Cass Business School
CITY UNIVERSITY LONDON

THREE ESSAYS IN ASSET MANAGEMENT

Svetlana Sapuric

Supervisors: Professor Andrew Clare and Dr. Natasa Todorovic

Thesis Submitted for the Degree of Doctor of Philosophy
CASS Business School, Faculty of Finance
City University
London

March, 2010

CONTENTS

LIST OF FIGURES 6
LIST OF TABLES 8
ACKNOWLEDGEMENTS 9
DISCLAIMER 10
ABSTRACT OF ENTIRE THESIS 11

CHAPTER ONE: QUANTITATIVE OR MOMENTUM MULTI-STYLE ROTATION? UK EXPERIENCE 13
ABSTRACT 13
1. INTRODUCTION 14
1.1. Characteristics of Value and Growth Stocks 15
1.2. Characteristics of Small and large Capitalization Stocks 16
1.2.1. Advantages of Small Capitalization Stocks 17
1.2.2. Disadvantages of Small Capitalization Stocks 17
1.2.3. Advantages of Large Capitalization Stocks 18
1.3. History of Performance of UK FTSE Size and Style Indices 18
1.4. Equity Style Timing 21
1.5. Objective of the Research 24
1.6. Significance of the Research 24
2. REVIEW OF LITERATURE 26
2.1. Predictability of Equity Style Returns 26
2.2. Style Rotation 31
2.3. Multi-Style Rotation 34
2.4. Momentum 35
3. THE CHOICE OF DATA 37
3.1. Equity Size and Style Index Selection 37
3.2. Selecting the Potential Forecasting Variables for the Quantitative Model 38
4. METHODOLOGY 41
4.1. Quantitative Forecasting Model: Evaluating the Forecasting Variables and the Model Specification 41
4.1.1. The Ordered Logit Model 42
4.1.2. Determining the Forecasting Variables 43
4.1.3. Example of the Probability Calculations 47
4.1.4. Implementation Strategies for the Quantitative Approach 50
4.2. Methodology of the Momentum Strategies 53
4.3. Transaction costs 54

5. EMPIRICAL RESULTS 55
5.1. Quantitative Multi-Style Rotation Results 55
5.1.1. Sharpe Ratios 58
5.1.2. Transaction Costs 59
5.2. Multi-Style Momentum Rotation Results 61
5.2.1. Long Only Strategies 61
5.2.2. Long/Short Momentum Strategies 65
6. CONCLUSION 71
APPENDIX A 74
APPENDIX B 79
REFERENCES 80

CHAPTER TWO: THE IMPACT OF MANAGER CHANGES ON MUTUAL FUND PERFORMANCE 86
ABSTRACT 86
1. INTRODUCTION 87
1.1 Advantages of Mutual Funds 88
1.2 Disadvantages of Mutual Funds 89
1.3 Objectives and Significance of the Research 89
2. LITERATURE REVIEW 91
2.1 The Impact of Fund Managers on Performance of Mutual Funds 91
2.2 Does Gender Matter? 94
2.3 Studies of Performance Persistence of UK Mutual Funds 95
2.4 Studies of Performance Persistence of US Mutual Funds 96
3. DATA AND METHODOLOGY 100
3.1 Data 100
3.2 Methodology 101
3.2.1. Performance using Benchmark-Adjusted Model 103
3.2.2. Performance using Mean-Adjusted Model 104
3.2.3. Tests for Significance 104
3.2.4. Performance using Information Ratio 106
4. EMPIRICAL RESULTS 107
4.1. Performance and manager change: All funds 107
4.2 Categories of Funds 115
4.2.1 Performance and manager change: Male vs. Female Managed Funds 115
4.2.2 Performance and manager change: UK Managed Funds vs. International Managed Funds 122

4.2.3 Performance and manager change: Emerging Markets vs. Developed Markets Funds 125
4.2.4 Performance and manager change: Equity Funds vs. Bond Funds 130
4.2.5 Performance and manager change: Growth Funds, Value Funds and Small Capitalization Funds 134
4.3 Persistence of Performance and Manager Change: Best Ten Percent vs. Worst Ten Percent Performing Funds 140
5. CONCLUSION 150
APPENDIX 1 152
APPENDIX 2 154
APPENDIX 3 156
APPENDIX 4 161
APPENDIX 5 183
APPENDIX 6 185
APPENDIX 7 187
APPENDIX 8 193
APPENDIX 9 215
APPENDIX 10 217
APPENDIX 11 218
APPENDIX 12 224
APPENDIX 13 246
APPENDIX 14 248
REFERENCES 249

CHAPTER THREE: DO FUND FLOWS PLAY A ROLE IN UK FUND MANAGER CHANGES? 252
ABSTRACT 252
1. INTRODUCTION 253
1.2 Objectives and Significance of Research 254
2. LITERATURE REVIEW 255
2.1 Fund Flows and Returns 255
2.2 Do other factors affect Fund Flows? 258
3. DATA AND METHODOLOGY 260
3.1 Data 260
3.2 Methodology 261
3.2.1 Event Study 261
3.2.2 Significance Tests 262
3.2.3 Empirical Model 263

4. EMPIRICAL RESULTS....266
4.1 Fund Flow for All Funds....266
4.1.2 Fund Flow for Male vs. Female Managed Funds....270
4.2 Aggregate Mutual Fund Flow Results....274
4.2.1 Average Abnormal Fund Flows....274
4.3 Individual Mutual Fund Flow Results....275
4.3.1 Do Gender and Fund Characteristics affect Mutual Fund Flows?....276
5. CONCLUSION....278
APPENDIX 1....280
APPENDIX 2....282
APPENDIX 3....284
APPENDIX 4....288
REFERENCES....289
CONCLUDING REMARKS AND FUTURE RESEARCH OF THE THESIS....293

LIST OF FIGURES

Figure 1.1: Twelve-Month Moving Average of FTSE Small-Cap and FTSE Large-Cap Indices…… 20
Figure 1.2: Twelve-Month Moving Average of FTSE Growth 350 and FTSE Value350 Indices…… 21
Figure 2.1: Benchmark-Adjusted Total Sample Average Abnormal Returns…… 108
Figure 2.2: Benchmark-Adjusted Total Sample Cumulative Average Abnormal Returns…… 109
Figure 2.3: Peer Group-Adjusted Total Sample Average Abnormal Returns..... 110
Figure 2.4: Peer Group-Adjusted Total Sample Cumulative Average Abnormal Returns…… 111
Figure 2.5: Mean-Adjusted Total Sample Average Abnormal Returns…… 112
Figure 2.6: Mean-Adjusted Total Sample Cumulative Average Abnormal Returns…… 113
Figure 2.7: Benchmark-Adjusted Male Managed Funds Cumulative Average Abnormal Returns…… 116
Figure 2.8: Peer Group-Adjusted Male vs. Female Managed Funds Cumulative Average Abnormal Returns…… 118
Figure 2.9: Mean-Adjusted Male vs. Female Managed Funds Cumulative Average Abnormal Returns…… 120
Figure 2.10: Benchmark-Adjusted UK Managed vs. International Managed Funds Cumulative Average Abnormal Returns…… 123
Figure 2.11: Peer Group-Adjusted UK vs. International Funds Cumulative Average Abnormal Returns…… 124
Figure 2.12: Mean-Adjusted UK Funds vs. International Funds Cumulative Average Abnormal Returns…… 124
Figure 2.13: Benchmark-Adjusted Emerging vs. Developed Markets Funds Cumulative Average Abnormal Returns…… 127
Figure 2.14: Peer Group-Adjusted Emerging Market vs. Developed Market Funds Cumulative Average Abnormal Returns…… 128
Figure 2.15: Mean-Adjusted Emerging Market Funds vs. Developed Market Funds Cumulative Average Abnormal Returns…… 130
Figure 2.16: Benchmark-Adjusted Equity vs. Bond Funds Cumulative Average Abnormal Returns…… 131
Figure 2.17: Peer Group-Adjusted Equity vs. Bond Funds Cumulative Average Abnormal Returns…… 132
Figure 2.18: Mean-Adjusted Equity Funds vs. Bond Funds Cumulative Average Abnormal Returns…… 133
Figure 2.19: Benchmark-Adjusted Growth, Value and Small-Cap Funds Cumulative Average Abnormal Returns…… 135
Figure 2.20: Peer Group-Adjusted Growth, Value and Small-Cap Funds Cumulative Average Abnormal Returns…… 137
Figure 2.21: Mean-Adjusted Value, Growth and Small-Cap Funds Cumulative Average Abnormal Returns…… 138
Figure 2.22: Benchmark-Adjusted Cumulative Average Abnormal Returns - Top 10% Funds according to IR pre-event…… 141
Figure 2.23: Benchmark-Adjusted Cumulative Average Abnormal Returns - 142

Bottom 10% Funds according to IR pre-event……..
Figure 2.24: Benchmark-Adjusted Cumulative Average Abnormal Returns - Top 10% Funds according to IR post-event……...…… 144
Figure 2.25: Benchmark-Adjusted Cumulative Average Abnormal Returns - Bottom 10% Funds according to IR post-event…….…… 145
Figure 2.26: Peer Group-Adjusted Cumulative Average Abnormal Returns - Top 10% Funds according to IR Pre-Event…….….. 146
Figure 2.27: Peer Group-Adjusted Cumulative Average Abnormal Returns - Bottom 10% Funds according to IR Pre-Event…….…. 147
Figure 2.28: Peer Group-Adjusted Cumulative Average Abnormal Returns - Top 10% Funds according to IR Post-Event…….. 148
Figure 2.29: Peer Group-Adjusted Cumulative Average Abnormal Returns - Bottom 10% Funds according to IR Post-Event……..... 149
Figure 3.1: Monthly Cumulative Average Abnormal Fund Flow - All Fund….. 267
Figure 3.2: Cumulative Average Abnormal Fund Flows - Top 10% Funds according to IR Pre-Event…….…. 269
Figure 3.3: Cumulative Average Abnormal Fund Flows - Bottom 10% Funds according to IR Pre-Event……...….... 270
Figure 3.4: Cumulative Average Abnormal Fund Flow for Male Managed Funds……..…… 272
Figure 3.5: Cumulative Average Abnormal Fund Flow for Female Managed Funds…….……. 273

LIST OF TABLES

Table 1.1	Frequency of Monthly Rankings for each Style and Size Index, February 1987 to April 2006…….	19
Table 1.2:	Host of Potential Variables for the Forecasting Model……..	40
Table 1.3:	Determinants of FTSE Small-Cap Index……..…….	44
Table 1.4:	Determinants of FTSE Large-Cap Index……...…	45
Table 1.5:	Determinants of FTSE Growth 350 Index……..…	46
Table 1.6:	Determinants of FTSE Value 350 Index……	46
Table 1.7:	Limit Points for Ordered Logit Model of FTSE Small-Cap Index…	47
Table 1.8:	Results of Ordered Logit Forecasting Model for UK FTSE style Indices……	56
Table 1.9:	Sharpe Ratios for Long only strategies based on 6 months formation and 1-6 months holding…….	62
Table 1.10:	Sharpe Ratios for Long only strategies based on 1-5, 9 and 12 months formation and 1 month holding……..……..	62
Table 1.11:	Long only strategies based on 6 months formation and 1-6 months holding……...…	64
Table 1.12:	Long only strategies based on 1-5, 9 and 12 months formation and 1 month holding……...……..	64
Table 1.13:	Sharpe Ratios for Long/Short strategies based on 6 month formation and 1-6 month holding……..	67
Table 1.14:	Sharpe Ratios for Long/Short strategies based on 1-5, 9 and 12 month formation and 1 month holding……...…...	67
Table 1.15:	Long only strategies based on 6 months formation and 1-6 months holding ……...…...	69
Table 1.16:	Long only strategies based on 1-5, 9 and 12 months formation and 1 month holding ……..……...…...	69
Table 3.1:	Determinants of Average Abnormal Mutual Fund Flows……	274
Table 3.2:	Determinants of Individual Mutual Fund Flows…….....	276
Table 3.3:	Determinants of Individual Mutual Fund Flows…….....	277

.

ACKNOWLEDGEMENTS

When I started my PhD journey I had one goal, and that is to become an academic. Ever since my goal is still the same and it is very difficult to find the words to express my gratitude to two people that have believed in me and helped me in nearing my goal, my two supervisors, Dr. Natasa Todorovic and Professor Andrew Clare. I regard myself as fortunate and deeply grateful to have had two supervisors that have provided continuous support, encouragement, advice and guidance in completing my PhD thesis. Without a doubt, this thesis would have not been possible without them, and not only have they been exceptional supervisors but they have become friends.

I wish to express my warm and sincere thanks to Professor Joelle Miffre and Dr. Dirk Nitzsche, for their valuable comments and advice during my transfer and after. I warmly thank Professor Michael Tamvakis, Dr. Aneel Keswani, Dr. Lorenzo Trapani and Dr. Elena Kalotychou for their valuable advice and friendly help throughout the course of this research. Many thanks are due to all the academic staff of Cass Business School who I did not mention explicitly.

I am indebted to my many student colleagues, Myria Kyriacou, Nick Motson, Panagiotis Dontis-Charitos and Stefan Van Dellen, for all the advice, help and support they have provided me and for making the PhD journey a lot more fun. Special thanks to Myria for teaching me how to programme and for being a wonderful friend for all these years. I would also like to warmly thank Margaret Busgith and Malla Pratt from the faculty research office.

Finally, I wish to thank my parents, my sister and my brother, and Nicholas who have encouraged, supported and inspired me to achieve my goal.

DECLARATION

I grant powers of discretion to the university Librarian to allow this thesis to be copied in whole or in part without further reference to me. This permission covers only single copies made for study purposes, subject to normal conditions of acknowledgement.

ABSTRACT OF ENTIRE THESIS

Investors or fund managers are all striving to beat the market and chase higher returns in order to enhance performance of their investments. Usually, the return of the investment is compared to a benchmark, often constructed from the returns of the market or the returns from the peer or industry sector that our asset class belongs to. Although the three chapters in this Doctoral Thesis are on different areas of asset management, they all have one important common denominator of asset management: *performance*. In particular, the three chapters are aimed at determining the factors and components that instigate higher returns and the enhancement of performance of index portfolios and mutual funds.

The first chapter in this thesis examines whether short-term variation in the ranking of size and style index returns in the UK equity market is better predictable and exploitable by means of quantitative or momentum style rotation strategies. In other words, we attempt to answer whether an investor should employ a more complex, quantitative model or a simple momentum-based model to forecast index returns and apply various trading strategies. Using a number of long only and long/short strategies, we are able to assess the profitability and, therefore, performance of these two alternative methods. In particular, we use the UK size and style benchmark indexes, FTSE 350 Value, FTSE 350 Growth, FTSE Small Cap and FTSE 100 index in the period from January 1987 to April 2006. In our quantitative approach, we use the set of most appropriate minimum number of macroeconomic, fundamental and market variables that can be used to forecast which one of our style indexes has the highest probability to be ranked first, second, third or last in a particular month. In other words, these probabilities provide us with an indication of the best performing index to the worst performing index. This implies that our dependent variable is the ranking of the index return in a particular month. Therefore, as our forecasting model, we choose a recursive ordered logit model that gives us month-by-month probabilities of rank-order for each of four indexes separately. Based on these probabilities, we devise a number of long-only and long/short trading strategies, which are ultimately able to enhance the profitability and performance of these index portfolios. As an alternative to this complex quantitative forecasting approach, we apply a variety of momentum strategies during the same trading period, to assess if similar results can be obtained through a much simpler approach. Our momentum trading strategies are based on different formation and holding periods, varying from 1 month to 12 months, to test the robustness of the momentum approach. The results suggest that trading rules based on simple short-term momentum strategies are able to generate higher Sharpe ratios and greater end-of-period wealth at a reasonable level of transaction costs than our quantitatively based trading rules, which is particularly pronounced among the long-only strategies.

A number of past studies have ascertained that good performance of mutual funds is driven by asset allocation, market timing and stock-picking ability. In the second chapter we attempt to establish whether it is in fact the fund manager that affects the performance of a mutual fund. Using a unique database of 258 UK fund manager changes from April 2002 until December 2005, we examine whether a fund manager plays a determining role in the performance of the mutual funds. Applying an event study methodology, the performance (abnormal returns) of the funds pre- and post-

manager change is measured in three methods: the benchmark-adjusted model, mean-adjusted model and the information ratio. For the benchmark-adjusted model we use (1) benchmark index defined by the investment objectives of a fund and (2) peer group benchmark. Furthermore, we assess whether the impact of a change is more pronounced among male or female managed funds, emerging or developed market funds, bond or equity funds and whether the persistence of performance depends on fund's style, i.e. growth, value or small cap. We also examine the persistence of the top performing funds compared with the bottom performing funds pre- and post management change. Our results show clearly across different categories of funds that a change in fund manager can have a significant impact on fund performance, at least in the first year following the event. However, in the second and the third year following managers' change, the performance starts descending largely, we believe, due to exceptionally bad conditions in financial markets during 2007 and 2008, which are the last two years of our data sample. Our findings suggest that the performance of the female managed funds is more volatile in the pre-event period as opposed to the post event, when the female manager is replaced. We document that funds' performance improves more on average after a female fund manager has been replaced in comparison to the male managers. In addition, for the majority of the categories of funds the improvement of the performance in the post event period lasts for duration of about eighteen months after a new fund manager takes over. Finally, we find persistence in performance of the bottom performing funds compared with the top performing funds pre-and post management change.

Finally, the third chapter is devoted to examining the effect that a manager replacement has on fund flows and the extent to which these flows are influenced by the performance of the funds. Mutual fund managers have always had to deal with the fundamental conflict between long-term investment strategies and daily liquidity requirements due to shareholder flow. In other words, we attempt to answer the question of whether the level of fund flows increases or decreases once a fund manager is replaced. Therefore, using an event study methodology and unbalanced panel data analysis, we examine the trend of the fund flows preceding the fund manager change and the level of flow once a new fund manager takes over. Due to the significant downturn in financial markets during 2007 and 2008, investors have reacted to declining or volatile markets by withdrawing their assets in whole hosts. Our findings suggest that fund flows substantially deteriorate after the manager leaves the fund, which is especially pronounced in the turbulent periods of 2007 and 2008. Moreover, we find that there is a negative relationship between fund flows and returns over longer period horizons and a positive relationship over shorter periods. In particular, using the panel data analysis we show that good (poor) past performance causes increases (decreases) in subsequent fund flows. However, we find no evidence that the gender of the fund manager, the market in which the fund invests or the type of the fund plays any determining role for the size of the fund flows.

CHAPTER ONE

Quantitative or Momentum based Multi-Style Rotation? UK Experience

ABSTRACT

The objective of this paper is to examine whether short-term variation in the ranking of size and style index returns in the UK equity market is better predictable and exploitable by means of quantitative or momentum style rotation strategies. Using UK index data, we assess the profitability of a number of long-only and long/short multi-style rotation strategies based on these two alternative methods. The findings suggest that trading rules based on simple short-term momentum strategies are able to generate higher Sharpe ratios and greater end-of-period wealth at a reasonable level of transaction costs than our quantitatively based trading rules. This result is particularly pronounced among the long-only strategies.

1. INTRODUCTION

The concept of size and style rotation is prominent in the equity market and has attracted extensive research and study. More precisely, it is the potential profitability of size and style rotation strategies that has fascinated not only the researchers, but investors as well. Consistent style approach is often the preferred investment strategy with mutual funds and traditional asset managers. Although we can identify significant number of value, growth, large capitalisation and small capitalisation funds, there is extensive evidence which suggests that each of those styles does not persistently outperform the market or the remaining three styles. This implies that being style consistent is risky as it can lead to underperformance due to inevitable reversal in the performance of the selected style. Specifically, the existing literature suggests that better performance can be generated by applying style rotation between pairs of styles at the opposite end of the spectrum, namely: value vs. growth rotation and small vs. large rotation. However, there is no reason why an investor should switch from value to growth stock when the forecast suggests so, if large cap stocks are expected to perform better than both value and growth style. In other words, we believe that more profit potential lies in the multi-style rotation which is enabling investors to switch across all four styles. Arshanapalli, Switzer and Panju (2005) and Ahmed et al. (2002) show potential profits arising from multi-style rotation strategies opposed to single-style rotation strategies in the US market. Therefore, creating a strategy that will enable us to successfully switch from one style performing at its best in one period of time to another style expected to be the best performer in the next period, is of essence. Although there are a number of studies that provide evidence on the benefits and profitability of size and style rotation in particular, there are only a few that are concentrated on the UK financial market. Furthermore, much of equity style timing literature focuses on shifting between pairs of risky assets or between one risky and one riskless asset class, using a binomial approach. Our study differs from other literature on the UK markets in that it implements a multi-style rotation approach.

In this study, we examine whether short-term variation in the ranking of size and style index returns in the UK equity market is better predictable and exploitable by means of quantitative or momentum multi-style rotation strategies. In other words, we attempt to answer whether an investor should employ a more complex, quantitative model or a

simple momentum-based model to forecast index returns and apply various trading strategies. We assess the profitability of a number of long-only and long/short trading strategies based on these two alternative methods, using data on UK equity style and size indexes. Our quantitative method of multi-style rotation is based on a number of financial and macroeconomic factors, which in turn aid in the forecasting of the best performing index. The various variables included in our quantitative model perform differently during different periods, and will therefore have a change in impact on our indexes at different points in time. As a result, our quantitative model, which takes into consideration the impact of the variables and their changes on our indexes, will potentially entail a greater strength of forecasting the best performing index. On the other hand, our simpler method of forecasting the best performing index, the momentum strategy, relies solely on the past returns of each corresponding index. Short-term past performance of each index has proven to be a strong predictor of future performance with different holding periods for each corresponding index. This can be seen in Table 1.1 and Figures 1.1 and 1.2, which show the trend of the returns for the size and style indexes respectively. The recent increase in availability and popularity of Exchange Traded Funds (ETFs) as well as the existence of style index futures contracts makes the suggested trading strategies very cost effective, in terms of lower comparable costs and high liquidity.

1.1. Characteristics of Value and Growth Stocks

When making portfolio allocation decisions, investors and fund managers tend to categorize their assets into broad classes into which they will allocate their funds accordingly. Therefore, the concept of style in financial markets depicts the investment perspective of a fund.

There are different types of equity investment styles that an investor or a fund manager can invest into. Equity investment styles include domestic versus international, company size, such as large and small, and investment approach, such as growth and value. One of the investment styles an investor can follow is by investing in value stocks. A value stock tends to trade at a lower price relative to its fundamentals, such as dividends, earnings, book value, cash-flow and sales, and to its industry peers. Having a high dividend yield, a low price-to-book ratio and a low price-to-earnings ratio are some

of the characteristics associated to value stocks. A value investor will mainly base his criteria on quantitative factors, such as asset values, cash flows and discounted future earnings. Therefore, an investor investing in value stocks believes that the market is not always efficient and that it is possible to find companies that are trading for less than they are worth. As a consequence, these companies will then have the potential to increase in share price when the market corrects its valuation error, and this will ultimately benefit the value investor.

Value stocks can be located in any industry, however they are often found in industries that have faced difficult times or that are currently facing market overreaction to a piece of news or information affecting the industry. In other words, these type of stocks are prominent in cyclical industries.

Growth stocks comprise of earnings that are expected to grow at an above average rate relative to the market. Therefore, they are classified as stocks that have high price per earnings, price to book and price to sales ratios. More often than not, a growth stock does not pay a dividend, as the company would prefer reinvest the retained earnings in capital projects. In general, a growth investor looks to invest into rapidly expanding industries, such as new technology. Therefore, investors in growth stocks are prepared to pay for the growth stocks as they believe that their value will increase in the future. As a comparison to value investing, growth investors use a qualitative approach to evaluate the health of the company. These investors concentrate on the value judgements of the company, its markets, its management, and its ability to extract future earnings growth from its industry. However, an investor engaging into growth investing needs to be cautious as such a strategy entails substantial risks. It is often the case that growth stocks are overvalued and these stocks are known as glamour stocks.

1.2. Characteristics of Small and large Capitalization Stocks

Furthermore, another type of style investing comprises of the size of the stocks. More precisely, companies are usually classified in terms of size or market capitalization. As a general guideline, companies that have a market capitalization of £2 billion or more

are classified as large capitalization stocks[1]. Moreover, companies that have a market capitalization of about less than £500 million are considered as small capitalization stocks. There are various advantages and disadvantages related to investing in small capitalization stocks and large capitalization stocks, which are fully explained in the following section.

1.2.1. Advantages of Small Capitalization Stocks

- Small capitalization stocks have a huge growth potential and have a chance of becoming one of the biggest companies in the industry. Most of the successful large capitalization companies were at one stage small business and this provides the investor with great expectations that the small company will expand and provide substantial profits.

- Due to the fact that it is uncommon of mutual funds to invest in small capitalization stocks, this gives a great opportunity to an individual investor who is able to recognize companies with growing potential. Mutual funds have regulatory restrictions that limit them from buying large portions of any one issuer's shares; therefore, some mutual funds would not be able to give a meaningful position of the small cap stock in the fund.

- Furthermore, there is a lack of analyst coverage on small capitalization stocks. This is can be considered as a great advantage to the investor due to the fact that there is a possibility that the small capitalization stocks are improperly priced. As a result, the investor will be able to gain from these inefficiencies that are caused by the lack of coverage in the market.

- Historically, small cap stocks exhibit much better returns for investors than large cap stocks as shown in Reinganum (1992), and Fama et al. (1992).

1.2.2. Disadvantages of Small Capitalization Stocks

- Small capitalization stocks are far more risky and volatile relative to the blue-chip and large companies. The risk associated to small-cap companies comes in

[1] Bodie, Z., Kane, A. and Marcus, A. *Investments*, International Edition, McGraw-Hill Irwin, 2002.

the form of the fierce competition that they face from large companies. Moreover, small capitalization stocks are vulnerable to adequate amounts of volatility due to their size, which is not favourable from an investor's point of view, as shown in Jensen and Mercer (2002) and Timmermann and Peres-Quiros (2000).

- Although there is an advantage that the small capitalization stocks have less coverage, this may is also considered as a disadvantage. There is a fewer amount of readily available information which poses a problem to the investor, known as the familiarity bias. Simply, investors and fund managers will need to devote more time in order to uncover the small capitalization stocks, due to the fact that most financial ratios and reports and published for the larger companies.

1.2.3. Advantages of Large Capitalization Stocks

- Large capitalization stocks have is the fact that these companies have readily available information on them. This is a benefit to the investors as they will be able to use the financial reports and ratios provided to them to make the appropriate decisions on the valuation of the company in question. Therefore, this will also translate as being time consuming to the investor.

1.3. History of Performance of UK FTSE Size and Style Indices

In order to show changing trends in UK FTSE Equity Style Indices, we examine the ranking frequency of each index. In other words, Table 1.1 shows the amount of times each index has been ranked first, second, third and fourth. From the results of the table, we can see that the FTSE Small-Cap index has been ranked first the most times from all four indices from the period February 1987 to April 2006. In other words, the index exhibited the most times (92 times) the highest return in comparison to the other three indexes over the months in our analysis. However, the FTSE Small-Cap also was ranked fourth 93 times (the highest frequency among all indexes for being ranked fourth), indicating the volatility of its returns. Furthermore, we see that the FTSE Value and FTSE Growth were ranked first 54 and 55 times respectively, with FTSE Large-Cap having the lowest frequency of being ranked first (30 times). From the table we can deduce that the four indexes are ranked first at different periods. An investor only

choosing to hold the FTSE Small-Cap index based on the fact that it was ranked first the highest number of times, may not realize that the particular index was ranked last more times. As a result, s/he may not take advantage of the fact that other indexes exhibited highest returns during particular months.

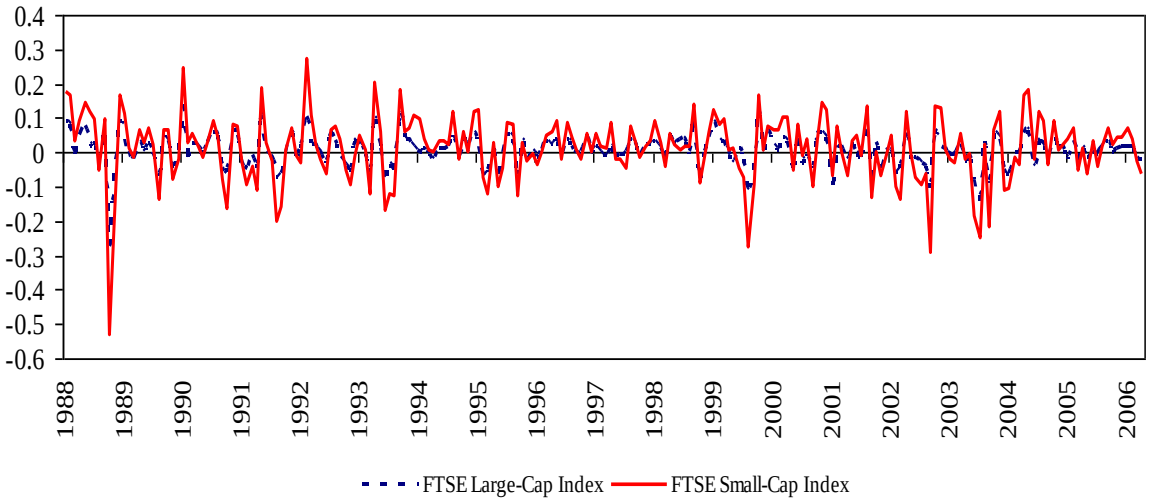
Table 1.1 Frequency of Monthly Rankings for each Style and Size Index, February 1987 to April 2006

	Small-Cap Returns	Large-Cap Returns	Value Returns	Growth Returns
Ranked First	**92**	**30**	**54**	**55**
Ranked Second	26	78	71	56
Ranked Third	20	83	66	62
Ranked Fourth	93	40	40	58

To further show the changing trends in UK FTSE Equity Style Indices, we graphed the monthly time series returns for the FTSE Small-Cap Index, FTSE Large-Cap Index, FTSE Growth 350 Index and FTSE Value 350 Index, from 1988 to 2006. It is evident that different times of the economic cycles favour different types of stocks. Figure 1.1 depicts the time series returns for the FTSE Small-Cap and the FTSE Large-Cap[2]. From the graph it can be seen that the FTSE Small-Cap experiences more extreme movements as a comparison to the FTSE Large-Cap Index. In the first half of our sample, the FTSE Small-Cap has a good cycle from 1993 to 1995, followed by a slight fall in returns at the end of year 1995. Furthermore, the Small-Cap experienced good cycles in the period ranges of 1996 to 1999 and from 2004 to the end of our sample, April 2006. The FTSE Large-Cap experienced similar trends as FTSE Small-Cap; however, the frequency variations for the FTSE Small-Cap are larger. From the negative aspect, both the small-caps and the large-caps had a bad cycle from 2001 to 2003. However, the magnitude was higher for the small-caps. From our whole sample, 65% of the months the FTSE Small-Cap had a positive return whereas the FTSE Large-Cap had a positive return 62% of the time.

[2] We also show the changing trends of the four style and size indices through their respective moving averages, which is shown in Appendix A, Figures 1.1 and 1.2.

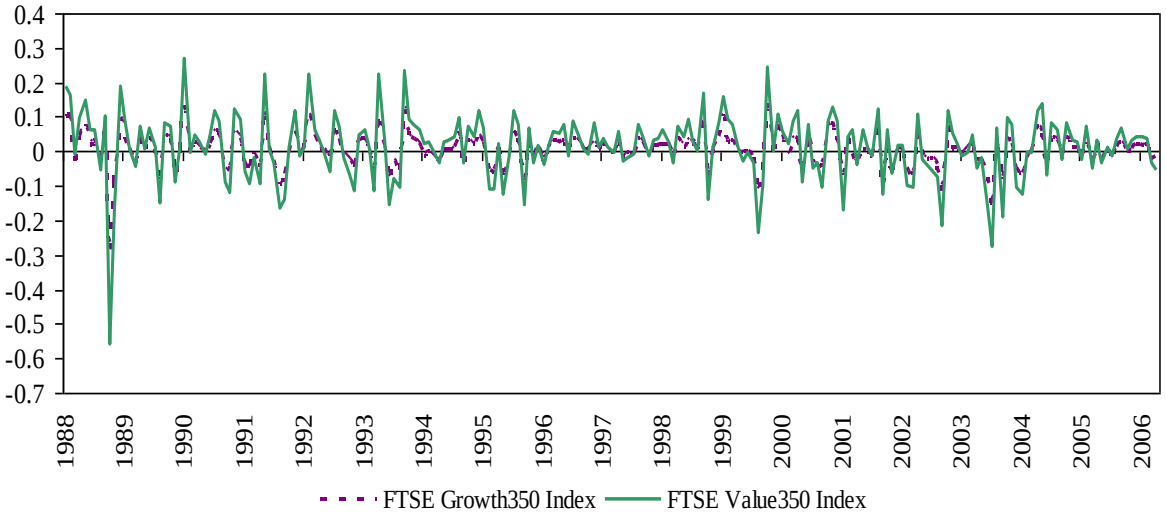
Figure 1.1: Time Series Returns of FTSE Small-Cap and FTSE Large-Cap Indices



Taking into account the FTSE Growth 350 Index and the FTSE Value 350 Index, Figure 1.2 illustrates the variations in trends for the two indices. It is clear from the graph that the two indices experience similar trends; however, the magnitude of the variations is greater for the FTSE Value 350 Index. Both indices had a good cycle from 1995 to 1999. This depicts the unprecedented rise of growth stocks in the technology boom of the late 1990s and their subsequent demise. Furthermore, the value stocks experienced higher returns from 2004 to April 2006 (end of our sample) as a comparison to growth stocks. Moreover, 65% of the time the value stocks entailed positive returns, while the growth stocks had a positive return 66% of the time.

Indeed, changing trends and cycles affect the different indices in different ways and magnitudes. Effective implementation of switching between the different indices at favourable times would ensure maximum profit and performance enhancement for the investors. Nevertheless, the implementation of successful rotation between the indices requires a realistic assessment of the degree of forecasting ability.

Figure 1.2: Time Series returns of FTSE Growth 350 and FTSE Value350 Indices



This implies that if an investor switches or rotates between the different styles, depending on the period when each style is performing at its best, s/he will be able to achieve substantial profits. However, prior to investing in the next best performing style, it is essential for the investor or the fund manager to know which style will outperform the rest in the next period. Unfortunately, it is not a simple procedure to able to know which style will outperform and accurate market timing is necessary.

1.4. Equity Style Timing

There have been numerous studies carried out that confirm the benefits of market timing, with the work of Sharpe (1975) being the most influential one. His study was one of the first that depicted the usefulness of market timing between cash and equities and showed the benefits that such strategies delivered. However, he also highlighted that market timing strategies do require a substantial amount of forecasting accuracy in order to enhance the performance. The topic of market timing as a strategy has remained controversial among many researchers and practitioners, as according to the efficient market hypothesis, prices exhibit random walk behaviour. It is difficult to predict when a bubble or an economic crash will surface in the market and when it will terminate. Therefore, in order for an investor or a fund manager to time the market, various factors and indicators can be of assistance and used as signalling tools.

Indeed, there are several ways to construct style-timing models, which are based on the theories of the economic cycle, business cycle, stock valuation, mean reversion hypothesis, seasonal indicators and technical indicators. The economic cycle is one of the indicators that can assist in style timing and, consequently, deciding which equity style index to invest in. This hypothesis is based on the assumption that a style trend reflects the economic cycle. In the case of a strong economy, and a high GDP forecast, there is an implication to invest in value stocks. Therefore, an investor who invests in value stocks will expect the prices of the stocks to rise in conjunction to the state of the economy. Furthermore, rising interest rates have proven to negatively affect the growth stocks by a greater magnitude as comparison to the value stocks.

Moreover, stock valuation is another tool which can be used as indicator of style timing and performance. The forecast of the price per earnings spread between the growth index and the value index is a model used for style timing. The price per earnings ratio is higher for the growth index than it is for the value index, which implies that growth stocks have a higher growth potential. Furthermore, the model also assumes that the price per earnings spread between the growth index and the value index remains at the equilibrium level in the long run. However, when the forecasted price per earnings spread narrows, the value index is expected to perform better and the signal is therefore directed towards the investment of value stocks (Fabozzi, 1998).

The residual risk spread between the indexes is based on the mean reversion hypothesis and is another method of style timing. According to the mean reversion hypothesis, the style trend mirrors the mean reversion of the overvalued and undervalued stocks. In the case of an increase in residual risk for a particular stock, it implies that the stock is performing poorly relative to the market and its industry, or it is neglected by the investors.

Other signals for style switching come in the form of seasonal indicators. There is a general rise in the price of stocks during the month of January. This is due to the fact that many investors choose to sell their stocks during the month of December in order to claim a capital loss for tax purposes. As soon as the new year starts, these investors reinvest their funds in the market and, therefore, the prices of the stocks automatically rise. Value stocks and especially small capitalization stocks have historically tended to

rise in price at the beginning of the month of January[3]. However, recently the January effect has become well known to the public and has become less evident. As a consequence, the effect has shifted to the month of December, where the stock prices rise at the end of the month as an anticipation to the January effect.

Moreover, factors within the business cycle itself can be implemented as indicators used for equity style timing. Profit expectations on a company and its default premium on bonds are a source of indication for style switching. Furthermore, business expansion tends to coincide with large capitalization stocks, as these stocks react to the expansion faster than the small capitalization stocks. In addition, a rise in the risk premium for the small capitalization stocks is a signal for the investors to switch to the large capitalization stocks. In the case of a depreciating domestic currency, the large capitalization stocks are able to benefit as a comparison to the small capitalization stocks.

Therefore, with the aid of relevant macroeconomic, financial and market factors, an investor is able to determine and forecast which equity style index will outperform the rest of the style and size indexes. Through this style timing process, the investor or the fund manager will then be able to successfully switch or rotate between the style indexes so as to achieve superior performance enhancement.

Based on the historical performance of different style and size indices, it is evident that there are times when an investor is better off holding growth stocks and times when value stocks turn to lead. The same criteria can be applied to small and large capitalization stocks. For this reason, it is highly beneficial to be aware of when each style or size index is outperforming in order to take advantage of the possible profits incurred. In our study we show by using a complex quantitative model to forecast the best performing style and size index, an investor is able to incur reasonable profits above the best performing buy-and-hold strategy. However, an investor that chooses to follow a simple momentum based strategy in an attempt to forecast the best performing index is likely to sustain even higher return on their investment.

[3] Chen and de Bondt (2004) undertook a study of style momentum within the S&P500 Index and found that small-cap stocks, value stocks and no-dividend stocks earn exceptionally large returns in January.

1.5. Objective of the Research

The first objective of this study is to assess the driving forces behind the different style indices. In particular, we analyse the cyclical changes in the financial markets and in the economy in general, that affect the trends and returns of style indices.

The second objective of this study is to emphasize the various benefits that style rotation strategies can offer to an investor or a fund manager. This study attempts to assess the likely higher gains that style rotation of different indices can incur as a comparison to investing in solely one style index.

Above all, this study is focused at evaluating whether short-term variation in the ranking of size and style index returns in the UK equity market is better predictable and exploitable by means of quantitative or momentum multi-style rotation strategies. The use of the two methods will allow us to compare the profitability of various strategies incurred by each method.

1.6. Significance of the Research

There have been a few studies that have tackled to outline the benefits of style rotation strategies within the UK equity market. However, these studies are based on analysing the benefits of rotating between return spreads of style and size indices through the implementation of binary models. This is the first study, to the best of our knowledge, which models four different market segments simultaneously. We demonstrate the enhanced profitability for investors of rotating between four different indices, FTSE Small-Cap, FTSE Large-Cap, FTSE Value 350 and FTSE Growth 350.

In addition, our research applies a multinomial ordered logit model for the UK equity market, which has not been introduced in the style-timing arena in previous studies. Through the ordered logit model we are able to accentuate the potential for increased profitability in multi-style rotation as opposed to binomial or two-way style rotation.

Furthermore, our study contributes to the existing literature of style investing by comparing the results obtained from the multinomial ordered logit model to those of the momentum model. In order to assess whether similar results can be obtained without

going through subjective and complex quantitative process, we implement a number of momentum-based multi-style rotation strategies using the same data set and sample period as in the quantitative model.

The structure of this chapter is organized as follows. Section two comprises of the literature review, which discusses the earlier findings related to this study. Section three contains the description used in this chapter. Section four explains the methodology of the forecasting variables and the model used in this study. Section five outlines the different style rotation strategies implemented. Section six represents some preliminary results and the last section represents the conclusion and future contributions.

2. REVIEW OF LITERATURE

The concept of equity market timing has attracted many studies to date and there exists a wide literature on style timing in general. This review of the literature is intended to cover most indicative and influential studies that have been accomplished.

2.1. Predictability of Equity Style Returns

A study by Amenc et al. (2003) has illustrated the benefits of a new form of market neutral portfolio strategy that aims at delivering absolute return over the business cycle through systematic equity style timing decisions. Using monthly return data of the S&P500 during the period 1997-2002, they found that absolute returns of style differentials are achieved using tactical style allocation and tactical timing strategies. In order to test for predictability in the style index returns, they divided the data in three sub-periods: calibration period (estimation of coefficients), training period (generating forecasts and computing hit ratios) and trading period (implementation of the forecasting model). Using a logit regression and variables such as the term-spread, short-term rate, credit spreads, B/M, P/E ratios, dividend payout ratios, return on bond indexes, liquidity indicators, currency rates, commodity prices, inflation, economic growth, unemployment and consumer confidence, they found strong evidence predictability in value and size style differentials. Furthermore, they implemented a beta-neutral strategy that generated abnormal return from timing of the four style indexes, while maintaining a zero exposure with respect to S&P500. Moreover, they showed that the market neutral timing strategy can be employed to Exchange Traded Funds, resulting in substantially higher annualized returns (controlling for transaction costs), lower volatility and higher Sharpe ratios than the S&P500 index.

Kao and Shumaker (1999) undertook a study on equity style timing. They found that timing strategies in the US market, based on asset class and size, have historically provided more opportunity for out-performance than a timing strategy based on value. During the period 1979-1997, primarily they analysed the properties of style spreads and the extents to which seasonality (value stocks tend to outperform in the first calendar quarter and growth stocks tend to outperform in the fourth quarter) and serial correlation have an effect. Further, they analysed the extent to which macroeconomic factors have an effect on equity style timing by applying a nonparametric technique

known as the recursive partitioning algorithm (RPA) to explain this relationship. They conclude that a long-short strategy earned an annual return of 5.05% and the model had a 74% accuracy rate when applied to out-of-sample data. In addition they applied their analysis to pension fund strategies, pointing out that a sponsor can fund or de-fund managers whose styles are in or out of favour.

Moreover, Asness et al. (2000) criticized this approach as it may be susceptible to uncovering spurious ex post relationships due to the fact that all the variables may be economically meaningful and as a result becomes difficult to determine which of the observed relations are real and which are artefacts of the data. Using US data between the periods 1982 to 1999, they proposed an approach of forecasting the style spread through the spread in valuation multiples between a value portfolio and a growth portfolio (the value spread) and the spread in expected earnings growth between a growth portfolio and a value portfolio (the earnings growth spread). This measure had shown to be statistically and economically significant and forecasts near-historic highs in the expected one–year return of value stocks versus growth stocks.

Kester (1990) examined the comparative benefits and required predictive accuracy of market timing with small firm stocks. He examined two approaches to market timing; (1) shifting from cash equivalents to small stocks and vice versa and (2) shifting form large firm stocks to small firm stocks and vice versa. His data incorporated monthly returns from 1934-1988 for US stocks. Kester criticized Sharpe's (1975) approach of assuming transaction costs of 2 per cent as they are not representative of the transaction costs incurred by large, institutional investors which highly dominate the market. By using 0.25 per cent transaction cost, the potential gains from market timing are significantly higher than reported by Sharpe. In a perfect market timing scenario with annual portfolio revisions and transaction costs of 2 per cent, the return advantage of market timing with small stocks and cash equivalents is 7.71 per cent. However, with monthly portfolio revisions and 0.25 per cent transaction costs, the return advantage of market timing with small stocks and cash equivalents increases to 28.26 per cent. Furthermore, as transaction costs decrease so does the level of predictive accuracy. The benefit of reduction of transaction costs from 2 to 0.25 per cent is a decline in the level of predictive accuracy from 71 to 66 per cent with large stocks and cash equivalents,

from 72 to 68 per cent with small stocks and cash equivalents and 67 to 60 per cent for market timing for small and large-firm stocks.

Copeland and Copeland (1999) explored the market timing strategies through style and size rotation using the Market Volatility Index (VIX). They proposed two strategies that implied volatility options on stock index futures as market timing signals and found portfolio returns enhanced considerably. In the first strategy, when the estimate of expected future volatility increased, there was a shift from growth stocks to value stocks. This is due to the fact that rising uncertainty for the future leads to a decline in confidence for the growth stocks. Moreover, value stocks are considered to be undervalued in the market and a rise in volatility implies a mean reversion for the value stocks. Furthermore, in the case of a decrease in volatility, the portfolio is shifted from value stocks to growth stocks. The second strategy consists of the changes in size rotation. When the implied volatility increases, there is a shift to large stocks in the portfolio and vice versa. They employed historical and implied volatility estimators of the S&P500 and monthly return data between 1981 and 1997 in order to find the relevant variables for the value (P/E, price-to-book ratio and dividend yield) and growth (sales growth, return on equity and dividend payout). When the trading position was long value and short growth, the returns were positive in 26 out of 32 cases. Consequently, using larger changes in the VIX (20 per cent or higher) resulted as a best approach to the long value/short growth strategy. However, when the trading position was to long large stocks and short small stocks (volatility increase), the futures on the large-cap portfolio outperformed futures on the short-cap portfolio in 31 out of 32 cases. According to Fama and French (1992) firm size and beta are highly correlated, which may lead to the fact that the trading rule based on size was more successful than the trading rule based on style.

A recent study by Bauer and Dahlquist (2001) concur with Sharpe (1975) that market timing is a complex trading strategy. However, the difficulty does vary over time which implies that there is scope to beat a buy-and-hold strategy and earn higher returns. They used a new measure of investment performance known as the “roulette wheel”, in order to analyze monthly, quarterly and annual market-timing strategies during the period 1926-1999 switching between large-cap and small-cap stocks. The roulette wheel provides a simple measure as there is there is an equal chance of investing in small-cap

stocks or large-cap stocks. Using this approach for monthly market-timing, the buy-and-hold large cap strategy slightly beat the switching strategy between small- and large-cap stocks. This measure provides the clarity of identifying the attractiveness of a buy-and-hold strategy for certain asset classes, especially when transaction costs are considered. Furthermore, it clearly shows the simplicity for active market-timing strategies to outperform buy-and-hold strategies during certain time periods. According to their results, a 0.13 percent greater forecasting accuracy is needed per basis point of one-way transaction costs when switching between large-cap stocks and T-bills, as opposed to buying and holding large-cap stocks. However, by buying-and-holding large-cap stocks, an investor would have beaten the roulette wheel approach 90 percent of the time in 1995, whereas in 1981 the situation was reversed. The authors conclude that in certain years beating the market with active timing is a challenging process.

