess returns in Thailand. The SET generates the greatest average excess abnormal return of 6.75% using a 12 month rank and six month hold strategy. The 12 month rank and test period materialises the highest excess returns on the SET market, accumulating to 1.42%. Therefore, the SET cumulative average excess abnormal returns of both markets monotonically increase with the length of the holding period.

Studies focussing on emerging and developed markets, such as Shen *et al.* (2005), ascertain that momentum profits cannot be earned in the less developed markets. Griffin *et al.* (2003) investigate the momentum effect around the world using methods similar to Jegadeesh and Titman (1993). Profits for Asia are dramatically smaller than

those for other regions, especially when compared to Europe. When exploring emerging markets and developed markets (exclusive of the US), the results report insignificant average profits of 0.27% per month for emerging markets and significant average returns of 0.73% per month for developed markets. In addition, these emerging markets findings are consistent with Rouwenhorst (1999). On the contrary, this study identifies a market adjusted average abnormal return of 7.8%, and furthermore, a 6.07% average return can be earned subsequent to taking time-varying betas into account.

In addition, various studies, including Rouwenhorst (1998) find substantial return continuation in developed markets. Yet, the CAPM returns for the FTSE stocks as outlined in the previous chapter are economically insignificant when transaction costs have been accounted for, yielding a minimal 1.51% excess abnormal return (0.01% after transaction costs), therefore, weak form market efficiency holds. This offers support to Hon and Tonks' (2003) theory that momentum is not a constant feature in UK stock markets. Investors would be advised to invest in the FTSE index in this case. Consequently, these varying results corroborates that the momentum investment strategy is not a consequence of data snooping bias.

#### **5.4 Hybrid Investment Strategy**

An essential question is how different are the winner and loser returns in the contrarian portfolios from the winners and losers in the momentum portfolios. Even though this study has accepted both the null and alternative hypotheses, to a certain extent, the contrarian strategy has proved to virtually be a failure in contrast to the momentum strategy returns. The largest overall average abnormal return stemmed from the SET market adjusted momentum strategy. Likewise, the biggest loss is generated by the SET adjusted market model returns also, but with regards to the contrarian method of investment. These large losses and profits are likely to be linked to the higher levels of volatility experienced in the Thai market. Overall, the disposition effect and gambler's fallacy elements of an investment strategy fail to yield an investor abnormal returns.

However, as outlined in the previous chapter, this study recommends the use of a combination of investment strategies to obtain the greatest excess abnormal returns. This hybrid has emerged as a profitable model in its own right. On the contrary to Brown *et al.* (2008), employing the momentum strategy in the initial investment stage followed by a contrarian strategy seems to maintain the best of both worlds. Diversification benefits could be reaped from this combination of portfolios.

However, this study does not examine the hybrid strategy in detail. Thus, further research into the area is essential. Additional analysis can determine whether the higher returns are worth the extra investment in hybrid propulsion.

It is believed that eventually, hybrid strategies that combine the features of both value and momentum will be preferred by investors. Yet, investors must be willing to embrace the hybrid model and roll out services to support it. A restraint to this strategy is that hybrids are more technologically complicated. The hindrance in the hybrid model for advisors is compliance. Setting up and supervising takes an increasing amount of time and money. If it weren't for the compliance everyone would be applying the hybrid model instantly.

## **5.5 Transaction Costs**

The momentum strategy can seem to give a return that is considerably profitable, such as the SET 7.8% average excess abnormal return.. Nonetheless, if an investor seeks to utilise the momentum effect to their advantage, then it is imperative that the impact of transaction costs be assessed.

Typical commission costs are 0.2% of the transaction amount, while the bid-ask spread and market impact is approximately 0.55%. When a management fee is included, the overall transaction costs can rise to 1.5%. However, the bid-ask spread is generally bigger for small cap stocks with limited trading volume. Lesmond *et al.* (1999) approximate round-trip costs to be 1.2% and 10.3% for large and small cap stock respectively. In addition, it is essential to note that trading costs are decreasing

due to electronic crossing networks which have lower commissions and have no spreads or market impact.

After correcting for transaction costs of 1.5% the two investment strategies remains profitable on the SET market. In particular, the momentum strategy exhibits increased profitability for longer ranking and holding periods, while it becomes less profitable for shorter periods. This is because the strategy becomes more trading intensive once the holding period gets shorter. However, with regards to the FTSE profitability following the introduction of approximate transaction costs, the momentum strategy becomes an irrelevant investment strategy. The contrarian results also decline to an average market model excess abnormal return of 2.76%. Overall, the success of a momentum or contrarian investment strategy on the FTSE market is brought into question when transaction costs are accounted for.

Furthermore, transaction costs are a major drawback to the use of the hybrid investment strategy. These costs would at least double, dependent on how many times the contrarian and momentum strategies are interchanged throughout the test period.

## **5.6 Risk**

The risk change hypothesis states that overreaction is the rational response to risk changes measured by an asset's beta value. Chan (1988) and Ball and Kothari (1989) have advocated that the differences in beta risk may explain the performance gap between winners and losers. As the contrarian strategy FTSE winner portfolio maintains an average beta 12.36% higher than the average loser beta, it can be assumed that this portfolio offers the possibility of a higher rate of return. Chan (1988) asserts that when time-varying risk has been accurately controlled for the overreaction effect ceases to exist, as verified by the FTSE and SET primary research findings. Taking the FTSE as an example, the winners' betas averaged 0.86 during the rank period, while the losers average portfolio beta was 1.07. During the test periods, the respective betas were 1.04 and 0.92, comparable to De Bondt and Thaler's (1985) riskier winner portfolios. By splitting the sample into two sub periods, 1997 to 2002

and 2003 to 2008, the difference in rank-period betas between winners and losers was greater in the second sub period, 0.01 as opposed to 0.41. The test period betas were 0.28 versus 0.03. Hence, these results are in line with the FTSE contrarian strategy illustrating more profitability during the second half of the period.

With regards to the momentum strategy, as the average beta values for the winner portfolios are lower than their loser portfolio counterparts, the momentum effect cannot be justified by the variances in systematic risk. Assuming that the CAPM theory is legitimate and that systematic risk is the motive causing the momentum effect, then the average beta values of the winner portfolios would have to be higher than the loser betas.

Both strategies and their profitability on the Thai market are driven by risk as they both maintain average betas greater than one. The opposite is the case for the FTSE market, the profitability of either strategy is not driven by risk.

Both the FTSE and SET winner and loser average betas increase as the holding time period increase. As an asset's expected return is a function of its beta value, a security with high beta value would thus be expected to yield a higher return in contrast to an asset maintaining a lower beta value. In addition to this, higher volatility is associated with increasing holding period, which can be attributed to the uncertainty inherent in the longer periods. French *et al.* (1987) suggest that the expectations of investors become stronger as the holding time frame increases. These expectations are confirmed and investors are excessively compensated for their risk exposure.

### **5.7 January Effect**

With respect to the January effect, the data does not support this anomaly as an explanation for the findings of this study. It is emotional shifts in mood of investors, not rational shifts in economic conditions that cause investors to act. Reinganum (1981), Keim (1983) and Roll (1983) assert that the January effect is related to the Size effect. Cakici (1999) and Conrad and Kaul (1993) identify a substantial January effect in their studies which include small firms, thus the relatively high January

returns can be attributed to the Size effect. However, as this study eliminates the validity of the Size effect as a possible explanation for excess abnormal returns, any considerably high January returns would be specifically attributable to the January effect.

During the month of January, Jegadeesh and Titman's (1993) loser portfolio outperforms the winners considerably, which is in contrast to the momentum findings of this study. Regarding overreaction studies, De Bondt and Thaler's (1985) findings state that most of the returns are realised in January, 16.6% of the overall 24.6%, which thus leads to a degree of uncertainty surrounding the robustness of these results. In order to disqualify similar doubts, this study has examined the loser portfolio's average abnormal January returns to discover that both the SET and FTSE contrarian returns are free of any January effect bias.

As tax loss selling is the main explanation behind the January effect, it is important to focus on the FTSE April returns, as this is when the UK tax year commences. In spite of this, Dissanaïke (1997) identifies a substantial January effect in the UK. This reason for this is due to foreign investors responding to their home country's tax environment. The cumulative contrarian market model results for the months of April are equivalent to 4.76%, which is greater than the overall profitability of the strategy of 4.36%. Hence, the contrarian excess abnormal returns for this market may be attributable to an April effect. However, this stipulation cannot be assured without a more detailed examination.

On the whole, these findings support the theory that the January effect is declining, concurrent with the findings of Gu (2003) and Schwert (2003), which represents a trend toward market efficiency. Investors are much more experienced and knowledgeable nowadays, which could also explain an unsuccessful contrarian strategy. Advances in information technology should make investment markets more efficient. In effect, developed markets are more efficient than emerging markets, as highlighted by the minimal momentum and contrarian profits from the FTSE following the inclusion of transaction costs. Therefore, this may give confidence to supporters in the theory of efficient markets.

## **5.8 Chapter Summary**

The empirical evidence discussed in this chapter clearly indicates that the momentum method of investment is both strong and pervasive, but may be constrained to a particular geographic area. The evidence of profitability of contrarian strategies is not as strong as the momentum findings, as it is more controversial and dependent on the test method used. However, it can be said that both of these strategies earn profits that excess the market index used. Therefore, this evidence casts a doubt over the EMH and weak form market efficiency as it may be possible to make abnormal profits due to some predictability in stock prices.