Ferson and Harvey (1991) presented a study on the sources of predictability in portfolio returns and whether this predictability is a reflection of market inefficiency. Using monthly data of the S&P500 over the period 1959-1986, they implemented a multi-beta asset pricing model using risk factors related to the stock market, unexpected inflation, consumer expenditures and interest rates. According to their results they found that changes in portfolios' exposures to risk (betas) and changes in the premiums the market offers for accepting risks account for the majority of the predictable variation in portfolio returns. However, their results showed that the risk premium change was the most important indicator of predictability of portfolio returns, as risk premiums change is positively correlated with the business cycle and is higher in January than in the other eleven months. In addition, interest rate and inflation premiums are the most important factors in predicting bond portfolio returns. Furthermore, the authors demonstrated that a large portion of the predictable variation is explained by the multiple-beta model in most of the cases. Therefore, this validates that a small fraction of the predictability is justified by market inefficiencies.

There have been a number of studies which had confirmed that value stock strategies outperform growth stock strategies in the U.S. However, Bauman et al. (1998) used data from France, Germany, Japan and U.K, and tested whether the same applies to twenty international markets during the period 1986-1996. From their evaluations they found that their results did not differ to the results of studies on U.S. markets. Value stocks

outperformed the growth stocks in majority of the years and in most of the countries with a large margin. Furthermore, a small-company effect was observed in most of the years of the study, but the differences in performance between large value stocks and large growth stocks were greater than between small value stocks and small growth stocks.

Reinganum (1999) undertook a study to illustrate the importance of market capitalization exposure in portfolio management over time. Specifically, he focused on the differential return between small-cap and large-cap stocks. In his previous study, Reinganum (1992) stated that the relationship between market capitalization and performance varies over time and it is this variability that is in part predictable. In his current study, he investigated NYSE stocks between the periods of 1925 to 1998. The first part of his study includes the long-run return characteristics of portfolios formed on the basis of market capitalization. Then, he documented the variability of the relationship between market capitalization and stock returns. Finally, he illustrated the benefits that investors can potentially gain by exploiting this variability. According to his results, the average return of the smallest-cap portfolio is 22.72% per year and it is 12.19% for the largest-cap portfolio. Therefore, over long investment horizons, smaller-cap stocks outperform the larger-cap stocks, and there is an inverse relationship between market capitalization and portfolios returns. Furthermore, the concept of seasonality is evident in small-cap stocks, as nearly one half of the annual performance for small-cap stocks occurs in January. However, when considering shorter investment horizons, the average return for the small-cap stocks declines. Even so, the short-cap stocks still outperform the large-cap stocks. Therefore the relationship between market capitalization and stock returns is highly variable after excluding different types of outliers on average returns. Such outliers include the exclusion of ten best and worst years of small-cap stocks. Using three different active investment strategies, Reinganum found that a strategy with greater flexibility in shifting market capitalization will enhance returns to the investors.

Moreover Coggin (1998) focused his work on the existence of long-term memory in equity style index returns. The long-run memory property of the mean-reverting model of stock returns implies that stock returns are negatively serially correlated and the serial correlation becomes more negative as the length of the holding period increases.

Therefore, stock returns will revert to their historical mean. In his study, Coggin examined the random walk and long-term memory hypotheses for eleven U.S. broad market and equity style indexes (value, growth, small and large) during the period 1963-1975, using two statistical methodologies: the variance ration test and the modified rescaled range (R/S) statistic. According to his findings, the random walk null hypothesis cannot be rejected for broad market indexes and for the equity style indexes, implying that they do follow a random walk Furthermore, the results from the R/S test indicate that there is no evidence of long-term memory in broad market or equity style indexes and stock index returns are not mean-reverting.

Due to the fact that capital flows to emerging markets increased dramatically in the nineties, Desrosiers at al. (2004) analysed the effect of style timing strategies in emerging markets. They examined the performance of relative value (price-to-book) and relative strength (price momentum) strategies during the period of October 1995-October 2004. Both strategies on emerging market indices post a non-significant positive market risk-adjusted return at 5% level. Due to the fact that the two strategies exhibit negative correlation, an implication for diversification and style timing between both strategies arises. Furthermore, the authors tested a style timing strategy over the 26 emerging market countries, using a conditioning criterion related to changes in wealth and risk aversion. The authors assumed that a high-risk aversion would support relative value strategy while a low risk-aversion would favour a relative strength strategy. They determined a monthly preference for a relative value or strength strategy according to whether the past twelve-month excess return of the equally-weighted emerging market index is negative or positive. Consistent with their results, the style timing strategy indicates a significant market risk-adjusted return of 1.46% per month. Nevertheless, the results remain robust to the inclusion of transaction costs.

2.2. Style Rotation

Levis and Liodakis (1999) analysed the potential profitability of style rotation strategies in the United Kingdom. Their study was based on value/growth and small/large cap segments of the market during the period 1968-1997. They used a Monte Carlo simulation to assess the average gains of style rotation after accounting for transaction costs. Furthermore, using a style rotation model based on macroeconomic variables they

test the ability to forecast the direction of the style spread at a given month. In the results of the out-of-sample tests, they found a strong evidence of out-performance for small versus large and little evidence for value versus growth style rotation strategies. More specifically, their results suggest that forecasting the size spread needs a 65%-70% accuracy rate in order to outperform the long term small-cap strategy. In addition, an accuracy rate of more than 80% is required to outperform the value buy-and-hold strategy. Furthermore, by applying a logit regression model they found a significant relation between economic cycles and equity style spreads. Their findings suggest that style rotation strategies based on small and large firms have high potential to be successful whereas for value and growth firms the probability of success is low. Therefore, the probability of style rotation strategies depends on the temporal volatility of the underlying return spread between the styles.

Levis and Tessaromatis (2003) carried out a study using value and growth indices for the FTSE100 and FTSE250 during the period January 1987 to October 2001. They found, using implementation rules to control for risk, that style rotation strategies are profitable for investors with different benchmarks and risk constraints. Firstly, they developed a model based on macroeconomic variables in order to forecast the direction and magnitude of value/growth spread. Secondly, they assessed the implementation of the style rotation on hedge funds, traditional fund managers and style-consistent managers. Thirdly, they controlled for the risk characteristics of portfolio in terms of tracking errors relative to the benchmark. As a result, they show that the value/growth spread can be predicted using the financial and macroeconomic variables. By controlling for risk, the style rotation strategy is profitable for both the hedge fund managers and the traditional fund managers.

A further study that examined style and size rotation strategies within the UK equity market was by Todorovic (2005). The study focused at forecasting index return spreads between FTSE Small-Cap and FTSE 100 Index, and FTSE Growth 350 and FTSE Value 350 Index. Using a binomial logit model for the period between January 1987 and May 2005, the out-of-sample results indicated that style rotation strategies are profitable for investors at transactions cost levels of up to 1,140 basis points for the size indices and 183 basis points for the style indices.

Moreover, Wang (2005) added support to the consistent literature that style momentum and logit-based style rotation strategies do generate profits. Using US (NYSE, AMEX and NASDAQ) monthly observations from 1960 to 2001, he evaluated that style momentum profits are generated from cross-style differences in average returns; however, the Fama-French model fails to accurately capture the cross-section of the average returns. He applied a logit model based on the Fama-French three factors to predict relative style performance. According to his findings, neither the pricing errors of the three factor model nor the cross-sectional differences in average returns are responsible for style momentum profits. In fact, multifactor beta rotation and the covariances between rotating betas and the common risk factors account for the profits of style rotation strategies.

Furthermore, Arshanapalli et al. (1998) implemented the concept of style rotation strategies across international markets. Specifically, they evaluated the relationships among beta, size, book-to-market and average regional industry portfolio returns in eighteen equity markets during the period 1975-1995. Their objectives were aimed at examining the value investing strategy across North America, Europe, the Pacific Basin and international (U.S. and non U.S. markets), to test whether the value stocks are more riskier than growth stocks and to examine the fit of the Fama and French (1996) three-factor model internationally. According to their results, they find that the value stocks have outperformed the growth stocks for every investment horizon and geographic region over the period 1975-1995. Regardless of the geographic region, if investors had invested in value stocks they would have obtained superior returns. Furthermore, their results of the Sharpe ratios for value investing were larger than for growth investing, which implies that such strategies are not fundamentally riskier in eighteen equity markets. Finally, their findings confirm that the three-factor model explains most of the variation in average returns on industry portfolios and, therefore, suggests that the returns are largely explained by size and book-to-market effects.

Jacobs and Levy (1996) agreed with previous study of Brinson et al. (1991) that it is asset allocation that has the largest impact on investment fund returns rather than stock selection. They used a comparative analysis of naïve returns, which does not take into account the effects of related factors, and pure returns of style rotation. For the pure returns they controlled for macroeconomic and fundamental factors that vary across

stocks with different attributes. According to the results, they found that the pure returns of the style rotation portfolio are substantially higher than the naïve returns and the strategy outperformed the market from 1990 to 1994. Moreover, the volatility level was substantially lower for a pure strategy as compared to the naïve strategy.

Lucas et al. (2002) showed that the impact of firm-specific characteristics, such as size and book-to-price, on future excess stock returns varies over time. They used U.S. data from 1984 to 1999 and showed that the variation is particularly predictable. By linking the impact of macroeconomic conditions, using the term structure variable and the business cycle indicator, they found excess returns to style rotating investment strategies. Nonetheless, the result of the returns were robust to various ways of risk-correction, choice of holding period (monthly, quarterly, semi-annual and annual), way of portfolio construction and outlier control. However, the authors reported that a rotating size and book-to-price based style strategy, using the business cycle approach, generated the best overall performance before and after risk correction.

2.3. Multi-Style Rotation

Arshanapalli, Switzer and Panju (2005) concentrated on equity style timing and developed a multi-style rotation model for the Russell large-cap and small-cap growth and value style indexes. They used a multinomial timing model based on macroeconomic and fundamental public information and modelled the four different market segments concurrently. Their results for the out-of-sample tests suggest that the active multi-style rotation strategies can be developed in order to outperform the best performing buy-and-hold strategy even when accounting for transaction costs. Their sample data was during the period 1979-2000. According to the results, there is a 138.38% out-performance of their model as a comparison to the best performing buy-and-hold equity style index (Russell 1000 Value Index), without taking into account the transaction costs, and a 63.64% out-performance with transaction costs. Therefore, their study suggests that excess returns can be achieved even when controlling for transaction costs.

In a study by Ahmed et al. (2002), the potential profits arising from multi-style rotation strategies opposed to single-style rotation strategies were shown. Ahemd et al.

contended that moderate multi-style rotation gives a portfolio an excellent chance of outperforming the market index for US data during the period 1979-1997. For the period 1982 to 1993, the joint investment in small-cap and growth stocks perform the best, where as between 1982 to 1983 large and value perform the best. Specifically, using tactical asset allocation for single-style strategies, a manger who correctly forecasts the outperforming market sector would have added more than $2 to terminal wealth per $1 initial investment over the sample period. Having an initial investment of $10,000 in 1981, the terminal wealth would be $92,000 in 1997 by investing 65% in large stocks and 35% in small stocks. On the other hand, a manager that is engaged in multi-style rotation strategies would incur a terminal wealth of $264,000 for the same period.

2.4. Momentum

All the evidence noted above shows the profitability of long-only style rotation strategies based on quantitative forecasting models. Wang (2005) suggests that style rotation strategies in spirit are comparable to technical trading rules, such as relative strength indicator which is a form of a momentum strategy. This implies that the use of momentum based style rotation should achieve similar results as a quantitatively based one. Evidence of profitability of various momentum strategies in the US can be found in Lo and McKinlay (1990) and Jegadeesh and Titman (2001) for example. Levellen (2002) documents that the momentum is pronounced in style index portfolio based trading and that, in some cases, it is even stronger than in individual stocks. In the UK, Ellis and Thomas (2004) find that momentum profits prevail for holding periods greater than five months when five percent of transaction costs[4] are incorporated to their momentum strategies on the FTSE 350 index.

Since its first inspection by Jegadeesh and Titman (2001) momentum return has been one of the most intriguing challenges to finance academics and researchers. The persistence of stock return for intermediate horizon (six to twelve months) is evident across markets, across industries, among asset classes and in equity styles. Simply, momentum trading refers to the trading strategy of buying past winners (stocks that exhibit high returns) and selling past losers (stocks that exhibit low returns). Jegadeesh

[4] See Carhart (1997) for the impact of transaction costs on the profitability of momentum strategies

and Titman (2001) examine the trading strategy over intermediate horizon, from three months to twelve months, and document that the strategy of buying winners and selling losers over the previous three to twelve months also achieve an abnormal profit of twelve percent per year in the US market. Furthermore, a study by Chen and De Bondt (2004) concentrated on style momentum strategies within the S&P-500, where an investor buys an equity style with characteristics that are in favour and sells an equity style with characteristics that are out of favour. However, De Bondt and Thaler (1985) document that the momentum contrarian trading strategy of buying past losers and selling past winners can also achieve abnormal profit in the long-term, especially from three to five years. In such case, long-term past losers outperform long-term past winners. Nonetheless, even taking into account transaction costs, momentum strategies continue to exhibit abnormal returns. Ellis and Thomas (2004) focused on the UK market and incorporated five percent of transaction costs to their momentum strategies on the FTSE 350. Their results confirmed that momentum profits prevail for holding periods greater than five months.

It is evident from the review of the literature that 1) style returns are predictable, but the degree of predictability depends on the specification of the forecasting model; 2) quantitatively based two-way style rotation is profitable, however there is significantly more potential in multi-style rotation; 3) style rotation can be implemented by using simple momentum approach rather than a complex quantitative one and 4) transaction costs do play a significant role in the profitability of these strategies. In addition of taking into account these four issues when devising our trading strategies, we will include the possibility of short-selling a style which is expected to be out of favour, as our strategies can be applicable in the ETF and futures markets where short-selling is permitted.

From the review of the literature, it is not difficult to observe that most studies of style rotation have used a binomial approach, with an exception two that employed a multinomial approach for the US market. To the best of our knowledge, this is a first study in the UK that models four different market segments simultaneously. Our study further adds to the existing literature by employing two different methods of style-rotation, the ordered logit model, which has not been used in the style-timing arena in previous studies, and a momentum-based model.

3. THE CHOICE OF DATA

In order to create a valid model from which an investor will be able to forecast the best performing style, it is of great importance to establish the types of variables that will provide an accurate prediction and ultimately enhance the performance of the investment. Furthermore, it is crucial to set suitable criteria from which the forecasting model will be developed and determine the appropriate estimation method that will be applied.

3.1. Equity Size and Style Index Selection

For this study we developed a multinomial timing model based on macroeconomic and fundamental public information, used to forecast the best performing UK FTSE index[5]. Furthermore, we implement a number of momentum-based multi-style rotation strategies using the same data set and sample period as in the quantitative model. We employed our analysis and modelling on indices rather than on individual stocks due to several reasons. It is far simpler to trade on indices through ETFs (Exchange Traded Funds) and futures as a comparison to individual stocks. Further to this, it is easier and less expensive to trade in indices due to their market acceptance as basket trades or block trades. Indices have less liquidity constraints and they require less rebalancing of individual stocks as opposed to customised portfolios. In scenarios where switching or rotating between different stocks is frequent, the transaction costs are high. Although our multinomial style timing model requires a higher frequency of switching or rotating between the different styles, the transaction costs remain lower due to the fact that we implement our strategies on indices. Our monthly data sample covers the period from February 1987 to April 2006, due to the fact that style indices used for the purpose of this paper only become available in the late 1980's. In particular, as a representation of the style indices, we used the FTSE 350 Growth Index and the FTSE 350 Value Index as proxies for the growth stocks and the values stocks respectively. These indices cover the top 350 largest stocks listed on the London Stock Exchange. In addition, in order to represent the size indices, we applied the FTSE 100 Index and the FTSE Small-Cap Index as proxies for the large capitalization stocks and the small capitalization stocks respectively. The former index covers the top 100 largest, by market capitalization, companies listed on the London Stock Exchange. On the other hand, the FTSE Small-

[5] All data used for empirical analysis was gathered from DataStream.

Cap Index contains companies with the smallest capitalization of the capital and industry segments. In order to develop the monthly returns for each index, the following computation was employed[6]:

$$R_t = \left(\frac{P_t - P_{t-1}}{P_{t-1}} \right) \quad (1)$$

Therefore, this supplies our research with a sample size of 231 observations, where all the prices are calculated at the first trading day of each month.

3.2. Selecting the Potential Forecasting Variables for the Quantitative Model

For the purpose of effective style timing and ultimately investing in the best performing index, it is vital to primarily distinguish and establish the appropriate forecasting variables. From previous studies and financial theory it has been proven that events which take place in the economy and the business cycle do have an impact on the direction and magnitude of the stock index returns. For this study we selected a collection of variables based on macroeconomic, market and fundamental factors that were used in previous studies.

One of the variables that was included in our analysis is the interest rate. Previous studies by Sorensen and Lazzara (1995) and Kao and Schumaker (1999) have shown that the predictive power of the interest rate is linked to the performance of the style indices, the growth index and the value index. The measures that we employed for the calculation of the interest rate were the term structure and the monthly change in the three-month UK Treasury Bill. The term structure was calculated as the monthly difference between the ten-year UK Benchmark Bond Yield and the three-month UK Treasury Bill (middle rate).

Furthermore, we have incorporated the UK monthly exchange rate against the US Dollar, due to the fact that the US market is currently one of the most prevailing ones in the world. Sterling/dollar exchange rate is likely to help predict performance of size indices, as suggested by Levis and Liodakis (1999). Nonetheless, the value of the

[6] As in Arshanapalli et al (2005) the dividends were not taken into account as the difference in the return calculation is minimal.

exchange rate will have a greater impact on the size indices rather than the style indices. In particular, in case of a depreciating UK Pound against the US Dollar, the exports would become cheaper than the imports and therefore the domestic large capitalization stocks would prosper more than the small capitalization stocks.

Additionally, in our study we have taken into account the monthly change in the UK CPI Index as a measure of inflation. Numerous studies have been carried out to demonstrate whether inflation plays a role in equity investment. One of them was by Anderson (1997) who conveyed that at periods of high levels of inflation, growth stocks and large-cap stocks performed poorly and value and small-cap stocks became favourable.

Moreover, in order to demonstrate the impact of earnings on stock prices, we included the rate of change in the industrial production index. In our study was we have taken into account two measures; the monthly change in the UK Production Index and the monthly change in the UK Industrial Production of the Manufacturing sector. There are two reasons that we have included the industrial production index as a possible forecasting variable. First, as Sorenson and Lazzara (1995) have shown, the industrial production index is linked with the earnings of a company, which in return may affect the performance of the growth and value stocks. Second, the industrial production index has the benefit of providing monthly observations whereas company earnings are usually reported on a half yearly basis in the UK.

It is also essential to take into account a sort of measure of money supply as a possible forecasting factor. The level of money supply is able to affect the economy as a whole, primarily prices in the long-run and in essence influence future cash-flow expectations within the market. In order to justify for money supply two variables have been incorporated in our analysis. The first variable is M0 which is referred as the "wide monetary base" or "narrow money". The second variable which was included as a possible forecasting variable is M4, which is referred as "broad money" or simply "the money supply".

Furthermore, another macroeconomic variable that was incorporated in our research is the rate of change in the spot price of Brent Oil. The reasoning behind the inclusion of

this variable is the fact that a change in the price of oil may affect the stock market as a whole and its volatility. This is of importance to our research, given the political situation in the Gulf and Middle East in the 1990s and 2000s, which is our period of analysis.

Fama and French (1998) have reported that the market dividend yield has the ability to vary according to changes in business conditions and can therefore affect stock returns. Therefore, we take account of this variable and include it in our analysis. In particular, we included the difference between the dividend yield for the FTSE Small-Cap Index and the FTSE 100 Index.

Finally, to enhance the predictive power of our model, we include the one month lagged indices for each style and size index respectively. This shows that the past value or trend of the indices can be an indicator of the future values or trends, and can potentially facilitate in style rotation models.

The set of potential explanatory variables are shown in Table1.2[7]:

Table 1.2: Host of Potential Variables for the Forecasting Model

Measure	Code	Description
Inflation	cinfl	Monthly change in UK CPI
Interest Rates	c_ts	Monthly change in the 10 year UK Benchmark Bond Yield minus the UK 3 month T-Bill
Interest Rates	mc3mtb	Monthly change in 3 month T-Bill
Exchange Rate	c_er	Monthly change in the GBP/USD exchange rate
Consumer Confidence	c_conf	Monthly change in the UK Consumer Confidence Indicator
Liquidity	c_ukindpro	Monthly change in the UK Production Index
Liquidity	c_pm	Monthly change in the UK Industrial Production of the Manufacturing Sector
Money Supply	c_m0ms	Monthly change in the M0 UK money supply
Money Supply	c_m4ms	Monthly change in the M4 UK money supply
Commodity	per_c_oil	Monthly percentage change in the price of Brent Oil
Dividend Yield	dysmall_large*	FTSE Small-Cap Dividend Yield minus FTSE 100 Large-Cap Dividend Yield
Risk Premium	C_riskprem	Monthly change in the UK Risk Premium
Lagged Dependent Variable	Small-cap	1 month lagged FTSE Small-Cap Index
Lagged Dependent Variable	Large-cap	1 month lagged FTSE Large-Cap Index
Lagged Dependent Variable	Value	1 month lagged FTSE Value 350 Index
Lagged Dependent Variable	Growth	1 month lagged FTSE Growth 350 Index

*measure only applicable for the size indices

[7] All of the potential forecasting variables were corrected for stationarity.

4. METHODOLOGY

4.1. Quantitative Forecasting Model: Evaluating the Forecasting Variables and the Model Specification

In order to establish a successful model that will have the potential in forecasting the best performing index, the appropriate choice of explanatory variables need to be chosen. As a consequence, an investor or a fund manager will be able to enhance the performance through various style rotation strategies. In this study, we estimate an in-sample period of 120 months to determine the potential forecasting variables[8]. Using these results, we then implement a recursive method on the out-of-sample observations of 111 months to generate monthly forecasted performance of each index and select the index with the highest terminal wealth. Since the goal of our style-timing model is to select the best performing index among the four FTSE style indices, a statistical technique able to generate a probabilistic forecast of a group membership is most suitable. There are various statistical models that have the aptitude to predict the direction of stock index returns, such as linear discriminant analysis, probit model, logit model and probabilistic neural networks, which were derived from the Bayes Theory. Due to the fact that the logistic approach has been used in the style-timing literature and, similarly with Arshanapalli, Switzer and Panju (2005) who used the logit model, we employ the same methodology. However, our study differs from the existing literature of the UK markets in that we use a multinomial ordered logit model as opposed to binary model. Levis and Liodakis (1999) implemented the logit model in their literature, however, they used a binary model so as to predict style and size spreads. To the best of our knowledge, this is the first study that uses this methodology for the style-timing analysis for the UK market. The multinomial logit model as specified by Greene (2003) is as:

$$\text{Prob}\,(y_t = j \mid x_t) = \frac{e^{\beta' j X i}}{1 + \sum_{k=1}^{J} e^{\beta' k X i}} \qquad (2)$$

[8] The software used throughout the study for the quantitative model is EViews.

The estimated equations provide a set of probabilities for the *J+1* responses or rankings, which in the case of this study is the probability that a given index outperforms the others.

4.1.1. The Ordered Logit Model

In order to develop a strategy that will forecast the best performing style index in the next period, we use the multinomial ordered logit model. The multinomial logit and probit models in general have been widely used in many fields, including economics, market research and transportation engineering. Examples of such studies include bond ratings, opinion surveys, employment status, etc. However, although the outcome is discrete, these studies fail to account for the ordinal nature of the dependent variable. On the other hand, the ordered logit model has come to be applied in a framework for analysing ordered responses. More specifically, in an ordered logit model, the observed dependent variables (y_t) represent ordered outcomes or ranks. For instance, the responses to an opinion survey can be categorized as 0, 1, 2, 3 or 4. As specified by Greene (2003), the model is built around a latent regression, where y^* is unobserved that depends linearly on the explanatory variables, and has the following transformation:

$$y_t^* = \mathrm{x}_t' \beta + \varepsilon_t \qquad (3)$$

The explanatory variables are denoted by x_t and ε_t are independent and identically distributed random variables. The random disturbance term in this case has a logistic distribution. The observed y_t is determined from y_t^* and follows the following conditions:

$$\begin{aligned}
&\mathrm{y} = 1 \qquad \text{if } y_t^* \le \gamma_1 \\
&\mathrm{y} = 2 \qquad \text{if } \gamma_1 < y_t^* \le \gamma_2 \\
&\mathrm{y} = 3 \qquad \text{if } \gamma_2 < y_t^* \le \gamma_3 \\
&\vdots \\
&\mathrm{y} = \mathrm{J} \qquad \text{if } \gamma_{\mathrm{J}} < y_t^*
\end{aligned}$$

The threshold values gammas, γ, are estimated along with the β coefficients using the maximum likelihood estimation. Under very general conditions, the estimators are consistent, asymptotically normal and asymptotically efficient. The value of the observed variable y depends on whether or not the gamma thresholds have been crossed. Therefore, in order to evaluate the logistic probabilities[9] of observing each value of y_t, the following calculations are required:

$$\begin{aligned}
\Pr(y_t = 1 | x_t, \beta, \gamma) &= F(\gamma_1 - x_t'\beta) \\
\Pr(y_t = 2 | x_t, \beta, \gamma) &= F(\gamma_2 - x_t'\beta) - F(\gamma_1 - x_t'\beta) \\
\Pr(y_t = 3 | x_t, \beta, \gamma) &= F(\gamma_3 - x_t'\beta) - F(\gamma_2 - x_t'\beta) \\
&\vdots \\
\Pr(y_t = J | x_t, \beta, \gamma) &= 1 - F(\gamma_J - x_t'\beta)
\end{aligned}$$

For all the probabilities to be positive, each gamma needs to smaller in value than the previous one. Specifically, it needs to entail the following specification:

$$\gamma_1 < \gamma_2 < \ldots < \gamma_{J-1}.$$

4.1.2. Determining the Forecasting Variables

Using the variables that have been widely discussed in the literature as potential predictors of stock returns, we run the recursive ordered logit model to first determine whether potential variables affect the FTSE Small-Cap Index, the FTSE Large-Cap Index, the FTSE Value 350 Index and the FTSE Growth 350 Index[10]. As a first step, we rank the four style and size indices, according to their returns, with rank 1 representing the index with the highest return and rank 4 representing the index with lowest return. We do this procedure over the whole sample data, from February 1987 to April 2006.

[9] Other distributions, particularly the normal distribution using the probit model, could be used just as easily. We assume logistic distribution in our analysis, although both distributions generally give similar results in practice, because the densities are very similar. That is, the fitted regression plots will be virtually indistinguishable and the implied relationships between the explanatory variables and the probabilities will also be very similar. This was the case for our study as we also incorporated probit probabilities for comparison and the probabilities estimated resulted to be very similar to those of the logistic distribution.

[10] We attempted to use Granger Causality tests, proposed by Arshanapalli, Switzer and Panju (2005), as a method of removing insignificant variables. However, the results attained were not reliable and we excluded Granger Causality tests as a technique of evaluating significant variables that are able to predict the performance of the size and style indices.

These rankings are applied as dependent variables in our modelling. In order to determine the forecasting variables, we run the ordered logit model using all of the potential variables over the first in-sample period. Our first in-sample period contains 120 monthly observations, starting from February 1987 and ending on January 1997. As a result, we determine the statistically significant variables and the optimal lags to consider for each variable. Table 1.2 shows the results of the statistically significant variables between February 1987 to January 1997 for the FTSE Small-Cap Index, using the ordered logit model. Those variables shown in Table 1.3 will then be used in the ordered logit model from February 1997 to January 1998 to forecast the probability of the Small Cap index to be ranked 1^{st}, 2^{nd}, 3^{rd} or 4^{th}[11].

Table 1.3: Determinants of FTSE Small-Cap Index

	Coefficient	Std. Error	z-Statistic	Prob.
SMALLRET(-1)	-32.17842	6.210421	-5.181359	0.0000**
CONSCONF(-1)	-0.066085	0.037356	-1.769037	0.0769*
CPI(-1)	-1.527482	0.569980	-2.679888	0.0074**
CPI(-2)	1.292298	0.546335	2.365396	0.0180**
DYS_L(-1)	-1.455415	0.546850	-2.661453	0.0078**
MONEX(-1)	12.38289	6.311049	1.962097	0.0498**
TS(-1)	-0.516409	0.242673	-2.128005	0.0333**

**Significant at 5% significance level
*Significant at 10% level

To obtain the next set of explanatory variables for each style/size index which will be used for forecasting the ranking probabilities in the period February 1998 to January 1999, we extend our in-sample window by one year. The same recursive procedure is carried out until the end of the sample, April 2006.

The results in Table 1.3 show information on coefficient estimates, asymptotic standard errors, the corresponding z-statistics and significance levels. The sign of the β coefficients show the direction of the change in the probability of falling in the endpoint

[11] Note that 1) the variables shown in Tables 1.2, 1.3, 1.4 and 1.5 are only the initial set of variables which will be changing through the recursive process (explained on page 48) and 2) only significant variables used for further forecasting are shown. The results of all the potential variables (including statistically insignificant variables) implemented in the ordered logit model are shown in Tables 1, 2, 3 and 4 in the Appendix.

rankings. From the results and the p-values in particular[12], the one-month lagged value of FTSE Small-Cap Index return is highly significant. This shows that past trends affect the future trends. Furthermore, the inflation is found to be significant at one-month and two-month lagged periods. Moreover, the dividend yield of FTSE Small-Cap minus FTSE Large-Cap, the monthly exchange rate and the term structure are also found to be significant and play a role in forecasting the performance of the FTSE Small-Cap Index.

Tables 1.4, 1.5 and 1.6 show the ordered logit model results for the FTSE Large-Cap Index, FTSE Growth 350 Index and FTSE Value 350 Index respectively. Each table indicates the significant variables between the period of February 1987 to January 1997 that have a predictive ability in evaluating the performance of the FTSE Large-Cap Index, the FTSE Growth 350 Index and the FTSE Value 350 Index in the period February 1998 to January 1999. Similarly with the analysis of FTSE Small-Cap Index, the results of all the potential variables (including statistically insignificant variables) implemented in the ordered logit model for the three remaining indices are shown in Appendix 1.

Table 1.4: Determinants of FTSE Large-Cap Index

	Coefficient	Std. Error	z-Statistic	Prob.
CPI(-2)	-0.168389	0.086412	-1.948681	0.0513*
DYS_L(-1)	0.634674	0.361617	1.755100	0.0792*
RISKPREM(-1)	57.95229	27.27952	2.124388	0.0336**

*Significant at 10% significance level
**Significant at 5% significance level

From the results of Table 1.4, it is evident that a lower number of variables affect the FTSE Large-Cap Index, in comparison to the FTSE Small-Cap Index. The two-month lagged value of the inflation and the risk premium are significant at the 10% and 5% significance levels respectively. However, we also include the dividend yield of FTSE Small-Cap Index minus FTSE Large-Cap Index, which is significant at 10% significance level.

[12] We applied the same criteria for each variable using the 10% significance level in order to determine the significant variables.

Table 1.5: Determinants of FTSE Growth 350 Index

	Coefficient	Std. Error	z-Statistic	Prob.
CONSCONF(-2)	-0.064208	0.027658	-2.321478	0.0203**
CPI(-1)	-0.278054	0.086005	-3.232978	0.0012**
M4(-1)	1.335756	0.469112	2.847412	0.0044**
MO(-1)	-1.075791	0.465056	-2.313251	0.0207**
MONBO(-1)	3.297721	1.862488	1.770600	0.0766*

**Significant at 5% significance level
*Significant at 10% significance level

Table 1.5 reports the potential determinants of the FTSE Growth 350 Index. From the results, it is evident that the consumer confidence affects the FTSE Growth 350 Index. However, it is two-month lagged level that is significant. Furthermore, the inflation, the broad money supply and the narrow money supply are highly significant. In addition, the monthly change in the price of Brent Oil is found to be significant at 10% significance level and affects the FTSE Growth 350 Index.

Table 1.6: Determinants of FTSE Value 350 Index

	Coefficient	Std. Error	z-Statistic	Prob.
VALUE_RET(-1)	5.688850	3.359873	1.693174	0.0904*
CONSCONF(-2)	0.065861	0.026975	2.441524	0.0146**
M4(-1)	-0.963185	0.460886	-2.089857	0.0366**
MONIPMAN(-1)	-35.52409	21.15829	-1.678967	0.0932*
YLD_SPR(-1)	-0.527808	0.192255	-2.745359	0.0060**

*Significant at 10% significance level
**Significant at 5% significance level

Indeed, when the aim is to increase the profitability of equity indices through style timing, the appropriate use of potential forecasting variables is necessary. Therefore, in order to create a higher degree of predictability and make our model more robust, we implemented the statistically significant forecasting variables that were determined from the in-sample period in the ordered logit model to provide the forecasted probabilities for the following year only (February 1997 to January 1998). Subsequently, we continued to again identify the statistically significant variables for each style index, however, this time starting from February 1987 to January 1998 (in-sample period of

132 observations). The second group of variables is then implemented in the ordered logit model to supply the forecasted probabilities for the following year (February 1998 to January 1999). The same procedure is carried out until the end of the sample data, April 2006. Different factors affect the style indices at different time periods and by implementing the proposed method, there is a potential increase in the predictable accuracy and an escalation in the profitability.

4.1.3. Example of the Probability Calculations

For each style index for which the ordered logit model is estimated, a set of gamma coefficients is also estimated. The gamma coefficients are known as Limit Points or thresholds, and are used in evaluating the probabilities of the rankings of each style index. Table 1.7 depicts the Limit Points for the ordered logit model of the FTSE Small-Cap Index, which was shown in Table 1.3.

Table 1.7: Limit Points for Ordered Logit Model of the FTSE Small-Cap Index

	Coefficients	Std.Error	z-Statistic	Prob.
LIMIT_2: γ2	-0.744902	1.064409	-0.699826	0.4840
LIMIT_3: γ3	-0.084489	1.063915	-0.079413	0.9367
LIMIT_4: γ4	0.428931	1.066799	0.402073	0.6876

The first column in Table 1.7 gives the estimates of the Limit Point or the gamma coefficients. The remaining three columns show the corresponding standard errors and probability values. For all the probabilities to be positive, as previously discussed, each consecutive gamma must be larger than the previous. Our gamma results satisfy this criterion and as we have:

$$\gamma_1 = -0.745 < \gamma_2 = -0.084 < \gamma_3 = 0.429$$

In order to evaluate the probabilities of which rank the FTSE Small-Cap Index will result in for each month, the following calculations need to be carried out:

$$Y^*_i = \sum_{k=1}^{K} \beta_k X_{ki} + \varepsilon_i = Z_i + \varepsilon_i \quad (4)$$

The random disturbance term has a logistic distribution. This reflects that relevant variables may be left out of the equation, or variables may not be perfectly measured. Therefore, the ordered logit model estimates part of equation (4), which is:

$$Z_i = \sum_{k=1}^{K} \beta_k X_{ki} = E(Y^*) \quad (5)$$

Taking the lagged variables that were found to be significant from the ordered logit model of FTSE Small-Cap and their corresponding β coefficients, we have the following:

$$\begin{aligned} Y\ (\text{Rank}) = {} & \beta_1 \text{Small Returns}_{t-1} + \beta_2 \text{UKConsumerConfidence}_{t-1} + \beta_3 \text{CPI}_{t-1} \\ & + \beta_4 \text{CPI}_{t-2} + \beta_5 \text{DY small-large}_{t-1} + \beta_6 \text{Exchange Rate}_{t-1} + \beta_7 \text{UKTS}_{t-1} \end{aligned} \quad (6)$$

Consequently, we result with the following:

$$\begin{aligned} Z_i = {} & [(-32.178 * 0.0107) + (-0.066 * -3) + (-1.527 * 2.46) + (1.292 * 2.74) + \\ & (-1.456 * -0.75) + (12.38 * -0.026) + (-0.516 * 1.24)] = -0.249 \end{aligned} \quad (7)$$

Subsequently, using the threshold parameters (γs) and the Z value, we can calculate the corresponding logistic probabilities for each month for the FTSE Small-Cap Index. The following calculations show the probabilities of which rank the FTSE Small-Cap will be expected to land in the first month of our out-of-sample, February 1997.

$$P(Y=1) = \frac{1}{1+\exp(Z_i - \gamma_1)} = \frac{1}{1+\exp(-0.249+0.744)} = 0.378$$

$$\begin{aligned} P(Y=2) &= \frac{1}{1+\exp(Z_i - \gamma_2)} - \frac{1}{1+\exp(Z_i - \gamma_1)} \\ &= \frac{1}{1+\exp(-0.249+0.084)} - \frac{1}{1+\exp(-0.249+0.744)} = 0.1625 \end{aligned}$$

$$P(Y=3) = \frac{1}{1+\exp(Z_i - \gamma_3)} - \frac{1}{1+\exp(Z_i - \gamma_2)}$$

$$= \frac{1}{1+\exp(-0.249 - 0.428)} - \frac{1}{1+\exp(-0.249 + 0.084)} = 0.122$$

$$P(Y=4) = 1 - \frac{1}{1+\exp(Zi - \gamma 3)} = 1 - \frac{1}{1+\exp(-0.249 - 0.428)} = 0.336$$

Hence, for the FTSE Small-Cap, the highest probability results in 0.378, which is for P(Y=1). That is, the FTSE Small-Cap has a probability of 37% of ranking first for the month of February 1997. Furthermore, we can also determine the marginal effects that each variable, that has been found significant, has on the rankings, as shown by Brooks (2008). For this, we need to multiply each β coefficient with the probability of ranking first, $P(Y=1)$. Therefore for the FYSE Small-Cap Index, the marginal effects of the variables are:

Marginal Effects for FTSE Small-Cap Ordered Logit Model for probability of ranking first

Small Returns $_{t-1}$	-32.178	*	0.378	=	-12.1633
UK Consumer Confidence $_{t-1}$	-0.066	*	0.378	=	-0.02495
CPI $_{t-1}$	-1.527	*	0.378	=	-0.57721
CPI $_{t-2}$	1.292	*	0.378	=	0.488376
DY small-large $_{t-1}$	-1.456	*	0.378	=	-0.55037
Exchange Rate $_{t-1}$	12.38	*	0.378	=	4.67964
UKTS $_{t-1}$	-0.516	*	0.378	=	-0.19505

Thus a 1-unit increase in the one month lagged returns of the FTSE Small-Cap Index will cause a decrease in the probability that the outcome corresponding to $P(Y=1)$ will occur by -12.16. This same interpretation is carried out for the remaining variables, and the results indicate that the one month lagged returns have the highest marginal effect of the FTSE Small-Cap Index obtaining a probability of 37% of being ranked first for the month of February 1997. The calculations for the remaining three indexes are shown in Appendix B, where the risk premium, price of bent oil and industrial production-manufacturing sector have the highest marginal effect of the FTSE Large-Cap, FTSE Growth 350 and FTSE Value 350 respectively, that the outcome of $P(Y=1)$ will occur.

The same procedure is carried out for each ordered logit model for all style and size indices. Therefore, we estimate a set of models in an in-sample framework using the statistically significant publicly available macroeconomic and fundamental variables and generate out-of-sample monthly forecasts in a recursive framework for each potential model. Our out-of-sample forecasting period is from February 1997 to April 2006, providing us 111 monthly forecasts. Using the specifications of our best model for each style index, the β regression coefficients of the first 120 months of the sample (our in-sample period from February 1987 to January 1997) and the corresponding γ coefficients are used to obtain the conditional probability estimates of the likelihood that one particular index will outperform the others in February 1997. At the end of the month of February 1997, the regression coefficients are re-estimated using the data from the 121 months preceding the forecasted month to generate, this time, the conditional probability estimates of the likelihood that one particular index will outperform the others in March 1997. Until the last prediction month of April 2006, the same procedure is repeated using the recursive method of adding the data corresponding to the month preceding the new prediction month.

The forecasted probability estimates obtained for each individual month in our out-of-sample forecast ranges from 0 to 1. Specifically, for every month, the probability that the specific index will be of rank 1, rank 2, rank 3 and rank 4 is calculated. This is carried out for each style index over the whole out-of-sample period.

4.1.4. Implementation Strategies for the Quantitative Approach

One of the most important aims for an investor or a fund manager is to enhance to performance of their investment. Specifically, they aspire to generate the highest possible return over their investment horizon and some choose to invest in one style or size index over their whole investment horizon. In this study we attempt to highlight the benefits of rotating between different style and size indices, rather than committing to one style index only.

Our trading simulation assumes that at the beginning of each month an investor needs to decide in which of the four FTSE indices to invest. At the end of every month, we run the ordered logit model and study the conditional probabilities estimated by our model

to allocate the funds according to our guidelines. Using those probabilities, we devise a set of long-only and long/short trading strategies that we believe are feasible in practice. Through the results of these strategies we are able to demonstrate the benefits of style-timing rotation strategies. In addition, the rotation strategies proposed can be compared to find an optimal strategy, taking into account constraints, such as transaction costs. The style rotation strategies that we implemented are:

Strategy 1

The first strategy entails investing 100% of the funds in the index that has the highest probability of ranking first. Therefore, the investor will long the style index with the highest probability of rank 1. The same strategy is carried out for every out-of-sample monthly period.

Strategy 2

The second strategy is aimed at buying two style indices. Firstly, the investor will place 50% of the funds in the index with the highest probability of ranking first. Secondly, the investor will place the remaining 50% of the funds in the index whose probability was the second highest in ranking first.

Strategy 3

This strategy is concerned with the direction of the probability value forecasted by the ordered logit model rather than the magnitude. It follows the same approach as strategy 1, but in addition to probability of an index being ranked first, it uses empirical cut-off rates[13]. For example, whenever the ordered logit model signals an upcoming FTSE Small-Cap month, i.e. probability being larger or equal to 0.4, the investor will switch from the position he is currently holding and place 100% in the FTSE Small-Cap. In cases where the investor has already placed the funds in the FTSE Small-Cap Index and the ordered logit model signals a probability of greater than or equal to 0.4 for the same index, then the investor will remain with the current position. On the other hand, if the ordered logit model gives a probability of less than 0.4 for all the indices in the upcoming month, the investor will again remain with the index s/he is holding. Furthermore, in cases where the ordered logit model gives two probabilities of higher

[13]For each month a cut-off is calculated based on the historical return rankings of each style index, as the number of months an index was ranked the first in relation to the total number of months.

than 0.4, then the investor will place the funds in the index with a higher probability. This applies to all other indices.

There has been much debate between practitioners on the issues of implementing style rotation strategies and, in particular, of whether a fund manager is allowed to short-sell. However, in our study we have implemented strategies which do involve short-selling due to the fact that we use indices in our analysis which are relatively easy to short-sell through ETFs and futures. In particular, FTSE 100 and FTSE Small-Cap futures are an example of such investable instruments that investors can short-sell. However, futures on FTSE Value and Growth are not available to investors, and our strategies may be a potential indication to introduce such instruments.

Strategy 4

The fourth strategy entails short-selling. This strategy aims at investing 100% in the index that has the highest probability of being ranked first and short-selling in the index that has the lowest probability of being ranked first[14].

Strategy 5

Finally, the last strategy also takes into account and allows short-selling. In this case the investor will place 100% of the funds in the two indices for which the ordered logit model generated the highest probabilities of being ranked first, i.e. 50% in each index. Furthermore, the strategy then entails in short selling the other two indices for which the ordered logit model obtained the lowest probabilities of being ranked first.

Perfect Foresight

Finally, the Perfect Foresight multi-style rotation strategy is a strategy in which we assume the investor with 100% forecasting accuracy, i.e. investing every month in the winning style index. This strategy is used to reflect the profit potential in multi-style rotation.

[14] For example, if the ordered logit model generated the probability of being ranked first for the FTSE Value 350 index, the investor will place 100% of the funds in the FTSE Value 350 Index in the next month. For the same ordered logit model, if the FTSE Growth 350 Index had the lowest probability of being ranked first, the investor will short-sell the FTSE Growth Index.

Buy-and-Hold Strategy

For comparative performance assessment, the long-only buy-and-hold strategy is implemented it requires the investor to invest in one style index only. The investor will invest in the style index that gives the highest possible end-of-period wealth according to its return and investing £1 million. Therefore, this strategy involves no rotation or switching. In this study, we attempt to outperform the buy-and-hold strategy using the ordered logit model and the five strategies discussed.

4.2. Methodology of the Momentum Strategies

To assess whether similar results can be obtained without going through subjective and complex quantitative process, we implement a number of momentum-based multi-style rotation strategies using the same data set and sample period as in the quantitative model. Such momentum based rotation strategy are used to predict the best performing style index. In particular, we test the momentum strategy on the four style indices, FTSE Large-Cap, FTSE Small-Cap, FTSE Value 350 and FTSE Growth 350, which were used in our ordered logit model. From the results obtained by the momentum strategies, we are able to make comparisons with the results achieved from the ordered logit model and conclude which is the more profitable option for an investor.

We compute cumulative compound returns for each of the four style indices as:

$$r_t = \prod_{n=-2}^{j}((1+r_{t-1})\ldots(1+r_{t-n}))-1 \qquad (8)$$

where j denotes historical compound return period used for portfolio formation, taking values j = -2, -3, -4, -5, -6, -9, -12 months.

Our data sample is identical to the one used in the ordered logit model, starting from February 1987 to April 2006, where monthly returns are collected for each style index. Subsequently, every month, for each style index we compute the equally-weighted compounded returns over the previous one, two, three, four, five, six, nine and twelve months. The past compounded returns are denoted by the letter *J*. In order to make appropriate comparisons to the ordered logit model, we start our testing period or in-

sample analysis in February 1997 until April 2006. In the in-sample framework, we assign various holding periods ranging from one to six months. These holding periods are denoted by the letter *K*. Therefore, depending on the past compounded return (*J*), we long the best performing index (the index with the highest return) and short the worst performing index (the index with the lowest return). We hold this portfolio according to the months specified (*K*). In particular, we create 13 long-only strategies based on the idea of investing in the style with highest positive momentum as indicated by the compound return in our portfolio formation period. Additionally, we apply equivalent 13 long-short strategies where we are long in the index with the highest positive momentum and short the index with the highest negative momentum.

4.3. Transaction costs

Break-even transaction costs per trade are calculated for all our strategies. This should give an indication of practical feasibility of both quantitative and momentum based multi-style rotation as both type of strategies are expected to have large number of switches across different investment styles. The average level of transaction costs for ETFs is 12-20bps, with maximum expense ratio for UK ETFs being 0.5% (50bps)[15]. We will use this level of transaction costs as a benchmark for our feasibility assessment.

[15] www.trustnet.com

5. EMPIRICAL RESULTS

5.1. Quantitative Multi-Style Rotation Results

Table 1.8 provides the results of the ordered logit forecasting model for all four FTSE Indices. In particular, we measure the performance for our long-only and long/short multi-style rotation strategies, Strategies 1 to 5 as well as the buy and hold index strategies and the perfect foresight strategy over the same sample period. We begin by analyzing the average annual returns and Sharpe ratios for the passive buy-and-hold strategies and our style rotation strategies.

According to the results in Table 1.8, we examine that the highest average annualized returns for the buy-and-hold strategies are for the FTSE Small-Cap Index and the FTSE Value 350 Index, at 7.49% and 8.77% respectively. They are followed by FTSE Large-Cap and the FTSE Growth 350 which yield positive average annualized returns, at 5.39% and 4.30% respectively. Out of the four buy-and-hold strategies, it is evident that FTSE Value 350 generated the highest average annualized returns. In the case of the style rotation strategies, only Strategy 1 and Strategy 3 outperform all the buy-and-hold strategies, with average annual returns of 9.48% and 9.28% respectively. However, the perfect foresight strategy attains average annualized returns of 35.3%, which is substantially higher than all of our strategies.

With the intention of emphasizing the potential profits that an investor can gain through our style rotation strategy, we consider each buy-and-hold strategy and our style rotation strategy by observing the cumulative growth of a £1 million initial investment. This is carried out for our out-of-sample period, starting from February 1997 to April 2006[16]. Table 1.8 reports the results for the end-of-period wealth for each buy-and-hold strategy and our style rotation strategies. Out of the four buy-and-hold strategies, the FTSE Value 350 Index generated the highest end-of-period wealth of £1,949,434.74, making it the superior of the four buy-and-hold strategies.

[16] Cumulative growth is calculated as: $Y_n = [\ Y_0 (1+r_1) (1+r_2) + \ldots + (1+r_n)\ ]$, where Y_0 is the initial investment of £1 million and r_t is the forecasted return form our model in each time period for an n period investment.

Table 1.8: Results of Ordered Logit Forecasting Model for UK FTSE style Indices (1987:02 to 2006:04, with out-of-sample 1997:02 to 2006:04)

	Buy-and Hold Strategies				Style Rotation Strategies					
	Large Cap	**Small Cap**	**Value350**	**Growth350**	**Perfect Foresight**	**Strategy 1**	**Strategy 2**	**Strategy 3**	**Strategy 4**	**Strategy 5**
Average Annual Returns	5.396%	7.494%	8.778%	4.304%	35.3%	9.792%	7.703%	9.287%	5.973%	4.694%
Standard Deviation	15.11%	18.443%	15.445%	15.635%	15.8%	16.098%	15.516%	16.33%	10.835%	14.738%
Sharpe Ratio	-0.012	0.103	0.206	-0.082	1.87	0.261	0.136	0.226	-0.471	-0.060
End of Period Wealth	£1,462,736.4	£1,663,214.4	**£1,949,434.74**	£1,318,756.9	£14,669,652.6	**£2,105,518.36**	£1,775,593.4	**£2,010,907.6**	£1,622,108.8	£1,384,481.4
net of transaction costs (10bps)						£2,002,780.92		£1,990,888.8		
net of transaction costs (20bps)						£1,901,151.12		£1,971,049.5		
net of transaction costs (50bps)						£1,630,557.62		£1,912,595.0		
net of transaction costs (100bps)						£1,261,112.87		£1,818,629.0		
net of transaction costs (200bps)						£751,430.63		£1,643,058.0		
Recommended Switches						50		10		
Profit over Buy-and-Hold Strategies:										
Strategy 1	£642,781.93	£442,303.95	£156,083.62	£786,761.39						
Strategy 2	£312,856.97	£112,378.99	(£173,841.2)	£456,836.43						
Strategy 3	£548,171.17	£347,693.19	£61,472.90	£692,150.63						
Strategy 4	£159,372.37	(£41,105.61)	(£327,325.8)	£303,351.83						
Strategy 5	(£78,255.03)	(£278,733.01)	(£564,953.3)	£65,724.43						
Break-Even Transaction Costs (Benchmark: Value350 Index)						15 bps		30bps		
Total Correct Predictions						33%		32%		

The FTSE Small-Cap Index and the FTSE Large-Cap Index generated end-of-period wealth of £1,663,214.41 and £1,462,736.43 respectively. However, the lowest end-of-period wealth was for the FTSE Growth 350 Index with £1,318,756.97. Nevertheless, the end-of-period wealth generated by investing in Strategy 1 and Strategy 3 outperformed all four buy-and-hold strategies with a sum of £2,049,877.379 and £2,010,907.64 respectively. On the other hand, the end-of-period wealth for the remaining style rotation strategies (Strategy 2, Strategy 4 and Strategy 5) resulted in a lower value as a comparison to the FTSE Value 350 (superior buy-and-hold strategy). Furthermore, we compute in Table 1.8 the excess profit of investing in all style rotation strategies over the four buy-and-hold strategies. However, only Strategy 1 and Strategy 3 incur excess profits over all buy-and-hold strategies. The end-of-period wealth generated by investing in Strategy 1 is higher than investing in FTSE Large-Cap, FTSE Small-Cap and FTSE Growth 350 by £642,71.93, £442,303.95 and £786,761.39 respectively. In particular, Strategy 1 generated a higher end-of-period wealth than the superior buy-and-hold strategy, FTSE Value 350 Index, by an amount of £156,083.62.

Furthermore, Strategy 3 generated an end-of-period wealth of £2,010,907.64, which is higher than the end-of-period wealth for FTSE Large-Cap, FTSE Small-Cap and FTSE Growth 350, by £548,171.17, £347,693.19 and £692,150.63 respectively. In fact the end-of-period wealth for Strategy 3 was £61,472.90 higher than the superior buy-and-hold strategy, FTSE Value 350.

Nevertheless, we have also supplied the results for the end-of-period wealth of a perfect foresight strategy, which amount to £14,669,652.60. This is considerably higher than all of our strategies, including Strategy 1 and Strategy 3, which were the only strategies that incurred profits above the best performing buy-and-hold strategy. Once more, this implies that there is a scope for further improvement of the model.

This brings us to evaluate the accuracy of our forecasting model in correctly predicting the style and size index. Due to the fact that only Strategy 1 and Strategy 3 outperform the buy-and-hold strategies, we report more detailed results solely for these two strategies. We find that Strategy 1 results in 33% correct predictions, while Strategy 3 results in 32% correct predictions. These results are relatively low, implying that there is scope for further improvement of our model. Nevertheless, even with the low

forecasting accuracy rates, our two strategies mentioned outperform all the buy-and-hold strategies.

5.1.1. Sharpe Ratios

In order to check for the robustness of the investment recommendations of our model, we compute Sharpe ratios (calculated as the average return of the portfolio minus the average risk-free rate divided by the portfolio's standard deviation) of our style rotation strategies and compare it to the Sharpe ratios of the buy-and-hold strategies[17]. We do this in order to assess whether or not the superior performance of our style rotation strategy is due to higher risk. Among all the buy-and-hold strategies, the buy-and-hold strategy with the highest Sharpe ratio corresponds to the FTSE Value 350 Index. With a Sharpe ratio of 0.206, this strategy is followed by the FTSE Small-Cap Index with Sharpe ratio of 0.103. Subsequently, the FTSE Large-Cap Index and the FTSE Growth Index have a negative Sharpe ratio of -0.012 and -0.082 respectively. Furthermore, it is interesting to note that the FTSE Small-Cap buy-and-hold strategy is the riskiest with an annualized standard deviation of 18.44%. However, it is closely followed by FTSE Growth 350 buy-and-hold strategy, FTSE Value 350 buy-and-hold strategy and FTSE Large-Cap buy-and-hold strategy.

If we now consider our style rotation strategies, we note that Strategy 1 possess a Sharpe ratio of 0.261, which is higher than that of the FTSE Value 350 Index (0.206)[18]. In addition, Strategy 3 attains a Sharpe ratio of 0.226, which is once again higher than the Sharpe ratio of the value buy-and-hold strategy. However, the Sharpe ratios of the remaining style rotation strategies are lower than the value buy-and-hold strategy, with Strategy 4 and Strategy 5 resulting with a negative Sharpe ratio. Nonetheless, this indicates that even when we take into account risk-adjusted measure of performance, our two style rotation strategy (Strategy 1and Strategy 3) outperform the buy-and-hold strategies. Furthermore, it is worth noting that the standard deviation of Strategy 1 and Strategy 3 (16.09% and 16.33% respectively) is lower than that of FTSE Small-Cap

[17] Our study tries to predict the best performing index based on their returns and, thus, the returns were initially ranked. The performance of each strategy was evaluated on the basis of which strategy exhibited the highest profit. The Sharpe ratio is simply used as a robustness test, which has also been carried out by Arshanapalli et al. (2005).

[18] We use FTSE Value 350 Index as a comparison because it generated the highest Sharpe ratio among all four buy-and-hold strategies.

buy-and-hold strategy (18.44%), which adds to the notion that the superior return performance of our strategies is not due to higher risk. On the other hand, the perfect foresight strategy possesses a significantly higher Sharpe ratio of 1.87, with a lower standard deviation of 15.8% as a comparison to Strategy 1 and Strategy 3.

5.1.2. Transaction Costs

So far, we have analysed the performance of our style rotation strategies without taking into account the effect of transaction costs. In fact, in order for our trading strategies be a feasible investment option for practitioners, we must take into consideration different levels of transaction costs. Most previous studies correct for transaction costs by imposing a fixed penalty subsequent to the allocation process, i.e. deducting transaction costs after calculating the end-of-period wealth (Levis and Liodakis (1999)). However, in this study we explicitly include transaction costs in the selection process and deduct these costs from our returns as-and-when funds are switched from one equity index to the other. In order to verify that our style rotation strategies are profitable in reality, we implement five levels of transaction costs of 10 basis points, 20 bps, 50 bps, 100 bps and 200 bps[19].

Due to the fact that only Strategy 1 and Strategy 3 incur profits over the buy-and-hold strategies, we report the results of the effect of transaction costs on these strategies only. Through the implementation of transaction costs, we evaluate that investing in Strategy 1 generates superior returns than the FTSE Value 350 buy-and-hold strategy at transaction costs levels of 10bps. However, losses are made at higher levels of transaction costs (20 bps, 50 bps, 100 bps and 200 bps). Furthermore, we also calculate the break-even level of transaction costs for Strategy 1. These are the transaction costs that give the same end-of-period wealth as the FTSE Value 350 buy-and-hold strategy. Given that the number of switches from one style to another in this strategy is 50, only a marginal level of transaction costs of 15bps per switch will allow this strategy to breakeven with the benchmark buy-and-hold, Value index strategy. However, the strategy outperforms consistent Large cap, Small cap and Growth investing at much

[19] We calculate transaction costs as: $Y_t = [Y_{t-1} (1+r_t) * V$, where V denotes the transaction costs. When a switch is made, V is equal to $(1- \alpha)$ where $\alpha = (bps/10{,}000)$. When a switch is not made, V merely takes the value of 1. With regards to the buy-and-hold strategies, for comparative purposes it is of convenience to simply observe the gross passive returns for their respective end-of-period wealth.

more feasible level of transaction costs of 73bps, 47bps and 93bps respectively. In fact, trading of ETFs is associated with transaction cost levels ranging between 8 bps to 11 bps[20]. Therefore, the transaction cost level of our Strategy 1 is attainable by investors and the break-even transaction cost is above the usual transaction costs of ETFs.

In the case of our Strategy 3, an investor is able to generate excess returns over the FTSE Value 350 buy-and-hold strategy at transaction cost levels of 20bps. In fact, Strategy 3 is beneficial with break-even transaction costs up to 30 bps per switch, which is twice as high as for Strategy 1. This is due to the fact that Strategy 3 entails fewer switches between the different style and size indices, and therefore, there are less transaction costs involved. Although this strategy has only 10 switches, its forecasting accuracy is lower than for Strategy 1.

Despite the fact that the transaction costs subtract a fundamental amount our strategy's value, pursuing a strategy following the signals of our model nonetheless remains a more profitable option than pursuing a buy-and-hold strategy. In fact, after accounting for transaction costs of up to 10 bps, the end-of-period wealth for our Strategy 1 amounts to £1,959,633.491. Similarly, the end-of-period wealth for Strategy 3 results in £1,971,049.5 when accounting for transaction costs up to 20 bps. In contrast, the terminal wealth of the best performing buy-and-hold strategy (FTSE Value 350 Index) is £1,949,434.74.

Strategy 2, which represents equally weighted portfolio of the two style indices with the highest probability of being ranked first, underperforms the benchmark buy-and-hold Value index strategy, but outperforms Large cap, Small cap and Growth buy-and-hold at small level of breakeven transaction costs of 33bps, 11bps and 50bps respectively. The results for Strategy 4 and Strategy 5 imply that introducing short-selling does not improve the performance of quantitative multi-style rotation. The reason for this may be in the nature of the model we use: the ordered logit model will indicate to us which index has the lowest probability to be the best, but it will not tell us if we should expect negative return on that index. If the return of the index to be shorted is simply the

[20] Source: Report Elins/McSherry LLC, May 2005

lowest positive return out of the four, then the return of the long/short strategy will be lower than the return of the long-only strategy.

The following conclusions can be drawn from the quantitative multi-style rotation analysis: a) long-only multi-style rotation strategies have a profit potential over style-consistent strategies, particularly over Large Cap and Growth Style at reasonable level of transaction costs for institutional investors and b) the introduction of short-selling does not add value if we do not assess the magnitude of the expected style return.

As an alternative to this complex quantitative forecasting approach, we apply a variety of momentum strategies during the same trading period, to assess if similar results can be obtained through a much simpler approach.

5.2. Multi-Style Momentum Rotation Results

5.2.1. Long Only Strategies

Tables 1.9 and 1.10 provide the results of average annual returns, standard deviations and Sharpe ratios for the long only momentum strategies for the all the style indices, FTSE Large-Cap, FTSE Small-Cap, FTSE Value 350 and FTSE Growth 350. In particular, the tables show the results of buying the best performing index only. The first to the sixth column in Table 1.9 reports the results of the long only strategies based on six months past returns (J=6) only and various holding periods (K=1, 2, 3, 4, 5, 6). We examine that the highest average annualized return is for the momentum strategy based on past six month returns and holding period of two months, (J=6; K=2) at 14.57%. Closely following is the momentum strategy (J=6; K=1) with average annualized returns of 13.86%. Taking into consideration Strategy 1and Strategy 3 from the ordered logit model, their average annualized returns were at 9.79% and 9.28% respectively. All of the momentum strategies in Table 1.9, with the exception of (J=6; K=5) strategy with average annualized returns of 8.63%, outperform Strategy 1 and Strategy 3. In order to check for the robustness of our investment recommendations, we compute Sharpe ratios for each momentum strategy and compare it to the best performing buy-and-hold strategy and Strategies 1 and 3 from

Table 1.9: Sharpe Ratios for Long only strategies based on 6 months formation and 1-6 months holding

	Past Return(*J*) – Holding Period(*K*)					
	6m-6m	**6m-5m**	**6m-4m**	**6m-3m**	**6m-2m**	**6m-1m**
Average Annual Returns	12.11%	8.63%	13.11%	12.16%	14.57%	13.86%
Standard Deviation	15.37%	15.00%	13.36%	12.96%	12.08%	12.15%
Sharpe Ratio	0.451	0.229	0.593	0.538	0.776	0.713

Table 1.10: Sharpe Ratios for Long only strategies based on 1-5, 9 and 12 months formation and 1 month holding

	Past Return(*J*) – Holding Period(*K*)						
	1m-1m	**2m-1m**	**3m-1m**	**4m-1m**	**5m-1m**	**9m-1m**	**12m-1m**
Average Annual Returns	12.91%	13.50%	7.52%	6.56%	9.02%	7.66%	9.35%
Standard Deviation	13.30%	12.26%	12.01%	12.35%	12.36%	12.69%	12.28%
Sharpe Ratio	0.580	0.677	0.193	0.110	0.310	0.195	0.339

the ordered logit model. The bottom row in Table 1.9 represents the Sharpe ratios for each momentum strategy. Once again, strategies (*J*=6; *K*=2) and (*J*=6; *K*=1) possess the highest Sharpe ratios of 0.778 and 0.713 respectively. With the exception of strategy (*J*=6; *K*=5), all of the momentum strategies in Table 1.9 incur higher Sharpe ratios than the best buy-and-hold strategy (0.206)[21], Strategy 1 (0.261) and Strategy 3 (0.226).

Table 1.10 provides the results of the long only strategies based on various monthly past returns (*J*=1, 2, 3, 4, 5, 9, 12) and holding periods of only one month (*K*=1). In this case, only strategies (*J*=2; *K*=1) and (*J*=1; *K*=1) exhibit higher average annual returns as a comparison to Strategies 1 and 3 of the ordered logit model, with the inclusion of strategy (*J*=12; *K*=1) obtaining higher average annual returns than Strategy 1 only. Nevertheless, strategies (*J*=2; *K*=1), (*J*=1; *K*=1), (*J*=12; *K*=1) and (*J*=5; *K*=1) have Sharpe ratios of 0.677, 0.580, 0.339 and 0.310 respectively, which are all higher than the best performing buy-and-hold strategy and Strategies1 and 3. Furthermore, it is important to note that all of the momentum strategies mentioned that have higher Sharpe ratios than Strategy 1 and Strategy 3, entail lower standard deviations. This shows that the superior performance of our momentum strategies is not due to higher risk.

Furthermore, in order to highlight the potential profits an investor can incur through our momentum strategies, we consider each strategy by observing the cumulative growth of £1 million initial investment. The same procedure was carried out with the ordered logit model, which will provide us with an appropriate base for making comparisons. Tables 1.11 and 1.12 report the results of our long only momentum strategies. The tables show the end-of-period wealth, the profit over the best buy-and-hold strategy, the break-even transaction costs and the recommended switches for each momentum strategy. Taking into account all of the results from Tables 1.11 and 1.12, strategy (*J*=6; *K*=2) yields the highest end-of-period wealth with £3,296,294.90. This amount is well above the best buy-and-hold strategy, which yielded £1,949,434.77.

[21] FTSE Value 350

Table 1.11: Long only strategies based on 6 months formation and 1-6 months holding

	Past Return(*J*) – Holding Period(*K*)					
	6m-6m	**6m-5m**	**6m-4m**	**6m-3m**	**6m-2m**	**6m-1m**
End of Period Wealth	£2,586,638.4	£2,297,952.5	£2,881,908.6	£2,679,947.9	£3,296,294.9	£3,108,790.9
Profit/Loss over best Buy-and-Hold Strategy	£637,203.6	£348,517.7	£932,473.8	£730,513.1	£1,346,860.2	£1,159,356.2
Break-Even Transaction Costs (Benchmark: Value350 Index)	215bps	96bps	257bps	137bps	235bps	113bps
Recommended Switches	13	17	15	23	22	32

Table 1.12: Long only strategies based on 1-5, 9 and 12 months formation and 1 month holding

	Past Return(*J*) – Holding Period(*K*)						
	1m-1m	**2m-1m**	**3m-1m**	**4m-1m**	**5m-1m**	**9m-1m**	**12m-1m**
End of Period Wealth	£2,839,671.8	£3,015,528.4	£1,831,028.9	£1,678,897.1	£2,074,426.1	£1,838,928.3	£2,135,280.4
Profit/Loss over best Buy-and-Hold Strategy	£890,236.9	£1,066,093.6	(£118,405.85)	(£270,537.67)	£124,991.4	(£110,506.4)	£185,845.7
Break-Even Transaction Costs (Benchmark: Value350 Index)	46bps	73bps	-11bps	-26bps	13bps	-19bps	45bps
Recommended Switches	81	59	54	57	47	30	20

In fact, strategy (*J*=6; *K*=2) generated £1,346,860.20 extra profits over the best-buy-and-hold strategy. Furthermore, the end-of period wealth is substantially higher than that of Strategy 1 and Strategy 3 which generated profits of £2,105,518.38 and £2,010,907.6 respectively. Out of all the long only momentum strategies, only three incurred lower profits as a comparison to the best performing buy-and-hold strategy[22]. On the other hand, when comparing to the quantitative Strategies 1 and 3, four momentum strategies underperformed[23]. The rest of the momentum strategies generated significantly higher end-of-period wealth.

With the intention of making our momentum strategies realistic for investors, we take into account different levels of transaction costs. Similarly to the ordered logit model analysis, we report the results of the break-even transactions costs for each momentum strategy. The highest level of break-even transaction costs is for strategy (*J*=6; *K*=4) at levels up to 257 basis points. This is closely followed by strategy (*J*=6; *K*=2) at break-even transaction costs up to 235 basis points. All but four strategies[24] incur higher levels of break-even transaction costs in relation to Strategy 1 and 3, which incurred break-even transaction costs up to 15 and 30 basis points respectively. It is worth noting that the momentum strategies with past six months compounded returns showed higher end-of-period wealth and higher levels of break-even transaction costs, which is consisted with the literature of Jegadeesh and Titman (2001). Therefore, from the total of thirteen long only momentum strategies, ten of these simple long-only momentum strategies are exhibiting better overall performance than more complex quantitative multi-style rotation strategies.

5.2.2. Long/Short Momentum Strategies

If equity style cycles truly exist, then it is highly profitable for an investor to buy winning stocks and sell the losing stocks. Therefore, it is important to know when each style is outperforming in order to be able to take advantage of positive alphas. We examine different momentum style rotation strategies that require an investor to long and short stocks according to their past performance or return. In particular, we study

[22] The strategies that generated lower profits in relation to the best buy-and-hold strategy were (*J*=9; *K*=1), (*J*=3; *K*=1) and (*J*=4; *K*=1).
[23] The strategies that generated lower profits in relation to the Strategies 1 and 3 were (*J*=9; *K*=1), (*J*=3; *K*=1), (*J*=4; *K*=1) and (*J*=5; *K*=1).
[24] (*J*=9; *K*=1), (*J*=3; *K*=1), (*J*=4; *K*=1) and (*J*=5; *K*=1).

the same momentum strategies that were used for the long only scenarios, however, we also short the style index with the lowest past compounded return and hold this portfolio for different time periods.

Tables 1.13 and 1.14 provide the results for the average annual returns, standard deviations and the Sharpe ratios for each momentum strategy. Table 1.13 focuses solely on the results for the past six month compounded returns and various holding periods. It can be concluded that strategies (J=6; K=1) and (J=6; K=2) provide an investor with higher average annual returns than Strategies 1 and 3 from the ordered logit model. The two momentum strategies exhibit average annual returns of 11.24% and 10.57% respectively. Furthermore, the Sharpe ratios of the two strategies are significantly higher in relation to the best buy-and-hold strategy and Strategies 1 and 3, with strategy (J=6; K=1) having a Sharpe ratio of 0.369 and strategy (J=6; K=2) having a Sharpe ratio of 0.349. Evidently, as a comparison to the long only strategies, the average annual returns and the Sharpe ratios do decrease when shorting is introduced into the portfolio. However, the two momentum based strategies continue to exhibit higher average annual returns and Sharpe ratios in relation to Strategy 1 and 3 even when shorting is introduced.

Table 1.14 displays results for the past one, two, three, four, five, nine and twelve past month compounded returns and only month one holding period. Out of all the momentum strategies, strategies (J=1; K=1) and (J=5; K=1) have the highest average annual returns of 11.73% and 10.39% respectively. Furthermore, their Sharpe ratios amount to 0.409 and 0.355 respectively. The two strategies both outperform the best buy-and-hold strategy and Strategies 1 and 3 in terms of the average annual returns and Sharpe ratios. Moreover, their standard deviations amount to 15.97% and 15.53% respectively, which is lower than for Strategy 1 and 3, implying that the higher annual return is not due to higher risk. It is also interesting to note that the average annual returns and the Sharpe ratio for strategy (J=5; K=1) increased in relation to the long only scenario once short-selling is introduced. Evidently, as a comparison to the long-only positive momentum strategies in general, the average annual returns and the Sharpe ratios decrease when shorting is introduced into the portfolio.

Table 1.13: Sharpe Ratios for Long/Short strategies based on 6 month formation and 1-6 month holding

	Past Return(*J*) – Holding Period(*K*)					
	6m-6m	**6m-5m**	**6m-4m**	**6m-3m**	**6m-2m**	**6m-1m**
Average Annual Returns	8.13%	4.57%	5.60%	6.96%	10.57%	11.24%
Standard Deviation	15.40%	13.31%	14.09%	14.89%	15.41%	16.39%
Sharpe Ratio	0.191	-0.047	0.029	0.118	0.349	0.369

Table 1.14: Sharpe Ratios for Long/Short strategies based on 1-5, 9 and 12 month formation and 1 month holding

	Past Return(*J*) – Holding Period(*K*)						
	1m-1m	**2m-1m**	**3m-1m**	**4m-1m**	**5m-1m**	**9m-1m**	**12m-1m**
Average Annual Returns	11.73%	8.79%	5.75%	7.49%	10.39%	6.45%	7.26%
Standard Deviation	15.97%	16.68%	17.92%	17.40%	15.53%	17.53%	16.29%
Sharpe Ratio	0.409	0.216	0.031	0.132	0.335	0.071	0.127

In the same manner as for the long only strategies, we consider each long/short strategy by observing the cumulative growth of £1 million initial investment. The results for the end-of-period wealth, the profits over the best buy-and-hold strategy, the break-even transaction costs and the recommended switches are shown in Tables 1.15 and 1.16. Taking into consideration Table 1.15, the strategies (J=6; K=1) and (J=6; K=2) generate substantially higher end-of-period wealth than the best buy-and-hold strategy with amounts of £2,373,552.30 and £2,271,763.60 respectively. Even more, the two momentum strategies earn higher profits than Strategy 1 and Strategy 3 from the ordered logit model.

Taking into account strategies with various past month compounded returns and one month holding period, Table 1.16 shows the results for these strategies. The highest end-of-period wealth is for strategy (J=1; K=1) with the amount of £2,488,023.90. This strategy yields the highest wealth for an investor out of all the long/short strategies considered. Furthermore, strategy (J=5; K=1) generates an end-of-period wealth of £2,239,221.90. Both strategies (J=1; K=1) and (J=5; K=1) produce higher profits than the best buy-and-hold strategy with excess amounts of £538,589.20 and £289,787.20 respectively. Moreover, the two strategies prove to be even more profitable than Strategies 1 and 3. Therefore, the four long/short momentum-based strategies that generate higher end-of-period wealth in relation to the best buy-and-hold strategy and Strategies 1 and 3 have shown higher potential and increased profits for an investor.

Tables 1.15 and 1.16 also provide the break-even transaction costs, in relation to the best buy-and-hold strategy, and the recommended switches for each long/short strategy. Strategies (J=6; K=1) and (J=6; K=2) remain beneficial with break-even transaction costs up to 23 basis points and 25 basis points respectively. However, strategies (J=1; K=1) and (J=5; K=1) incur lower break-even transaction costs at levels of up to 14 basis points and 13 basis points respectively. This is due to the fact that the latter two strategies require additional switches between the different style and size indices, and, therefore, there are less transaction costs. Even so, the transaction cost levels of the four momentum-based strategies are attainable by investors due to the fact that

Table 1.15: Long/Short strategies based on 6 months formation and 1-6 months holding

	Past Return – Holding Period					
	6m-6m	**6m-5m**	**6m-4m**	**6m-3m**	**6m-2m**	**6m-1m**
End of Period Wealth	£1,850,473.9	£1,392,872.9	£1,510,200.2	£1,682,224.5	£2,271,763.6	£2,373,552.3
Profit/Loss over best Buy-and-Hold Strategy	(£98,960.7)	(£556,561.8)	(£439,234.5)	(£1,949,434.7)	£322,328.9	£424,117.6
Break-Even Transaction Costs (Benchmark: Value350 Index)	-12bps	-71bps	-59bps	-22bps	25bps	23bps
Recommended Switches	39	45	41	63	58	83

Table 1.16: Long/Short strategies based on 1-5, 9 and 12 month formation and 1 month holding

	Past Return – Holding Period						
	1m-1m	**2m-1m**	**3m-1m**	**4m-1m**	**5m-1m**	**9m-1m**	**12m-1m**
End of Period Wealth	£2,488,023.9	£1,925,709.7	£1,453,574.8	£1,703,115.6	£2,239,221.9	£1,549,740.9	£1,693,336.6
Profit/Loss over best Buy-and-Hold Strategy	£538,589.2	(£23,724.9)	(£495,859.9)	(£246,319.1)	£289,787.2	(£399,693.8)	(£256,098.1)
Break-Even Transaction Costs (Benchmark: Value350 Index)	14bps	-0.9bps	-25bps	-11bps	13bps	-30bps	-22bps
Recommended Switches	172	113	114	115	97	74	62

trading of ETFs is associated with transaction cost levels ranging between 8 and 11 basis points.

Overall, we can conclude that negative momentum is not persistent and that adding a short position does not improve the profitability of the momentum strategies. This is consistent with the results from quantitative rotation which finds that construction of long/short portfolios based on quantitative multi-style rotation signals generated through ordered logit model is not profitable either.

6. CONCLUSION

To the best of our knowledge, this is the first research that uses a multinomial logit model for this type of study of the UK equity market, in order to investigate the benefits of style rotation strategies. Previous studies have engaged in utilising binary the logit models in style-timing arena, however, in this study we model four different market segments simultaneously.

In particular, this research employs the ordered logit model, which has not been introduced in the equity style-timing arena in previous studies. Through this model, we demonstrate ways in which an investor can enhance the performance of the portfolio using style rotation strategies.

This study compares the profitability of quantitative and momentum multi-style rotation where we alternated the investment between four different style segments, Value, Growth, Small cap and Large cap, as suggested by the quantitative or the momentum trading signal. We attempt to answer our research question concerning which method is more profitable in providing trading signals. This is, is it more profitable to employ a complex, quantitative model or a simple momentum-based model? The various variables included in our quantitative model perform differently during different periods, and will therefore have a change in impact on our indexes at different points in time and to a different extent. Our quantitative model is able to capture these effects and successfully forecast the next period's best performing index. On the other hand, our simpler method of forecasting the best performing index, the momentum strategy, relies solely on the past returns of each corresponding index. Short-term past performance of each index has proven to be a strong predictor of future performance with different holding periods for each corresponding index. This is particularly pronounced from the results in Table 1.1 and Figures 1.1 and 1.2, where it clearly shows that the rankings of the four indexes change throughout our anaylsis.

Using data from February 1987 to April 2006, we found that investors can add substantial value to their portfolio by timing the FTSE Small-Cap, FTSE Large-Cap, FTSE Value 350 and FTSE Growth 350 Indices by using our model. By using appropriate macroeconomic, market and fundamental variables and implementing them

in our ordered logit model, we demonstrate that the size and style indices are reasonably predictable. The results from our out-of-sample forecasts (February 1997 to April 2006) indicate that forecasting the best performing index with accuracy of 33%, was found to be sufficient to outperform the buy-and-hold strategies. As a result, our Strategy 1 and Strategy 3 outperformed the buy-and-hold FTSE Value 350 strategy by £156,083.62 and £61,472.90 respectively for an initial £1m investment (excluding transaction costs).

However, a key determinant that is able to affect the performance of our strategy is the actual level of transaction costs. Our results indicate that our trading strategies are profitable at transaction cost levels up to 15 bps and 30bps. Even though the level of transaction costs deduct a vital amount of our strategy's profitability, it is nevertheless more profitable for the investor to follow our strategies rather than the best buy-and-hold strategy.

As an alternative approach to predicting the best performing index, we employ momentum-based style rotation strategies in order to enhance the performance of our portfolios. Our results suggest that trading rules based on short-term momentum strategies incur higher Sharpe ratios and even higher end-of-period wealth than the strategies based on the ordered logit model. We demonstrate that several of our strategies outperform the best buy-and-hold strategy and all the strategies based on the ordered logit model. In particular, the highest end-of-period wealth for our momentum-based strategies amounted to £2,488,023.90 for an initial £1 million investment (excluding transaction costs). This is clearly above Strategies 1 and 3 of the ordered logit model and the best buy-and-hold strategy.

Indeed, our results substantiate that the momentum strategies based on long only trading rules achieve even higher end-of-period wealth and Sharpe ratios. The highest end-of-period wealth results to £3,296,294.90, which is substantially higher than any of the strategies based on our quantitative approach. Furthermore, the momentum-based strategies remain beneficial at transaction cost levels ranging from 257 basis points to 13 basis points. The profitability of the momentum strategies is better for shorter holding periods and for medium term (6 months) formation periods at a very realistic level of transaction costs. This implies that a better and more robust performance can be obtained through a much simpler approach. Multi-style rotation is more successful

when following a long only, rather than a long/short investment approach regardless of whether momentum or quantitative trading rules are implemented. Despite this reduction in profitability when shorting is introduced, momentum multi-style rotation still has an edge over the quantitative one.

Appendix A

Figure 1.1: Twelve-Month Moving Average of FTSE Small-Cap and FTSE Large-Cap Indices

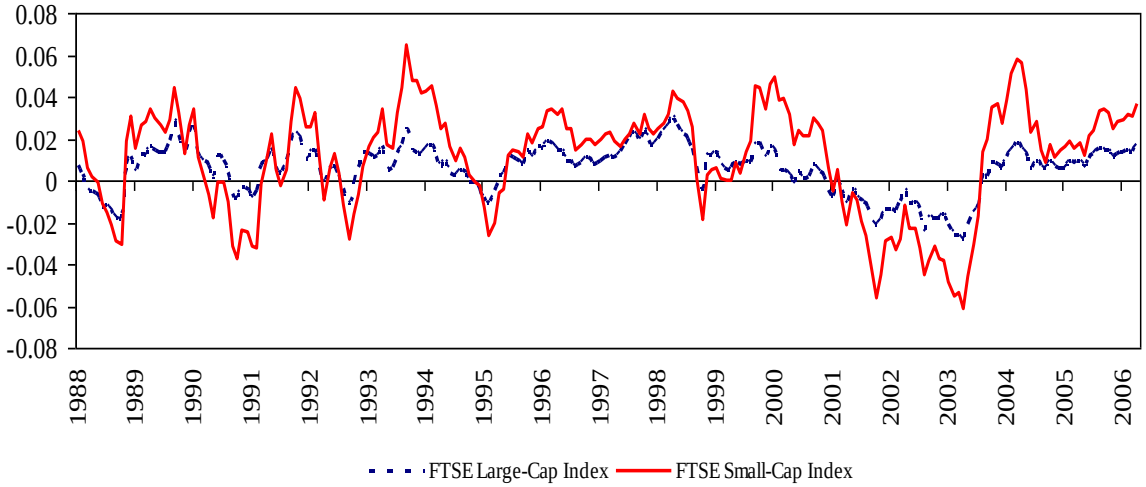


Figure 1.2: Twelve-Month Moving Average of FTSE Growth 350 and FTSE Value350 Indices

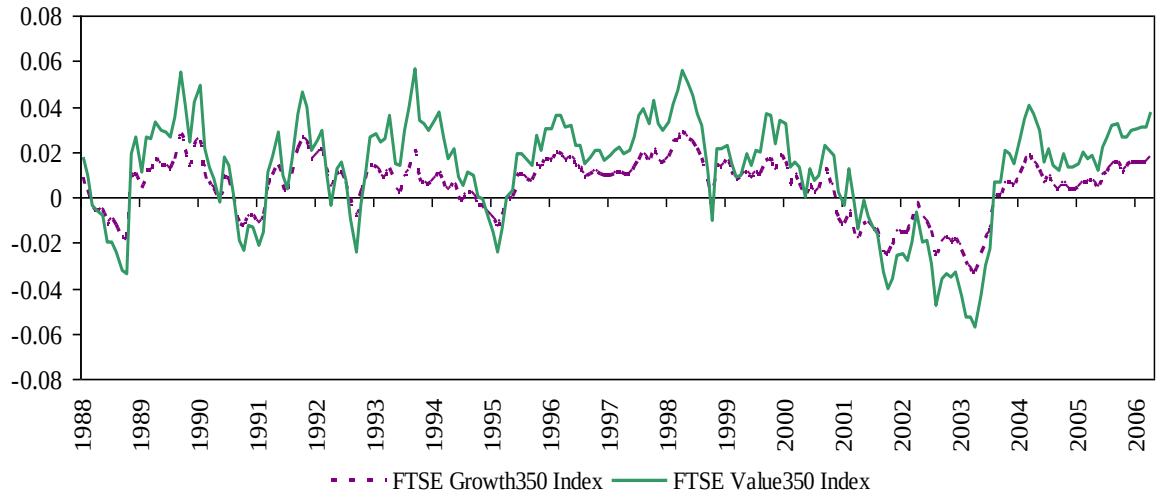


Table 1: Results of Ordered Logit Model with all potential forecasting variables of FTSE Small-Cap Index

	Coefficient	Std. Error	z-Statistic	Prob.
CONSCONF(-1)	-0.065837	0.069738	-0.944057	0.3451
CONSCONF(-2)	0.022768	0.070114	0.324727	0.7454
CPI(-1)	-1.434563	0.645855	-2.221183	0.0263
CPI(-2)	1.158288	0.620591	1.866427	0.0620
DYS_L(-1)	-1.760122	0.677435	-2.598216	0.0094
M4(-1)	-0.199557	0.601596	-0.331713	0.7401
M4(-2)	-0.360415	0.592345	-0.608454	0.5429
MO(-1)	-0.057931	0.563126	-0.102875	0.9181
MO(-2)	-0.203241	0.582241	-0.349066	0.7270
MONBO(-1)	1.586331	2.524721	0.628319	0.5298
MONEX(-1)	12.36954	6.965582	1.775808	0.0758
MONIP(-1)	16.70001	34.45735	0.484657	0.6279
MONIP(-2)	15.19422	36.91041	0.411651	0.6806
MONIPMAN(-1)	-22.67974	38.39672	-0.590669	0.5547
MONIPMAN(-2)	-32.96526	41.81407	-0.788377	0.4305
RISKPREM(-1)	-7.908972	9.782087	-0.808516	0.4188
TS(-1)	-0.606410	0.281711	-2.152593	0.0314
SMALLRET(-1)	-28.13471	9.443183	-2.979367	0.0029
UKTBILL3M(-1)	-6.582526	4.414011	-1.491280	0.1359
YLD_SPR(-1)	-0.096806	0.350864	-0.275907	0.7826
Limit Points				
LIMIT_2:γ2	-1.186523	1.661684	-0.714048	0.4752
LIMIT_3: γ4	-0.482579	1.658308	-0.291007	0.7710
LIMIT_4: γ4	0.053396	1.659841	0.032169	0.9743

Table 2: Results of Ordered Logit Model with all potential forecasting variables of FTSE Large-Cap Index

	Coefficient	Std. Error	z-Statistic	Prob.
CONSCONF(-1)	0.005570	0.057312	0.097195	0.9226
CONSCONF(-2)	0.009933	0.061357	0.161882	0.8714
CPI(-1)	0.755370	0.533684	1.415388	0.1570
CPI(-2)	-0.659463	0.525367	-1.255242	0.2094
DYS_L(-1)	1.227387	0.553604	2.217085	0.0266
M4(-1)	0.051029	0.529522	0.096368	0.9232
M4(-2)	0.268075	0.550564	0.486910	0.6263
MO(-1)	0.258767	0.481452	0.537472	0.5909
MO(-2)	0.112256	0.515240	0.217872	0.8275
MONBO(-1)	-2.669971	2.201905	-1.212573	0.2253
MONEX(-1)	-8.475957	5.364262	-1.580079	0.1141
MONIP(-1)	-25.06452	31.10666	-0.805761	0.4204
MONIP(-2)	3.021340	31.14236	0.097017	0.9227
MONIPMAN(-1)	63.77924	35.46944	1.798146	0.0722
MONIPMAN(-2)	10.86145	33.52278	0.324002	0.7459
RISKPREM(-1)	59.59850	29.76786	2.002109	0.0453
TS(-1)	0.309610	0.237098	1.305833	0.1916
LAR_RET(-1)	-41.53504	29.80060	-1.393765	0.1634
UKTBILL3M(-1)	5.034008	3.669481	1.371858	0.1701
YLD_SPR(-1)	0.190373	0.304019	0.626189	0.5312
Limit Points				
LIMIT_2:γ2	-3.101859	1.450696	-2.138186	0.0325
LIMIT_3: γ3	-1.069085	1.425263	-0.750097	0.4532
LIMIT_4: γ4	1.031506	1.425885	0.723415	0.4694

Table 3: Results of Ordered Logit Model with all potential forecasting variables of FTSE Growth 350 Index

	Coefficient	Std. Error	z-Statistic	Prob.
CONSCONF(-1)	0.053729	0.059094	0.909208	0.3632
CONSCONF(-2)	-0.133249	0.060136	-2.215784	0.0267
CPI(-1)	-0.197249	0.496974	-0.396900	0.6914
CPI(-2)	-0.046993	0.499413	-0.094097	0.9250
M4(-1)	1.275526	0.520072	2.452597	0.0142
M4(-2)	0.568493	0.533195	1.066200	0.2863
MO(-1)	-0.988795	0.514410	-1.922192	0.0546
MO(-2)	0.040656	0.494398	0.082234	0.9345
MONBO(-1)	3.482029	2.160423	1.611735	0.1070
MONEX(-1)	-0.776399	5.500397	-0.141153	0.8877
MONIP(-1)	-26.24577	31.10626	-0.843746	0.3988
MONIP(-2)	-12.83405	31.67860	-0.405133	0.6854
MONIPMAN(-1)	39.73356	33.47476	1.186971	0.2352
MONIPMAN(-2)	31.63463	34.74780	0.910407	0.3626
RISKPREM(-1)	2.510546	20.03778	0.125291	0.9003
TS(-1)	-0.057739	0.193727	-0.298045	0.7657
GRWTH_RET(-1)	-0.030030	20.26553	-0.001482	0.9988
UKTBILL3M(-1)	-1.185071	3.332008	-0.355663	0.7221
YLD_SPR(-1)	0.303056	0.302917	1.000457	0.3171
Limit Points				
LIMIT_2:γ2	-1.879822	1.385452	-1.356830	0.1748
LIMIT_3: γ3	-0.390087	1.368117	-0.285127	0.7755
LIMIT_4: γ4	1.086183	1.377003	0.788802	0.4302

Table 4: Results of Ordered Logit Model with all potential forecasting variables of FTSE Value 350 Index

	Coefficient	Std. Error	z-Statistic	Prob.
CONSCONF(-1)	0.035322	0.057668	0.612508	0.5402
CONSCONF(-2)	0.059221	0.060783	0.974300	0.3299
CPI(-1)	0.377872	0.482350	0.783398	0.4334
CPI(-2)	-0.082593	0.475193	-0.173810	0.8620
DYS_L(-1)	0.373251	0.530323	0.703818	0.4815
M4(-1)	-1.087225	0.549587	-1.978258	0.0479
M4(-2)	-0.002677	0.538061	-0.004975	0.9960
MO(-1)	0.085219	0.477833	0.178344	0.8585
MO(-2)	0.058891	0.483878	0.121706	0.9031
MONBO(-1)	-2.448083	2.297856	-1.065377	0.2867
MONEX(-1)	-2.282456	5.607537	-0.407034	0.6840
MONIP(-1)	21.47987	29.55745	0.726716	0.4674
MONIP(-2)	-7.237776	29.53882	-0.245026	0.8064
MONIPMAN(-1)	-43.81426	32.97569	-1.328683	0.1840
MONIPMAN(-2)	12.55646	32.93288	0.381274	0.7030
RISKPREM(-1)	-2.665089	25.03468	-0.106456	0.9152
TS(-1)	0.275217	0.225485	1.220555	0.2223
VALUE_RET(-1)	8.697936	24.58344	0.353813	0.7235
UKTBILL3M(-1)	2.308706	3.438159	0.671495	0.5019
YLD_SPR(-1)	-0.352932	0.288733	-1.222347	0.2216
Limit Points				
LIMIT_2:γ2	-0.340942	1.380171	-0.247029	0.8049
LIMIT_3: γ3	1.018451	1.380260	0.737869	0.4606
LIMIT_4: γ4	2.571007	1.392213	1.846704	0.0648

Appendix B

Marginal Effects for FTSE Large-Cap Ordered Logit Model for probability of ranking first

CPI_{t-2}	-0.168	*	0.194	=	-0.03259
DY small-large $_{t-1}$	0.634	*	0.194	=	0.122996
Risk Premium $_{t-1}$	57.952	*	0.194	=	11.24269

Marginal Effects for FTSE Growth 350 Ordered Logit Model for probability of ranking first

UK Consumer Confidence $_{t-2}$	-0.064	*	0.594	=	-0.03802
CPI $_{t-1}$	-0.278	*	0.594	=	-0.16513
M4 $_{t-1}$	1.335	*	0.594	=	0.79299
M0 $_{t-1\ t-1}$	-1.075	*	0.594	=	-0.63855
Brent Oil	3.297	*	0.594	=	1.958418

Marginal Effects for FTSE Value 350 Ordered Logit Model for probability of ranking first

Value Returns $_{t-1}$	5.688	*	0.116	=	0.659808
UK Consumer Confidence $_{t-2}$	0.065	*	0.116	=	0.00754
M4 $_{t-1}$	-0.963	*	0.116	=	-0.11171
Industrial Production Manufacturing $_{t-1}$	-35.52	*	0.116	=	-4.12032
Yield Spread $_{t-1}$	-0.527	*	0.116	=	-0.06113

REFERENCES

Ahmed, P., Lockwood, L.J., and Nanda, S. "Multistyle Rotation Strategies", *Journal of Portfolio Management*, Spring (2002), 27, pp.47-59

Allen, D.E. and Tan, M.L. "A Test in Persistence of the Performance of UK Managed Funds", *Journal of Business Finance and Accounting*, (1999), Vol. 24(2), pp.155-178.