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# Chapter 6

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# Conclusion



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## Chapter Six

### CONCLUSION

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#### **6.1 Chapter Overview**

This chapter offers a conclusion to the study. The core conclusions from the primary research are outlined initially, detailing the focal empirical findings of the study. Subsequently, several recommendations for future research will be highlighted. The final section will provide a concluding comment on the study.

#### **6.2 Primary Research Findings**

From an investor's point of view, it's only interesting to follow a contrarian or momentum strategy if it can yield higher returns than a passive buy-the-index strategy which can be implemented much more easily by buying an index fund. This study reports mixed results in relation to these investment strategies.

Firstly, the contrarian strategy indicates that 4.36 % FTSE excess abnormal returns are yielded through the use of the market model, incorporating a degree of risk. This profit is primarily attributable to the second and third test periods. However, findings from the other methodologies indicate that a contrarian strategy cannot yield excess abnormal returns on the FTSE market. This highlights an important topic which is crucial to this study, that the success or failure of the investment strategy is markedly dependent on the applied methodology. These findings are comparable to the SET also. The first three test periods in the SET account for almost 30% excess abnormal returns, which are offset by large losses in the fourth test period. Both the winner and

loser portfolios for the FTSE and SET display significant rank to test period return reversal.

The results from the empirical examination of the momentum effect on the Thai stock market can be summed up in a few important findings. First of all, the strategy of buying winners and short selling losers is indeed profitable on the SET. Ignoring transaction costs, the average excess abnormal return for a momentum portfolio can yield up to 7.8% and all strategies with various test periods manage to yield significant profits. However, the profitability of the strategy is almost entirely explained by the short position in the losers.

With regards to the FTSE market, the disregard of transaction costs tolerates the profitability of the momentum strategy. In addition, comparing momentum returns with the FTSE market returns highlights that this strategy can yield an abnormal excess return. All strategies except the short term three and six month test strategies give a return which is higher than the market index. However, the inclusion of estimated transaction costs eradicates the profitability of this strategy on the FTSE market.

As momentum strategies involve frequent trading and result in a high portfolio turnover the transaction costs will severely limit its profitability for shorter horizons. Statistically, the long positions give significant excess returns for the 12 month rank and hold strategy on the SET only. However, both the FTSE and SET excess abnormal returns remain significant for the contrarian strategy subsequent to the inclusion of transaction costs.

The penultimate test oversees whether the abnormal profits generated from momentum or contrarian trading can be explained by differences in systematic risk. The winner portfolios have a lower beta value than the loser portfolios for the two strategies in both markets, with the exception of the FTSE beta pertaining to the contrarian strategy. For the winner portfolio, the beta value is also greater than one on the SET for both strategies and hence, it implies that investing in these strategies in this market is more risky than buying the index.

The final test surrounds the examination of excess abnormal returns for the month of January, which indicate that no proportion of momentum or contrarian abnormal profits can be attributed to the January effect. Nonetheless, there may be an element of tax loss selling in the FTSE market founding the basis of an April effect.

Overall, the contrarian approach to investing is capable of providing greater excess abnormal returns in both markets than the momentum strategy. Additionally, for both strategies, the emerging SET market yields superior profitability as opposed to the developed FTSE market. This is due to the larger levels of risk inherent in this emerging market.

In addition, the primary research findings suggest that large excess abnormal returns could be exploited by investors through a hybrid combination of momentum and contrarian strategies. In particular, the contrarian strategy excess abnormal returns for both the FTSE and SET could be enhanced considerably through the employment of a momentum strategy in the early stages of the investment approach.

### **6.3 Recommendations for Further Research**

This study not exhaustive, hence advanced research is necessary to determine various issues in relation to the performance of momentum and contrarian strategies as methods of investment. One such issue surrounds the differences between the winners and losers and other companies. In addition, as previously mentioned, areas highlighted by this study, such as the possibility of an April effect in the UK markets and the emergence of a profitable hybrid investment strategy warrant more comprehensive research.

A much broader topic which stems from this research involves the sources of contrarian and momentum profits. This includes behavioural explanations such as industry and earnings momentum and analyst's coverage. Additionally, risk-based explanations including bid-ask bounce and inventory effects warrants exploration in future studies.

Pertaining to the momentum strategy, this study focuses on stock momentum, whereas the area of industry momentum and the relationship between the two could offer a more in-depth analysis of this investment strategy. In particular, previous research in this area, carried out by Markowitz and Grinblatt (1999) and Giannikos and Ji (2007) focus on developed markets. Therefore, centring such research on emerging markets would be a particularly beneficial addition to existing literature.

#### **6.4 Concluding Comment**

This study determines that both momentum and contrarian based investment strategies can generate positive abnormal returns in the FTSE and SET markets. When considering the efficient market hypothesis in its weak form, which asserts that it is not possible to profit from historical prices, the results presented here refute weak efficiency. Hence, the overreaction and momentum effects remain to be two of the few anomalies that cannot be fully explained and continues to question the validity of efficient markets.