Amenc, N., Malaise, P., Martellini, L. and Sfeir, D. "Evidence of Predictability in Bond Indices and Implications for Fixed-Income Tactical Style Allocation Decisions", *Risk and Research Management Centre EDHEC Business School*, working paper, October (2003).

Amenc, N., Malaise, P., Martellini, L., and Sfeir, D. "Tactical Style Allocation – A New Form of Market Neutral Strategy", *The Journal of Alternative Investments*, Summer (2003), Vol. 6(1).

Arshanapalli, B., Switzer, L., and Panju, K. "Equity Style Timing: A Multi-Style Rotation Model for the Russell Large-Cap and Small-Cap Growth and Value Style Indexes", *The Financial Management Association*, January (2005)

Arshanapalli, B., Coggin, T.D., and Doukas, J. "Multifactor Asset Pricing Analysis of International Value Investment Strategies", *Journal of Portfolio Management*, Summer (1998), 24 (4), pp.10-23

Asness, C.S., Friedman, A., Robert, J.K. and Liew, J.M. "Style Timing: Value Versus Growth", *Journal of Portfolio Management*, (2000), 26 (3), pp.50-60

Atkinson, S. M., Baird, B.S. and Frye, M.B "Do Female Mutual Fund Mangers Manage Differently?", *Journal of Financial Research*, (2003), Vol. (26), pp.1-18.

Bauer, R.J., and Dahlquist, J.R. "Market Timing and Roulette Wheels", *Financial Analysts Journal*, January/February (2001), pp.28-40

Bauman, W., Conover, C. and Miller, R. "Growth Versus Value and Large Versus Small Cap Stock in International Markets", *Financial Analysts Journal*, 1998, pp.75-88

Blake, D. and Timmerman, A. "Mutual Fund Performance: Evidence from the UK", *European Finance Review*, (1998), Vol. (2), pp.57-77.

Bodie, Z., Kane, A. and Marcus, A. *Investments*, International Edition, McGraw-Hill Irwin, 2002.

Brinson, G.P., Singer, B.D. and Beebower, G.L. "Determinants of Portfolio Performance II: An Update", *Financial Analysts Journal*, May/June (1991)

Brown, S.J. and Goetzmann, W.N. "Performance Persistence", *The Journal of Finance*, June (1995), Vol. (2), pp.679-699.

Brown, S.J., Goetzmann, W., Ibbotson, R.G. and Ross, S.A. "Survivorship Bias in Performance Studies", *Review of Financial Studies*, (1992), Vol. (5), pp.533-580.

Carhart, M.M. "On Persistence in Mutual Fund Performance", *Journal of Finance*, March (1997), Vol. (1), pp.57-83.

Chen, H. and De Bondt, W. "Style Momentum within the S&P500 Index", Journal of Empirical Finance, (2004), Vol. (11), pp.483-507.

Chevalier, J. and Ellison, G. "Are Some Mutual Fund Managers Better Than Others? Cross-Sectional Patterns in Behavior and Performance", *Journal of Finance*, June (1999), Vol. 54(3), pp.875-899.

Coggin, T.D. "Long-Term Memory in Equity Style Indexes", *Journal of Portfolio Management*, Winter (1998), Vol. 24(2), pp.37-46

Copeland, M.M. and Copeland, T.E. "Market Timing: Style and Size Rotation Using the VIX", *Financial Analysts Journal*, March/April (1999), 55 (2), pp.73-81

Daniel, K., Grinblatt, M., Titman, S. and Wermers, R. "Measuring Mutual Fund Performance with Characteristic-Based Benchmarks", *Journal of Finance*, (1997), Vol. (52), pp.1035-1058.

De Bondt, W. and Thaler, R. "Does the Stock Market Overreact?", *Journal of Finance*, (1985), Vol. (40), pp.793-808.

Desrosiers, S., Kortas, M., L'Her, J.F., Plante, J.F. and Roberge, M. "Style Timing in Emerging Markets", *Financial Analysts Journal*, December (2004), Vol.60, Issue 6, pp40-54

Detzler, M.L. "The Performance of Global Bond Mutual Funds", *Journal of Banking & Finance*, (2002), Vol. 23(8), pp.1-34.

Ellis, M. and Thomas, D. "Momentum and the FTSE 350", *Journal of Asset Management*, (2004), Vol. 5(1), pp.25-36.

Elton, E.J., Gruber, M.J. and Blake, M.R "The Persistence of Risk-Adjusted Mutual Fund Performance", *Journal of Business*, (1996), Vol. 62(2), pp.133-157.

Fama, E.F. and French, K.R. "The Cross-Section of Expected Stock Returns", *Journal of Finance*, (1992), Vol.47, pp.427-465

Fama, E. F. and French, K. R. "Common Risk Factors in the Return on Bonds and Stocks", *Journal of Financial Economics*, (1993), Vol. (3), pp.3-53.

Ferson, W.E. and Harvey, C.R. "Sources of Predictability in Portfolio Returns", *Financial Analysts Journal*, May/June (1991), pp.49-56

Goetzman, W. and Ibbotson, R. "Do Winners Repeat?", *Journal of Portfolio Management*, Winter (1994), Vol. (20), pp.9-18.

Grinblatt, M. and Titman, S. “The Persistence of Mutual Fund Performance”, *Journal of Finance*, December (1992), Vol. (5), pp.1977-1985.

Hendricks, D., Patel, J. and Zeckhauser, R. “Hot Hands in Mutual Funds: Short-run Persistence of Relative Performance, 1974-1988”, *The Journal of Finance*, March (1993), Vol. (1), pp.93-125.

Jacobs, B.I. and Levy, K.N. “High-Definition Style Rotation”, *Journal of Investing*, Fall (1996), Vol.5 (3), pp.14-23

Jegadeesh, N. and Titman, S. “Profitability of Momentum Strategies: An Evaluation of Alternative Explanations”, *Journal of Finance*, (2001), Vol. 56, pp.699- 720.

Jensen, G. R. and Mercer, J. M. “Monetary Policy and the Cross-Section of Expected Stock Returns”, *Journal of Financial Research*, Spring, (2002), Vol. 25(1), pp.125-139.

Kao, D. and Schumaker, R.D. “Equity Style Timing”, *Financial Analysts Journal*, February (1999), pp.37-48

Kester, G.W. “Market Timing with Small Versus Large-Firm Stocks: Potential Gains and Required Predictive Ability”, *Financial Analysts Journal*, September/October (1990), pp.63-69

Keswani, A. and Stolin, D. “Determinants of Mutual Fund Performance Persistence: A Cross-Sector Analysis”, *Journal of Financial Research*, (2004).

Keswani, A. and Stolin, D. “Mutual Fund Performance Persistence and Competition: A Cross-Sector Analysis”, *Journal of Financial Research*, Fall (2006), Vol. 30(3), pp.349-366.

La Bruslerie, H. “Active Bond Strategies: What Link Between Forecasting Ability, Excess Return and Performance”, *CREFIB University Paris I Sorbonne*, January (2003).

Levis, M., and Liodakis, M. "The Profitability of Style Rotation Strategies in the United Kingdom.", *Journal Portfolio Management*, Fall (1999), pp. 73-86.

Levis, M. and Tessaromatis, N. "Style Rotation Strategies: Issues of Implementation", *Journal of Portfolio Management*, December (2003), Vol. 30(4), pp.73-86.

Lucas, A., Van Dijk, R. and Kloek,T., "Stock Selection, Style Rotation and Risk", *Journal of Empirical Finance*, January (2002), Vol.9(1), pp.1-34

Malkiel, B.G. "Returns in Investing in Equity Mutual Funds 1971 to 1991", *The Journal of Finance*, June (1995), Vol. (2), pp.549-572.

Quigley, G. and Sinquefield, R.A. "Performance of UK Equity Unit Trusts", *Journal of Asset Management*, (1998), Vol. (1) pp.72-92.

Reinganum, M.R. "A Revival of the Small Firm Effect", *Journal of Portfolio Management*, (1992), Vol.18, pp.55-62

Reinganum, M.R. "The Significance of Market Capitalization in Portfolio Management over Time", *Journal of Portfolio Management*, Summer (1999), Vol.25 (4), pp.39-49

Sharpe, W.F. "Likely Gains from Market Timing", *Financial Analysts Journal*, March/April (1975), pp.60-69

Sharpe, W.F. "Asset Allocation: Management Style and Performance Measurement", *Journal of Portfolio Management*, Winter (1992), Vol.18, pp.7-19

Timmermann, A. and Perez-Quiros, G. "Firm Size and Cyclical Variations in Stock Returns", *Journal of Finance*, June, (2000), Vol. 55(3), pp.1229-1262.

Todorovic, N. "Profitability of the Index-Based Size and Style Rotation Strategies in the UK Equity Markets", *Cass Business School Working Paper*.

Volkman, D. A., and Wohar, M. E. "Determinants of persistence in relative performance of mutual funds", *Journal of Financial Research*, (1995), Vol. (18), pp.415-430.

Wang, K. "Style Rotation, Momentum and Multifactor Analysis" *Journal of Financial and Quantitative Analysis*, 40, March (2005), pp.349-372

Wermers, R. "Predicting Mutual Fund Returns", *Working Paper, Robert H. Smith School of Business*, University of Maryland, (2001).

CHAPTER TWO

The Impact of Manager Changes on Mutual Fund Performance

ABSTRACT

Using our unique database of UK fund manager changes and event study methodology, we examine the impact of such changes to establish whether this impact varies depending upon whether the fund manager is male or female; whether the fund is a developed or emerging market; and depending upon the fund's style, that is, growth, value or small cap. Our results show clearly across different categories of funds that a change in fund manager can have a significant impact on fund performance, at least in the first year following the event. We document that funds improve their performance after a female fund manager has been replaced. Finally, we find persistence in performance of the bottom performing funds compared with the top performing funds pre-and post management change.

1. INTRODUCTION

How persistent is a fund's performance? Is it dependent on the skill of the manager who is managing a fund? Can a trading strategy be created based on the positive alpha portfolios that consistently outperform the market? It is great to achieve a high alpha, but is it plausible to rely on the fund manager to produce that alpha year after year and do poor performing funds demonstrate performance persistence? These are some of the questions that previous literature has attempted to answer.

In recent years, studies on investment styles and fund manager performance have become wide-spread. In particular, studies by Chevalier and Ellison (1999) and Wermers and Ding (2005) focused on the characteristics of fund managers, such as experience and education, and found evidence that fund performance is positively correlated with manager education and experience. However, there has been little evidence devoted to the influence of gender on fund management. One of the studies that focused on this area was by Niessen and Ruenzi (2006). They undertook a study on the different styles of fund management between male and female fund managers in the US market, and found significant differences between them: while men are more aggressive, women appear to be more methodological and risk averse in their investment choices. However, most of the studies on gender of fund managers tend to assess the behavioural issues rather than look at the manger performance which is if essence to investors. There has been little attention devoted to the fund manager tenure and its relationship to performance of a fund and additionally, most of the research in this area has been focusing on the US market.

In this chapter we assess how the performance of a fund is affected when a fund managers leaves. In particular, we attempt to answer whether it is in fact the fund manager that influences the performance of the funds s/he runs. With unique, hand-constructed database, which focuses on the UK fund manager changes in recent history (2002-2005), we examine whether the impact of a change is more pronounced among bond or equity funds, emerging or developed market funds for example. Further, we assess the impact of the gender of the manager on the performance of a managed fund. This study attempts to fill the gap in the literature by offering a comprehensive study of

fund manager changes and gender influences in different types of funds in the UK managed fund industry. Specifically, we intend to highlight the effect a fund manager change (replacement) has on the performance of a fund. Hence, we examine the performance of those funds whose manager had been replaced three years before and after the replacement. Finally, we will assess the persistence of performance of our top and bottom performing funds pre-and post management change.

1.1 Advantages of Mutual Funds

Professional Management

One of the main advantages of mutual funds is the professional management of the investor's money. Due to lack of time and expertise, investors purchase funds in order to manage their portfolios.

Diversification

If an investor owns shares in a mutual fund rather than individual stocks or bonds, s/he is able to lower the risk incurred. Typically, large mutual funds own hundreds of different stocks in different industries and in this way it allows investors to diversify their risk.

Economies of Scale

Economies of scale can be defined as the decrease of cost as output increases. In case of mutual funds, large amount of securities are traded which implies that the transaction costs are lower in relation to an individual buying and selling securities.

Liquidity

Furthermore, through mutual funds an investor can request for shares to be converted into cash at any point in time.

Simplicity and Choice

Finally, owning a mutual fund does not entail expertise and difficulty. It is a fairly simple procedure as there is an abundance of mutual funds in almost any bank.

Furthermore, mutual funds come in wide variety types, with some investing exclusively in a particular sector while others may target growth opportunities in general.

1.2 Disadvantages of Mutual Funds

Costs

One of the disadvantages of mutual funds is the association of high costs. Due to the fact that professional management works for the investor, the investor is entitled to pay a management fee or a management expense ratio. Furthermore, mutual funds also entail distribution fees, which are paid to the broker or advisor that sells the fund or manages the account. Usually, the distribution fees are part of the management fees that the investor pays. On the whole, the average mutual fund charges from 1.3% to 1.5% for the expense ratios.

Dilution

Although diversification is one of the advantages of mutual funds, it can also become a burden. Due to the fact that many mutual funds have small holdings in various companies in different industries, implies that even high returns in a few investments do not make a big difference in the portfolio.

Taxes

Even though the return of investing in a mutual fund can be very satisfying, the investor is still liable to pay a capital-gain tax. Therefore, the return from the fund will be lower than anticipated.

1.3 Objectives and Significance of the Research

The objective of this study is to examine the performance of mutual funds and to assess whether fund managers are an important determinant in this process. In recent years, studies on investment styles employed by fund manager have become wide-spread. However, little evidence has been devoted to the performance of the fund managers and whether gender has an influence on the performance of the funds.

Firstly, we intend to distinguish fund manager changes that have taken place. Second, we intend to measure the performance of the specific fund before manager replacement and after manager replacement. In this way, there will be a possibility to compare the performance of a fund, whether it experiences persistence and to what extent the manager had on the performance.

Our study focuses on the gender of the fund manager and whether there is a difference in male and female fund manager performance. In particular, we aim to report whether performance of female fund managers is more persistent or stable as a comparison to male fund managers. Furthermore, we also concentrate on the performance of different groups of funds to examine whether the fund manager change is pronounced in some groups more than others.

Using our unique, hand-constructed database of UK fund manager changes in recent history (2002-2005), we examine whether the impact of a change is more pronounced among male or female managed funds, emerging or developed market funds, bond or equity funds and whether the persistence of performance depends on fund's style, i.e. growth, value or small cap. We also examine the persistence of the top performing funds compared with the bottom performing funds pre-and post management change. This study attempts to fill the gap in the literature by offering a comprehensive study of fund manager changes and gender influences in different types of funds in the UK managed fund industry and to highlight the effect a fund manager change (replacement) has on the performance of a fund.

The structure of this chapter is organized as follows. Section two comprises of the literature review, which discusses the earlier findings related to this study. Section three explains the data and methodology description utilized in this chapter. Section four is devoted to the results of our findings.

2. LITERATURE REVIEW

Past studies on performance persistence have shown mixed evidence that performance actually persists. During the past fifteen years, the topic of mutual fund performance has attracted considerable attention which has been primarily focused on US data sets. Only a handful of studies have been devoted to non-US data. Even more so, only a few studies on manager impact on mutual fund performance have been undertaken. This review of the literature is intended to cover most indicative and influential studies that have been carried out so far in the US and the UK.

2.1 The Impact of Fund Managers on Performance of Mutual Funds

There have been many studies that have examined the performance of mutual funds over time and the relative performance based upon investment objective. Although mutual funds have stated investment objectives, the fund manager normally has a significant impact on the selection of the individual securities in a fund's portfolio and, therefore, the risk and return characteristics of the portfolio. It would be logical to assume that there is a direct correlation between fund performance and portfolio manager experience, age, education and even gender. If a fund has experienced continued positive performance, one would expect that positive performance to continue as long as the same manager is associated with a particular fund.

One of the studies that examine a manager's affect on fund performance is by Chevalier and Ellison (1999). Their attempt is to uncover whether some managers are better than others. They examine whether mutual fund performance is related to the characteristics of the fund managers that may designate ability, knowledge or effort. Specifically, they inspect the relationship between the fund performance and the manager's age, the average SAT score, and whether the manager has an MBA or not. In their study they used a sample of 492 managers from 1988-1994, and used a cross-sectional analysis to evaluate how performance is related to the different characteristics of the fund manager. From their results they found that younger managers outperform the older managers by 460 basis points per year. It is important to note that the out-performance of younger managers is due to the lower expense ratios and survivorship bias. By taking into account the survivorship bias, the found that fund survival is more performance

sensitive for funds managed by younger managers. Therefore, the negative relationship between age and return suggests that survivorship bias would make younger managers appear to outperform the older managers.

Furthermore, managers that hold an MBA outperformed the managers that do not by 63 basis points per year. Such a result is accountable by the higher systematic risk that the MBA managers hold, which in result provides them with higher returns. In addition, managers that hold higher than average SAT scores significantly outperformed the managers with lower SAT scores. A logical explanation given was that managers from higher SAT schools have greater abilities and knowledge to produce positive alphas and possibly have a better network of connections with other members of financial institutions. Once again, this is attributable to the differences in expenses, levels of risk and survivorship. They showed that managers with higher SAT scores or MBA degrees managed higher beta funds. Furthermore, these managers dealt with larger funds that had smaller or unreported expense ratios. Taking into account survivorship, these managers could possibly be working for more aggressive firms which fire fund managers that under-perform. Also, the true, positive relationship between high SAT score managers and return may be understated by the possibility that fund executives give these managers a second chance following a poor performance.

Chevalier and Ellison continued their study by examining the relationship between management characteristics and different investment styles. They used a four factor model by regressing the monthly return of the mutual fund on the monthly return of the RMRF (return minus risk-free rate) portfolio, the HML (high book-to-market minus low book-to-market) portfolio, SML (small firm shares minus large firm shares) portfolio and PR1YR (last year's winners bought and last year's losers sold) portfolio. They found a positive relationship between age and PR1YR, which shows that the older managers use momentum strategies. However, in the beginning of their study they found that older managers are out performed by the younger managers and this finding is somewhat contrary to the findings of Carhart (1997) and Daniel, Grinblatt, Titman and Wermers (1997), who showed that momentum strategies are the main reason for performance persistence. Subsequently, the MBA managers showed a statistically significant tendency to purchase 'glamour' stocks (stocks with lower book-to-market ratios). The result showed that these managers were earning roughly average returns

even though they purchased glamour stocks. As for the managers with high SAT scores, they found that the overperformance of these managers remains the same even with the inclusion of the four factor residuals as the performance measure.

From this study it can be concluded that a manager's characteristics do have an impact on the performance of the mutual fund. Chevalier and Ellison showed that managers that held an MBA degree or a high SAT score exhibited higher performance than those that did not. In addition, younger managers outperformed the older managers. Several factors need to be taken into account that may be responsible for such a result. These factors are the level of risk used, the amount of expense ratio and the survivorship bias. It is also important to note that managers with MBAs and high SATs are more educated, have a better network of connections and possibly higher access to information. All of these factors contribute to these managers having a better stock picking ability. Also, younger managers are usually striving for a successful career and are therefore more motivated to work harder so as to prove themselves.

Other literature on mutual fund managers compares the performance of single-managed and team-managed funds. Prather and Middleton (2002) used a sample of 162 U.S. mutual funds for the period 1981 -1994, consisting of 147 funds managed by individuals and 15 that are team managed. Their results indicate that there are no appreciable differences between the performance of team-managed and individual-managed funds. Another study by Bar, Kempf, and Ruenzi (2005) finds team-managed funds exhibit marginally lower risk, more persistent returns, and experience greater inflows over time.

Furthermore, Gaspar et al. (2006) investigate whether mutual fund families strategically allocate performance across their member funds favoring those more likely to generate higher fee income or future inflows. They further document how this family strategy takes place by looking at preferential allocation of IPO deals and at the amount of opposite trades among different valued funds.

2.2 Does Gender Matter?

From previous studies it has been shown that performance can persist. But how much of this performance persistence is accountable by female managers? Do women who are fund managers perform any differently than their male counterparts? It is a known fact that women and men behave differently and this may affect fund manager performance. However, there are numerous factors that have an impact on fund performance, including the fund's size, structure and expenses, the age tenure, educational level and compensation of the manager and the turnover and risk profile of the fund. This is a key issue as there is significant evidence that women view money, risk and investing differently to men. There is also evidence suggesting that women may actually be better investors than men. This may not have been a major issue in previous times as the funds management industry has traditionally been male dominated, however, times are changing and there are more women managing money on behalf of others.

Differences in risk aversion between men and women show up in a variety of situations. For example, in the US it has been found that women tend to smoke less, wear seatbelts more and are less likely to use illegal drugs. In the labour market, women tend to work in safer industries and have safer jobs within industries. Furthermore, with women being more risk averse would imply that they prefer lower levels of portfolio volatility, individual stock volatility, beta and size.

Atkinson et al. (2003) examine the performance and investment behaviour of female fixed-income mutual fund managers compared with male fixed-income mutual fund managers. They find that male and female managed funds do not differ significantly in terms of performance, risk, and other fund characteristics. Their results suggest that differences in investment behaviour often attributed to gender may be related to investment knowledge and wealth constraints. In addition, despite the similarities between male and female managers, there is evidence that gender influences the decision-making of mutual fund investors. They also find that the net asset flows into funds managed by females are lower than for males, especially for the manager's initial year managing the fund.

A study by Niessen et al. (2006) investigated gender differences between US equity mutual fund managers. Specifically, their data covers US open-end mutual funds for the time period between January 1994 and December 2003. They hypothesized that female fund managers take less risk than male fund managers, that female fund managers are expected to follow less extreme investment styles that are more consistent over time, that female fund managers trade less due to their lack of confidence, that female fund managers experience lower inflows than the male fund managers and that their performance is more persistent. They measured the performance of the funds using the Jensen's Alpha, Fama-French three-factor model and Carhart four-factor model, in order to evaluate the risk-adjusted abnormal returns. Their results indicate that women seen to take moderately less unsystematic risk and less small firm risk, while the overall return risk does not differ. Due to the fact that male fund managers seem to take higher idiosyncratic risk translates into them trading more actively as a comparison to the female fund managers. Furthermore, Niessen et al. evaluated that female fund managers follow less extreme investment styles due to lower factor loadings and that their styles are more stable over time. However, they conclude that although the differences in behaviour between female and male fund managers are apparent, the differences in abnormal returns between the two are not significantly high.

Single women have also been reported as more risk averse in financial decision making than single men and this difference is essentially influenced by factors like age, race and the number of children that they have (Jianakoplos and Bernasek, 1998). Bliss and Potter (2002) add the information that women that manage funds hold less risky positions than men. In particular, Bliss and Potter (2002) explore whether gender affects fund manager performance and/or behavior, in particular whether female fund managers are more risk-averse and less confident. Their exploration of whether equity mutual funds managed by women differed systematically in performance or operationally from those managed by men produced negative findings.

2.3 Studies of Performance Persistence of UK Mutual Funds

Blake and Timmerman (1998) formed portfolios of high and low alpha funds and evaluated that performance did persist for a holding period of up to two years. Their study included complete return histories of 2,300 UK open-ended mutual funds over the

period from 1972 to 1995. They find some evidence of performance persistence and the existence of survivorship bias. Furthermore, they reported that there is evidence that mutual fund performance varies across different asset categories. Moreover, they find that underperformance increases as fund termination date approaches and it (weakly) outperforms during their first year of existence. On the other hand, Quigley and Sinquefield (1998) employed a similar strategy over the period of 1978 to 1997, and found that underperforming funds continue to underperform, while outperforming funds do not continue to outperform.

Furthermore, Allen and Tan (1999) used various tests including the contingency tables methodology, employed by Blake and Timmerman (1998), on a UK sample of 131 funds between the periods 1989 to 1995. Their results verified that performance persisted even after adjusting for risk and for holding periods of up to two years.

There have been numerous studies that have analyzed the occurrence and the detection of performance persistence, however, only a few are on the determinants of persistence per se. One of the recent research studies that aim at answering the latter was carried out by Keswani and Stolin (2004). They undertook a study of net annual returns on all UK unit trusts over the period of 1991 to 2001. Specifically, Keswani and Stolin analyzed whether performance persistence differs between sectors, by also examining sectors where funds are not restricted to UK equities. They find significant differences in the level of persistence across different sectors. However, they conclude that it is not the sector characteristics that explain the different levels of persistence, but the differences in securities invested. Furthermore, Keswani and Stolin (2006) extended the study they undertook in 2004 and they concentrated on peer groups of competing mutual funds to evaluate whether this determinant affects performance persistence. Through their results they find that performance persistence is more vivid in sectors where concentration of assets under management is higher.

2.4 Studies of Performance Persistence of US Mutual Funds

Hendricks, Patel, and Zeckhauser (1993) performed a study on 165 no entry fee growth-oriented US funds over the period 1974 to 1988 and obtain similar results. They find stronger evidence that funds that do well in the past do well in the short-term future. In

their study, the funds in the top octile of past performers over the previous year outperformed the lowest octile of past performers in the following year. In addition, they reported profits from a strategy of buying past winners and selling the past losers. Conclusively, they report positive persistence for four quarters and then a reversal. They conclude these results as a 'hot hands' phenomenon.

Subsequently, Elton et al. (1996), using a sample free of survivor bias of 188 US equity funds, reconfirm the 'hot hands' phenomenon of Hendricks et al. (1993). Nevertheless, using risk-adjusted returns to rank the funds, they report that past 'winner' funds outperform past 'loser' funds also for longer periods of three years. Furthermore, they excluded the funds with high expense ratios from their analysis; however the results were very similar, suggesting that fees and expenses account for only part of the differences in performance across funds.

In a study of 728 US mutual fund returns over the period 1976 to 1988, Goetzmann and Ibbotson (1994) find that two-year performance is predictive of performance over the successive two years. They report evidence of relative performance persistence, particularly for underperforming funds.

Volkman and Wohar (1995) extend this analysis in order to examine factors that impact performance persistence. Their US data consists of 322 funds over the period 1980 to 1989, and shows performance persistence is negatively related to size and negatively related to levels of management fees. Specifically, they find negative persistence in performance for both small and large funds, suggesting that small funds can be risky when they first enter the market and that large funds have possibilities of becoming inefficient.

Furthermore, Brown and Goetzmann (1995) implemented the analysis, between the years 1976-1988, of surviving and non-surviving US funds from a sample data that is free of survivorship bias. They use a regression analysis that past performance is the major determinant of fund disappearance and find that size and age are negatively related to disappearance, while the expense ratio is positively related to it. Their result confirms that there is persistence in performance especially for the underperforming funds.

Moreover, Malkiel (1995) used a sample data of surviving and non-surviving funds between the periods 1971 to 1991 in the US. It is interesting to note that they found that performance persists in the 1970s but does not continue in the 1980s. This shows the sensitivity of the survivorship bias throughout the sample period studied.

Studies of performance persistence in mutual funds are not without contrary evidence. Carhart (1997) dismisses the 'hot hand' phenomenon suggested by Hendricks et al. and shows that expenses and common factors in stock returns such as beta, market capitalization, one-year return momentum, and whether the portfolio is value or growth oriented "almost completely" explain short term persistence in risk-adjusted returns. He finds that the 'hot hand' result is due to the momentum strategies used. Therefore, he added a factor representing momentum strategies and found that the performance persistence disappears. He concludes that his evidence does not "support the existence of skilled or informed mutual fund portfolio managers" (Carhart, 1997, p. 57). This was agreed by Daniel, Grinblatt, Titman and Wermers (1997), who applied a portfolio-based measurement model and confirmed that the momentum strategies were indeed the main reason for performance persistence in mutual funds. Carhart (1997) and Daniel et al. (1997) focused more on the determinants of performance persistence rather than detecting performance persistence per se.

The issue of performance persistence has also been thoroughly reconsidered by Wermers (2001) on a basis of a methodology introduced by Daniel et al. (1997). He finds that prior-year winning funds outperform prior-year losers in the following year, by almost 5 per cent per year at the net return level, as well as beating market indices 2 per cent per year. Moreover, Wermers (2001) also finds that persistence in growth-oriented funds is positively correlated with portfolio turnover.

Grinblatt and Titman (1992) analyze performance of 279 US funds over the period of 1975 to 1984 using a benchmark technique. The benchmark that they use consists of passive portfolio funds which take into account size, past returns and dividend yields. Subsequently, they use a regression analysis to evaluate the positive alphas for reach fund which depicts the excess return. They then divide the sample period into two sub-periods; 1975-1979 and 1980-1984, and assess whether the performance for the first

sub-period is indicative for the performance for the second sub-period. Their results show that better than average performance persists over time.

An earlier study by Brown et al. (1992) identified performance persistence due to survivorship bias of mutual funds. Their evaluation was to choose high-risk strategies which will survive in the first sub-period and thus encounter above average returns. If these funds continue the same strategy and survive in the second sub-period, they will continue to achieve above average returns. Furthermore, they document strong persistence for the periods 1976-81 and 1982-87 whereas for the interval period 1979-84 no persistence was found.

Given the evidence from prior literature which suggests that there is performance persistence in the short run and that investment strategies of a fund depend largely on managers themselves and their characteristics, this paper will examine how the change of a fund manager in a fund impacts its performance and whether different conclusions apply to different types of funds. How is our research different to other studies on the performance of fund managers? To the best of our knowledge, this is the first study that examines the performance of funds whose manager has been replaced. Furthermore, it is the first study that examines the performance of fund managers in the UK. Our study adds to the existing literature on fund managers by providing a comprehensive event study analysis on the relationship between the performance of the funds and the fund manager, before and after the fund manager is replaced.

3. DATA AND METHODOLOGY

3.1 Data

We use a unique, hand-constructed database of manager changes. Our primary data sources are Citywire[25], Standard and Poor's database and the Financial Express Database. Both Citywire and the Financial Express databases cover UK open-ended mutual funds and provide information on fund returns, fund management structures, investment objectives, fund managers' characteristics and other fund characteristics. The Standard & Poor's data source provides us with information of manager replacements from April 2002 to December 2005. The price data for the funds and their respective benchmarks is obtained from Datastream.

To construct our unique database, we first determine the fund manager replacements, from the Standard & Poor's data source, for all 45 months of our analysis period (April 2002 to December 2005). This provides us with a total of 258 fund manager changes. Our next step was to ascertain the name of the funds that the replaced managers were running. We were able to uncover this information through Citywire, Financial Express database and fund factsheets. Further, from our unique database we distinguish the gender of the replaced fund managers and the characteristics of the specific funds. In the Citywire and Financial Express databases there is no field indicating the gender of the fund manager. However, the first name of the fund manager is usually given, which assists in distinguishing the gender. Moreover, Citywire, the Financial Express database and the Standard and Poor's data source indicate the sector that each fund belongs to which enables us to allocate our funds according to different investment strategies. We concentrate our analysis on single-managed funds and exclude all team-managed funds. In a way, this will assist us to distinguish the differences in fund behaviour due to management structure (team- vs. single-managed) from differences that can be attributed to gender or investment strategy (value or growth, developed or emerging markets etc.) for example.

[25] Source: Citywire is a UK data source providing information on UK fund managers and tracks their performance.

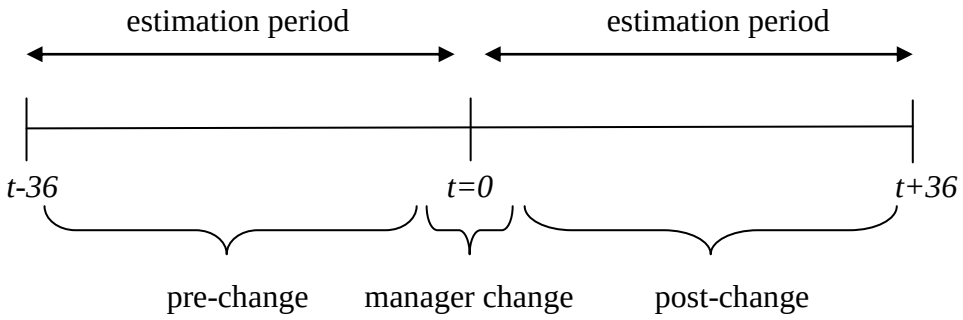
Indeed, in order to measure the performance of the 258 funds, specific benchmarks are assigned to each fund, which is explained in detail in the next section of the chapter. Through Citywire and the Standard and Poor's fund factsheets we were able to find the pre-defined benchmarks according to each funds' objectives. Furthermore, we also measure the performance of each fund in relation to their peers. The Investment Management Association (IMA) provides data on peer group benchmarks, which enables us to match each one of our funds to the appropriate peer group and the evaluate their performance accordingly.

To generalise our results across different groups of funds we group our funds according to the following categories: (1) male managed, (2) female managed, (3) UK funds (equity and bond), (4) international funds (equity and bond), (5) emerging markets funds, (6) developed markets funds, (7) equity only funds, (8) bonds only funds, (9) equity value funds, (10) equity growth funds, (11) equity small cap funds, (12) top 10 percent performing funds before the management change, (13) bottom 10 percent performing funds before the management change, (14) top 10 percent performing funds after the management change and (15) bottom 10 percent performing funds after management change.

3.2 Methodology

Our research uses an event study methodology to examine the relationship between mutual fund performance in the pre and post managerial turnover periods. Managerial turnover is defined as the event that occurs when a fund manager is replaced and the event date is the exact year and month of the management turnover. Standard event studies use daily data, however, we believe that 1) using a month of managers' change as an event date is sufficient to capture the effect of the change and 2) the data on managers' changes is only available on month-to-month basis. We measure the performance of the fund three years before and after the event date[26]. The time line for our event study is as follows:

[26] Where the manager has not managed the fund three years prior to the event, we apply a minimum data requirement of one year prior to the event date.



We require this pre-event time period because Khorana (2001) advocates that funds which experience a management turnover have at least two years of performance history before the management replacement month. Furthermore, Hendricks et al. (1993), Goetzann and Ibbotson (1994) and Brown and Goetzmann (1995) all find evidence of performance persistence in mutual funds over a horizon of one to three years. In addition, to a certain extent, this will also enable us to determine the reason for replacement. Some of the reasons for which fund manager changes occur are retirement, poor performance of the fund manager or good performance. In the latter case, good performance can give rise of opportunities to the fund manager where s/he moves to a better job position or is simply taken by another fund management company.

We use an event study methodology to examine the relationship between mutual fund performance in the pre and post managerial turnover. We apply steps suggested by Campbell, Lo and MacKinlay (1997). We measure the performance of the funds pre- and post- event date in three ways. The first method is using the benchmark-adjusted model, where we use fund objective pre-defined benchmarks and peer-group benchmarks. The second and third methods used to measure the performance of the funds are the mean-adjusted model and the information ratio respectively. More specifically, we use these methods to calculate the abnormal returns for each fund. These methods provide us with a detailed and thorough analysis to distinguish whether a fund manager plays a role in the outperformance or underperformance of a fund. Furthermore, we will be able to study how different categories of funds are affected by the change of the fund manager and whether outperforming funds continue to outperform and underperforming funds continue to underperform.

3.2.1. Performance using Benchmark-Adjusted Model:

The traditional event study methodology is using Market model, which is a statistical model, estimated through OLS regression, it relates fund i return to the market return and estimates parameters α_{it} and β_{it} that are used for calculation of abnormal returns. This implies that the estimation period for alphas and betas is needed. Since most of our funds have quite a short history prior to management change, we find that this method is not appropriate for our analysis. The alternative to use in such circumstances is the Market-adjusted model or the benchmark-adjusted model. Since the funds for which we analyse the impact of fund managers' changes are benchmarking their performance against benchmarks pre-defined in their investment objectives, we feel that it is more appropriate to calculate abnormal returns adjusted for benchmark returns, rather than the market (i.e. FTSE All Share Index) itself. Therefore, the benchmark adjusted return model we use can be treated as restricted Market model in which α_{it} is equal to zero and β_{it} is equal to one. According to Campbell et. al. (1997), since coefficients alpha and beta are pre-specified, an estimation period is not required and abnormal returns can be calculated as:

$$AR_{it} = R_{it} - R_{bt} \tag{1}$$

Where AR_{it} is abnormal return of fund *i* in period *t*, R_{it} is the return of fund *i* in period *t* and R_{bt} is the return of fund *i'*s benchmark. As a benchmark we use i) benchmark index defined by the investment objectives of a fund and ii) peer group benchmark. The information on the appropriate peer group benchmarks for each fund was obtained through the Investment Management Association.

Further, we calculate Average Abnormal Returns for each of the 12 groups of funds:

$$\overline{AR_t} = \frac{1}{n}\sum_{i=1}^{n} AR_{it} \tag{2}$$

Where n is the number of funds in which the change of a fund manager occurred.

Additionally, typical event study methodology will assess the impact of the event by testing weather there is a difference between cumulative abnormal returns for fund i before and after the event, in our case the change of fund manager:

$$CAR_{it} = \sum_{t=-36}^{+36} ARi_t \quad (3)$$

CAR_{it} gives us returns from investing in fund i from the start of the event horizon till the 12 months post event date.

For each of our group of funds we calculate Average Cumulative abnormal returns:

$$\overline{CAR}_{it} = \sum_{t=-36}^{+36} \overline{ARi}_t \quad (4)$$

3.2.2. Performance using Mean-Adjusted Model:

$$AR_{it} = R_{it} - \overline{R}_i \quad (5)$$

Where $\overline{R}_i$ is the mean return of fund i for which the management change has occurred over the estimation period (in our case 36 months prior to the change of fund manager) as suggested by Campell et al. (1997). Although this model appears to be the simplest out of the three, Brown and Warner (1980, 1985) state that it often gives similar results as the other more complex models.

In the same manner as for the Benchmark-Adjusted Model, we calculate Average Abnormal Returns, Cumulative Abnormal Returns and Average Cumulative Abnormal Returns for this Mean-Adjusted Model using equations (2), (3) and (4).

3.2.3. Tests for Significance

To test for significance of Average abnormal returns and Average cumulative abnormal returns for the Market-Adjusted, Mean-Adjusted and Peer Group-Adjusted Models, we

need to calculate the aggregate pre-event standard deviation of abnormal returns for each of the funds within each of the 12 sample groups (Brown and Warner (1985)):

$$\sigma_{i,pre-event} = \sqrt{\frac{\sum_{t=-36}^{-1}(\overline{AR}_{it} - \overline{AR}_{pre-event})^2}{n-1}} \quad (6)$$

Where $\sigma_{i,pre-event}$ is the standard deviation of abnormal returns of fund i estimated from pre-event period, $\overline{AR}_{pre-event}$ is the average abnormal return of fund i in the pre-event period and n is the number of months in the pre-event period (in our case 36).

The aggregate standard deviations across all funds in each of the 12 sample groups are calculated as:

$$\sigma_{N,pre-event} = \sqrt{\frac{\sum_{i=1}^{N}\sigma_{i,pre-event}^2}{N}} \quad (7)$$

Where N is the number of funds in the sample.

Using these standard deviations, we calculate T-test for ARs and CARs as:

$$\overline{ARt}_{T-test} = \frac{\overline{AR_t}}{\sigma_{N,pre-event}} \quad (8)$$

and

$$\overline{CARt}_{T-test} = \frac{\overline{CAR_t}}{\sigma_{N,pre-event}\sqrt{t_2 - t_1 + 1}} \quad (9)$$

Where t_1 is the first day and t_2 is the last day in the period over which we calculate cumulative returns.

3.2.4. Performance using Information Ratio:

$$IRi_{t<0} = \frac{\overline{Ri}_{t<0} - \overline{Rb}_{t<0}}{St.Deviation(Ri_{t<0} - Rb_{t<0})} \text{ and } IRi_{t>0} = \frac{\overline{Ri}_{t>0} - \overline{Rb}_{t>0}}{St.Deviation(Ri_{t>0} - Rb_{t>0})} \quad (10)$$

Where $IRi_{t<0}$ ($IRi_{t>0}$) is the information ratio obtained by fund i before (after) the management change; $\overline{Ri}_{t<0}$ ($\overline{Ri}_{t>0}$) is the average return of fund i before (after) the event; $\overline{Rb}_{t<0}$ ($\overline{Rb}_{t>0}$) is the average return of the benchmark for the pre-event (post-event) period; and Standard deviation of $Ri_{t<0} - Rb_{t<0}$ ($Ri_{t>0} - Rb_{t>0}$) is taken as measure of total risk over the pre-event (post-event) period. The information on appropriate benchmarks for each fund is obtained from Citywire, S&P database or fund fact sheets[27].

Further, to avoid any fund-specific bias in our results, we calculate the average Information Ratio for each of our 12 groups of funds as:

$$\overline{IR}_{t<0} = \sum_{i=1}^{n} IRi_{t<0} \text{ and } \overline{IR}_{t>0} = \sum_{i=1}^{n} IRi_{t>0} \quad (11)$$

Where $\overline{IR}_{t<0}$ ($\overline{IR}_{t>0}$) is the average information ratio of n funds for each of our groups in period prior to (after) event.

[27] Note that we do not use peer-group performance as a benchmark for calculation of Information ratios but the benchmark, which is defined by fund objectives.

4. EMPIRICAL RESULTS

Analysis that follows shows that three alternative methods of measuring abnormal performance generate to some extent similar results. We report the results both for the overall sample of funds and by fund categories. Note that 104 out of 258 manager changes in this study occur in 2004 and 2005, so the 36 months post-event period includes the severe market downturn of 2007 and 2008. Therefore, we will analyse our results having the worsening market conditions in mind for those last two years in our sample.

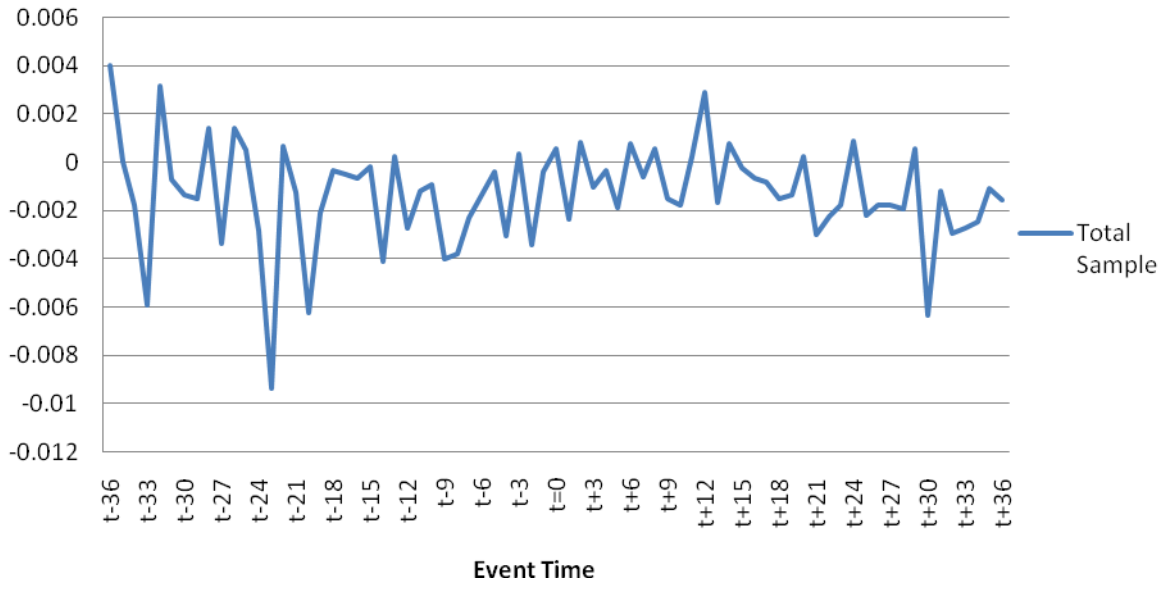
4.1. Performance and manager change: All funds

For the benchmark-adjusted method, we compare the return of each fund with the return of its corresponding benchmark, defined by the funds' objectives. We do this procedure for the entire period of our data sample in the event study. In this way, we are able to evaluate whether the funds yield higher returns than their corresponding benchmark or whether they underperform as a comparison to their benchmarks. More importantly, we are able to observe the performance of the funds before the change of the manager and after the change of the manager. From these results we are able to construe the strength of the fund manager's role in the performance of a particular fund.

We first report the results of the entire sample data followed by the results for each category of funds. Appendix 1 depicts the average abnormal returns and the cumulative abnormal returns for the entire event period and full sample in our estimation. The period *t-36* to *t-1* corresponds to the pre-event period. The period *t=0* is the event date, which corresponds to the month that the fund manager has stopped running the particular fund. The period *t+1* to *t+36* correspond to the post-event period, where the previous manager has been replaced. From the results it can be seen that the average abnormal returns increase after the event date. However, only months 33, 23 and 20 before the event date and month 30 after the event date are significant. This can also be seen in Figure 2.1. Twenty-four months or two years prior to the event date, the average abnormal returns are at their lowest and are more volatile during the pre-event period. Subsequently, the average abnormal returns for all the funds increase and continue to do so after the event date. After the event date, or change in fund manager, the average

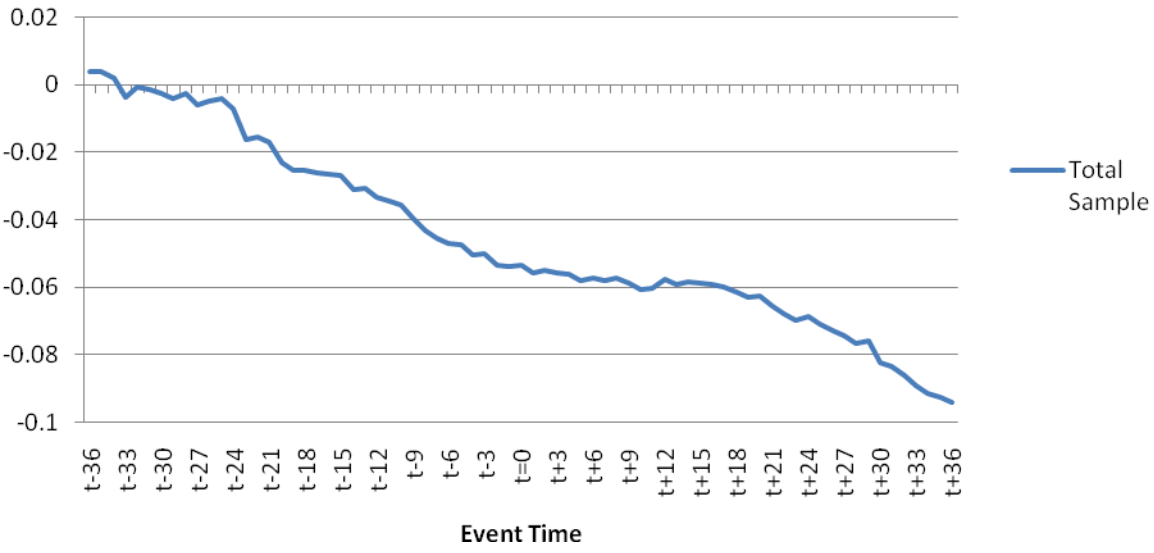
abnormal returns become less volatile. As a result, the sum of the average abnormal returns before the event date (-0.0531) is lower than the sum of the average abnormal returns after the event date (-0.0403), which is shown in Panel A of Table 1 in Appendix 2.

Figure 2.1: Benchmark-Adjusted Total Sample Average Abnormal Returns



This overall verifies that the change in managers has increased the performance of the funds, who are achieving higher abnormal returns, albeit lower than the corresponding benchmarks. Furthermore, Appendix 1 gives results for the cumulative average abnormal returns for all of the 258 funds in our data sample and their corresponding tests for significance. The cumulative abnormal returns show a decrease in value during the pre-event period and from period *t-12* to *t+36* they are statistically significant. However, from the event date until *t+10*, the cumulative average abnormal returns continue to decrease in value, but at a substantially lower rate. This can be seen in Figure 2.2, which depicts this trend. This is not surprising as the cumulative average abnormal returns of each month are affected by the previous months' values. Nevertheless, our results also indicate one year after the event date the average abnormal returns show a large increase in value, which is shown in Figures 2.1 and 2.2.

Figure 2.2: Benchmark-Adjusted Total Sample Cumulative Average Abnormal Returns

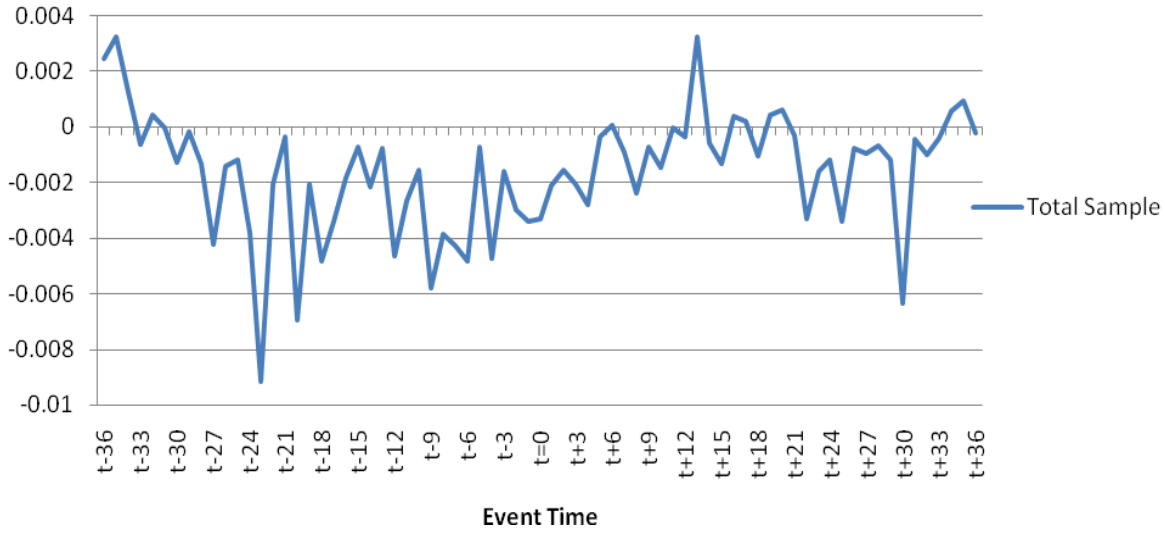


However, the performance of the funds deteriorates in the next two years after the event date, which we believe is largely influenced by the overall market downturn in 2007 and 2008.

The second method that we apply to evaluate the performance of the funds is the peer group benchmark-adjusted method. Rather than measuring the performance against a specific benchmark and/or the average performance, most fund managers tend to be compared to their own peers. Therefore, a fund manager is able to compare the performance of his fund in relation to the average performance of the sector in which his fund is grouped. For this reason we also use this method to show how the funds are performing according to their peers, and more importantly, whether the change in fund managers affects their performance.

In order to compute the peer group-adjusted return, we use the IMA (Investment Management Association) sector classifications, which allocate each fund with one of its styles based on the fund's portfolio holdings. A fund's peer group-adjusted return in month *t* is the fund's return in month *t* minus the return of the corresponding peer group benchmark for the same month. Very similar pattern of average and cumulative abnormal returns is observed in the peer group adjusted performance, as seen in Figures 2.3 and 2.4.

Figure 2.3: Peer Group-Adjusted Total Sample Average Abnormal Returns

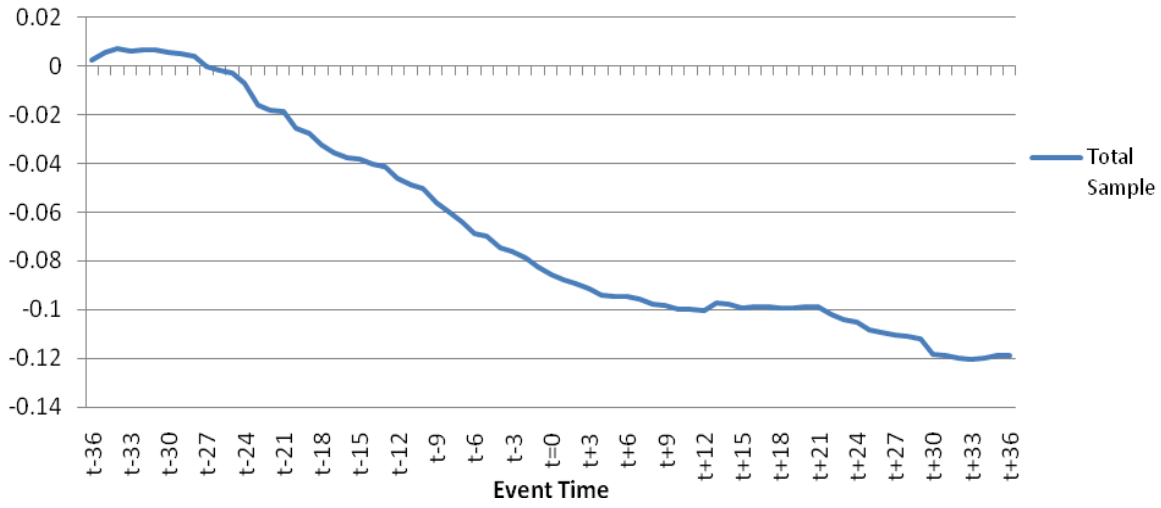


Similar to the benchmark-adjusted method, our results show that the average abnormal returns for the peer group-adjusted method are more volatile and more negative during the pre-event period. This can be seen in Figure 2.3 and Appendix 9. However, the post-event period shows the average abnormal returns of the funds as more stable and increasing in value. Therefore, once a new fund manager takes over the fund, the performance of that fund becomes more constant and our results confirm a steady rise in the returns. According to the table in Appendix 10 the sum of the peer group adjusted average abnormal returns before the event date (-0.0823) is lower than the sum of the average abnormal returns after the event date (-0.0367) and it can be seen in Appendix 9 that peer-adjusted average abnormal returns becoming positive after about a year of post-event performance. However, similarly to the benchmark adjusted method the average abnormal return with the peer group adjusted method deteriorates about eighteen months after the event date, implying underperformance of the funds.

Indeed, these results are verified when taking into account the cumulative average abnormal returns, which is shown in Figure 2.4 and Appendix 9. It seems that the fund managers exhibit a poor performance two years leading to their replacement, implying that the reason of actual change is their underperformance in comparison to their peers. Therefore, a change in the new fund manager serves a more a favourable outcome, as the performance of the funds is stabilized and gradually rizing. Although, our results indicate that the performance of the funds deteriorates about eighteen months after the

new fund manager takes over, the perfromance of the new fund manager in comparison to the previous manager still remains favourable.

Figure 2.4: Peer Group-Adjusted Total Sample Cumulative Average Abnormal Returns

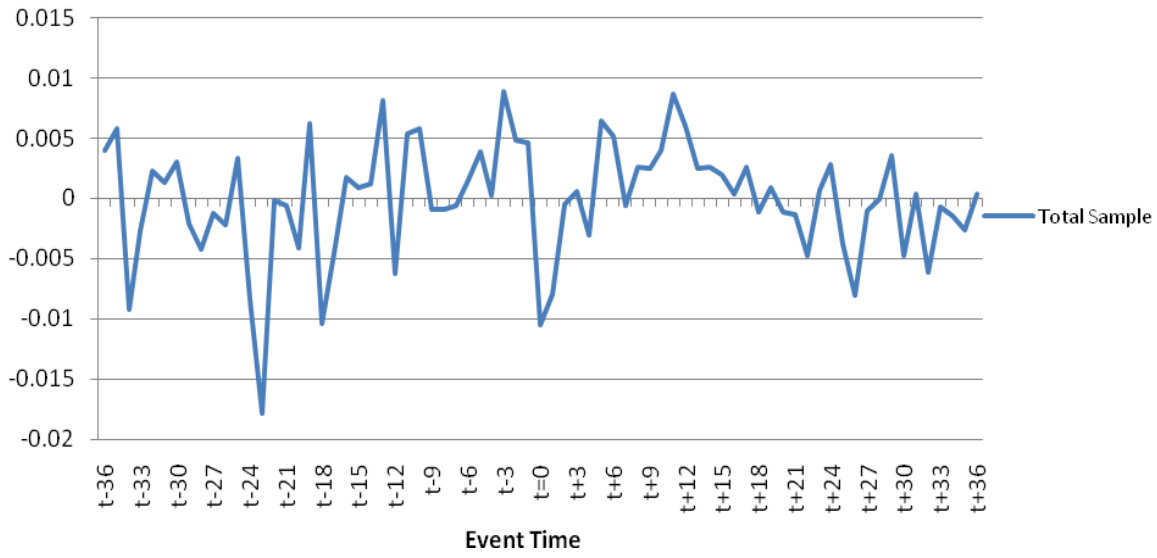


Overall, the funds in our sample are exhibiting a persistent decrease in returns before the change in manager. Once a manager has been replaced, the returns and the overall performance of the funds show an improving trend but then decrease again due to deteriorating market conditions that are part of our sample period. This can lead us to conclude that the performance of the fund managers from our sample was unsatisfactory leading to a replacement, but the replacement manager has around 10 months of the 'adjustment period' before the performance starts to improve. During the first 10 months of the post-event period, the new fund manager may have taken a more cautious outlook, taking on less risk and leading to higher returns. Although our results indicate that the performance of the funds deteriorates about twelve to eighteen months after the new fund manager takes over, the perfromance of the new fund manager in comparison to the previous manager still remains favourable.

The third method that we employed in our study to measure the performance and compute the abnormal returns of the funds throughout the event analysis is the mean-adjusted method. Specifically, for each fund we calculate the average return before the event date (from *t-36* to *t-1*) and subtract it from each month's return in the pre-event period. In this way we are able to evaluate whether a fund is experiencing abnormal

returns over its average performance before the fund manager is replaced. Subsequently, we calculate the average return after the event date (from *t+1* to *t+36*) and subtract it from each month's return in the post-event period. The result will convey whether the new fund manager exhibits higher abnormal returns. We repeat this procedure for each fund for every year in our study. The average abnormal returns for the mean adjusted method are statistically significant at periods *t-34*, *t-23*, *t-18* and *t=0*, and have a less mean-reverting trend as a comparison to the benchmark-adjusted average abnormal returns (Appendix 6). Nevertheless, the results are leading to the same conclusion as for benchmark adjusted returns. This can be seen in Figure 2.5 which shows the mean-adjusted average abnormal returns.

Figure 2.5: Mean-Adjusted Total Sample Average Abnormal Returns

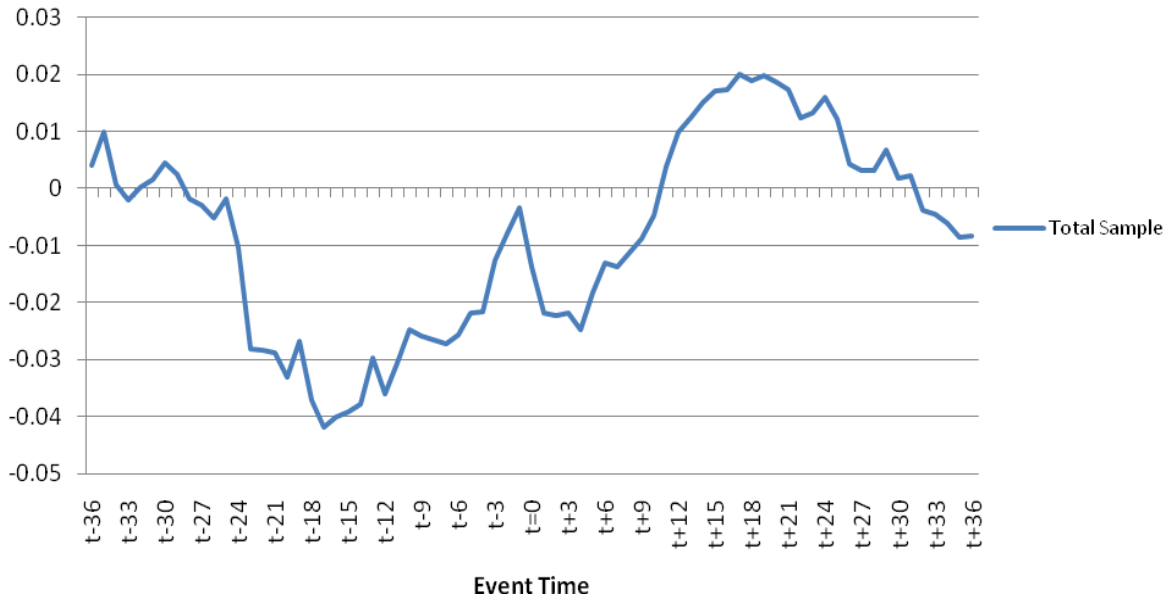


The funds exhibits positive average abnormal returns sixteen months before the event date and continue to do so until the event, with only a few negative values in between. However, during the event date and two months after the fund manager leaves the average abnormal returns decrease to negative values before they start increasing again. This implies that a new fund manager will take up to a few months before adjusting to a new position of running the fund. After one year, the new fund manager's performance deteriorates as the average abnormal returns of the funds decline from *t+12* to *t+36*.

Mean adjusted cumulative average abnormal returns exhibit a similar pattern to the benchmark-adjusted ones: returns are at their lowest one year before the event while

eight months after the change in fund manager the funds exhibit increase in cumulative abnormal returns, which continues in the succeeding months up to *t+18*. From here on, the funds depict a decline in cumulative average abnormal returns. Appendix 6 shows that the cumulative abnormal returns are statistically significant during months *t-23* to *t-11*, *t-8* and *t-7*. This leads us to deduce that the funds experience an improvement in performance before the fund manager is changed, followed by a few months of adjustment for the new fund manager. In general, as Figure 2.6 shows, eight months after the change in fund manager the funds exhibit abnormal returns which seems to continue in the succeeding ten months. Subsequently, the average abnormal returns decrease and continue to do so until the end of our estimation period. Mean adjusted cumulative average abnormal returns are shown in Figure 2.6.

Figure 2.6: Mean-Adjusted Total Sample Cumulative Average Abnormal Returns



To conclude, according to mean-adjusted method of performance, a change in fund manager does improve the funds' performance based on average abnormal returns and cumulative average abnormal returns after the event date. However, this outperformance does not persist in the long-run as the funds exhibit a decrease in return after a year and a half of the new fund manager taking over, which we believe is the result of the falling markets in 2007 and 2008.

Finally, we would expect to draw similar conclusions from the analysis of information ratios and the benchmark adjusted method, as they are both benchmark-based performance measures. Specifically, the information ratio determines the excess return of the fund manager relative to the appropriate benchmark divided by the risk the manager takes. The risk is computed by the standard deviation of the funds before and after the event date, implying that the ratio provides a risk-adjusted method of calculating the abnormal returns. We calculate the information ratio before and after the fund manager leaves enabling us to compare the performance of the funds before the event date and after the event date. Therefore, a higher information ratio insinuates higher abnormal returns, given the level of risk, and better performance from the fund manager. We initially compute the information ratio for the entire data sample before the event date and after the event date. Subsequently, we also calculate the information ratio for each of the categories of funds in order to avoid any fund-specific bias that may occur. Table 1, Panel A (Appendix 2) presents Information ratios (based on fund objectives benchmark), tracking errors, benchmark adjusted average abnormal returns and the sum of the benchmark adjusted average abnormal returns for the full sample period 36 months prior and 36 months after the event date, for total sample of funds and each of the fund groups separately. Panel B of Table 1 is the same as Panel A except that is covers only the first 12 months of the post event period to eliminate the effect of severe and prolonged equity market deterioration in 2007 and 2008. Table 1, Panel A, suggest that for the total sample of funds, the information ratio is lower for the post-event period (-0.092) in comparison to the pre-event period (-0.067). The same conclusion can be drawn from the information ratio in Panel B, Table 1. This implies that given the decrease in tracking error post event, the funds overall do not exhibit higher average abnormal returns relative to their corresponding benchmarks in the post-event period as a comparison to the pre-event period. Once a new fund manager takes over the fund, s/he is more cautious which may explain the fall in the average standard deviation and decline in the risk preference taken. Overall, this risk-adjusted measure of performance shows that there is no improvement in performance after the new manager has taken over. Information ratios by fund category from Table 1 will be discussed in the sections that follow.

4.2 Categories of Funds

In order to emphasize the effect of change of the fund manager on the performance of the funds, we divide the 258 funds into different groups. Consequently, we carry out the analysis of the performance of the funds in the same manner as for the entire sample set. This will aid us into distinguishing whether certain groups of funds are affected by the change of the fund manager to a greater extent and whether they exhibit higher abnormal returns[28].

4.2.1 Performance and manager change: Male vs. Female Managed Funds

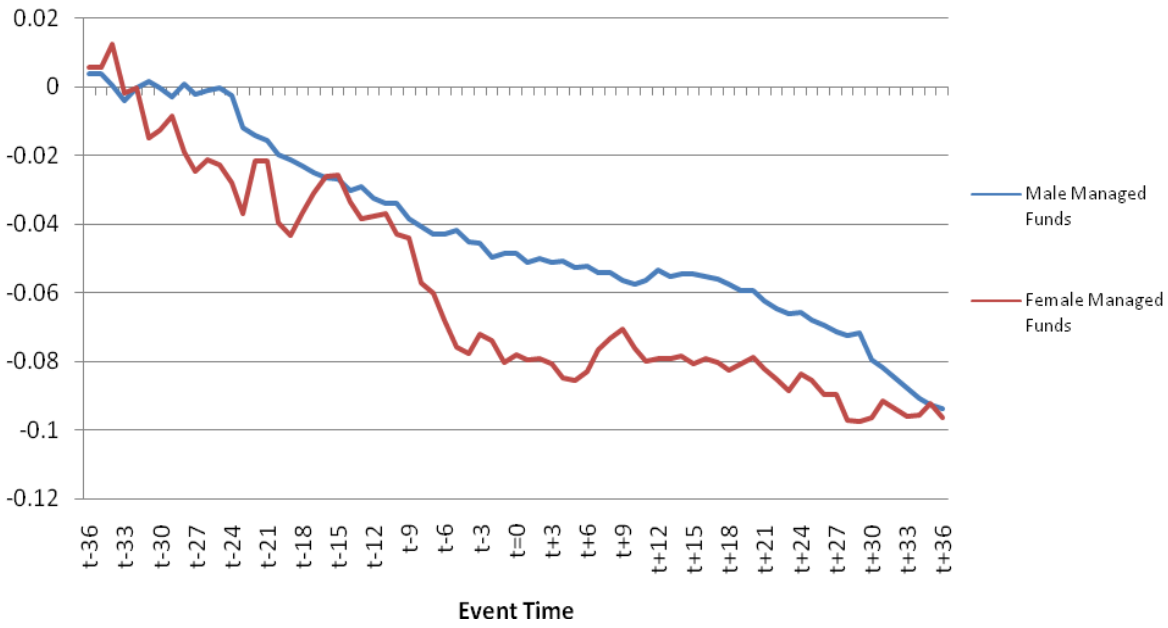
The first category of funds studied is the previously male managed funds. Specifically, a male fund manager was in charge of these funds prior to being replaced. It is not known whether a male or a female fund manager succeeded the male manager replaced. Even so, the measure of the fund performance before and after the replacement date is able to show whether male fund managers exhibit higher abnormal returns than their female counterparts do before the event date and vice versa.

Due to the fact that more than half of the funds in our data are previously male managed, the average abnormal and the cumulative average abnormal returns for the previously male managed funds demonstrate similar trends as the total sample set. Panel A of Table 1 (Appendix 2) shows that the sum of the average abnormal returns for the male managed funds is lower for the pre-event period (-0.0488) than for the post-event period (-0.0451). Figure A3.1 (Appendix 3) also indicates that the benchmark-adjusted average abnormal returns are more volatile before the event date as opposed to after the event date. From the 258 funds in our data sample only one third of the funds are previously female managed. However, our results indicate that their performance is more pronounced than that of the previously male fund managers. The sum of the benchmark adjusted average abnormal a return for the previously female managed funds during the pre-event period is -0.0805, whereas the post-event period entails an improved negative sum of -0.0159. This indicates that both previously male and female managed funds improve performance after the manager change but female managed

[28] We also carried out a significance test of the difference between the paired categories as shown in Appendix A14. All the paired categories show that there is a difference between their corresponding abnormal returns. For the style category, we paired the growth and small-cap funds and excluded the value funds as there wee only five funds in our sample.

funds improve more. From Figure 2.7 it can be seen that the cumulative average abnormal returns for the previously male managed funds show abnormal returns three years before the replacement, followed by a sharp decrease leading to the event date. However, once the male fund manager is replaced, the cumulative average abnormal returns continue to decline until *t+10*, followed by an advance in performance until *t+12*. Indeed, during these two months of our estimation, the previously male managed funds are generating abnormal returns above their benchmarks. Nonetheless, in the last two years of our estimation, the performance of the previously male managed funds deteriorates once again.

Figure 2.7: Benchmark-Adjusuted Male Managed Funds Cumulative Average Abnormal Returns

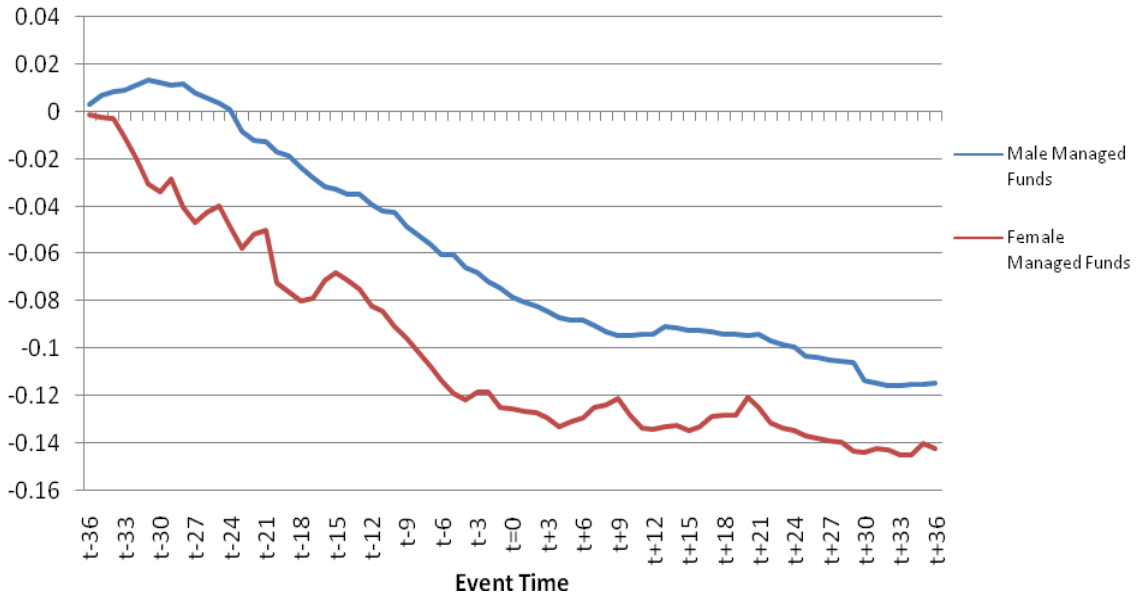


As can be seen from Figure 2.7, the performance of the previously female managed funds is substantially more volatile than that of the previously male fund managers. This is different to prior literature which advocates that female managers are more cautious and risk averse thus generally leading to a relatively steady performance. According to our results, we argue that in order to compete with their male counterparts, the female fund managers need to be more aggressive thus leading to the relatively volatile trend in performance.

Similar to the male fund managers, the previously female managed funds yield abnormal returns three years before the event date followed by a decrease in returns leading to the event date. However, the difference between the previously female managed funds and the male managed funds is their performance after the managers have been replaced as we see an improvement in the performance once the female fund manager leaves. Furthermore, the cumulative average abnormal returns for the previously male and female fund managers converge three years after the event date. This movement is depicted in Figure 2.7.

Similar results can be drawn from the peer group-adjusted method. Figure 2.8 shows the cumulative average abnormal returns for the previously male managed and female managed funds. In the case of the male managed funds, the cumulative average abnormal returns show an almost identical trend as to the results of the entire sample. The performance of these funds deteriorates two years before the male fund manager is replaced and continues to do so until the event date. This can also be seen in Figure A11.1 (Appendix 11) and Table A12.1 (Appendix 12), which illustrate the male managed average abnormal returns and the cumulative average abnormal returns. During the period a new fund manager takes over, the performance of the previously male managed fund improves, according to our results of the average abnormal returns in Appendix 11. In particular, according to peer group-adjusted return criteria, once the male fund manager is replaced, the cumulative average abnormal returns continue to decline until *t+10*, followed by an advance in performance until *t+12*. Indeed, one year after the new fund manager takes over, the previously male managed funds are generating abnormal returns above their benchmarks. However, the funds then exhibit a decline in performance lasting for about a year when they start to improve.

Figure 2.8: Peer Group-Adjusted Male vs. Female Managed Funds Cumulative Average Abnormal Returns



When considering the previously female managed funds, the reults of their performance are roughly similar to the male managed funds. However, it is interesting to observe that although the trend is simlar to the male managed funds, the female managed funds are noticeably more volatile. This can be clearly seen when examining the average abnormal returns (Appendix 11: Figure A11.2 and Appendix 12: Table A12.2). In Figure 2.8, the cumulative average abnormal returns are decreasing throughout the entire pre-event period and then become constant after the event date. However, the degree of the diminishing returns is much higher for the female managed funds in relation to the male managed funds. For female managed funds the peer group-adjusted cumulative abnormal returns show an improvement in months *t+5* to *t+12* after the replacement of female fund managers.

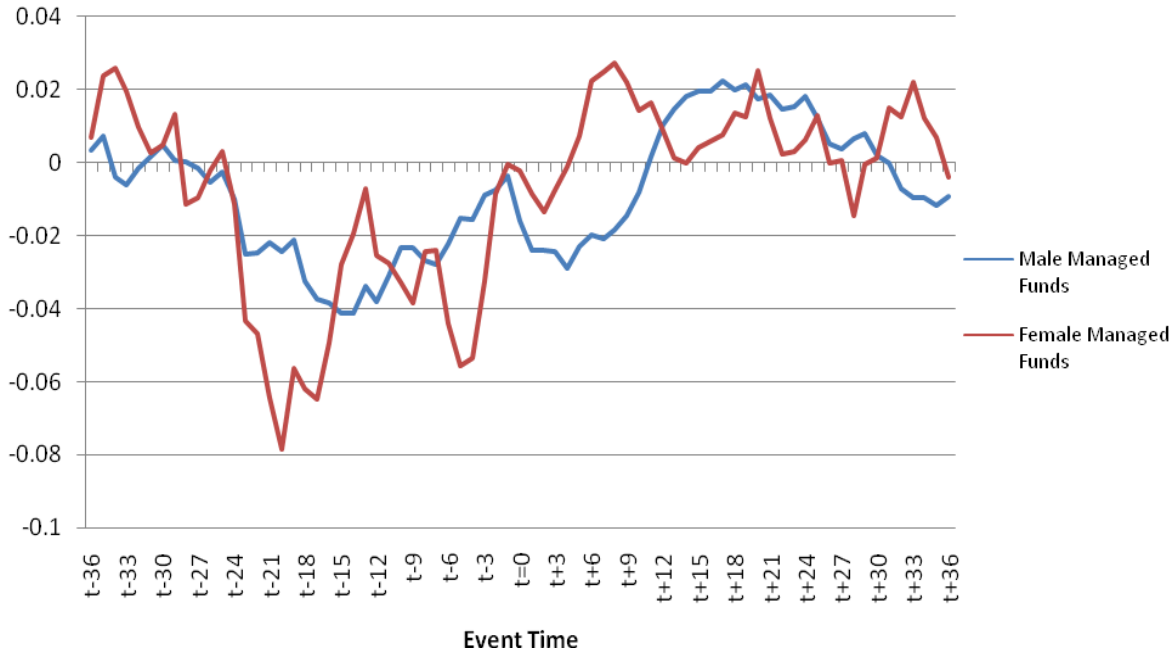
Indeed, we can conclude that the poor performance of both the male and female managed funds had led to the replacement of their managers. In particular, both categories of funds show an underperformance in relation to their peers at least two years prior to their replacemnet of fund manager. Once the change is made, both groups of funds show an improvement in performance lasting for about a year. However, for both periods, pre-event and post-event, the female managed funds depict a more volatile trend. For this reason, our results indicate that a change in fund manager will have a

positive effect on the performance of the funds, with a greater degree for the previously female managed funds. These results coincide with those of the benchmark-adjusted method.

In terms of the mean-adjusted method, the average abnormal returns for the previously male managed funds exhibit sharp increases and decrease throughout the pre-event period with months *t-34*, *t-23*, *t-18*, and *t=0* being statistically significant (Table A8.2 in Appendix 8). However, the average abnormal returns continue to be volatile seven months after the event date followed by a steady, positive growth generating positive abnormal returns. In addition, month *t+11* after the event date is statistically significant. Similarly to the results of the total sample, the average abnormal returns for the male managed funds decline one year after the male manager change and continue to underperform the average performance up to three years post manager change.

In the case of the cumulative average abnormal returns, Figure 2.9 shows a very similar movement for the previously male managed funds as for the total sample. The cumulative average abnormal returns are on large positive two years before the event date followed by negative values until the event date. For the one year before the male fund managers are replaced, their funds' performance improves until they are replaced. Nevertheless, the following months show a decrease in the cumulative average abnormal returns, which corresponds to the 'adjustment period', followed by an immense improvement in the performance of the previously male managed funds, generating abnormal returns and lasting for a period of one and a half years.

Figure 2.9: Mean-Adjusted Male vs. Female Managed Funds Cumulative Average Abnormal Returns



The previously female managed funds show a similar trend to the male managed funds before the event date, however, the consequence of replacing the female fund manager is very different as opposed to a male. Two years before the event date, the female fund managers also experience positive average abnormal returns just as the male fund managers. Nevertheless, the female managed funds seem show a more pronounced performance due to the fact that they exhibit higher negative and positive returns in comparison to the male managed funds. This can also be seen in Figure 2.9, which shows the cumulative average abnormal returns for the female managed funds. It is interesting to note that at the lowest values form *t-22* to *t-16*, the cumulative average abnormal returns are statistically significant. Moreover, a few months before the change of the female fund manager the cumulative average abnormal returns increase and, in contrast to the male managed funds, continue to do so eight months after the change of the female fund manager. However, our results indicate that eight months after the replacement of the female fund managers the funds show a decrease in the average abnormal returns and the cumulative average abnormal returns, which is in contrast to the previously male managed funds. Although the male and female fund performance trend is similar prior to manager change, we see that replacement of female managers leads to positive mean-adjusted cumulative returns.

According to all estimation methods, the average abnormal returns increase after the change in fund manager, generating abnormal returns. However, the improvement in performance is higher for the previously female managed funds for all three estimation methods. Looking at benchmark-adjusted, peer group-adjusted and mean-adjusted cumulative abnormal returns in Figure 2.7, Figure 2.8 and Figure 2.9 respectively, one can conclude that i) the performance of those funds managed by women is more volatile during the pre and post event period ii) the returns of both male and female managed funds are following a decreasing trend pre-event, and iii) after the event that the performance of funds actually improves after a period of time, up to approximately *t+12* months (depending on the method used to measure abnormal returns).

In terms of information ratios, the information ratio for previously male managed funds is lower in the post-event (-0.0889) compared to the pre-event (-0.0594) period, as shown in Panel A of Table 1 in Appendix 2 (Panel B leads to the same conclusion). On the other hand, previously female managed funds' average abnormal return, tracking error and information ratio all slightly improve in the post-event period, signalling better fund performance after the female fund manager has left. These information ratios are based on the benchmarks set and determined by funds' objectives and the findings are consistent with the ones we obtain using the benchmark adjusted method.

Therefore, our results indicate that the performance of the male and female fund managers is unsatisfactory leading to their replacement. This is because the funds of the male and female fund managers show a substantial decrease in returns in comparison the corresponding benchmarks three years prior to the change. In both cases, the returns increase after the change in fund manager, generating abnormal returns, with a longer and significantly higher period of improvement for the previously female managed funds.

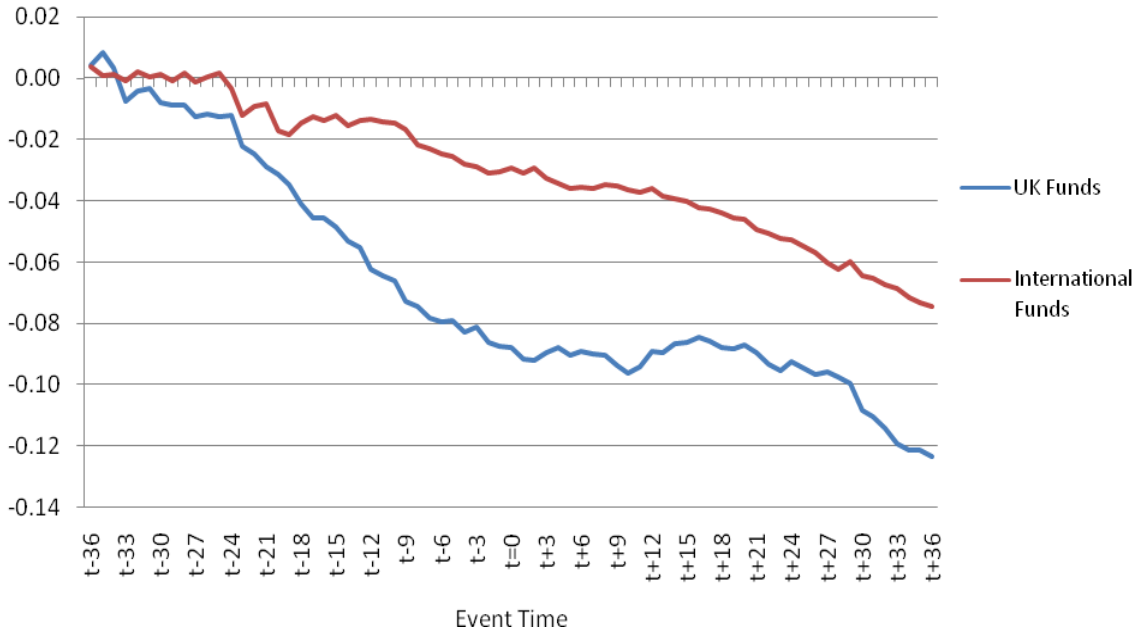
4.2.2 Performance and manager change: UK Managed Funds vs. International Managed Funds

From the 258 funds in our entire sample, 107 are UK funds while the remaining are international funds. It is interesting to note that only nine of the UK managed funds are managed by female managers and the rest are male managed. In addition, the majority are classed as equity funds. On the other hand, the remaining female managed funds are international funds. Furthermore, the international funds in our data sample belong to both developed markets and emerging markets and are a combination of equity funds and bond funds.

According to the benchmark-adjusted method, the average abnormal returns for the UK funds are on the whole negative before the event date and only during months *t-33, t-23, t-18, t-12* and *t-9* are they statistically significant (Table A4.3 in Appendix 4). However, the average abnormal returns for the UK funds become positive for some of the months after the event date. As a result, the sum of the UK funds during the pre-event period is lower than the post-event period with values of -0.0874 and -0.0358 respectively (Appendix 2). Furthermore, as seen in Figure A3.4 in Appendix 3, the average abnormal returns for the international funds before the event date follow a similar trend as for the UK funds, generating a sum of -0.0305 and -0.0436 before and after the event date respectively (Appendix 2). However, after the event date the average abnormal returns remain on majority negative. Indeed, this trend is more evident for both the UK funds and the international funds when cumulative average abnormal returns are computed. From the results in Table A4.4 in Appendix 4 it can be seen that the cumulative average abnormal returns are statistically significant fourteen and eight months before the event date for the UK and international categories respectively. Figure 2.10 illustrates the cumulative average abnormal returns for the UK and international funds of the entire estimation period and it can be concluded that the UK funds show a worse performance than the international funds. Before the event date both groups of funds exhibit negative cumulative average abnormal returns but the magnitude is higher for the UK funds. Subsequently, the international funds demonstrate higher values of cumulative average abnormal returns at periods after the event date. Our results also indicate that the performance of both groups of funds improves one year after the fund manager is

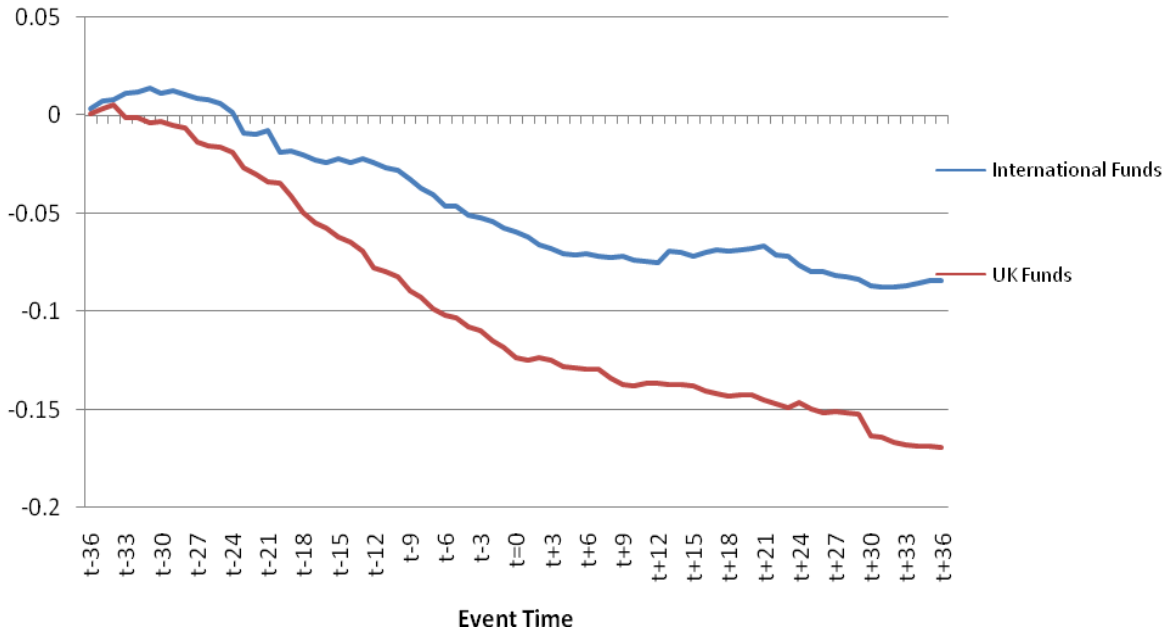
replaced. In addition, the performance of the UK funds advances substantially in the second year of the post-event period, followed by a worsening in the third year.

Figure 2.10: Benchmark-Adjusted UK Managed vs. International Managed Funds Cumulative Average Abnormal Returns



The results of the UK and the inernational funds for the peer-group-adjusted method are very much analogous to the findings of the benchmark-adjusted method. We find that both categories of funds show an underpeformance during the pre-event period in relation to their peers. When comapring the two, the UK funds demonstrate a worse performance which can be clearly seen Figure 2.11. Furthermore, the UK funds entail a more volatile trend in terms of the average abnormal returns throught the entire pre-event and post-event period (Appendix11: Figures A11.3 and A11.4). On the other hand, the international funds demonstrate a more stable performance in the post-event period in relation to the pre-event period. Nevertheless, the UK and the international funds show a steady upturn in performance according to their average and cumulative abnormal returns (Tables A12.3 and A12.4 in Appendix 12) after the fund manager is replaced.

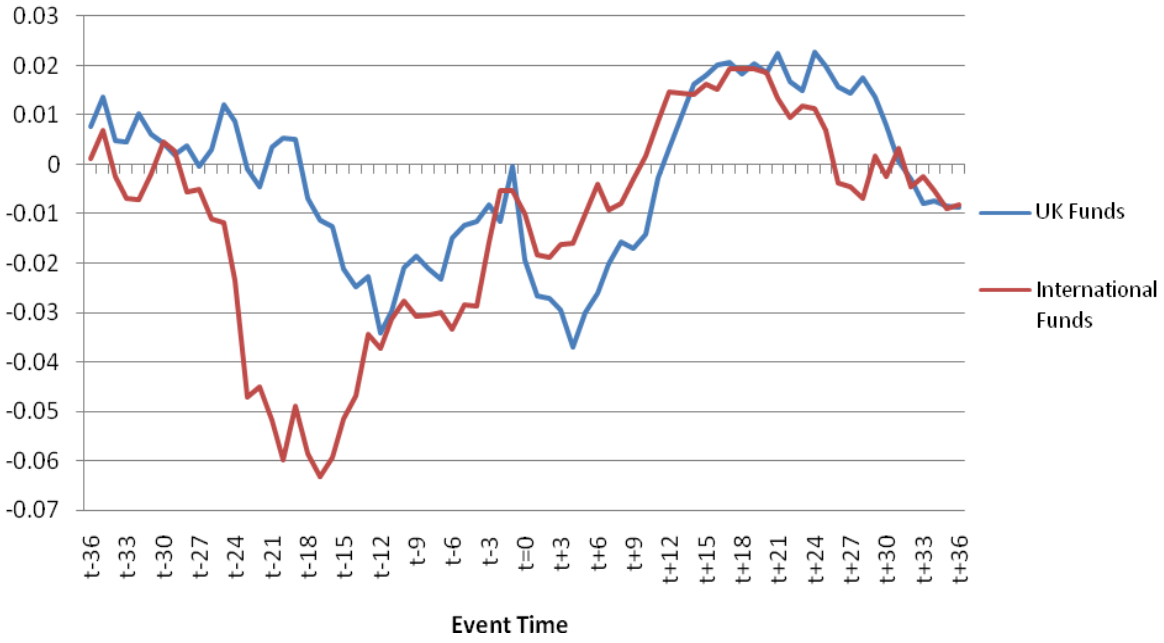
Figure 2.11: Peer Group-Adjusted UK vs. International Funds Cumulative Average Abnormal Returns



According to the mean-adjusted method, both funds exhibit postive average abnormal returns at the start of the pre-event period (Figures A7.3 and A7.4 in Appendix 7 and Tables A8.3 and A8.4 in Appendix 8). Furthermore, from period *t-8* to *t-2*, the international funds generate postitive abnormal returns, followed by a short-term decline in returns one month after the change in fund manager. However, they start to increase and continue for a period of one year post-event before they start to deteriorate until the end of our estimation. On the other hand the UK managed funds show a better performance in the pre-event period in comparison to the international funds. Similarly to the international managed funds, we see a sharp decrease in returns one month after the manager change for the UK managed funds. This trend becomes more evident when the cumulative average abnormal returns are computed for both classes of funds, which is depicted in Figure 2.12. At periods *t-36* to *t-19* the cumulative average abnormal returns are positive for the UK funds. However, both classes of funds experience a decrease in cumulative average abnormal returns, where international funds depicted a somewhat sharper decline. In addition, the cumulative returns for the international managed funds are statistically significant at their lowest values (from *t-23* to *t-14*). Indeed, our results show that the UK managed funds and the international funds follow

similar directional trends pre-event and post-event, however, the values for the international managed funds are greater in magnitude.

Figure 2.12: Mean-Adjusted UK Funds vs. International Funds Cumulative Average Abnormal Returns



Therefore, from these results we can coclude that the performance in general improves for the UK and international funds in relation to their benchmarks, peers and mean performance once a new fund manager has taken over. Nevertheless, the outperformance does not persist as the cumulative average return for both the UK and international funds decreases almost two years after the new fund manager has taken over, which we believe is a result from the market downturn in 2007 and 2008.

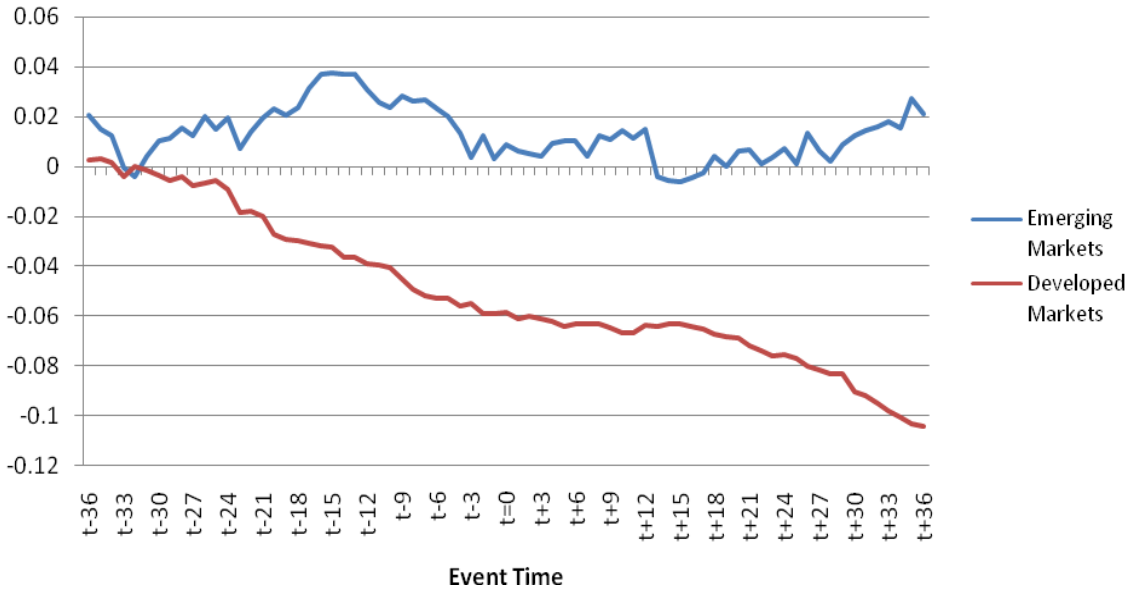
As is the case for the entire sample of funds, the information ratio for the UK managed funds and international managed funds (Table 1 in Appendix 2) is lower after the event date in relation to before the event date.