The major caveat of the findings of this study surrounds the mixed results, dependent on different methodologies. This is a problem for both methods of investment in the two markets. The anomalies are sensitive to the techniques used to measure them, and many disappear with reasonable changes in technique. This questions whether these apparent anomalies are due to methodology or market inefficiencies. Therefore, these two phenomena acquire a large amount of additional research in the future.

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# Appendices

## **Appendix 1: Personal Reflection on the Dissertation**

The dissertation process was an exceptionally positive educational experience. Studying one project over the duration of three semesters and being able to formulate my own investigation regarding certain theories proved to be a valuable lesson. Aside from the technical benefits, the process also proved to enhance my work ethic. The sheer size of the task forced me to set my own goals and pace to reach those goals. I feel that this experience will be instrumental in my career and help set me apart from my peers in the industry.

Initially, I thought that focussing on one topic and narrowing this down to one specific research question would be incredibly difficult. Reflecting back now, I believe that this is true. With constant research the subject area broadens and broadens. It was quite complicated to keep focussed on one specific investigation.

I began the dissertation process by researching past academic papers and articles in the area of stock market anomalies in order to help focus on a specific research question. I had primarily chosen this area due to my own level of interest and through recommendations made in several studies I had examined. The more I read and learned, the more apparent the research gap became. This systematic approach enabled me to set research objectives. Throughout the process that followed, writing, evaluating and analysing skills became imperative to each step. These skills were essential and thus, with time, improved immensely.

Something I would do differently is to write why I have selected certain material, and keep this with my notes. I believe that it would help to limit the volume of notes and it means starting to write as soon as possible. Similarly, at the end of the course I appreciate that efficient thesis writing is regular rather than continuous. In hindsight, I realise that it is paramount to write regularly rather than continuously as the task can become a monotonous after some time. Hence, in the future I plan to write in regular intervals to avoid this dullness as it can become dull for the reader also.

Another change I would uphold if I had to complete the thesis again takes place before the writing begins. I would prefer that I had undertaken research regarding the understanding of the thesis writing process. I would spend quality time exploring the thesis writing experience and studying how to effectively structure a thesis, including style, editing and presentation. In this case, there was a slight panic at the end. It is extremely vital with a dissertation that your work meets the necessary criterion in terms of ethics, correct referencing and academic honesty. For this reason, I feel that there is much to be gained from critiquing your own work.

My greatest asset also proved to be my greatest struggle. When given such freedom with such an assignment as challenging as a dissertation, it was often very difficult at times to stay focused and complete the tasks at hand. Through practice, nevertheless, I was able to master this technique and produce a carefully planned dissertation. In future works I will allocate more time to the latter chapters. The discussion chapter, in particular, is heavily weighted but had to be slightly rushed due to the upcoming deadline. Therefore, I have learned that time should be allocated to each section in respect of their weighting in marks. In addition to this, I would improve my consideration of both short and long term time management.

It is not easy to avoid the 'perfect chapter syndrome'. It was a difficult task to impede thinking that 'This has to be good, or why am I doing a thesis at all?' or 'I have to have something decent to show after all this time'. Whereas I now understand that there is no point in perfecting chapters until a rough draft of the entire dissertation has been completed, as there will be a magnitude of changes to be made. In reality, learning and change are synonymous. Furthermore, I noticed that my writing style changed over the course the dissertation process, consequently perfecting it to journal quality is pointless until the allotted revision period.

Another dissertation challenge surrounds the consistency of effort, as there is always a tendency and temptation to coast and cram. Getting started was a great complexity. I had the terror of the blank page for quite some time. As I had nothing to work with until I

wrote something, I recognise now that getting rough draft ready as soon as there is a sense of where the chapter is going. In the end, I noticed how this method was effective in helping me to clarify my thoughts.

The purpose of the Masters in Business Studies thesis is to independently conduct an empirical study in ones area of study. As I feel I have successfully completed this task, I believe that I have derived a special learning which will aid me in the future.

## Appendix 2: Average Test Period Returns on the FTSE – Contrarian Strategy

### Adjusted Market Model

<u>Test Period</u>	<u>Winner (W)</u>	<u>Loser (L)</u>	<u>L-W</u>
1997-1999	0.2483	-0.3046	-0.5529
2000-2002	-0.2606	0.0240	0.2846
2003-2005	0.1798	0.1759	-0.0039
2006-2008	-0.0103	-0.1407	-0.1304
<i>Average</i>	<i>0.0393</i>	<i>-0.0614</i>	<i>-0.1007</i>