4.2.3 Performance and manager change: Emerging Markets vs. Developed Markets Funds

The emerging market funds in our sample focus on the Asian, Pacific and Latin American markets. Although the majority of the funds in our data sample are developed markets funds, we identify 17 emerging markets funds. Nevertheless, the differences in

the performance of the two markets show results that are worth demonstrating. Analysing the benchmark adjusted method, average abnormal returns for the emerging market funds and the developed market funds (Table A4.5 in Appendix 4) are positive at the start of our estimation analysis, three years prior to the event date, and then decrease to negative values. However, two years before the event date the performance of the two groups of funds move into opposite directions. The average abnormal returns for the emerging markets funds rise to positive values two years before the event date and continue to exhibit on majority positive values until the event date, with a few exceptional negative values. However, the sum of the average abnormal returns for the emerging market funds before the event date (0.0032) is lower than after the event date (0.0176), as shown in Appendix 2. Nonetheless, from the results of the cumulative average abnormal returns we can see that the change in fund manager had initiated deterioration in the performance of the emerging market funds. This can also be seen in Figure 2.13, which shows the cumulative average abnormal returns for the emerging markets funds and the developed markets funds. The cumulative average abnormal returns for the emerging markets funds exhibit positive values during the pre-event period, with the highest performance in months *t-17 to t-14*. However, six months prior to the change in fund manager the performance starts to deteriorate leading to the event date. After the fund manager change, the emerging market funds continue to outperform, albeit not to the same extent as before the event date, showing greater improvement in performance and an upward trend from *t+8* onwards. Our results also indicate a short deterioration in performance during *t+12*, followed by an increase in performance until the end of our estimation. Developed markets funds on the other hand continue to underperform their benchmarks before and after manager change, but they do show some improvement in performance. Specifically, Panel A and Panel B of Table 1 (Appendix 2) show that both average abnormal return and the sum of average abnormal return for developed markets slightly improve in the post event period, while the corresponding values more substantially improve for emerging market funds. The cumulative average abnormal returns for the developed market funds continue to remain negative form *t-31* to the event date and are statistically significant form periods *t-14* to *t+36*. Indeed, the performance of the developed market funds improves only for one year after the change in manager before it commences to deteriorate.

Figure 2.13: Benchmark-Adjusted Emerging vs. Developed Markets Funds Cumulative Average Abnormal Returns

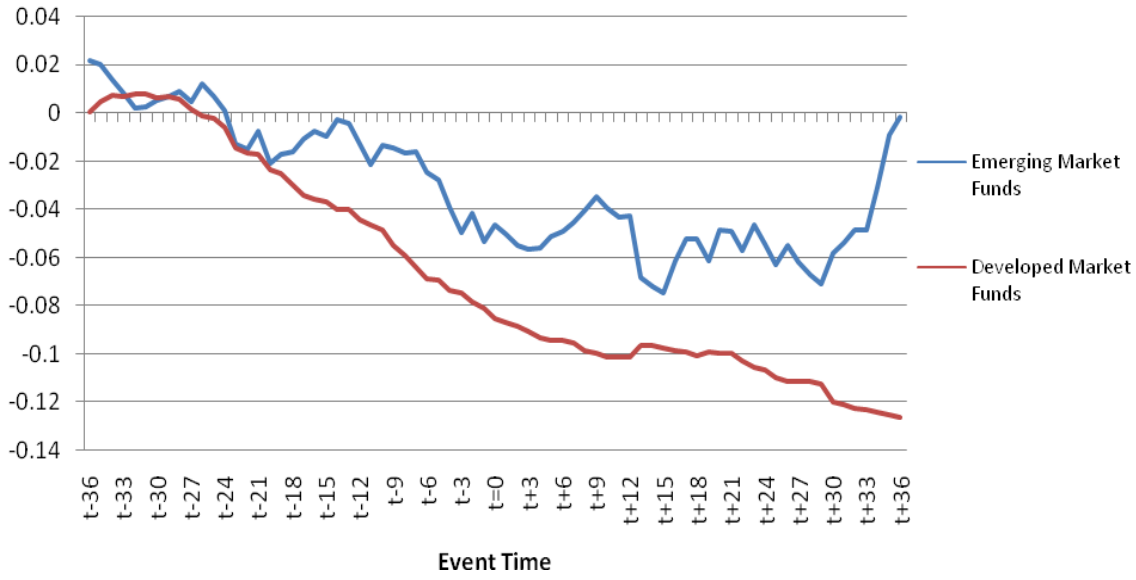


From our results and Figure 2.13, it is evident that the performance of the two classes of funds is reverse eighteen months before the event date. Therefore, it can be concluded that emerging markets funds show positive performance before the change in manager. This is also in line with practical cases due to the fact that emerging market funds are more volatile and more risky than the developed funds and the managers that are in charge of them take greater risk exposures. Furthermore, developed market funds offer more liquidity as a comparison to the emerging market funds. As a result, the reward of investing in emerging market funds is much higher at favourable times. From this, we can deduce that another institution due to their reputable performance may have hired the fund managers. The new fund managers that had taken over the emerging market funds may have adopted a more cautious outlook, bearing less risk and thus lower returns as shown in our results. Developed markets funds on the other hand continue to underperform their benchmarks before and after manager change. This leads us to conclude that the developed market funds exhibit persistence in performance before and after manager change.

Out of all different categories of funds we analyse, the results of the emerging market funds for the peer group-adjusted method show the most noticable difference to the results of the benchmark-adjusted method, while developed market funds show similar performance pattern based on both benchmark adjusted and peer adjusted methods, as

seen in Figure 2.14. The results of the peer group-adjusted average abnormal returns (Appendix 11: Figures A11.5 and A11.6 and Appendix 12: Tables A12.5 and A12.6) show that the emerging market funds exhibit more positive values and a more volatile movement throughout the entire estimation period as a comparison to the developed market funds. In addition, the average abnormal returns in the post-event period depict an increasing trend for the emerging market funds in relation to the pre-event period. Therefore, according to the peer group-adjusted method, a change in fund manager had lead to an increase in performance for the emerging market funds, which is also shown in Figure 2.14.

Figure 2.14: Peer Group-Adjusted Emerging Market vs. Developed Market Funds Cumulative Average Abnormal Returns

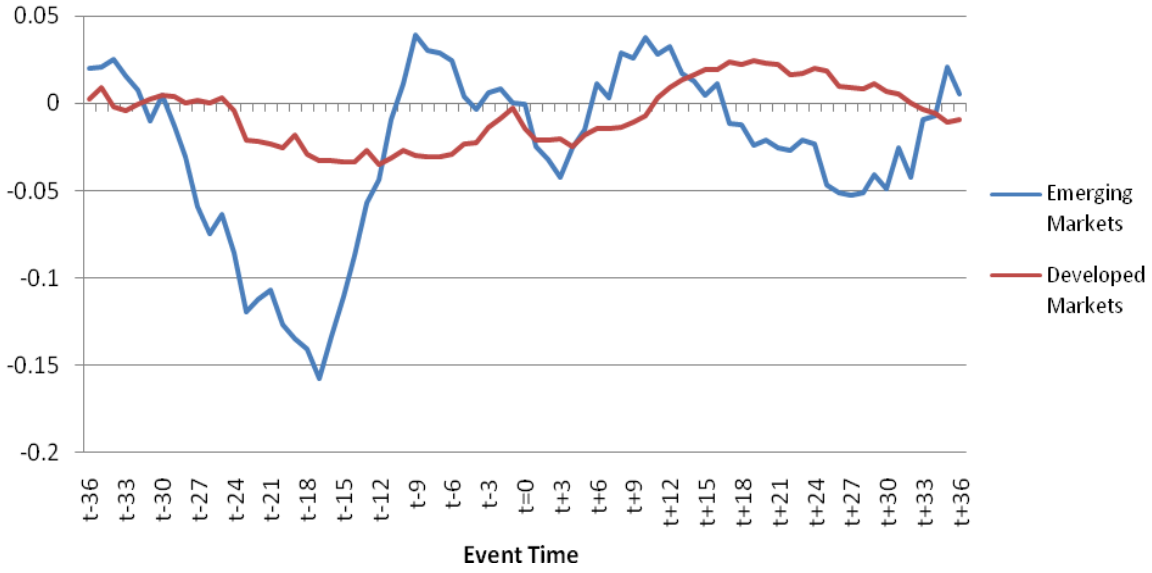


The developed market funds also confirm an improvement in performance once a new fund manager takes over. Although the average abnormal returns exibit negative values, they display an upward trend (Appendix 11: Figure A11.6). However, our results in Figure 2.14 indicate that the magnitude of the underperfomance during the pre-event period is greater for the developed market funds. There is an obvious downward trend in peer-adjusted performance for both group of funds particularly in the pre-event period. One should note that, although the trend continues to be negative after the event date, there is a slight improvement in performance for both emerging and developed markets funds in that they both generate less negative peer adjusted cumulative average abnormal returns after the management change. This is particularly pronounced among

emerging market funds, where we can identify an increasing cumulative abnormal returns pattern in the months immediately following manager change and towards the end of our sample period as well.

When the mean-adjusted performance is taken into account, as in Figure 2.15, it can be seen that i) both types of funds have decreasing or negative returns trend prior to manager change, ii) both types of funds improve performance and start generating positive cumulative mean-adjusted returns after the manager change and iii) the cumulative mean-adjusted abnormal returns revert to a decreasing pattern around a year after the manager change in emerging market funds and after about 18 months in developed market funds. Figure 2.15 indicates that although emerging market funds outperform their benchmarks, they do not manage to persistently outperform their mean, although they do exhibit periods of outperformance around ten months before and after management change for a period of few months. In addition, it can clearly be seen that mean adjusted performance of emerging market funds is decreasing just before the manager change and increasing soon after, indicating a positive effect that a change has had on the performance. However, a year after a new fund manager has taken over the performance deteriorates. Developed market funds on the other hand, do not outperform their mean or their benchmarks before or after the management change. Some improvement in mean-adjusted performance of developed funds occurs in months *t+5* to *t+12*, which enables to generate cumulative outperformance up to *t+30*, before continuing to decrease. In additon, the emerging market funds depict a signifiicant decrease in average abnormal returns during the three months after the event date followed by a steady increase in abnormal returns above the mean return (Appendix 7: Figure 5). When a new fund manager takes control of a fund, the first few months are perceived as an adjustment period which depicts the decline in returns. This aslo the case for the developed market funds, where the average abnormal returns show a superior performance above the mean returns from *t+5* to *t+17* (Appendix 7: Figure 6) . Overall, this is indicating a positive effect that a change has had on the mean-adjusted performance.

Figure 2.15: Mean-Adjusted Emerging Market Funds vs. Developed Market Funds Cumulative Average Abnormal Returns



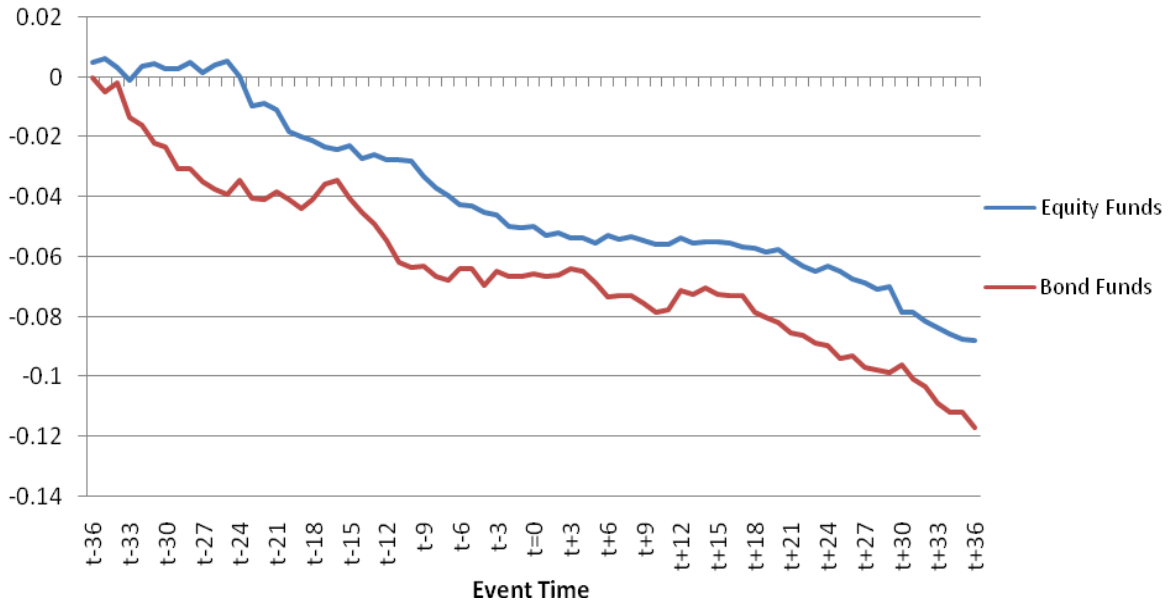
The information ratio analysis for the full sample period suggests somewhat different conclusions. Particularly, after the event, the information ratio in Panel A of Table 1 (Appendix 2) for emerging markets funds worsens from -0.0052 to -0.0153. We believe that this is heavily influenced by extreme negative returns of many emerging market funds around time period *t+12* and that is not a true reflection of performance of these funds in the post event period. Therefore, analysing information ratios in the post event period up to *t+12* only, shown in Panel B of Table 1, we find that the information ratio for emerging market funds takes a positive value of 0.0205. However, for developed market funds, the information ratio worsens and remains negative regardless of whether we measure performance over 12 months or 36 months post event. This is leading us to conclude once again that there is a short-lived improvement in performance after the change of a fund manager for emerging market funds according to this indicator, but the same cannot be stated for developed market funds.

4.2.4 Performance and manager change: Equity Funds vs. Bond Funds

The majority of the funds in our data sample are equity funds, with female fund managers being proportionate in both classes of funds according to each class's total sample. According to the benchmark-adjusted method, the equity funds have positive average abnormal returns three years prior to the event date whilst the bond funds exhibit underperfomance in relation to their benchmarks from the start of the pre-event

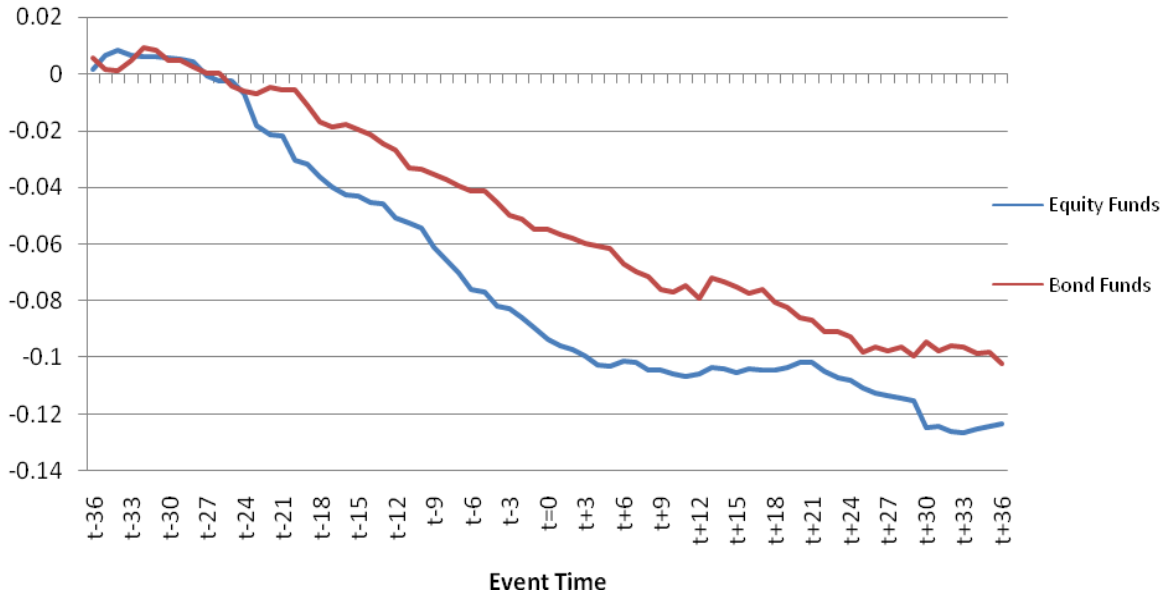
period (Appendix 4: Tables A4.7 and A4.8). Analyzing the charts of the average abnormal retuns for both categories (Appendix 3: Figures A3.7 and A3.8), it is evident that the bond funds exhibit a more volatile trend throughout the entire period. The sum of the average abnormal returns for both the equity and bond funds is lower in the pre-event period, -0.0503 and -0.0666 respectively, than for the post-event period, -0.0375 and -0.0503 respectively (Appendix 2). However, the trend for the bond funds is more prominent as can be seen in Figure 2.16, which portrays the cumulative average abnormal returns for the equity and bond funds. Up to two years before the change in manager, the equity funds exhibit postive cumulative average abnormal returns whereas the bond funds are more volatile, showing negative cumulative average abnormal returns from the start of the three year pre-event period. Furthermore, our results shown in Appendix 4 verify that the cumulative average abnormal returns for the bond funds are statistically significant twenty-seven months prior to the event date. On the other hand, the equity funds show a more steady decline in cumulative average abnormal retruns. After the change in manager, both classes of funds see a rize in average abnormal returns and a steady climb in the cumulative average abnormal returns which persists for one year after the event. However, two years after the change of fund manager, the cumulative average abnormal returns of both groups of funds declines and continues to do so up to the end of our post-event period.

Figure 2.16: Benchmark-Adjusted Equity vs. Bond Funds Cumulative Average Abnormal Returns



Similar conclusions can be drawn from the peer group-adjusted method. The average abnormal returns for the bond funds exhibit a more volatile movement in relation to the equity funds. During the pre-event period the bond funds yield positive average abnormal returns at various times whereas the equity funds only show postive returns in months *t-36* to *t-34* (Appendix 12: Tables A12.7 and A12.8). Nevertheless, both sets of funds bare an underperformance in relation to their peers before the event date, which is clearly shown in Figure 2.17. However, our results confirm that the peformance of the equity funds improves when the fund manager is changed whereas the bond funds continue to demonstrate persistant deterioration in performance even when the new fund manager takes charge. Once again, after month *t+21* the performance of the equity funds worsens.

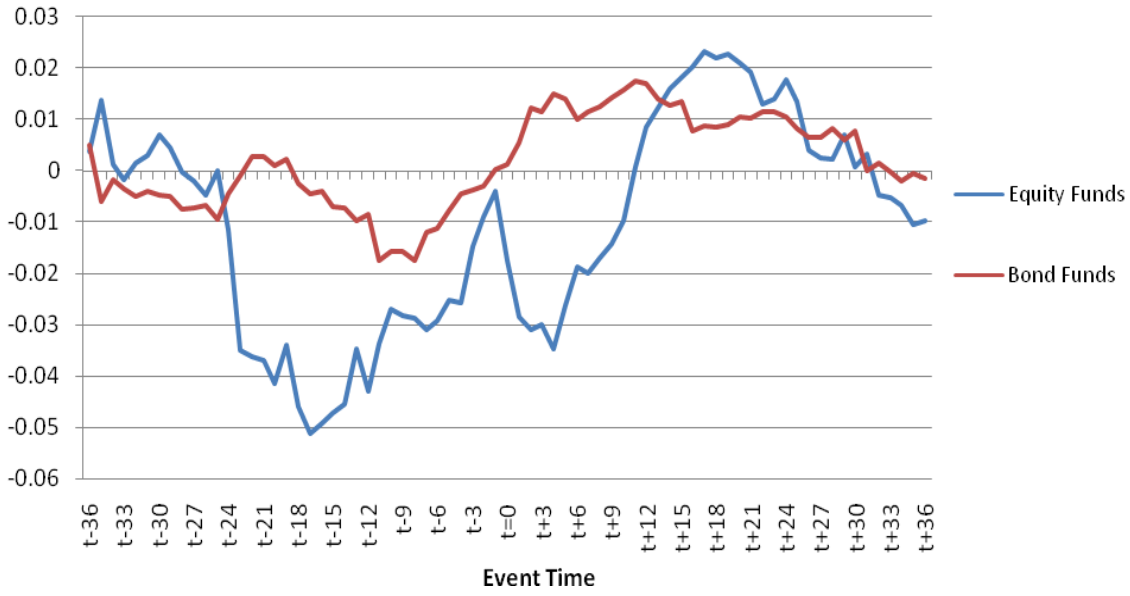
Figure 2.17: Peer Group-Adjusted Equity vs. Bond Funds Cumulative Average Abnormal Returns



In terms of the mean-adjusted method, the results of the two categories of funds is distinctively different from that of the benchmark (peer group)-adjusted models. Under the mean-adjusted model, both sets of funds exhibit postive average abnormal returns at the start of the pre-event period (Appendix 7: Figures A7.7 and A7.8). Furthermore, our results indicate a sharp decrease of average abnormal returns for the equity funds two years before the event date and a generally more volatile trend throughout the pre-event

period as a comparison to the bond funds. This movement is more pronounced when taking into account the cumulative average abnormal returns as seen in Figure 2.18.

Figure 2.18: Mean-Adjusted Equity Funds vs. Bond Funds Cumulative Average Abnormal Returns



About twelve months before the change in fund manager, the equity funds and the bond funds show an increase in cumulative abnormal returns, with preceding underperformance of the funds in relation to their mean return. Furthermore, as a new fund manager takes over, the performance of the equity funds weakens for a short period of time, implying a possible adjustement period and a more cautious outlook by the new fund manager. In contrast, the bond funds show an increase in cumulative average abnormal returns six months before the change in fund manager, which continues five months after the change. Nevertheless, from months *t+8* to *t+12* the equity funds and the bond funds show abnormal returns over the mean return. However, the increase above their corresponding mean returns is higher for the equity funds. Similarly to rest of the categories of funds, wee see a decrease in the abnormal returns for the the equity and bond funds about eighteen months after the new fund manager has taken over, which in cosequence deteriorates the cumulative performance. From these results we can conclude that the change in fund manager has played a positive role in the performance of both group of funds, but with a larger extent on the equity funds. Nevertheless, the oupteperformance does not persist.

In terms of information ratios, values in Panel A of Table 1 (Appendix 2) show that the bond funds and equity funds exhibit a decrease in information ratios after the change in fund manager (the same results are found in Panel B of Table 1). As a result we can conclude that according to the benchmark-, peer group- and mean-adjusted methods the change in fund manager has had an affect on the performance of the equity funds. In this case, a fund manager plays a significant role in determining the performance of the fund. On the other hand, it is interesting to note that this argument can not be applied to the bond funds, although we result in a higher information ratio in the post-event period. Even when the fund manager is replaced, the underperformance of the bond funds in relation to their peers continues to decline, and we only see a short-term improvement in the performance of both the bond the funds according to the benchmark- and mean-adjusted methods.

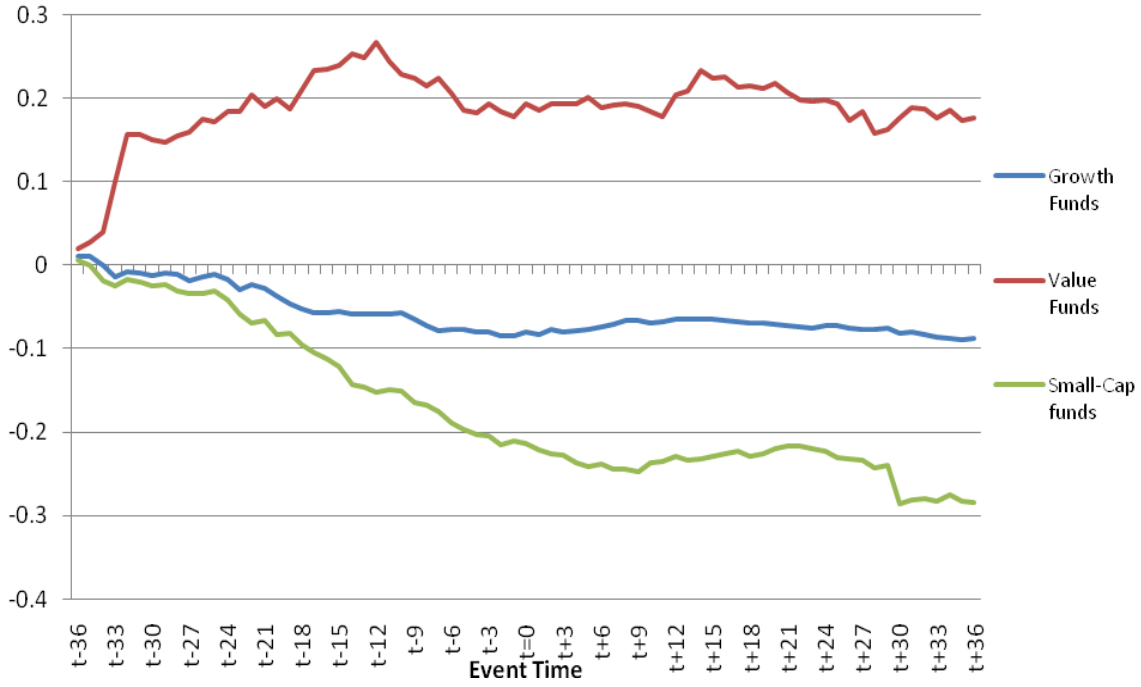
4.2.5 Performance and manager change: Growth Funds, Value Funds and Small Capitalization Funds

We divide the equity funds into style categories, specifically growth funds, value funds and small capitalization funds. Out of the entire sample of funds, 76 of them are equity growth, 27 are small cap and five funds follow value style. Due to the fact that there are only five value funds, we admit that the results may not be indicative and representative due to a small sample bias[29]. Analyzing the benchmark-adjusted method, the average abnormal returns for the all three fund classes are positive at the start of our analysis, three years before the change in manager (Appendix 4: Tables A4.9, A4.10 and A4.11). From Appendix 2 one can see that the value funds display positive benchmark-adjusted average abnormal returns before and after the event date, growth funds have positive average benchmark-adjusted abnormal returns after the event date and small cap funds are underperforming the benchmark on the average before and after the manager change. More specifically, the sum of the average abnormal returns for the small capitalization and growth funds increases in the post-event period, generating a value of -0.0742 and -0.0041 respectively, whereas the value funds decrease to -0.0024 (Panel A of Table 1 in Appendix 2). This can also be seen in Figure 2.19, which demonstrates the

[29] The sample of the value funds could not have been increased as these were the only value funds in our sample of manager changes.

cumulative average abnormal returns for the growth funds, value funds and small capitalization funds.

Figure 2.19: Benchmark-Adjusted Growth , Value and Small-Cap Funds Cumulative Average Abnormal Returns

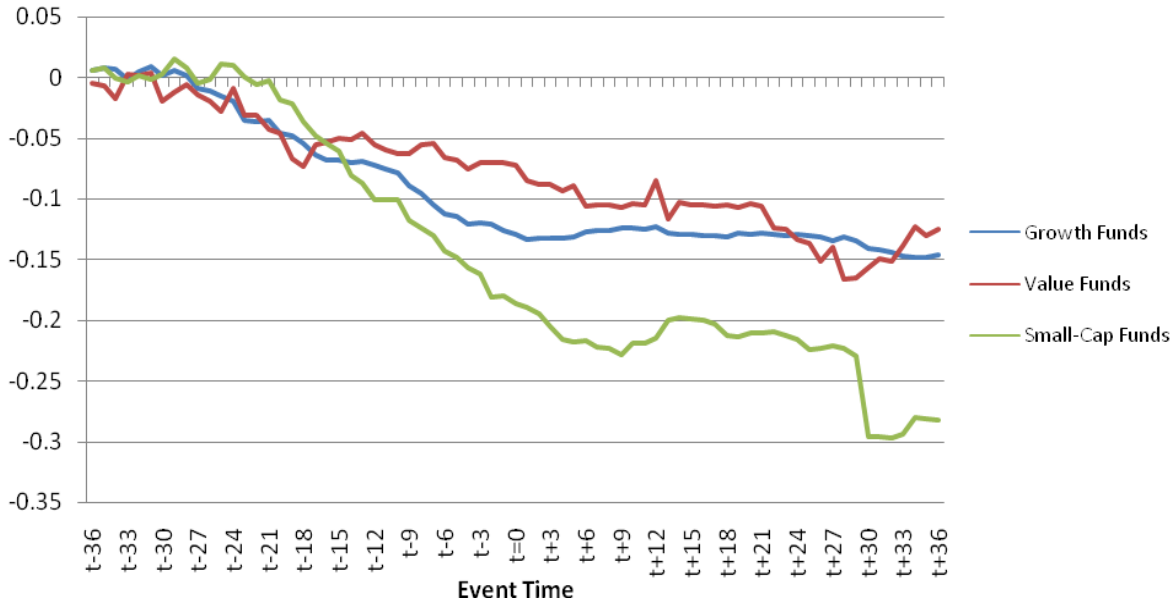


Tables A4.9, A4.10 and A4.11 (Appendix 4) also gives detail that the cumulative average abnormal returns during our entire estimation period are statistically significant for the growth funds (*t-18* to *t+36*), value funds (*t-33* to *t+36*) and small capitalization funds (*t-15* to *t+36*). Value funds are the only ones that outperform throughout the period based on their cumulative average abnormal returns. It can be noted that all three group of funds show a decline in performance before the manager change, which is consistent to the conclusions related to other group of funds analysed. After the manager change there is no extreme improvement in benchmark-adjusted performance for any of the three groups of funds over the 36-month period. In particular, the figures in Panel A of Table 1 show that the value funds display positive benchmark-adjusted average abnormal returns before the event date, and that those fall just below zero after the event date as a stream of negative average abnormal returns after the manager change is generated. On the other hand, growth and small cap funds show improvement in average abnormal returns after the event, even though they are still negative in cumulative terms before and after the event date. In addition, the sum of the average

abnormal returns for all three funds is negative after the event period for all funds, but small cap and growth funds exhibit improvement in those returns during the post-event period. However, if we take only the first 12 months after the manager change into account, as in Panel B of Table 1, the sum of average abnormal returns and average abnormal returns not only improve after the event for all three groups of funds, but are in fact positive for value funds and growth funds. This improvement in performance over the shorter period after manager change followed by deterioration in returns is consistent to what we have observed in other fund groups that we analyse.

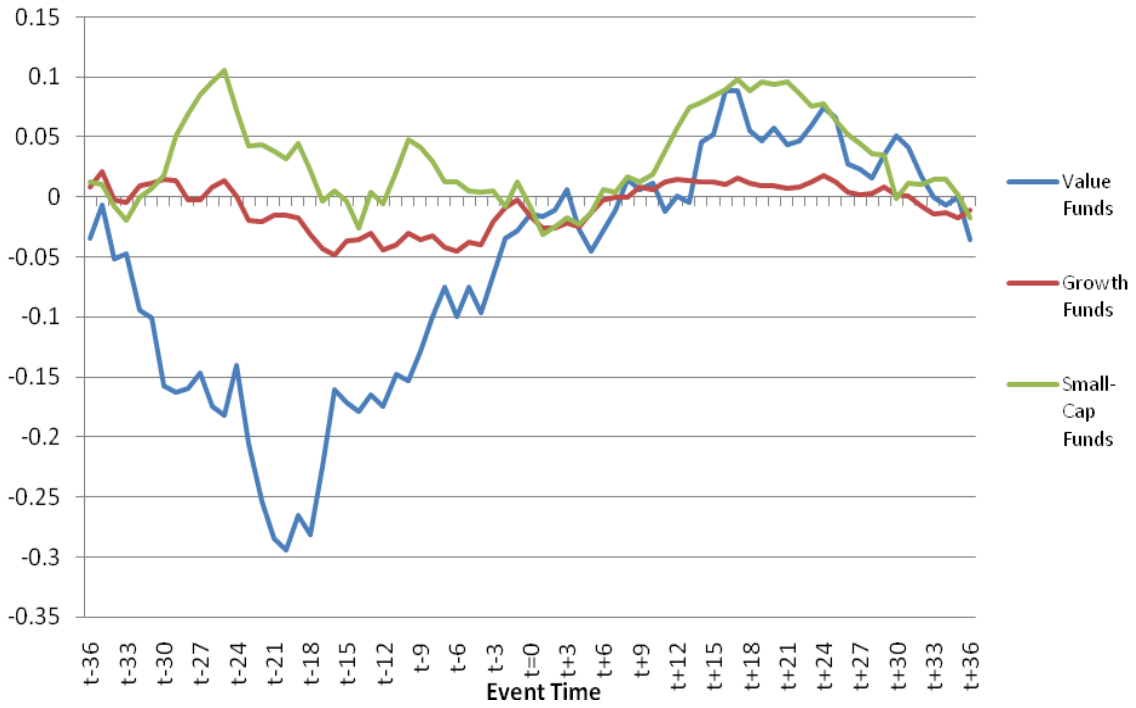
The results of the three equity styles of funds for the peer group-adjusted method are somewhat different to the results generated by the benchmark-adjusted method. According to the peer group-adjusted results in Appendix 12: Tables A12.9, A12.10 and A12.11, only the growth funds and the small capitalization funds demonstrate positive returns above their peer benchmarks three years prior to the event date. In addition, the value funds and the growth funds are more volatile during the entire estimation period whereas the small capitalization funds depict a considerably steady trend in the post-event period (Appendix 11: Figures A11.9, A11.10 and A11.11). Peer group adjusted performance of all three styles of equity funds improves slightly in the first 12 months of the post-event period, with the growth funds and small capitalisation funds showing more improvement right after the manager change, as seen in Figure 2.20. Nevertheless, although cumulative returns are still negative for all three styles of equity funds, they all yield positive average returns above their peer benchmarks at the end of the post-event period. A change in fund manager had led to a more favourable outcome in the performance of the value, growth and small capitalization funds. The underperformance of the funds in relation to their peers proved to be the main force behind the change in fund manager. As a result to the replacement, the funds appear to demonstrate superior performance, adding to the belief that the fund manager plays a vital part in determining the performance of the funds in question.

Figure 2.20: Peer Group-Adjusted Growth, Value and Small-Cap Funds Cumulative Average Abnormal Returns



The first glance of mean adjusted cumulative abnormal returns suggests more striking findings to benchmark-adjusted and peer-adjusted methods. Particularly, as seen in Figure 2.21, in the several months leading to manager change all three groups of funds perform below their means. After the manager change, their performance increases significantly above their respective means, showing a great degree of improvement for all three groups of funds. The cumulative abnormal returns remain above the mean until approximately *t+30*, showing a decreasing trend from around *t+20* onwards for all three groups of funds.

Figure 2.21: Mean-Adjusted Value, Growth and Small-Cap Funds Cumulative Average Abnormal Returns



In terms of information ratios, values in Panel B of Table 1 (Appendix 2) show that in the first 12 months of post change period, all three fund categories exhibit increase in the information ratio, with value and growth funds having positive post-event information ratios of 0.1134 and 0.0337 respectively. However, if we take into account the full 36 months post event period, the information ratio in Panel A of Table 1 of value funds decreases from 0.0622 in the pre event period to 0.0307 in the post event period, while growth funds and small cap funds' information ratios improve post event, however still remaining in the negative range taking values of -0.0272 and -0.0133 for growth and small cap funds respectively. The three groups of funds generate lower average tracking error in the post-event period. From this, one can conclude that the new fund manager is more vigilant with lower deviations from the benchmark's return.

Overall, regardless of the method used to assess the performance, all three groups of funds show improvement in performance after the manager change, with the greatest degree of improvement being for small cap and growth stocks. This holds particularly in the first year after the manager change, at the time when the severe market downturn of 2007 and 2008 did not yet start influencing the performance of funds.

Indeed, it is important to note that all of the eleven categories of funds in our study show a lower value in the average standard deviation for the post-event period in relation to the pre-event period. The pre-event managers were taking higher risks (higher average standard deviation in pre-event period) while striving for higher returns in order to keep hold of their jobs. On the other hand, we can also conclude that the new fund manager is more vigilant with lower deviations from the fund's average return. As is the case for the entire sample of funds, the information ratio for the male managed, UK managed funds, international managed funds, developed market funds, emerging market funds, equity funds, bond funds and equity value is lower after the event date in relation to before the event date. However, only the female managed funds, equity growth funds and equity small capitalization funds obtain higher information ratios in the post-event period in comparison to the pre-event period. The three groups of funds generate lower average standard deviations in the post-event period, which increases each corresponding information ratio after the event date. Out of all the categories of funds in our study, only the equity value funds exhibit positive information ratios in the post-event period (0.0307). Furthermore, they are the only category of funds in our analysis that generate positive information ratios during the pre-event period and the post-event period.

Furthermore, in order to provide robust results, we also compute the information ratios for the total sample of funds and for each category based on the peer group-adjusted returns. Table A10.1 in Appendix 10 shows the average tracking error, average abnormal return and information ratio for each category. Table A10.1 suggests that for the total sample of funds, the information ratio is higher for the post-event period (-0.0750) in comparison to the pre-event period (-0.1258). Information ratio for male managed funds is substantially higher in the post-event (-0.0674) compared to the pre-event (-0.1154) period. Similarly, female managed funds' average abnormal return, tracking error and information ratio all slightly improve in the post-event period. In terms of the UK funds and the inetrnational funds, the tracking error, average abnormal return and information ratio improve in the post-event period as a comparison to the pre-event period. Therefore, from these results we can coclude that the performance in general improves for the UK and international funds in relation to their peers once a new fund manager has taken over. Further, the information ratio for emerging markets

funds and developed market funds increases from -0.0873 to -0.0507 and from -0.1286 to -0.0767 respectively after the event leading us to conclude once again that improvement in performance is more prominent after the change of a fund manager in an emerging market fund. In the case of the equity funds, the tracking error, average abnormal return and information ratio all improve in the post-event period in relation to the pre-event period The same scenario is consistent with the bond funds. Value, growth and small cap funds exhibit increase in the information ratio after the event from -0.1289 to -0.1061 for value funds, -0.1287 to -0.0276 for growth funds and -0.1910 to -0.1099 for small cap funds. We also see that the tracking errors and average abnormal returns improve in the post-event period for the growth funds and the small cap funds, with a slight increase in tracking error for the value funds.

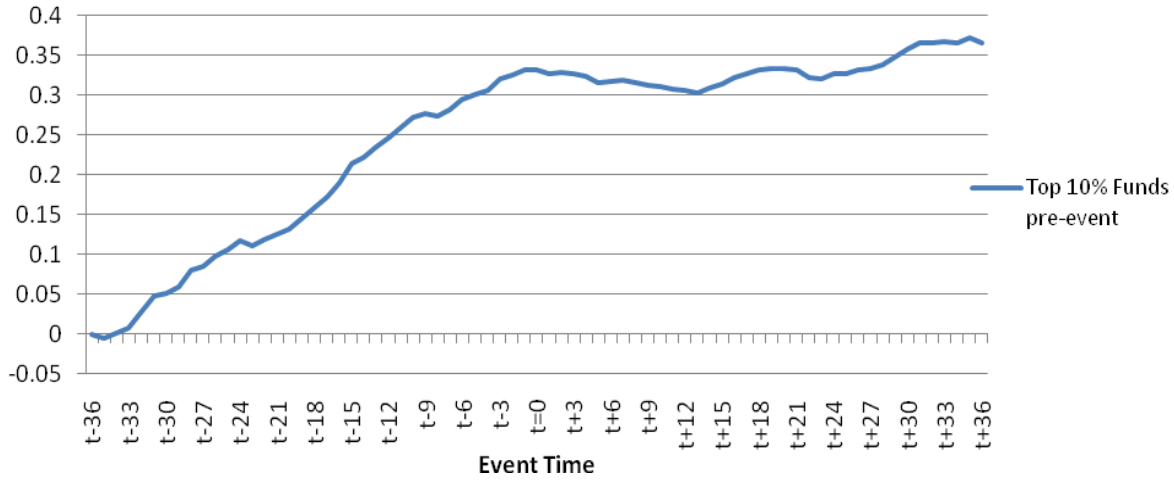
4.3 Persistence of Performance and Manager Change: Best Ten Percent vs. Worst Ten Percent Performing Funds

In this section, we attempt to answer whether the performance of the funds in our total sample persists. In particular, we examine whether the top performing funds, or the 'winners', continue to outperform, and whether the bottom performing funds, or the 'losers', persist on underperforming after the change in fund manager. In order to rank the performance of the funds, we employ the information ratio. More specifically, we rank the individual funds according to their corresponding information ratios before the event date and identify the top ten percent. Subsequently, this also allows us to identify the bottom ten percent funds according to the pre-event information ratio. In this way, we are able to examine performance of those two groups of funds, winner and loser funds, after the event to assess if there is any persistence in performance among the top or the bottom performers.

In this section, we first report benchmark adjusted cumulative average abnormal returns for top 10% and bottom 10% of the funds, followed by results of peer group-adjusted cumulative average abnormal returns. According to our benchmark-adjusted results in Appendix 5 (Chart A5.1), the average abnormal returns for the top 10% of the funds in our entire data sample on majority generate positive alphas above the corresponding benchmarks. During months *t-24* and *t-8* the funds depict a short-term decrease but only for a duration of one month for both periods. However, two months before the event

date, the top 10% funds of the pre-event period generate lower returns resulting in a decline in average abnormal returns. The deterioration of returns continues into the post-event period, resulting in lower returns in comparison to the corresponding benchmark and the pre-event period. We can also observe this movement when taking into account the cumulative average abnormal returns. This benchmark adjusted cumulative performance for top 10% of funds is presented in Figure 2.22.

Figure 2.22: Benchmark-Adjusted Cumulative Average Abnormal Returns - Top 10% Funds according to IR pre-event

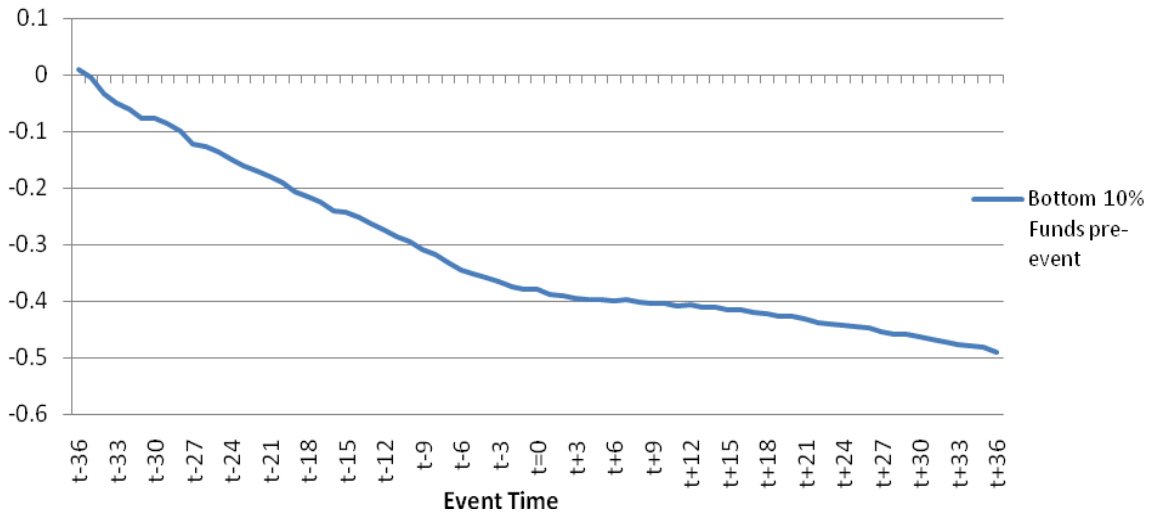


The rise in the cumulative average abnormal returns can be observed almost from the start of our analysis, from *t-36*, up to the event date, *t=0*. However, after the event date the cumulative average abnormal returns gradually start to decline until the end of first year post event, *t+12*. From *t+12* up to the end of our analysis, *t+36*, the funds once again exhibit an increase in the cumulative average abnormal returns, but at a lower rising rate. From these results, we can conclude that the prior, or pre-event, winner funds do not exhibit the same performance in the post-event period due to the fact that their returns are relatively lower in the post-event period. In particular, once a new fund manager takes over the outperformance of the winner funds ceases to persist for a period of one year before it improves but at a relatively lower rate. On observing individual funds within the 10% of top performers, we find that some of the funds after the change in fund manager continue to outperform, but only for a very short period (a month or two to three months) until performance starts to decline. This indicates that the manager's portfolio decisions continue to have a positive impact after they have left,

but eventually this positive influence wanes and is generally not replicated by the new management. The new management tends to pick up the increase in performance usually after a year after they start managing the fund. This leads us to conclude that the performance of the past winners does not persist immidiatelly after the manager change but tends to improve after a period of time.

When taking into account the bottom 10% of the funds according to their information ratio, the trend and consequences of change in fund manager is different as a comparison to the top 10%. In particular, as these are the pre-event 'loser' funds, their returns naturally decline prior to the event date. On average, the abnormal returns for the bottom 10% of funds are negative during the pre-event period, though showing a gradual increase from month *t-5* onwards (Appendix 5: Figure A5.2). However, the the previously bottom 10% of the funds still generate negative values over their corresponding benchamrks in the post-event period. This can aslo be seen Figure 2.23, which depicts the cumulative average abnormal returns for the bottom 10% of the funds based on the pre-event period.