### Market Model

<u>Test Period</u>	<u>Winner (W)</u>	<u>Loser (L)</u>	<u>L-W</u>
1997-1999	0.0641	-0.1326	-0.1968
2000-2002	-0.2285	-0.0059	0.2227
2003-2005	0.0381	0.3017	0.2636
2006-2008	-0.0168	-0.1315	-0.1147
<i>Average</i>	<i>-0.0357</i>	<i>0.0079</i>	<i>0.0437</i>

### CAPM

<u>Test Period</u>	<u>Winner (W)</u>	<u>Loser (L)</u>	<u>L-W</u>
1997-1999	0.1988	-0.2256	-0.4244
2000-2002	-0.1959	-0.0834	0.1125
2003-2005	0.1458	0.1987	0.0528
2006-2008	0.0351	-0.1749	-0.2100
<i>Average</i>	<i>0.0459</i>	<i>-0.0713</i>	<i>-0.1173</i>

### Appendix 3: Average Test Period Returns on the SET – Contrarian Strategy

#### Adjusted Market Model

<u>Test Period</u>	<u>Winner (W)</u>	<u>Loser (L)</u>	<u>L-W</u>
1997-1999	0.0306	-0.2987	-0.3293
2000-2002	-0.1284	0.0303	0.1587
2003-2005	0.5194	-0.1819	-0.7013
2006-2008	-0.0066	-0.4705	-0.4639
<i>Average</i>	<i>0.1037</i>	<i>-0.2302</i>	<i>-0.3339</i>

#### Market Model

<u>Test Period</u>	<u>Winner (W)</u>	<u>Loser (L)</u>	<u>L-W</u>
1997-1999	-0.1894	0.0372	0.2266
2000-2002	-0.1821	0.1434	0.3255
2003-2005	0.1068	0.1156	0.0088
2006-2008	-0.1580	-0.2114	-0.0534
<i>Average</i>	<i>-0.1057</i>	<i>0.0212</i>	<i>0.1269</i>

#### CAPM

<u>Test Period</u>	<u>Winner (W)</u>	<u>Loser (L)</u>	<u>L-W</u>
1997-1999	-0.5355	-0.8647	-0.3292
2000-2002	-0.3717	-0.2130	0.1587
2003-2005	1.0100	0.8004	-0.2095
2006-2008	-0.5373	-0.9945	-0.4572
<i>Average</i>	<i>-0.1086</i>	<i>-0.3180</i>	<i>-0.2093</i>



#### Appendix 4: Average Test Period Returns on the FTSE – Momentum Strategy

##### Adjusted Market Model

<u>Test Period</u>	<u>Winner (W)</u>	<u>Loser (L)</u>	<u>W-L</u>
1995	0.0256	-0.0040	-0.0040
1996	0.0597	-0.0596	0.1193
1997	0.1304	-0.1195	0.2499
1998	0.0857	-0.3083	0.3939
1999	-0.0617	0.2171	-0.2789
2000	0.0216	0.1648	-0.1432
2001	-0.0706	-0.0626	-0.0079
2002	0.1379	-0.4277	0.5656
2003	-0.0066	0.3116	-0.3182
2004	-0.0366	-0.0014	-0.0351
2005	0.0929	-0.0042	0.0970
2006	-0.0100	-0.0194	0.0094
2007	-0.0831	-0.0407	-0.0423
2008	-0.0997	0.1019	-0.2017
2009	-0.0702	0.1398	-0.2099
<i>Average</i>	<i>0.0077</i>	<i>-0.0075</i>	<i>0.0152</i>

### **Market Model**

<b><u>Test Period</u></b>	<b><u>Winner (W)</u></b>	<b><u>Loser (L)</u></b>	<b><u>W-L</u></b>
1995	0.0638	-0.0468	0.1106
1996	0.0473	-0.0506	0.0979
1997	-0.0205	0.0265	-0.0470
1998	0.0226	-0.2484	0.2709
1999	-0.0839	0.2352	-0.3190
2000	0.0952	0.0900	0.0051
2001	-0.1760	0.0433	-0.2193
2002	0.0927	-0.3796	0.4723
2003	-0.0208	0.3217	-0.3425
2004	-0.0407	-0.0005	-0.0402
2005	0.0993	-0.0151	0.1144
2006	-0.0020	-0.0308	0.0288
2007	-0.1307	0.0052	-0.1359
2008	-0.1086	0.1145	-0.2231
2009	-0.1238	0.1887	-0.3125
<i>Average</i>	<i>-0.0191</i>	<i>0.0169</i>	<i>-0.0360</i>

### **CAPM**

<b><u>Test Period</u></b>	<b><u>Winner (W)</u></b>	<b><u>Loser (L)</u></b>	<b><u>W-L</u></b>
1995	0.0415	-0.0187	0.0602
1996	0.0641	-0.0554	0.1195
1997	0.1263	-0.0917	0.2180
1998	0.0851	-0.3083	0.3934
1999	-0.0605	0.2405	-0.3010
2000	-0.0386	0.1686	-0.2072
2001	-0.1589	0.0661	-0.2250
2002	0.0915	-0.4088	0.5002
2003	0.0409	0.2662	-0.2253
2004	0.0054	-0.0467	0.0521
2005	0.0998	-0.0322	0.1320
2006	0.0075	-0.0427	0.0502
2007	-0.0795	-0.0459	-0.0337
2008	-0.0478	0.0630	-0.1107
2009	-0.1037	0.1056	-0.2093
<i>Average</i>	<i>0.0049</i>	<i>-0.0094</i>	<i>0.0142</i>

## Appendix 5: Average Test Period Returns on the SET – Momentum Strategy

### Adjusted Market Model

<u>Test Period</u>	<u>Winner (W)</u>	<u>Loser (L)</u>	<u>W-L</u>
1995	0.0209	-0.0649	0.0859
1996	-0.0019	-0.2695	0.2676
1997	-0.0353	-0.7247	0.6894
1998	0.2646	-0.1785	0.4431
1999	0.1668	0.2391	-0.0723
2000	-0.0436	-0.2062	0.1626
2001	0.0691	0.0801	-0.0110
2002	0.0136	-0.0111	0.0248
2003	-0.0794	0.2871	-0.3665
2004	0.0198	-0.0516	0.0713
2005	0.0697	0.0918	-0.0221
2006	-0.0667	0.0050	-0.0717
2007	-0.0707	-0.1794	0.1087
2008	-0.0042	-0.1612	0.1570
2009	0.1191	0.4151	-0.2960
<i>Average</i>	<i>0.0295</i>	<i>-0.0486</i>	<i>0.0781</i>

### **Market Model**

<b><u>Test Period</u></b>	<b><u>Winner (W)</u></b>	<b><u>Loser (L)</u></b>	<b><u>W-L</u></b>
1995	0.0076	-0.0461	0.0538
1996	-0.0555	-0.1120	0.0565
1997	-0.2623	-0.3583	0.0959
1998	0.0352	0.0648	-0.0296
1999	0.1596	0.2086	-0.0490
2000	-0.0625	-0.0998	0.0373
2001	-0.0799	0.2174	-0.2973
2002	0.0493	-0.0632	0.1125
2003	0.0174	0.0581	-0.0407
2004	-0.0162	0.0082	-0.0244
2005	0.0393	0.1156	-0.0763
2006	-0.0812	0.0563	-0.1376
2007	-0.1921	-0.1003	-0.0917
2008	0.0062	-0.0583	0.0645
2009	0.2490	0.2041	0.0449
<i>Average</i>	<i>-0.0124</i>	<i>0.0063</i>	<i>-0.0187</i>

### **CAPM**

<b><u>Test Period</u></b>	<b><u>Winner (W)</u></b>	<b><u>Loser (L)</u></b>	<b><u>W-L</u></b>
1995	0.0427	-0.0843	0.1270
1996	0.1104	-0.2413	0.3517
1997	-0.1230	-0.4082	0.2852
1998	0.0634	0.0411	0.0224
1999	0.0783	0.3184	-0.2401
2000	-0.1328	-0.1440	0.0112
2001	-0.0435	0.1640	-0.2075
2002	0.0757	-0.0604	0.1361
2003	-0.0378	0.0215	-0.0592
2004	0.0417	-0.0526	0.0943
2005	0.0107	0.1343	-0.1236
2006	0.0270	-0.0793	0.1063
2007	-0.0182	-0.2269	0.2087
2008	0.0843	-0.2495	0.3338
2009	0.1917	0.3265	-0.1348
<i>Average</i>	<i>0.0247</i>	<i>-0.0361</i>	<i>0.0608</i>

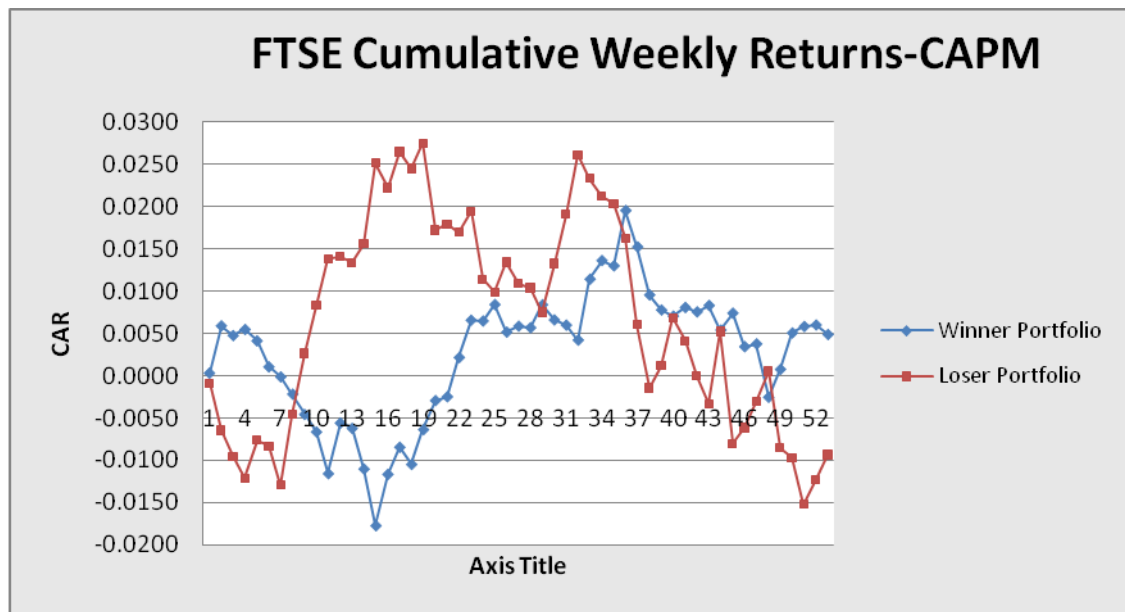
## Appendix 6: FTSE Cumulative Weekly Returns - Contrarian Strategy