Figure 2.23: Benchmark-Adjusted Cumulative Average Abnormal Returns - Bottom 10% Funds according to IR pre-event



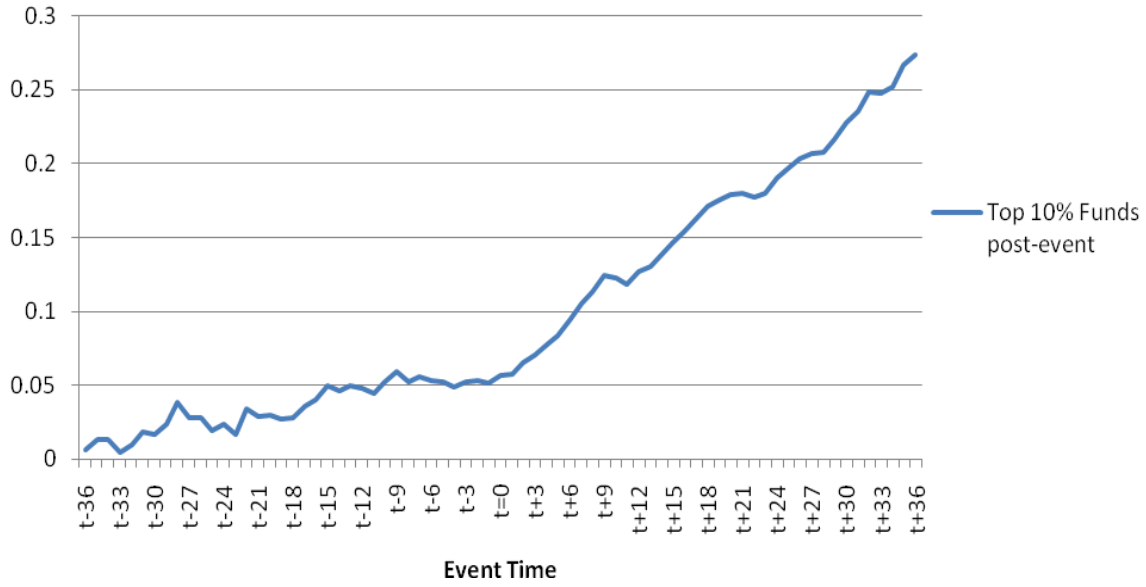
In particular, as these are the pre-event 'loser' funds, their returns naturally decline prior to the event date. From the start of our analysis, the funds experience a significant decline in cumulative average abnormal returns leading to the event date. As a the fund a manager is replaced, cumulative average abnormal returns of the previously bottom

10% funds persist to decline but at a lower diminishing rate. Therefore, the performance of the loser funds does continue to persist in the post-event period as in the pre-event period, even if a new fund manager has taken over the funds. Consequently, the poor performance of the fund managers of the bottom ten percent performing funds may have led to their replacement. In other words, investors in these funds should not pin their hopes on a rapid turnaround in performance when their poorly performing manager leaves.

In order to employ robust results for the degree of persistence in the performance of the funds, we examine the past performance of the post-event winner and loser funds. Specifically, we rank the top 10% and bottom 10% of funds during the post-event period according to the funds' corresponding information ratios.

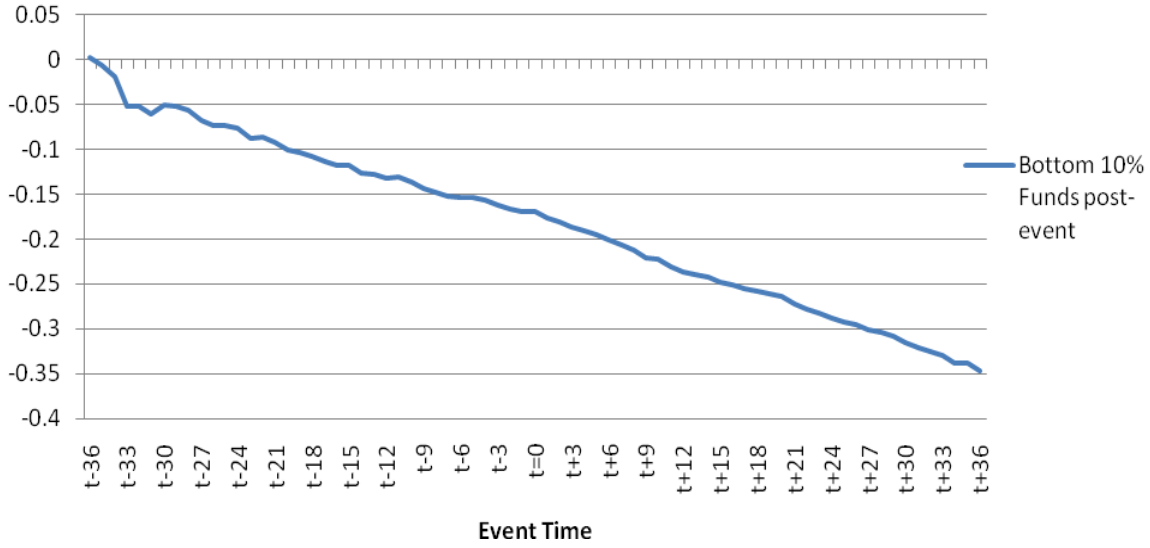
Appendix 5 (Figure A5.3) depicts the results of the average abnormal returns for the top 10% of funds in the post-event period. Naturally, the funds exhibit higher returns in relation to their benchmarks in post-event period, resulting in positive average abnormal returns during the majority of that period. However, when taking into account the pre-event period, the average abnormal returns demonstrate a volatile movement throughout. As shown in Figure 2.24, the cumulative average abnormal returns in the post-event period are substantially higher and increasing at a considerably higher rate than that of the pre-event period. From these results we can deduce that the funds which demonstrate a superior performance in the post-event period have not shown the same performance in the pre-event period. Therefore, the superior performance of these funds has not continued from the pre-event period, indicating that a change in fund manager has had a positive effect on their performance generating higher abnormal returns.

Figure 2.24: Benchmark-Adjusted Cumulative Average Abnormal Returns - Top 10% Funds according to IR post-event



Furthermore, we aslo study the past performance of the bottom 10% of the funds in the post-event period in order to determine whether their performance had persisted from the pre-event period. According to the results of the funds' average abnormal returns, only during months *t-36, t-32, t-30* and *t-22*, had the the funds generated positive average abnormal returns, (Appendix 5: Figure A5.4). However, on average the funds displayed lower returns during the pre-event period in comparison to their benchmarks, resulting in negative average abnormal returns. This can aslo be seen in Figure 2.25, which shows the cumulative average abnormal returns for the bottom 10% of the funds in the post-event period. The cumulative average abnormal returns decline at *t-30* and continue to do so up to the end of our analysis, *t+36*.

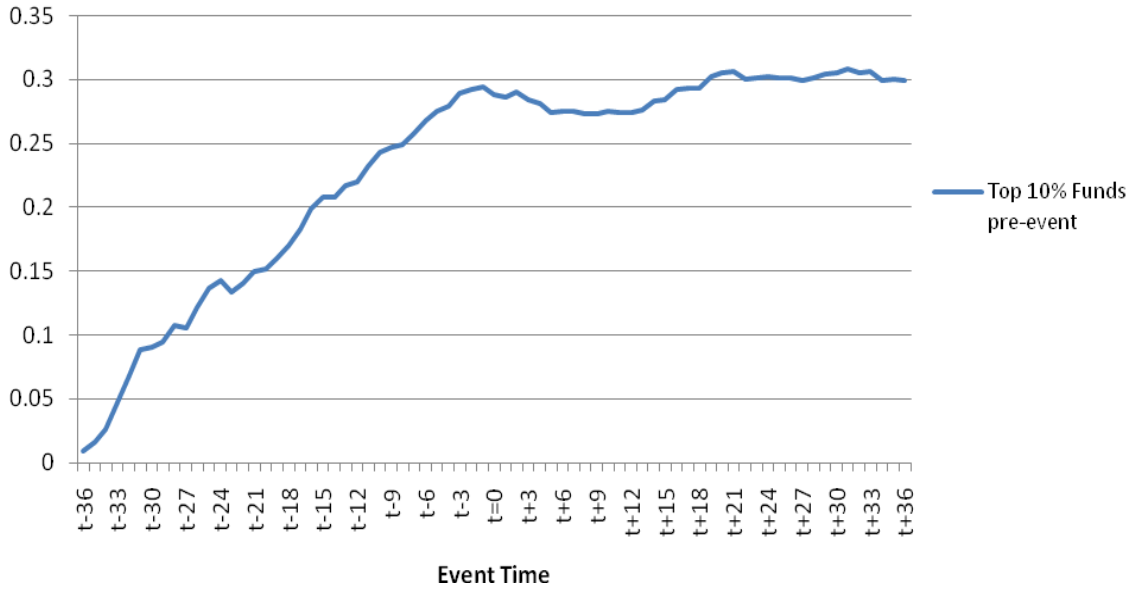
Figure 2.25: Benchmark-Adjusted Cumulative Average Abnormal Returns - Bottom 10% Funds according to IR post-event



Even after a change in fund manager the performance of the funds has not improved. As a result, we can conclude that the loser funds in the post-event period have persisted in their performance from the pre-event period, which supports our finding on performance persistence among underperforming funds. On the other hand, our results indicate that the past outperforming funds do not continue to outperform immediately when a new manager takes over. After the first year of the new manager taking over the fund, the performance of these past winner funds tends to improve.

Similar results can be drawn from the peer group-adjusted cumulative average abnormal returns for top 10% and bottom 10% of the funds. Figures A13.1 and A13.2 in Appendix 13 show the results for the average abnormal returns for top 10% and bottom 10% funds respectively. For the top 10% of the funds, our results indicate that the funds outperformed their peers in the entire pre-event period, with the only exception of month *t-23*. However, three months before the event date the average abnormal returns begin to decline. This trend persists in the post-event period and it is evident from Figure A13.1 that performance of the funds in the post-event period is significantly poorer as a comparison to the pre-event period and the peer group benchmark. The performance of the top 10% funds can also be observed when taking into account the cumulative average abnormal returns, Figure 2.26.

Figure 2.26: Peer Group-Adjusted Cumulative Average Abnormal Returns - Top 10% Funds according to IR Pre-Event



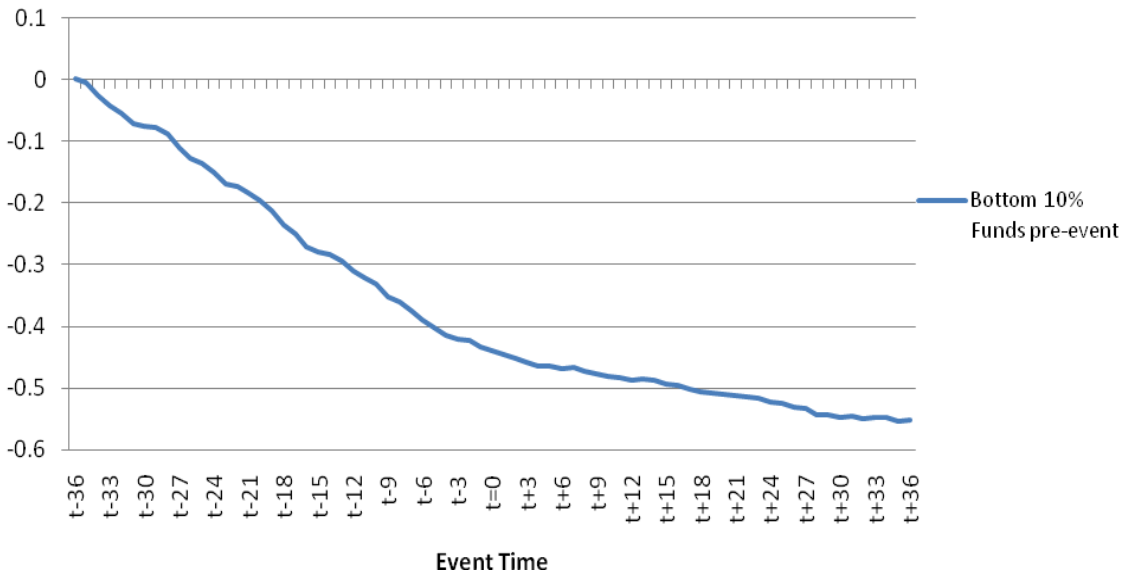
During the pre-event period, the funds depict an apparent rise in the cumulative avarege abnormal returns. Once the event date takes place the performance of the funds becomes constant and shows a significant decline in relation to the peer group benchmarks. Therefore, we see that these funds show a superior performance during the pre-event period and as soon as the fund manager is replaced their performance deteriorates. This leads us to conclude that the performance of the past winners does not persist and the impact of the fund manager being replaced played a significant role in the deterioration.

Indeed, a possible reason behind the replacement of the fund managers whose funds were ranked in the top 10% is that they had been poached by some other institution. A new fund manager that had taken control of these funds may have taken a more cautious position, which is evident from the results in the post-event period. These results concur with the results of the benchmark-adjusted method.

When taking into account the bottom 10% performing funds according to their Information Ratio, we see an almost reverse scenario. During the pre-event period, the average abnormal returns for these funds was negative throughout the three years (Appendix 13: Figure A13.2). Therefore, these funds were underperforming in relation to their peers. In this case, three months before the event date, the funds' performance begins to improve rising to postive returns in *t+7*. The improvement in the performance

of the bottom ten percent funds during the pre-event period is apparent in the post-event period. However, the past underperforming funds still continue to underperform their peers in the post-event period.This can aslo be seen in Figure 2.27, which shows the cumulative average abnormal returns.

Figure 2.27: Peer Group-Adjusted Cumulative Average Abnormal Returns - Bottom 10% Funds according to IR Pre-Event



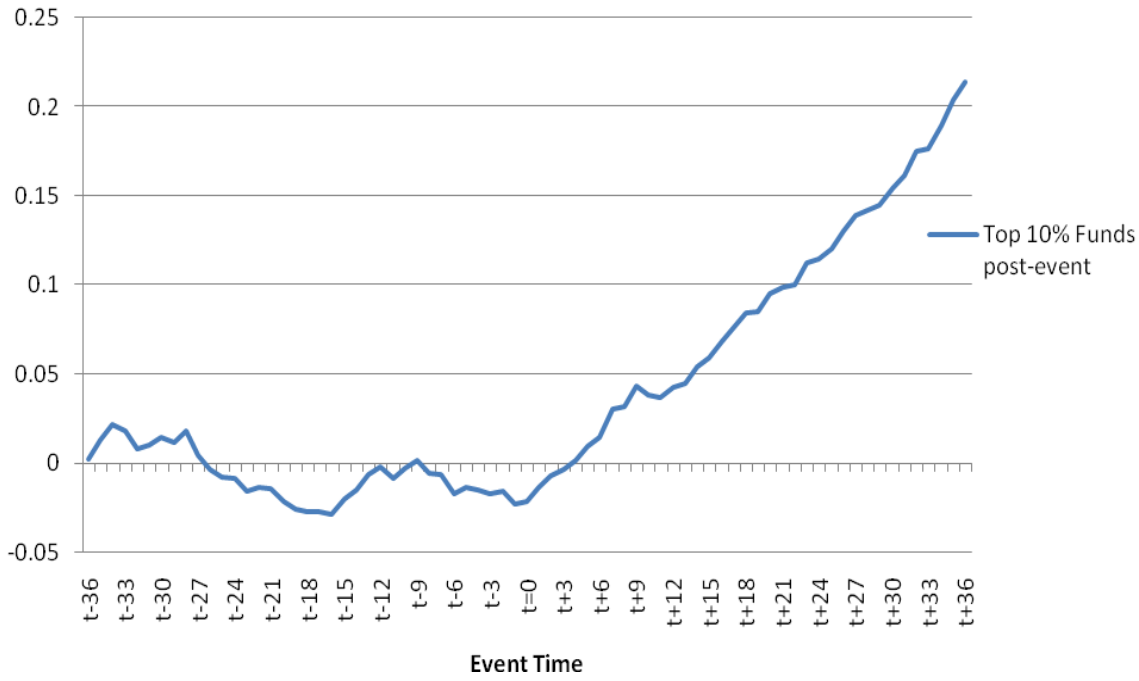
Three years prior to the event date the funds demonstrate a falling trend in the cumulative average abnormal returns up to the event date. Following the event date, the performance of the funds slightly improves as the returns of the funds in relation to their peers become more stabilized. Nonetheless, the funds still continue to generate negative returns in respect to their peer benchmarks even after the change in fund manager. Consequently, the poor performance of the fund managers of the bottom 10% performing funds may have led to their replacement. The new fund managers that had taken over may need more time to show a better performance than their preceding managers, which provides a possible reasoning to the negative average abnormal returns in the post-event period.

Furthermore, we also ranked funds according to their Information Ratios in the post-event period[30]. This will provide us with an indication of whether the performance of the funds in the post-event period had persisted from the pre-event period. More

[30] The same analysis was carried out as for the benchmark-adjusted method.

specifically we want to see whether the post-event winner funds (loser funds) were pre-event winner funds (loser funds). According to the results in Appendix 13 (Figure A13.3), the top 10% performing funds in the post-event period generated returns above their peers in the period after the event date. However, the pre-event period for these funds depicts a very different scenario. Our results indicate that these funds were underperfoming during the pre-event period, which had consequently led to a replacement in fund manager. As soon as a new fund manager takes over, the average abnormal returns for these funds significantly increases. This trend is even more pronounced when taking into account the cumulative average abnormal returns shown in Figure 2.28. Our results indicate that the outperformnace of the funds in the post-event period did not take plae in the pre-event period. This leads us to conlude that the fund managers that were underperforming in the pre-event period had been replaced due to their poor performance. In fact, the new fund managers that had taken over demonstate a significant imrovement in the fund performance. Through these results we can conclude that a change in fund manager entailed favourable outcomes.

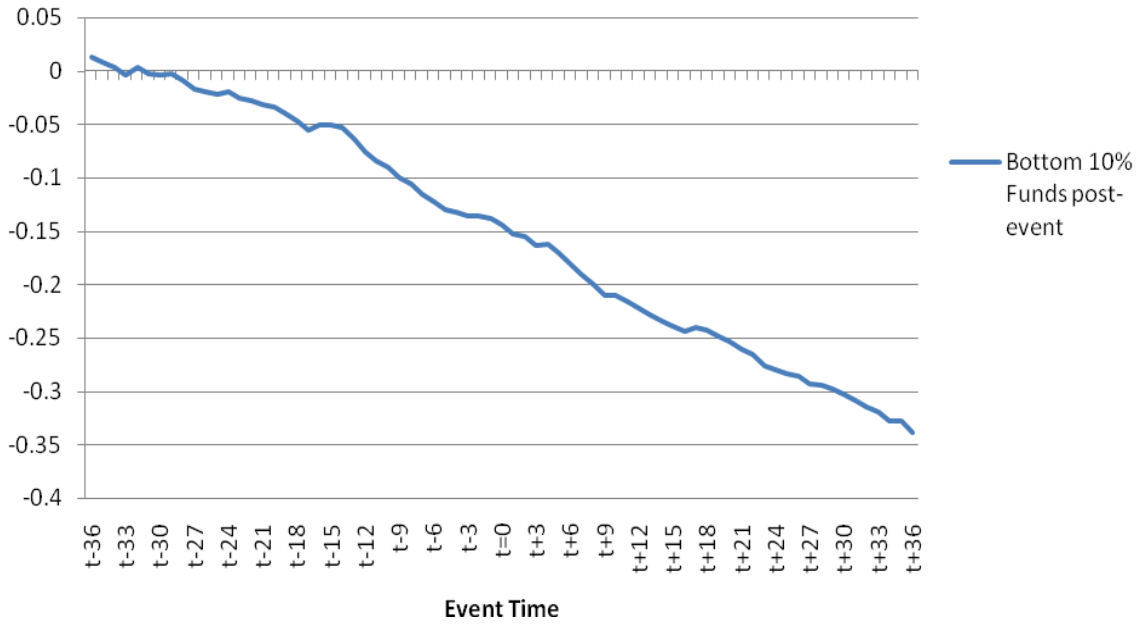
Figure 2.28: Peer Group-Adjusted Cumulative Average Abnormal Returns - Top 10% Funds according to IR Post-Event



In terms of the bottom 10% of funds during the post-event period, our results show that their performance had persisted from the pre-event period. Only during months *t-36*, *t-*

32, t-29, *t-24* and *t-16* had the funds generated returns above their peer benchmarks. For the remaining months the funds underperformed in relation to their peers (Appendix 13: Figure A13.4). This trend can aslo be seen in Figure 2.29, which takes into account the cumulative average abnormal returns for the bottom 10% peforming funds in the post-event period. The cumulative average abnormal returns decline at *t-24* and continue to do so up to the end of our analysis, *t+36*, implying a persistence in the underperformance of the funds. In this case, the change of fund manager had no impact on the performance of funds as they continued to deteriorate in the post-event period.

Figure 2.29: Peer Group-Adjusted Cumulative Average Abnormal Returns - Bottom 10% Funds according to IR Post-Event



5. CONCLUSION

The study examines how the performance of UK funds is affected when a fund manager leaves by examining the performance of those funds three years before and after the manager replacement. This provides us with an answer to whether it is in fact the manager that has an impact on the performance of the funds. In particular, we assess whether there is an impact of a manager change and whether this impact varies depending upon whether the fund manager is male or female; whether the fund is a developed or emerging markets fund; UK or international fund, bond or equity fund and depending upon the fund's style, that is, growth, value or small cap. In addition, we examine if there is persistence in performance across top and bottom performing funds after the manager change.

We construct a unique database for UK manager changes in the period April 2002 to December 2005 and use an event study methodology to assess performance before and after management change. Specifically, we measure the performance using 1) benchmark adjusted returns, both in terms of i) benchmarks set by the objectives of a fund and ii) peer-group benchmarks; 2) mean-adjusted returns and 3) information ratios. Performance is measured three years prior to the change in fund manager and three years after that change.

Our findings suggest that the performance of the funds in our sample broadly improves up to a year following a change in manager regardless of which method for assessing performance is used. Two years prior to the manager change the average abnormal returns are at their lowest and are generally more volatile during the pre-event period compared with the post-event period. However, in the second and the third year following managers' change, the performance starts descending largely, we believe, due to exceptionally bad conditions in financial markets during 2007 and 2008, which are the last two years of our data sample. We document evidence that suggests that the performance of those funds managed by women is more volatile during the pre-event period, and that the performance of the fund actually improves more on average after the female fund manager has been replaced rather than male. We find greater persistence in out-performance across emerging market funds, particularly up to 12 months after the change of manager. Further, small cap and growth equity funds

improve their performance following the manager change. We also find that for the majority of the categories of funds the improvement of the performance in the post event period lasts for duration of about eighteen months after a new fund manager takes over. In addition, focussing on the prior performance of the funds in our sample, our results indicate that the ten percent of top performing funds before the change in fund manager continue to outperform in the longer run, but there is evidence that their performance slightly declines in the year following the change. This implies that there is no immediate persistence in performance in funds classified as 'winners' before the event date. We find however that the bottom ten percent of performers prior to the manager change makes little difference to their subsequent performance, so that underperformance persists at least for the following three years. This paper presents the first evidence of such phenomena in the UK's fund management industry.

APPENDIX 1

Table A1.1 Benchmark-Adjusted AARs and CAARs (* indicates 5% significance level)

Event Time	Average Abnormal Returns	*T-test*	Cumulative Average Abnormal Returns	*T-test*
t-36	0.004314302	1.62	0.004314302	0.228
t-35	0.00053391	0.20	0.004848212	0.256
t-34	-0.001483869	-0.56	0.003364344	0.178
t-33	-0.006397176	-2.40*	-0.003032833	-0.160
t-32	0.003498183	1.31	0.000465351	0.025
t-31	-0.000740737	-0.28	-0.000275387	-0.015
t-30	-0.001028939	-0.39	-0.001304326	-0.069
t-29	-0.000729925	-0.27	-0.002034251	-0.108
t-28	0.000804434	0.30	-0.001229817	-0.065
t-27	-0.003782734	-1.42	-0.005012551	-0.265
t-26	0.001612215	0.61	-0.003400336	-0.180
t-25	0.000307357	0.12	-0.003092979	-0.164
t-24	-0.003227322	-1.21	-0.006320301	-0.334
t-23	-0.00940271	-3.53*	-0.015723012	-0.832
t-22	0.000872481	0.33	-0.014850531	-0.785
t-21	-0.001113567	-0.42	-0.015964098	-0.844
t-20	-0.006184065	-2.32*	-0.022148163	-1.171
t-19	-0.001508671	-0.57	-0.023656834	-1.251
t-18	-0.000617128	-0.23	-0.024273962	-1.284
t-17	-0.001059697	-0.40	-0.025333659	-1.340
t-16	-0.000662308	-0.25	-0.025995967	-1.375
t-15	0.000226	0.08	-0.025769966	-1.363
t-14	-0.004162014	-1.56	-0.02993198	-1.583
t-13	0.00058912	0.22	-0.02934286	-1.552
t-12	-0.002976535	-1.12	-0.032319395	-1.709*
t-11	-0.000976182	-0.37	-0.033295577	-1.761*
t-10	-0.001596914	-0.60	-0.034892491	-1.846*
t-9	-0.003816025	-1.43	-0.038708516	-2.047*
t-8	-0.004110115	-1.54	-0.042818631	-2.265*
t-7	-0.002069901	-0.78	-0.044888532	-2.374*
t-6	-0.00184448	-0.69	-0.046733012	-2.472*
t-5	-0.000287807	-0.11	-0.047020819	-2.487*
t-4	-0.002677181	-1.01	-0.049698	-2.629*
t-3	0.000226273	0.09	-0.049471727	-2.617*
t-2	-0.003541863	-1.33	-0.05301359	-2.804*
t-1	-0.000133914	-0.05	-0.053147504	-2.811*
t=0	0.000331215	0.12	-0.052816	-2.793*

t+1	-0.002278706	-0.86	-0.055095	-2.914*
t+2	0.000361195	0.14	-0.054734	-2.895*
t+3	-0.001062844	-0.40	-0.055797	-2.951*
t+4	0.00032502	0.12	-0.055472	-2.934*
t+5	-0.002018345	-0.76	-0.05749	-3.040*
t+6	0.0006675	0.25	-0.056822	-3.005*
t+7	-0.00087749	-0.33	-0.0577	-3.051*
t+8	0.00066233	0.25	-0.057038	-3.016*
t+9	-0.001452885	-0.55	-0.058491	-3.093*
t+10	-0.002025754	-0.76	-0.060516	-3.200*
t+11	0.000237361	0.09	-0.060279	-3.188*
t+12	0.002889389	1.09	-0.05739	-3.035*
t+13	-0.001644719	-0.640	-0.059186011	-3.152*
t+14	0.000749212	0.292	-0.0584368	-3.112*
t+15	-0.000228327	-0.089	-0.058665127	-3.124*
t+16	-0.000643316	-0.250	-0.059308443	-3.158*
t+17	-0.000801394	-0.312	-0.060109837	-3.201*
t+18	-0.001513557	-0.589	-0.061623394	-3.281*
t+19	-0.001348605	-0.525	-0.062971999	-3.353*
t+20	0.000249672	0.097	-0.062722327	-3.340*
t+21	-0.003013023	-1.173	-0.06573535	-3.500*
t+22	-0.002243593	-0.873	-0.067978944	-3.620*
t+23	-0.001782029	-0.694	-0.069760973	-3.715*
t+24	0.000889805	0.346	-0.068871168	-3.667*
t+25	-0.00217972	-0.849	-0.071050887	-3.783*
t+26	-0.001771217	-0.690	-0.072822104	-3.878*
t+27	-0.00176026	-0.685	-0.074582364	-3.971*
t+28	-0.001955399	-0.761	-0.076537763	-4.076*
t+29	0.000569326	0.222	-0.075968438	-4.045*
t+30	-0.006310127	-2.457*	-0.082278565	-4.381*
t+31	-0.001172913	-0.457	-0.083451477	-4.444*
t+32	-0.00293104	-1.141	-0.086382518	-4.600*
t+33	-0.00272091	-1.059	-0.089103427	-4.745*
t+34	-0.002459054	-0.957	-0.091562481	-4.876*
t+35	-0.00106135	-0.413	-0.092623831	-4.932*
t+36	-0.001577722	-0.614	-0.094201552	-5.016*

APPENDIX 2

Table A2.1 Information Ratio and Summary of Benchmark-Adjusted AARs and CAARs pre- and post-event

PANEL A: Information Ratio, Benchmark-Adjusted AARs and CAARs 36 months pre- and post-event								
	Average Tracking Error		Information Ratio		Average Abnormal Returns		Sum Average Abnormal Return	
	Pre-event	Post-event	Pre-event	Post-event	Pre-event	Post-event	Pre-event	Post-event
Total Sample	0.0248	0.0174	-0.0670	-0.0920	-0.0014	-0.0012	-0.0538	-0.0403
Male	0.0241	0.0175	-0.0594	-0.0889	-0.0014	-0.0012	-0.0487	-0.0450
Female	0.0279	0.0172	-0.1269	-0.1086	-0.0025	-0.0001	-0.0805	-0.0159
UK Funds	0.0237	0.0165	-0.0928	-0.0845	-0.0025	-0.0008	-0.0874	-0.0358
International Funds	0.0255	0.0182	-0.04911	-0.09737	-0.0009	-0.0012	-0.0306	-0.0437
Emerging Markets	0.0271	0.0224	-0.0052	-0.0153	0.000	0.0003	0.0032	0.0177
Developed Markets	0.0246	0.0171	-0.0715	-0.0975	-0.0017	-0.0012	-0.0588	-0.0451
Equity	0.0263	0.0186	-0.0466	-0.0626	-0.0504	-0.0375	-0.6413	-2.3245
Bonds	0.0189	0.0131	-0.1472	-0.2074	-0.0017	-0.0012	-0.0667	-0.0503
Value	0.0313	0.0190	0.0622	0.0307	0.0033	-0.0005	0.1782	-0.0024
Growth	0.0273	0.0182	-0.0602	-0.0272	-0.0023	-0.0003	-0.0842	-0.0041
Small	0.0355	0.0263	-0.1239	-0.0133	-0.0067	-0.0024	-0.2105	-0.0743

PANEL B: Information Ratio, Benchmark-Adjusted AARs and CAARs 36 months pre- and 12 months post-event								
	Average Tracking Error		Information Ratio		Average Abnormal Returns		Sum Average Abnormal Return	
	Pre-event	Post-event	Pre-event	Post-event	Pre-event	Post-event	Pre-event	Post-event
Total Sample	0.0248	0.0174	-0.0670	-.0853	-0.0014	-0.0004	-0.0538	-0.0042
Male	0.0241	0.0175	-0.0594	-0.0789	-0.0014	-0.0004	-0.0487	-0.0054
Female	0.0279	0.0172	-0.1269	-0.1239	-0.0025	-0.0001	-0.0805	0.0013
UK Funds	0.0237	0.0170	-0.0925	-0.0984	-0.0025	-0.0001	-0.0872	-0.0021
International Funds	0.0256	0.0178	-0.0467	-0.0800	-0.0009	-0.0006	-0.0295	-0.0058
Emerging Markets	0.0271	0.0177	-0.0052	0.0205	0.0001	0.0005	0.0032	0.114
Developed Markets	0.0246	0.0175	-0.0715	-0.0927	-0.0017	-0.0004	-0.0588	-0.0054
Equity	0.0264	0.0184	-0.0454	-0.0493	-0.0016	-0.0003	-0.0502	-0.0038
Bonds	0.0189	0.0141	-0.1442	-0.2272	-0.0016	-0.0006	-0.0641	-0.0060
Value	0.0313	0.0158	0.0622	0.1134	0.0033	0.0009	0.1782	0.0254
Growth	0.0273	0.0189	-0.0602	0.0227	-0.0023	0.0013	-0.0842	0.0192
Small	0.0355	0.0239	-0.1239	-0.0789	-0.0067	-0.0013	-0.2105	-0.0181