<i>Weeks After Portfolio Formation</i>	<i>Cum. L-W</i>		<i>Cum. L-W</i>		<i>Cum. L-W</i>		<i>Cum. L-W</i>
1	-0.0001	40	0.0329	79	0.0353	118	0.1207
2	0.0242	41	0.0384	80	0.0446	119	0.1138
3	0.0121	42	0.0329	81	0.0425	120	0.1187
4	-0.0067	43	0.0385	82	0.0489	121	0.1203
5	0.0008	44	0.0420	83	0.0406	122	0.1194
6	-0.0085	45	0.0376	84	0.0388	123	0.1233
7	-0.0308	46	0.0363	85	0.0521	124	0.1253
8	-0.0167	47	0.0411	86	0.0554	125	0.1237
9	-0.0555	48	0.0326	87	0.0395	126	0.1266
10	-0.0260	49	0.0408	88	0.0606	127	0.1332
11	-0.0459	50	0.0377	89	0.0368	128	0.1305
12	-0.0197	51	0.0371	90	0.0289	129	0.1317
13	-0.0101	52	0.0408	91	0.0335	130	0.1233
14	0.0048	53	0.0480	92	0.0547	131	0.1364
15	0.0030	54	0.0557	93	0.0585	132	0.1310
16	0.0052	55	0.0602	94	0.0546	133	0.1033
17	0.0114	56	0.0603	95	0.0556	134	0.1128
18	0.0115	57	0.0611	96	0.0574	135	0.1019
19	0.0376	58	0.0579	97	0.0573	136	0.1007
20	0.0263	59	0.0652	98	0.0676	137	0.0948
21	0.0147	60	0.0641	99	0.0663	138	0.1049
22	0.0404	61	0.0634	100	0.0631	139	0.1041
23	0.0410	62	0.0616	101	0.0731	140	0.0896
24	0.0452	63	0.0569	102	0.0911	141	0.0862
25	0.0499	64	0.0635	103	0.0805	142	0.0827
26	0.0393	65	0.0615	104	0.0716	143	0.0764
27	0.0455	66	0.0541	105	0.0825	144	0.0659
28	0.0266	67	0.0592	106	0.0925	145	0.0515
29	0.0193	68	0.0715	107	0.0800	146	0.0696
30	0.0334	69	0.0708	108	0.0935	147	0.0866
31	0.0394	70	0.0723	109	0.0912	148	0.0930
32	0.0441	71	0.0631	110	0.1000	149	0.0669
33	0.0497	72	0.0495	111	0.1033	150	0.0775
34	0.0281	73	0.0462	112	0.1095	151	0.0885
35	0.0340	74	0.0417	113	0.0959	152	0.0572
36	0.0426	75	0.0429	114	0.0977	153	0.0440
37	0.0475	76	0.0386	115	0.0992	154	0.0377
38	0.0346	77	0.0305	116	0.1136	155	0.0351
39	0.0335	78	0.0393	117	0.0985	156	0.0363
						157	0.0462

## Appendix 7: SET Cumulative Weekly Returns - Contrarian Strategy

Weeks After Portfolio Formation	Cum. L-W		Cum. L-W		Cum. L-W		Cum. L-W
1	0.0134	40	-0.0880	79	-0.0857	118	-0.0686
2	0.0376	41	-0.0961	80	-0.0799	119	-0.0621
3	0.0292	42	-0.1003	81	-0.0801	120	-0.0603
4	0.0069	43	-0.0208	82	-0.0936	121	-0.0660
5	-0.0234	44	-0.0216	83	-0.0792	122	-0.0592
6	-0.0142	45	-0.0254	84	-0.1023	123	-0.0568
7	-0.0194	46	-0.0280	85	-0.0906	124	-0.0582
8	-0.0204	47	-0.0403	86	-0.0893	125	-0.0535
9	-0.0379	48	-0.1183	87	-0.0866	126	-0.0453
10	-0.0244	49	-0.1209	88	-0.0735	127	-0.0224
11	-0.0063	50	-0.1181	89	-0.0636	128	0.0132
12	-0.0070	51	-0.0951	90	-0.1070	129	0.0291
13	-0.0255	52	-0.0984	91	-0.0713	130	0.0366
14	-0.0089	53	-0.0881	92	-0.0328	131	0.0429
15	-0.0098	54	-0.0947	93	-0.0377	132	0.0592
16	-0.0282	55	-0.1054	94	-0.0318	133	0.0428
17	-0.0390	56	-0.1534	95	-0.0350	134	0.0591
18	-0.0422	57	-0.1601	96	-0.0344	135	0.0596
19	-0.0234	58	-0.1450	97	-0.0171	136	0.0741
20	-0.0222	59	-0.1373	98	-0.0266	137	0.0735
21	-0.0323	60	-0.1438	99	-0.0526	138	0.0691
22	-0.0339	61	-0.1440	100	-0.0372	139	0.0728
23	-0.0379	62	-0.1528	101	-0.0535	140	0.0784
24	-0.0087	63	-0.1478	102	-0.0572	141	0.0829
25	0.0062	64	-0.1193	103	-0.0649	142	0.1046
26	0.0159	65	-0.1349	104	-0.0863	143	0.1158
27	-0.0224	66	-0.1418	105	-0.0811	144	0.1379
28	-0.0205	67	-0.1411	106	-0.0753	145	0.1204
29	-0.0145	68	-0.1649	107	-0.0697	146	0.1142
30	-0.0526	69	-0.1800	108	-0.0528	147	0.1361
31	-0.0578	70	-0.1794	109	-0.0417	148	0.1267
32	-0.0598	71	-0.1672	110	-0.0589	149	0.1309
33	-0.0668	72	-0.1410	111	-0.0473	150	0.1446
34	-0.0589	73	-0.1472	112	-0.0422	151	0.1539
35	-0.0611	74	-0.1352	113	-0.0581	152	0.1539
36	-0.0786	75	-0.1324	114	-0.0669	153	0.1522
37	-0.1004	76	-0.1122	115	-0.0537	154	0.1557
38	-0.1107	77	-0.1003	116	-0.0630	155	0.1385
39	-0.1018	78	-0.0883	117	-0.0652	156	0.1293
						157	0.1244

## Appendix 8: January Effect on FTSE – Momentum Strategy



## Appendix 9: Average Test Period Betas - Contrarian Strategy

### FTSE

<u><i>Test Period</i></u>	<u><i>Winner (W)</i></u>	<u><i>Loser (L)</i></u>
1997-1999	1.2085	0.6671
2000-2002	0.9776	0.9535
2003-2005	1.0135	1.0263
2006-2008	0.9848	1.0429
<i>Average</i>	<i>1.0461</i>	<i>0.9224</i>

### SET

<u><i>Test Period</i></u>	<u><i>Winner (W)</i></u>	<u><i>Loser (L)</i></u>
1997-1999	1.0672	1.2118
2000-2002	1.1355	0.9330
2003-2005	0.8494	1.3934
2006-2008	1.0774	0.9253
<i>Average</i>	<i>1.0324</i>	<i>1.1159</i>



## Appendix 10: Average Test Period Betas - Momentum Strategy

### FTSE

<u>Test Period</u>	<u>Winner (W)</u>	<u>Loser (L)</u>
1995	0.9754	1.0136
1996	0.8340	0.9482
1997	1.0316	0.7818
1998	1.0269	1.0022
1999	0.9827	0.7331
2000	0.8260	0.5834
2001	1.0666	1.1439
2002	0.9400	0.9776
2003	0.9845	0.9969
2004	1.0082	1.0682
2005	0.9472	1.2133
2006	0.9455	1.1543
2007	0.9976	0.9748
2008	1.1292	0.9030
2009	0.8943	1.4855
<i>Average</i>	<i>0.9726</i>	<i>0.9987</i>

### SET

<u>Test Period</u>	<u>Winner (W)</u>	<u>Loser (L)</u>
1995	1.0470	1.1764
1996	1.2174	1.0357
1997	1.3198	0.9839
1998	1.2666	1.0855
1999	1.3688	0.6695
2000	0.8065	1.1349
2001	0.8920	1.2401
2002	1.0796	0.8163
2003	0.9460	1.3449
2004	0.9740	1.2325
2005	1.1254	1.1176
2006	1.0014	1.0521
2007	0.7988	1.1825
2008	1.0115	0.9890
2009	1.0121	1.0214
<i>Average</i>	<i>1.0578</i>	<i>1.0721</i>