APPENDIX 3: Benchmark-Adjusted Average Abnormal Returns for all Categories

Figure A3.1 Male Managed Average Abnormal Returns

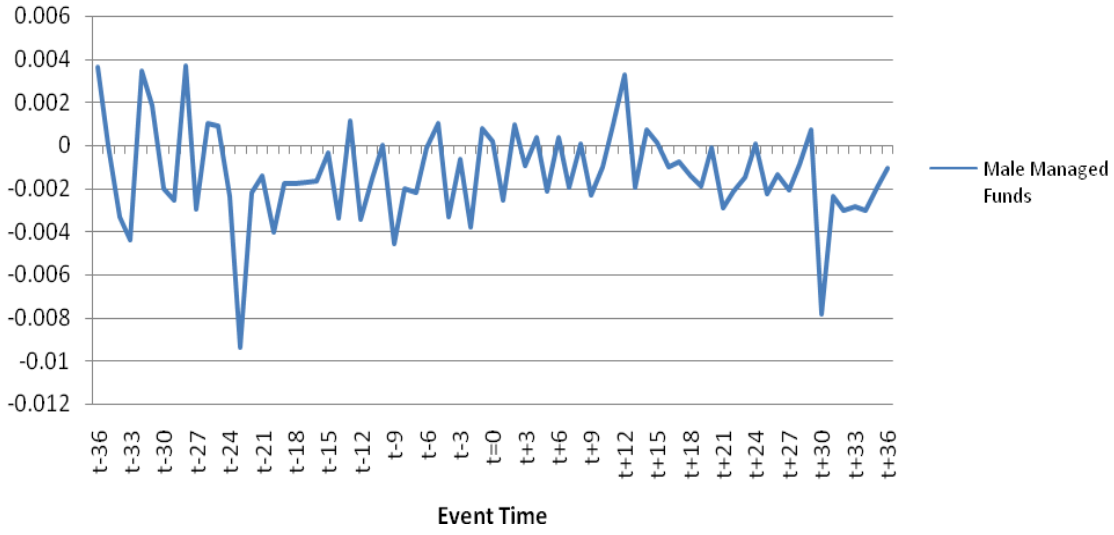


Figure A3.2 Female Managed Average Abnormal Returns

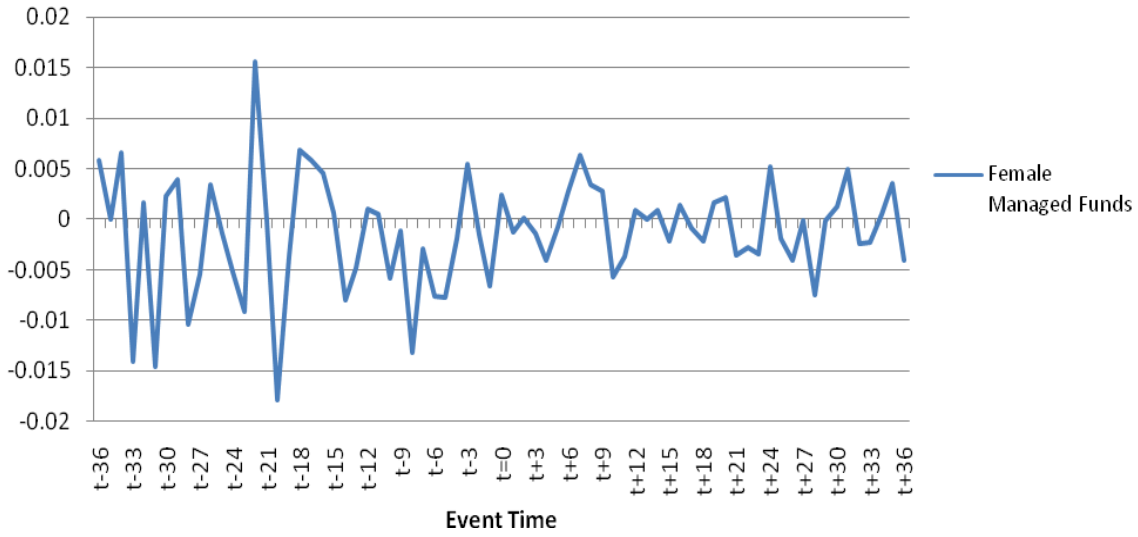


Figure A3.3 UK Managed Funds Average Abnormal Returns

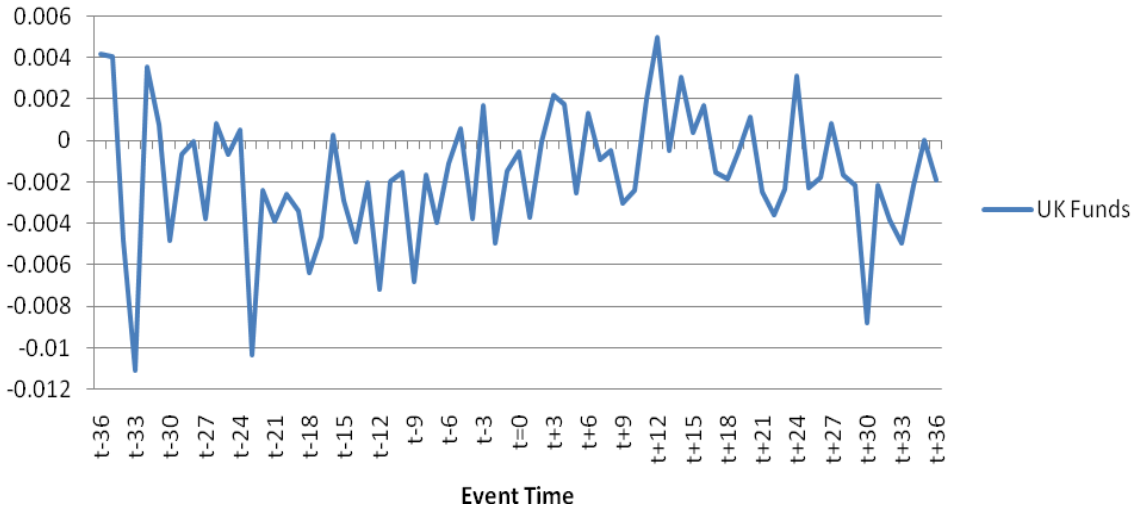


Figure A3.4 International Managed Funds Average Abnormal Returns

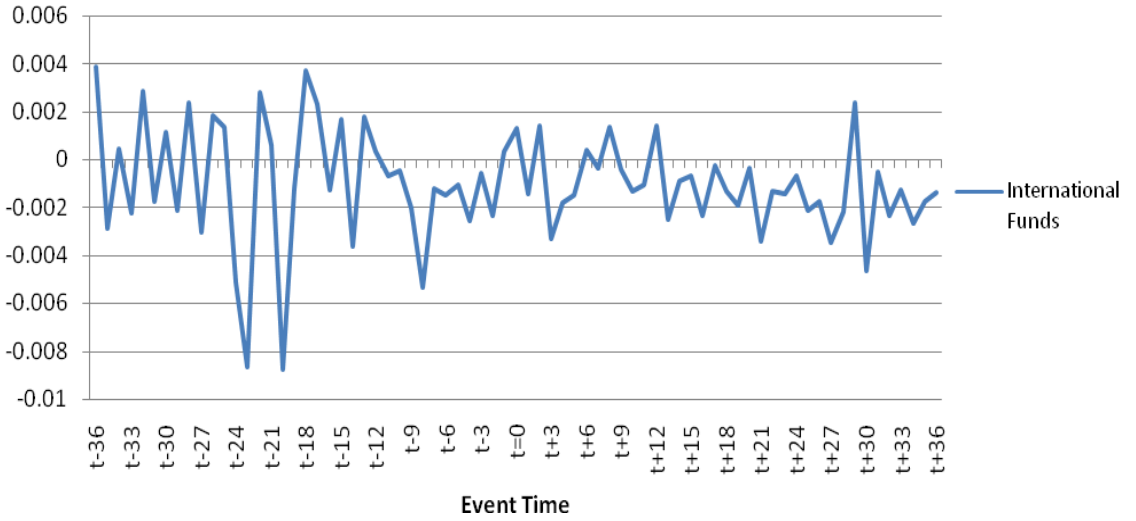


Figure A3.5 Emerging Market Funds Average Abnormal Returns

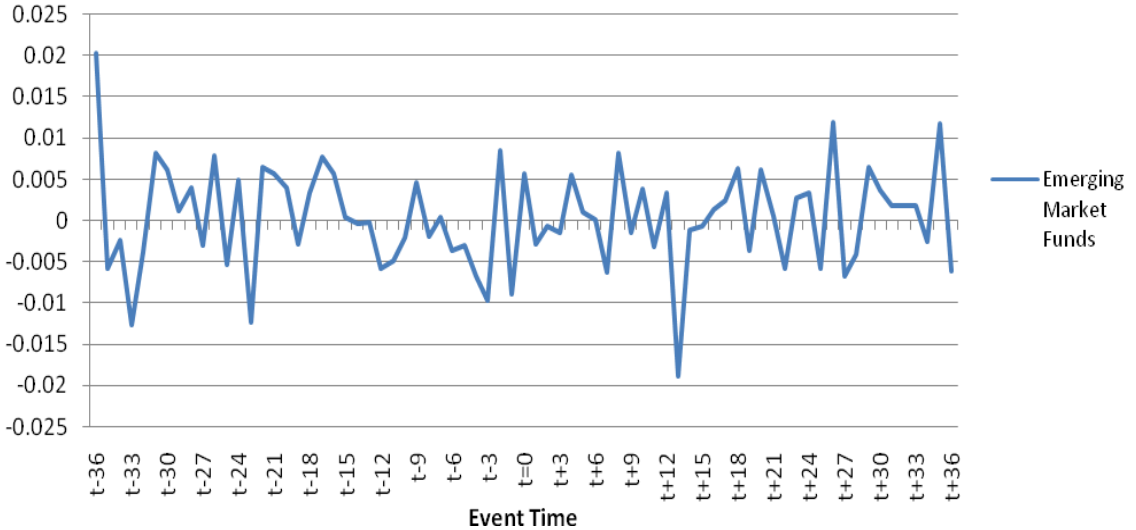


Figure A3.6 Developed Market Funds Average Abnormal Returns

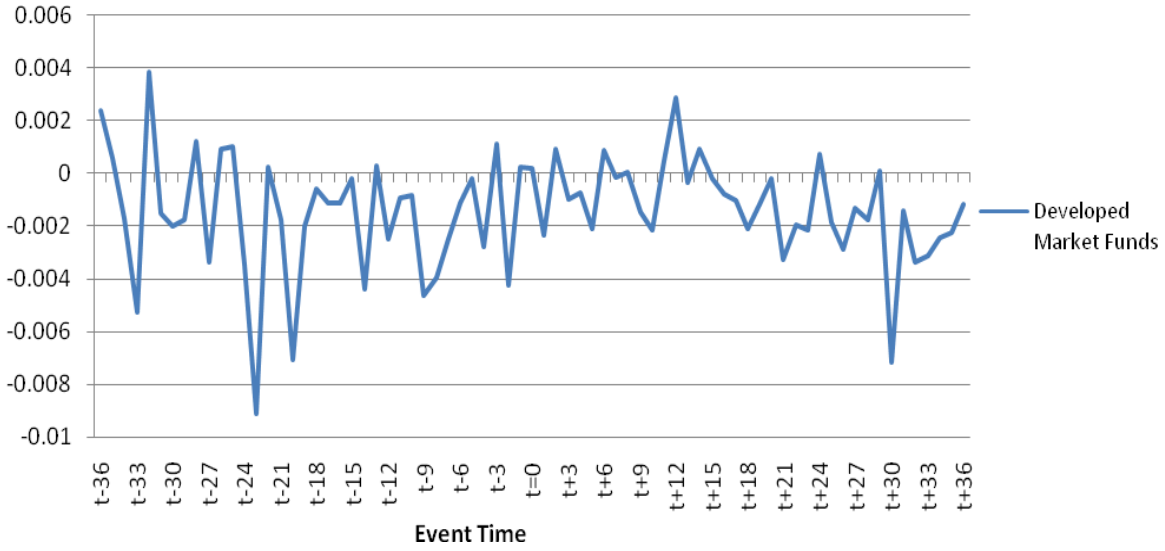


Figure A3.7 Equity Funds Average Abnormal Returns

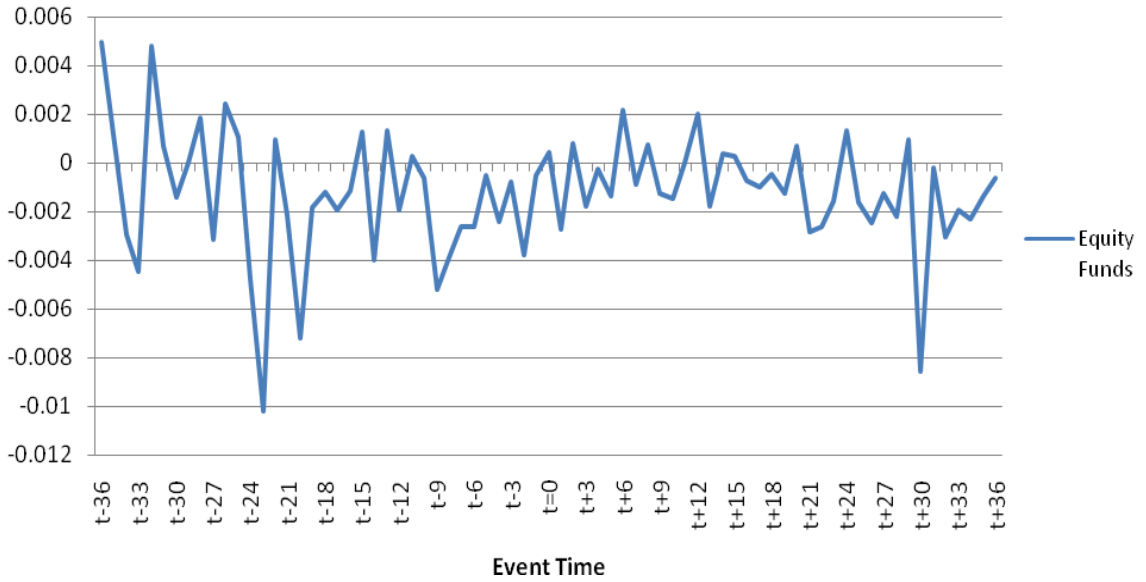


Figure A3.8 Bond Funds Average Abnormal Returns

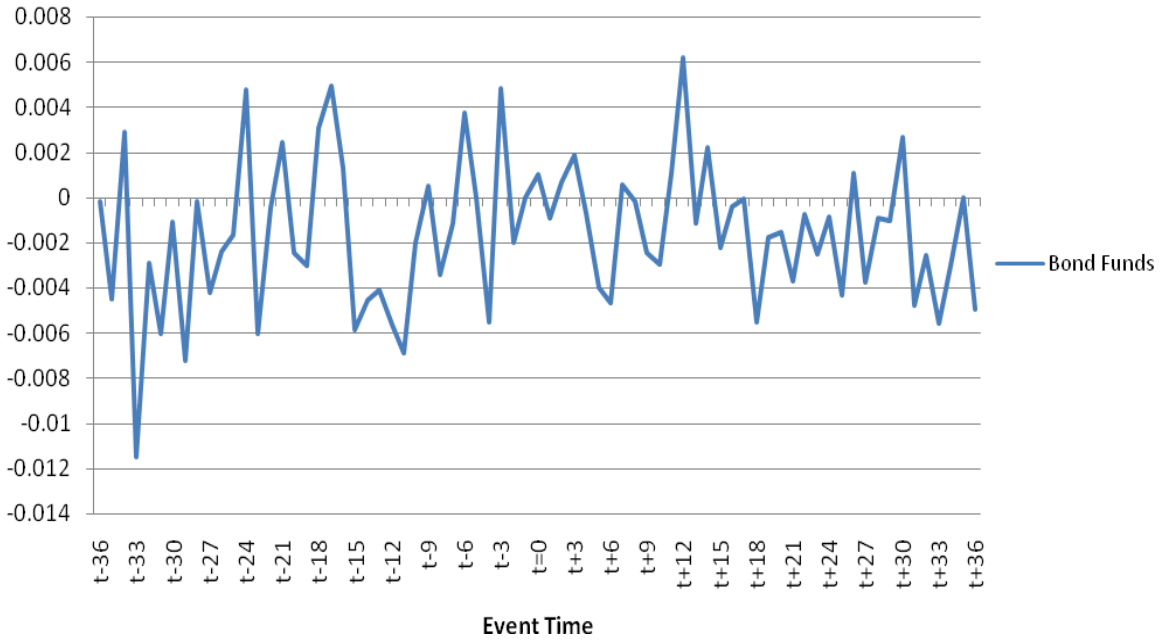


Figure A3.9 Growth Funds Average Abnormal Returns

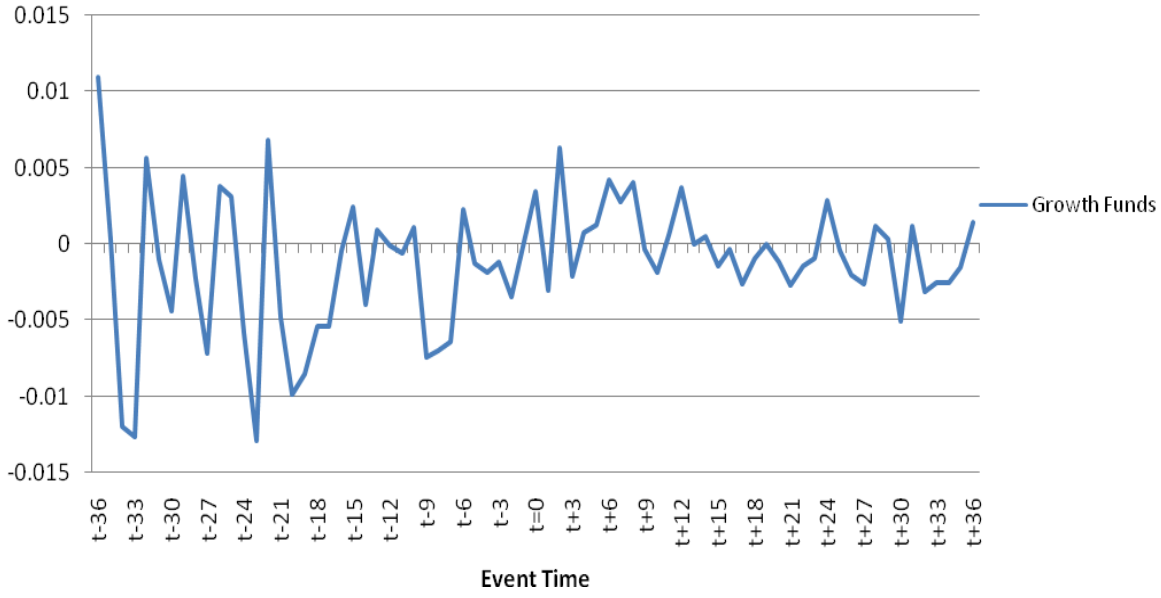


Figure A3.10 Value Funds Average Abnormal Returns

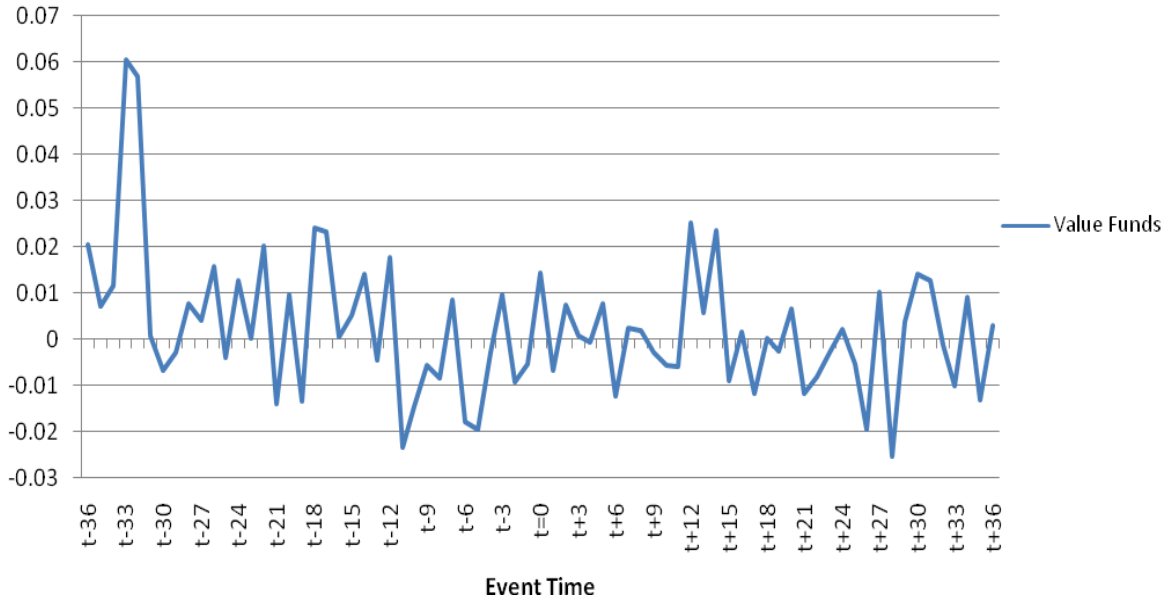
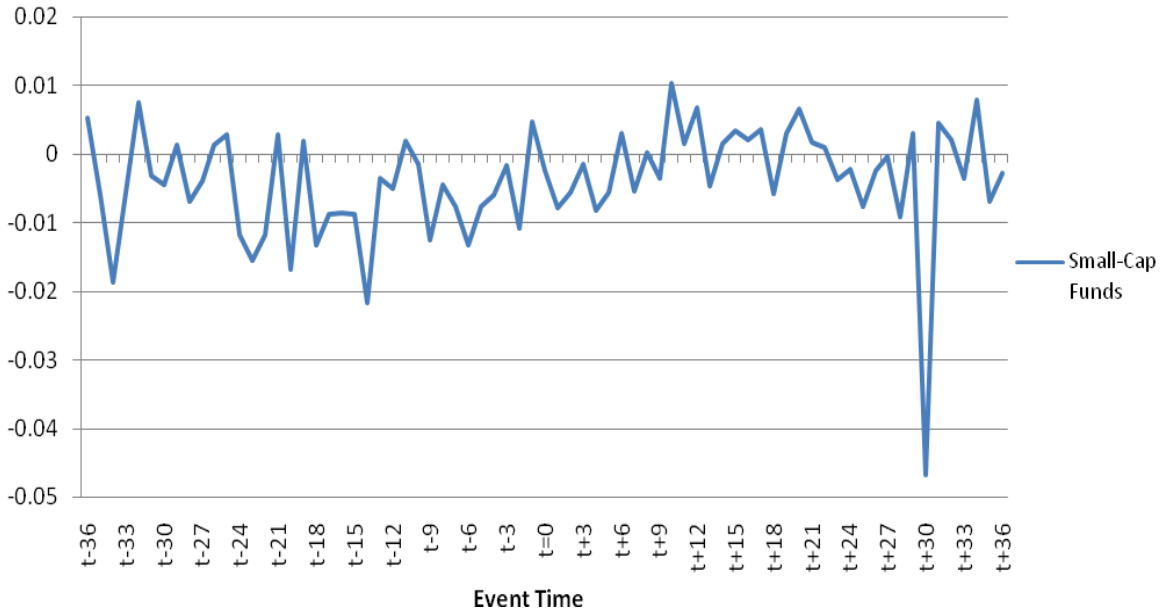


Figure A3.11 Small-Cap Funds Average Abnormal Returns



APPENDIX 4

Table A4.1 Benchmark-Adjusted Male Managed Funds AARs and CAARs (* indicates 5% significance level)

Event Time	Average Abnormal Returns	*T-test*	Cumulative Average Abnormal Returns	*T-test*
t-36	0.0040464	1.51	0.0040464	0.22
t-35	0.0006333	0.24	0.0046798	0.26
t-34	-0.0029521	-1.10	0.0017277	0.10
t-33	-0.0049635	-1.85*	-0.0032358	-0.18
t-32	0.0038658	1.44	0.00063	0.03
t-31	0.0018654	0.70	0.0024954	0.14
t-30	-0.0016359	-0.61	0.0008595	0.05
t-29	-0.0015812	-0.59	-0.0007217	-0.04
t-28	0.0029692	1.11	0.0022475	0.12
t-27	-0.003454	-1.29	-0.0012065	-0.07
t-26	0.0012833	0.48	7.687E-05	0.00
t-25	0.0006515	0.24	0.0007283	0.04
t-24	-0.0028418	-1.06	-0.0021135	-0.12
t-23	-0.0094467	-3.53*	-0.0115601	-0.64
t-22	-0.0019513	-0.73	-0.0135114	-0.74
t-21	-0.0012973	-0.48	-0.0148087	-0.82
t-20	-0.0039479	-1.48	-0.0187565	-1.03
t-19	-0.0010748	-0.40	-0.0198314	-1.09
t-18	-0.0020944	-0.78	-0.0219258	-1.21
t-17	-0.0023802	-0.89	-0.024306	-1.34
t-16	-0.0016765	-0.63	-0.0259825	-1.43
t-15	0.0001535	0.06	-0.025829	-1.42
t-14	-0.0034352	-1.28	-0.0292643	-1.61
t-13	0.0016163	0.60	-0.027648	-1.52
t-12	-0.0037292	-1.39	-0.0313772	-1.73*
t-11	-0.0012534	-0.47	-0.0326306	-1.80*
t-10	-0.0007659	-0.29	-0.0333965	-1.84*
t-9	-0.004335	-1.62	-0.0377314	-2.08*
t-8	-0.0023445	-0.88	-0.0400759	-2.21*
t-7	-0.001898	-0.71	-0.0419739	-2.31*
t-6	-0.0007217	-0.27	-0.0426957	-2.35*
t-5	0.0011568	0.43	-0.0415388	-2.29*
t-4	-0.0028245	-1.06	-0.0443634	-2.44*
t-3	-0.0007712	-0.29	-0.0451345	-2.48*
t-2	-0.0039283	-1.47	-0.0490628	-2.70*
t-1	0.0011152	0.42	-0.0479476	-2.64*
t=0	-6.62E-05	-0.02	-0.0480138	-2.64*

t+1	-0.0024547	-0.92	-0.0504685	-2.78*
t+2	0.000421	0.16	-0.0500475	-2.75*
t+3	-0.000994	-0.37	-0.0510415	-2.81*
t+4	0.0011689	0.44	-0.0498726	-2.74*
t+5	-0.0022412	-0.84	-0.0521138	-2.87*
t+6	0.0002748	0.10	-0.0518389	-2.85*
t+7	-0.0022553	-0.84	-0.0540942	-2.98*
t+8	0.0001455	0.05	-0.0539487	-2.97*
t+9	-0.0022519	-0.84	-0.0562006	-3.09*
t+10	-0.0013167	-0.49	-0.0575173	-3.17*
t+11	0.0009927	0.37	-0.0565246	-3.11*
t+12	0.0032735	1.22	-0.0532512	-2.93*
t+13	-0.0019376	-0.74	-0.055325	-3.07*
t+14	0.0007323	0.28	-0.0545927	-3.03*
t+15	0.0001411	0.05	-0.0544516	-3.02*
t+16	-0.0010165	-0.39	-0.0554681	-3.08*
t+17	-0.000774	-0.30	-0.0562421	-3.12*
t+18	-0.0013804	-0.53	-0.0576224	-3.20*
t+19	-0.0018853	-0.72	-0.0595078	-3.30*
t+20	-0.0001014	-0.04	-0.0596092	-3.31*
t+21	-0.0029066	-1.11	-0.0625158	-3.47*
t+22	-0.0021371	-0.82	-0.0646529	-3.59*
t+23	-0.0014531	-0.56	-0.066106	-3.67*
t+24	8.893E-05	0.03	-0.0660171	-3.67*
t+25	-0.0022156	-0.85	-0.0682327	-3.79*
t+26	-0.0013183	-0.50	-0.069551	-3.86*
t+27	-0.0020682	-0.79	-0.0716192	-3.98*
t+28	-0.0008836	-0.34	-0.0725028	-4.03*
t+29	0.0007244	0.28	-0.0717784	-3.99*
t+30	-0.0078212	-2.99*	-0.0795995	-4.42*
t+31	-0.0023868	-0.91	-0.0819864	-4.55*
t+32	-0.0030256	-1.16	-0.085012	-4.72*
t+33	-0.0028041	-1.07	-0.087816	-4.88*
t+34	-0.0030344	-1.16	-0.0908504	-5.05*
t+35	-0.0019465	-0.74	-0.0927969	-5.15*
t+36	-0.0010741	-0.41	-0.093871	-5.21*

Table A4.2 Benchmark-Adjusted Female Managed Funds AARs and CAARs (* indicates 5% significance level)

Event Time	Average Abnormal Returns	*T-test*	Cumulative Average Abnormal Returns	*T-test*
t-36	0.005581198	0.791	0.005581198	0.227
t-35	-9.45424E-06	-0.001	0.005571744	0.227
t-34	0.006591268	0.934	0.012163012	0.495
t-33	-0.013724137	-1.944*	-0.001561125	-0.063
t-32	0.001568265	0.222	7.13983E-06	0.0002
t-31	-0.014586056	-2.066*	-0.014578916	-0.594
t-30	0.002233664	0.316	-0.012345252	-0.503
t-29	0.003669393	0.520	-0.008675859	-0.353
t-28	-0.010165992	-1.440	-0.018841851	-0.768
t-27	-0.005464191	-0.774	-0.024306042	-0.990
t-26	0.00324838	0.460	-0.021057662	-0.858
t-25	-0.001460939	-0.207	-0.022518602	-0.917
t-24	-0.005109446	-0.724	-0.027628048	-1.126
t-23	-0.00917586	-1.300	-0.036803908	-1.500
t-22	0.015525418	2.200*	-0.02127849	-0.867
t-21	-0.000155179	-0.022	-0.021433669	-0.873
t-20	-0.017437702	-2.470*	-0.038871371	-1.584
t-19	-0.003650391	-0.517	-0.042521761	-1.733*
t-18	0.006845157	0.970	-0.035676604	-1.454
t-17	0.0057122	0.809	-0.029964353	-1.221
t-16	0.004564562	0.647	-0.025399791	-1.035
t-15	0.000605438	0.086	-0.024794353	-1.010
t-14	-0.00798225	-1.131	-0.032776603	-1.336
t-13	-0.004715621	-0.668	-0.037492225	-1.528
t-12	0.000937312	0.133	-0.036554912	-1.490
t-11	0.000467738	0.066	-0.036087175	-1.417
t-10	-0.005873813	-0.832	-0.041960988	-1.710*
t-9	-0.001145386	-0.162	-0.043106373	-1.757*
t-8	-0.013239552	-1.876*	-0.056345926	-2.296*
t-7	-0.002967192	-0.420	-0.059313117	-2.417*
t-6	-0.007704586	-1.092	-0.067017704	-2.738*
t-5	-0.007828139	-1.109	-0.074845842	-3.050*
t-4	-0.001908226	-0.270	-0.076754068	-3.128*
t-3	0.005432381	0.770	-0.071321687	-2.907*
t-2	-0.001525006	-0.216	-0.072846693	-2.969*
t-1	-0.00665369	-0.943	-0.079500383	-3.240*
t=0	0.002405556	0.341	-0.077094827	-3.142*
t+1	-0.001360073	-0.193	-0.0784549	-3.198*

t+2	4.9231E-05	0.007	-0.078405669	-3.19*
t+3	-0.001422256	-0.201	-0.079827925	-3.253*
t+4	-0.004079783	-0.578	-0.083907708	-3.420*
t+5	-0.000855144	-0.121	-0.084762852	-3.455*
t+6	0.002716997	0.385	-0.082045855	-3.344*
t+7	0.006313791	0.895	-0.075732064	-3.087*
t+8	0.003359723	0.476	-0.072372341	-2.950*
t+9	0.002717655	0.385	-0.069654687	-2.839*
t+10	-0.00572656	-0.811	-0.075381247	-3.072*
t+11	-0.003705032	-0.525	-0.079086279	-3.223*
t+12	0.000884716	0.125	-0.078201562	-3.187*
t+13	-5.715E-05	-0.01	-0.0793043	-3.19*
t+14	0.0008406	0.12	-0.0784637	-3.15*
t+15	-0.0022115	-0.31	-0.0806752	-3.24*
t+16	0.00136	0.19	-0.0793152	-3.19*
t+17	-0.0009485	-0.13	-0.0802637	-3.22*
t+18	-0.002248	-0.32	-0.0825117	-3.31*
t+19	0.0015526	0.22	-0.0809591	-3.25*
t+20	0.0021378	0.30	-0.0788212	-3.17*
t+21	-0.0035795	-0.50	-0.0824007	-3.31*
t+22	-0.0028104	-0.39	-0.0852111	-3.42*
t+23	-0.0035245	-0.49	-0.0887355	-3.56*
t+24	0.005089	0.71	-0.0836466	-3.36*
t+25	-0.0019937	-0.28	-0.0856402	-3.44*
t+26	-0.0041092	-0.58	-0.0897494	-3.60*
t+27	-0.0001705	-0.02	-0.0899199	-3.61*
t+28	-0.0074883	-1.05	-0.0974082	-3.91*
t+29	-0.000227	-0.03	-0.0976352	-3.92*
t+30	0.001245	0.17	-0.0963903	-3.87*
t+31	0.0048292	0.68	-0.0915611	-3.68*
t+32	-0.0024266	-0.34	-0.0939877	-3.78*
t+33	-0.002285	-0.32	-0.0962727	-3.87*
t+34	0.0004873	0.07	-0.0957854	-3.85*
t+35	0.0034448	0.48	-0.0923406	-3.71*
t+36	-0.0041271	-0.58	-0.0964677	-3.87*

Table A4.3 Benchmark-Adjusted UK Funds AARs and CAARs (* indicates 5% significance level)

Event Time	Average Abnormal Returns	*T-test*	Cumulative Average Abnormal Returns	*T-test*
t-36	0.0042094	1.19	0.0042094	0.14
t-35	0.0041316	1.16	0.008341	0.27
t-34	-0.004929	-1.39	0.003412	0.11
t-33	-0.0111094	-3.13*	-0.0076974	-0.25
t-32	0.0036879	1.04	-0.0040094	-0.13
t-31	0.0006148	0.17	-0.0033946	-0.11
t-30	-0.0047433	-1.34	-0.0081379	-0.26
t-29	-0.0006944	-0.20	-0.0088323	-0.28
t-28	-5.25E-05	-0.01	-0.0088848	-0.29
t-27	-0.0035222	-0.99	-0.012407	-0.40
t-26	0.0006607	0.19	-0.0117463	-0.38
t-25	-0.0008521	-0.24	-0.0125984	-0.41
t-24	0.0005435	0.15	-0.0120549	-0.39
t-23	-0.010557	-2.97*	-0.0226119	-0.73
t-22	-0.0019635	-0.55	-0.0245754	-0.79
t-21	-0.0043224	-1.22	-0.0288978	-0.93
t-20	-0.0023906	-0.67	-0.0312884	-1.01
t-19	-0.0031787	-0.90	-0.0344672	-1.11
t-18	-0.0064962	-1.83*	-0.0409634	-1.32
t-17	-0.0051265	-1.44	-0.0460899	-1.49
t-16	0.0006323	0.18	-0.0454576	-1.46
t-15	-0.0025393	-0.72	-0.0479969	-1.55
t-14	-0.0057253	-1.61	-0.0537222	-1.73*
t-13	-0.0013936	-0.39	-0.0551158	-1.78*
t-12	-0.007185	-2.02*	-0.0623008	-2.01*
t-11	-0.0019267	-0.54	-0.0642275	-2.07*
t-10	-0.0019498	-0.55	-0.0661773	-2.13*
t-9	-0.006446	-1.82*	-0.0726232	-2.34*
t-8	-0.0020918	-0.59	-0.0747151	-2.41*
t-7	-0.0034427	-0.97	-0.0781577	-2.52*
t-6	-0.0015442	-0.43	-0.0797019	-2.57*
t-5	0.0003337	0.09	-0.0793682	-2.56*
t-4	-0.003161	-0.89	-0.0825292	-2.66*
t-3	0.0013859	0.39	-0.0811433	-2.61*
t-2	-0.0052408	-1.48	-0.0863841	-2.78*
t-1	-0.000824	-0.23	-0.0872081	-2.81*
t=0	-0.0008821	-0.25	-0.0880902	-2.84*
t+1	-0.003598	-1.01	-0.0916882	-2.95*

t+2	-0.0004686	-0.13	-0.0921569	-2.97*
t+3	0.0025261	0.71	-0.0896308	-2.89*
t+4	0.0018414	0.52	-0.0877893	-2.83*
t+5	-0.0025659	-0.72	-0.0903553	-2.91*
t+6	0.00156	0.44	-0.0887952	-2.86*
t+7	-0.001529	-0.43	-0.0903242	-2.91*
t+8	-0.0001316	-0.04	-0.0904558	-2.91*
t+9	-0.0030546	-0.86	-0.0935104	-3.01*
t+10	-0.0024806	-0.70	-0.095991	-3.09*
t+11	0.0018715	0.53	-0.0941195	-3.03*
t+12	0.0048607	1.37	-0.0892588	-2.88*
t+13	-0.0004651	-0.13	-0.0894433	-2.89*
t+14	0.0030647	0.87	-0.0863786	-2.79*
t+15	0.0003794	0.11	-0.0859991	-2.77*
t+16	0.0017092	0.49	-0.0842899	-2.72*
t+17	-0.0015601	-0.44	-0.08585	-2.77*
t+18	-0.0018358	-0.52	-0.0876859	-2.83*
t+19	-0.0005534	-0.16	-0.0882393	-2.85*
t+20	0.0011046	0.31	-0.0871347	-2.81*
t+21	-0.0024808	-0.70	-0.0896155	-2.89*
t+22	-0.0035777	-1.02	-0.0931932	-3.01*
t+23	-0.0023308	-0.66	-0.095524	-3.08*
t+24	0.0031325	0.89	-0.0923914	-2.98*
t+25	-0.0023036	-0.65	-0.094695	-3.06*
t+26	-0.0018175	-0.52	-0.0965125	-3.11*
t+27	0.0008243	0.23	-0.0956882	-3.09*
t+28	-0.0016619	-0.47	-0.0973501	-3.14*
t+29	-0.0021868	-0.62	-0.0995369	-3.21*
t+30	-0.0087868	-2.49*	-0.1083237	-3.50*
t+31	-0.0021808	-0.62	-0.1105046	-3.57*
t+32	-0.0038152	-1.08	-0.1143198	-3.69*
t+33	-0.0049398	-1.40	-0.1192596	-3.85*
t+34	-0.0021554	-0.61	-0.1214149	-3.92*
t+35	-5.232E-06	0.00	-0.1214202	-3.92*
t+36	-0.0019077	-0.54	-0.1233279	-3.98*

Table A4.4 Benchmark-Adjusted International Funds AARs and CAARs (* indicates 5% significance level)

Event Time	Average Abnormal Returns	*T-test*	Cumulative Average Abnormal Returns	*T-test*
t-36	0.0043861	1.42	0.0043861	0.40
t-35	-0.0019908	-0.65	0.0023953	0.22
t-34	0.000964	0.31	0.0033593	0.31
t-33	-0.0030946	-1.00	0.0002647	0.02
t-32	0.0033663	1.09	0.003631	0.33
t-31	-0.0016862	-0.55	0.0019448	0.18
t-30	0.0015711	0.51	0.0035159	0.32
t-29	-0.0007554	-0.24	0.0027605	0.25
t-28	0.001394	0.45	0.0041546	0.38
t-27	-0.0039612	-1.28	0.0001934	0.02
t-26	0.0022637	0.73	0.002457	0.22
t-25	0.0011039	0.36	0.0035609	0.32
t-24	-0.0057881	-1.88*	-0.0022272	-0.20
t-23	-0.0086219	-2.79*	-0.0108491	-0.99
t-22	0.0028118	0.91	-0.0080373	-0.73
t-21	0.0011043	0.36	-0.006933	-0.63
t-20	-0.0087869	-2.85*	-0.0157198	-1.43
t-19	-0.0003673	-0.12	-0.0160871	-1.47
t-18	0.0033439	1.08	-0.0127431	-1.16
t-17	0.0017184	0.56	-0.0110248	-1.00
t-16	-0.0015405	-0.50	-0.0125653	-1.15
t-15	0.0021598	0.70	-0.0104055	-0.95
t-14	-0.0030764	-1.00	-0.0134819	-1.23
t-13	0.0019798	0.64	-0.0115021	-1.05
t-12	-8.501E-05	-0.03	-0.0115871	-1.06
t-11	-0.0003102	-0.10	-0.0118973	-1.08
t-10	-0.001349	-0.44	-0.0132462	-1.21
t-9	-0.001968	-0.64	-0.0152142	-1.39
t-8	-0.0055188	-1.79*	-0.020733	-1.89*
t-7	-0.001109	-0.36	-0.021842	-1.99*
t-6	-0.0020547	-0.67	-0.0238967	-2.18*
t-5	-0.0007229	-0.23	-0.0246196	-2.24*
t-4	-0.0023385	-0.76	-0.0269581	-2.46*
t-3	-0.0005854	-0.19	-0.0275435	-2.51*
t-2	-0.0023526	-0.76	-0.0298962	-2.72*
t-1	0.0003492	0.11	-0.029547	-2.69*
t=0	0.0011806	0.38	-0.0283665	-2.59*
t+1	-0.0013552	-0.44	-0.0297217	-2.71*

t+2	0.0009421	0.31	-0.0287796	-2.62*
t+3	-0.0035751	-1.16	-0.0323547	-2.95*
t+4	-0.0007365	-0.24	-0.0330911	-3.02*
t+5	-0.001635	-0.53	-0.0347262	-3.16*
t+6	4.274E-05	0.01	-0.0346834	-3.16*
t+7	-0.0004215	-0.14	-0.0351049	-3.20*
t+8	0.0012181	0.39	-0.0338868	-3.09*
t+9	-0.0003317	-0.11	-0.0342185	-3.12*
t+10	-0.0017074	-0.55	-0.0359259	-3.27*
t+11	-0.0009065	-0.29	-0.0368324	-3.36*
t+12	0.0015095	0.49	-0.035323	-3.22*
t+13	-0.0024921	-0.83	-0.038234	-3.55*
t+14	-0.0008977	-0.30	-0.0391317	-3.64*
t+15	-0.0006637	-0.22	-0.0397954	-3.70*
t+16	-0.0023285	-0.77	-0.0421239	-3.91*
t+17	-0.0002579	-0.09	-0.0423818	-3.94*
t+18	-0.001285	-0.43	-0.0436668	-4.06*
t+19	-0.0018996	-0.63	-0.0455663	-4.23*
t+20	-0.0003366	-0.11	-0.0459029	-4.27*
t+21	-0.0033767	-1.12	-0.0492797	-4.58*
t+22	-0.0013318	-0.44	-0.0506115	-4.70*
t+23	-0.0014109	-0.47	-0.0520224	-4.83*
t+24	-0.000649	-0.22	-0.0526714	-4.89*
t+25	-0.0020966	-0.70	-0.054768	-5.09*
t+26	-0.0017405	-0.58	-0.0565084	-5.25*
t+27	-0.003477	-1.15	-0.0599855	-5.57*
t+28	-0.0021503	-0.71	-0.0621358	-5.77*
t+29	0.0023799	0.79	-0.0597559	-5.55*
t+30	-0.0046528	-1.54	-0.0644086	-5.99*
t+31	-0.0005088	-0.17	-0.0649174	-6.03*
t+32	-0.0023249	-0.77	-0.0672424	-6.25*
t+33	-0.0012536	-0.42	-0.068496	-6.36*
t+34	-0.0026623	-0.88	-0.0711583	-6.61*
t+35	-0.0017596	-0.58	-0.0729179	-6.78*
t+36	-0.001351	-0.45	-0.0742689	-6.90*

Table A4.5 Benchmark-Adjusted Emerging Market Funds AARs and CAARs (* indicates 5% significance level)

Event Time	Average Abnormal Returns	*T-test*	Cumulative Average Abnormal Returns	*T-test*
t-36	0.0203285	2.98*	0.0203285	1.88*
t-35	-0.0057971	-0.85	0.0145314	1.35
t-34	-0.0023923	-0.35	0.0121391	1.12
t-33	-0.0126852	-1.86*	-0.0005461	-0.05
t-32	-0.0037409	-0.55	-0.004287	-0.40
t-31	0.0082214	1.21	0.0039345	0.36
t-30	0.0061093	0.90	0.0100437	0.93
t-29	0.0011549	0.17	0.0111987	1.04
t-28	0.0040131	0.59	0.0152117	1.41
t-27	-0.0030334	-0.44	0.0121783	1.13
t-26	0.007827	1.15	0.0200054	1.85*
t-25	-0.0053709	-0.79	0.0146345	1.36
t-24	0.0048784	0.72	0.0195129	1.81*
t-23	-0.0123564	-1.81*	0.0071565	0.66
t-22	0.0064081	0.94	0.0135647	1.26
t-21	0.0056302	0.83	0.0191948	1.78*
t-20	0.0040036	0.59	0.0231985	2.15*
t-19	-0.0029417	-0.43	0.0202568	1.88*
t-18	0.0033003	0.48	0.0235571	2.18*
t-17	0.0076473	1.12	0.0312044	2.89*
t-16	0.0057408	0.84	0.0369453	3.42*
t-15	0.0003651	0.05	0.0373104	3.46*
t-14	-0.0003831	-0.06	0.0369272	3.42*
t-13	-0.0002951	-0.04	0.0366321	3.39*
t-12	-0.0058909	-0.86	0.0307412	2.85*
t-11	-0.004957	-0.73	0.0257842	2.39*
t-10	-0.0021001	-0.31	0.0236841	2.19*
t-9	0.0045449	0.67	0.0282291	2.62*
t-8	-0.0019877	-0.29	0.0262413	2.43*
t-7	0.0003769	0.06	0.0266182	2.47*
t-6	-0.0037381	-0.55	0.0228801	2.12*
t-5	-0.0029774	-0.44	0.0199027	1.84*
t-4	-0.0067331	-0.99	0.0131696	1.22
t-3	-0.0096837	-1.42	0.0034859	0.32
t-2	0.0085578	1.25	0.0120437	1.12
t-1	-0.0088827	-1.30	0.003161	0.29
t=0	0.0056198	0.82	0.0087808	0.81
t+1	-0.0028059	-0.41	0.0059749	0.55

t+2	-0.0007168	-0.11	0.0052581	0.49
t+3	-0.0014673	-0.22	0.0037908	0.35
t+4	0.0054603	0.80	0.0092511	0.86
t+5	0.0010523	0.15	0.0103034	0.95
t+6	3.347E-06	0.00	0.0103068	0.95
t+7	-0.006355	-0.93	0.0039518	0.37
t+8	0.0081194	1.19	0.0120713	1.12
t+9	-0.0014763	-0.22	0.010595	0.98
t+10	0.003842	0.56	0.014437	1.34
t+11	-0.0031751	-0.47	0.0112619	1.04
t+12	0.003312	0.49	0.0145739	1.35
t+13	-0.018928	-2.78*	-0.0043541	-0.40
t+14	-0.001228	-0.18	-0.005582	-0.52
t+15	-0.0006379	-0.09	-0.0062199	-0.58
t+16	0.0013175	0.19	-0.0049024	-0.45
t+17	0.0024414	0.36	-0.002461	-0.23
t+18	0.0063627	0.93	0.0039016	0.36
t+19	-0.003738	-0.55	0.0001637	0.02
t+20	0.0060779	0.89	0.0062415	0.58
t+21	0.0005284	0.08	0.0067699	0.63
t+22	-0.0058087	-0.85	0.0009612	0.09
t+23	0.0027282	0.40	0.0036895	0.34
t+24	0.003286	0.48	0.0069755	0.65
t+25	-0.0058632	-0.86	0.0011123	0.10
t+26	0.0119865	1.76*	0.0130988	1.21
t+27	-0.0067853	-0.99	0.0063135	0.58
t+28	-0.0042022	-0.62	0.0021113	0.20
t+29	0.0065092	0.95	0.0086205	0.80
t+30	0.0037029	0.54	0.0123235	1.14
t+31	0.0017649	0.26	0.0140884	1.31
t+32	0.0018253	0.27	0.0159137	1.47
t+33	0.0018004	0.26	0.0177141	1.64
t+34	-0.0025722	-0.38	0.0151419	1.40
t+35	0.0117804	1.73*	0.0269223	2.49*
t+36	-0.0061041	-0.90	0.0208182	1.93*

Table A4.6 Benchmark-Adjusted Developed Market Funds AARs and CAARs (* indicates 5% significance level)

Event Time	Average Abnormal Returns	*T-test*	Cumulative Average Abnormal Returns	*T-test*
t-36	0.0027129	1.01	0.0027129	0.13
t-35	0.001142	0.43	0.0038549	0.19
t-34	-0.0013971	-0.52	0.0024577	0.12
t-33	-0.0058098	-2.16*	-0.0033521	-0.16
t-32	0.0041707	1.55	0.0008186	0.04
t-31	-0.0015643	-0.58	-0.0007457	-0.04
t-30	-0.0016779	-0.63	-0.0024236	-0.12
t-29	-0.0008995	-0.34	-0.003323	-0.16
t-28	0.0005233	0.19	-0.0027998	-0.14
t-27	-0.0038474	-1.43	-0.0066472	-0.32
t-26	0.0010892	0.41	-0.005558	-0.27
t-25	0.0007805	0.29	-0.0047774	-0.23
t-24	-0.0038898	-1.45	-0.0086673	-0.42
t-23	-0.0091647	-3.41*	-0.017832	-0.86
t-22	0.0004286	0.16	-0.0174034	-0.84
t-21	-0.0016518	-0.62	-0.0190552	-0.92
t-20	-0.0069934	-2.61*	-0.0260486	-1.26
t-19	-0.0013964	-0.52	-0.027445	-1.33
t-18	-0.0009212	-0.34	-0.0283662	-1.37
t-17	-0.0017265	-0.64	-0.0300927	-1.45
t-16	-0.0011504	-0.43	-0.0312431	-1.51
t-15	0.0002155	0.08	-0.0310276	-1.50
t-14	-0.004445	-1.66*	-0.0354726	-1.71*
t-13	0.000655	0.24	-0.0348175	-1.68*
t-12	-0.0027621	-1.03	-0.0375796	-1.82*
t-11	-0.0006857	-0.26	-0.0382653	-1.85*
t-10	-0.0015605	-0.58	-0.0398258	-1.92*
t-9	-0.0044209	-1.65*	-0.0442467	-2.14*
t-8	-0.004263	-1.59	-0.0485097	-2.34*
t-7	-0.0022447	-0.84	-0.0507544	-2.45*
t-6	-0.0017092	-0.64	-0.0524636	-2.53*
t-5	-9.569E-05	-0.04	-0.0525593	-2.54*
t-4	-0.0023875	-0.89	-0.0549467	-2.65*
t-3	0.0009341	0.35	-0.0540126	-2.61*
t-2	-0.0044061	-1.64	-0.0584187	-2.82*
t-1	0.000491	0.18	-0.0579277	-2.80*
t=0	-4.654E-05	-0.02	-0.0579743	-2.80*
t+1	-0.0022411	-0.83	-0.0602153	-2.91*

t+2	0.0004382	0.16	-0.0597771	-2.89*
t+3	-0.001034	-0.39	-0.0608111	-2.94*
t+4	-4.179E-05	-0.02	-0.0608529	-2.94*
t+5	-0.0022377	-0.83	-0.0630906	-3.05*
t+6	0.0007149	0.27	-0.0623756	-3.01*
t+7	-0.0004862	-0.18	-0.0628619	-3.04*
t+8	0.0001297	0.05	-0.0627322	-3.03*
t+9	-0.0014512	-0.54	-0.0641834	-3.10*
t+10	-0.0024449	-0.91	-0.0666283	-3.22*
t+11	0.0004811	0.18	-0.0661472	-3.20*
t+12	0.0028592	1.07	-0.063288	-3.06*
t+13	-0.0003504	-0.14	-0.0638311	-3.10*
t+14	0.0008979	0.35	-0.0629332	-3.06*
t+15	-0.0001974	-0.08	-0.0631306	-3.07*
t+16	-0.0007915	-0.31	-0.0639221	-3.11*
t+17	-0.0010464	-0.41	-0.0649685	-3.16*
t+18	-0.0021113	-0.82	-0.0670798	-3.26*
t+19	-0.001164	-0.45	-0.0682437	-3.32*
t+20	-0.0002027	-0.08	-0.0684465	-3.33*
t+21	-0.0032905	-1.27	-0.0717369	-3.49*
t+22	-0.0019643	-0.76	-0.0737012	-3.58*
t+23	-0.002137	-0.83	-0.0758383	-3.69
t+24	0.0006995	0.27	-0.0751388	-3.65*
t+25	-0.0018843	-0.73	-0.0770231	-3.75*
t+26	-0.0028797	-1.12	-0.0799028	-3.89*
t+27	-0.0013554	-0.52	-0.0812582	-3.95*
t+28	-0.0017744	-0.69	-0.0830326	-4.04*
t+29	8.848E-05	0.03	-0.0829441	-4.03*
t+30	-0.0071405	-2.77*	-0.0900846	-4.38*
t+31	-0.0014264	-0.55	-0.091511	-4.45*
t+32	-0.0033522	-1.30	-0.0948632	-4.61*
t+33	-0.0031276	-1.21	-0.0979908	-4.76*
t+34	-0.0024487	-0.95	-0.1004394	-4.88*
t+35	-0.0022478	-0.87	-0.1026873	-4.99*
t+36	-0.0011984	-0.46	-0.1038857	-5.05*

Table A4.7 Benchmark-Adjusted Equity Funds AARs and CAARs (* indicates 5% significance level)

Event Time	Average Abnormal Returns	*T-test*	Cumulative Average Abnormal Returns	*T-test*
t-36	0.0055267	1.75*	0.0055267	0.29
t-35	0.0014401	0.46	0.0069668	0.36
t-34	-0.0023354	-0.74	0.0046314	0.24
t-33	-0.0049605	-1.57	-0.0003291	-0.02
t-32	0.0049715	1.58	0.0046424	0.24
t-31	0.000656	0.21	0.0052983	0.27
t-30	-0.0008579	-0.27	0.0044405	0.23
t-29	0.0003731	0.12	0.0048135	0.25
t-28	0.0010771	0.34	0.0058907	0.30
t-27	-0.0035603	-1.13	0.0023303	0.12
t-26	0.002676	0.85	0.0050063	0.26
t-25	0.0007641	0.24	0.0057704	0.30
t-24	-0.0047653	-1.51	0.0010051	0.05
t-23	-0.010371	-3.29*	-0.0093659	-0.48
t-22	0.001201	0.38	-0.0081649	-0.42
t-21	-0.0023164	-0.73	-0.0104814	-0.54
t-20	-0.0071504	-2.27*	-0.0176317	-0.91
t-19	-0.0011848	-0.38	-0.0188165	-0.97
t-18	-0.0015146	-0.48	-0.0203312	-1.05
t-17	-0.0027715	-0.88	-0.0231027	-1.19
t-16	-0.0008561	-0.27	-0.0239588	-1.24
t-15	0.0018138	0.58	-0.022145	-1.15
t-14	-0.0041441	-1.31	-0.0262891	-1.36
t-13	0.0016148	0.51	-0.0246744	-1.28
t-12	-0.0022852	-0.72	-0.0269596	-1.39
t-11	0.0001728	0.05	-0.0267867	-1.39
t-10	-0.0014158	-0.45	-0.0282026	-1.46
t-9	-0.0049285	-1.56	-0.033131	-1.71*
t-8	-0.0042449	-1.35	-0.0373759	-1.93*
t-7	-0.0022145	-0.70	-0.0395904	-2.05*
t-6	-0.0030456	-0.97	-0.042636	-2.21*
t-5	-0.0005814	-0.18	-0.0432174	-2.24*
t-4	-0.0020172	-0.64	-0.0452346	-2.34*
t-3	-0.0007932	-0.25	-0.0460278	-2.38*
t-2	-0.003967	-1.26	-0.0499948	-2.59*
t-1	-0.0002181	-0.07	-0.0502129	-2.60*
t=0	0.0001656	0.05	-0.0500474	-2.59*
t+1	-0.0025344	-0.80	-0.0525817	-2.72*
t+2	0.0002877	0.09	-0.0522941	-2.70*

t+3	-0.0017202	-0.55	-0.0540143	-2.79*
t+4	0.0004315	0.14	-0.0535828	-2.77*
t+5	-0.0014346	-0.45	-0.0550174	-2.85*
t+6	0.0019645	0.62	-0.0530529	-2.74*
t+7	-0.0015434	-0.49	-0.0545963	-2.82*
t+8	0.00088	0.28	-0.0537163	-2.78*
t+9	-0.0009608	-0.30	-0.0546772	-2.83*
t+10	-0.0017266	-0.55	-0.0564038	-2.92*
t+11	0.0002613	0.08	-0.0561425	-2.90*
t+12	0.0021317	0.68	-0.0540108	-2.79*
t+13	-0.001775	-0.58	-0.0555718	-2.93*
t+14	0.0003777	0.12	-0.0551941	-2.91*
t+15	0.0002935	0.10	-0.0549006	-2.90*
t+16	-0.0007018	-0.23	-0.0556023	-2.94*
t+17	-0.0009888	-0.32	-0.0565912	-2.99*
t+18	-0.0004589	-0.15	-0.0570501	-3.01*
t+19	-0.0012379	-0.41	-0.0582879	-3.08*
t+20	0.0007242	0.24	-0.0575637	-3.04*
t+21	-0.0028254	-0.93	-0.0603891	-3.19*
t+22	-0.0026384	-0.87	-0.0630276	-3.33*
t+23	-0.0015857	-0.52	-0.0646133	-3.41*
t+24	0.0013564	0.45	-0.0632569	-3.34*
t+25	-0.0016201	-0.53	-0.064877	-3.43*
t+26	-0.0024857	-0.82	-0.0673627	-3.56*
t+27	-0.0012507	-0.41	-0.0686134	-3.62*
t+28	-0.0022196	-0.73	-0.070833	-3.74*
t+29	0.0009662	0.32	-0.0698668	-3.69*
t+30	-0.0085934	-2.82*	-0.0784602	-4.14*
t+31	-0.0002062	-0.07	-0.0786664	-4.15*
t+32	-0.0030325	-1.00	-0.0816989	-4.31*
t+33	-0.0019462	-0.64	-0.0836451	-4.42*
t+34	-0.0023034	-0.76	-0.0859485	-4.54*
t+35	-0.0013481	-0.44	-0.0872966	-4.61*
t+36	-0.0006115	-0.20	-0.0879081	-4.64*

Table A4.8 Benchmark-Adjusted Bond Funds AARs and CAARs (* indicates 5% significance level)

Event Time	Average Abnormal Returns	*T-test*	Cumulative Average Abnormal Returns	*T-test*
t-36	-0.0009508	-0.27	-0.0009508	-0.05
t-35	-0.0030676	-0.86	-0.0040185	-0.21
t-34	0.0019223	0.54	-0.0020962	-0.11
t-33	-0.0119337	-3.35*	-0.0140299	-0.74
t-32	-0.0020442	-0.57	-0.0160741	-0.85
t-31	-0.0059054	-1.66*	-0.0219794	-1.17
t-30	-0.0016695	-0.47	-0.0236489	-1.25
t-29	-0.0047909	-1.35	-0.0284399	-1.51
t-28	-0.0002306	-0.06	-0.0286704	-1.52
t-27	-0.004642	-1.30	-0.0333124	-1.77*
t-26	-0.0025011	-0.70	-0.0358135	-1.90*
t-25	-0.0014789	-0.42	-0.0372923	-1.98*
t-24	0.0029245	0.82	-0.0343678	-1.82*
t-23	-0.0056737	-1.59	-0.0400415	-2.12*
t-22	-0.0003996	-0.11	-0.0404411	-2.14*
t-21	0.0035699	1.00	-0.0368711	-1.96*
t-20	-0.002401	-0.67	-0.0392722	-2.08*
t-19	-0.0027315	-0.77	-0.0420037	-2.23*
t-18	0.0028081	0.79	-0.0391956	-2.08*
t-17	0.005411	1.52	-0.0337846	-1.79*
t-16	7.422E-05	0.02	-0.0337104	-1.79*
t-15	-0.0059028	-1.66*	-0.0396132	-2.10*
t-14	-0.0042316	-1.19	-0.0438448	-2.33*
t-13	-0.0033123	-0.93	-0.0471571	-2.50*
t-12	-0.005647	-1.59	-0.0528041	-2.80*
t-11	-0.0053513	-1.50	-0.0581554	-3.08*
t-10	-0.0022934	-0.64	-0.0604488	-3.21*
t-9	0.0004626	0.13	-0.0599862	-3.18*
t-8	-0.0035892	-1.01	-0.0635754	-3.37*
t-7	-0.0015054	-0.42	-0.0650808	-3.45*
t-6	0.0028445	0.80	-0.0622363	-3.30*
t-5	0.0008584	0.24	-0.0613778	-3.26*
t-4	-0.0052538	-1.48	-0.0666316	-3.53*
t-3	0.0042061	1.18	-0.0624255	-3.31*
t-2	-0.0018823	-0.53	-0.0643078	-3.41*
t-1	0.0001949	0.05	-0.0641129	-3.40*
t=0	0.0009779	0.27	-0.063135	-3.35*
t+1	-0.0012807	-0.36	-0.0644157	-3.42*
t+2	0.0006483	0.18	-0.0637674	-3.38*

t+3	0.0015035	0.42	-0.0622639	-3.30*
t+4	-9.065E-05	-0.03	-0.0623545	-3.31*
t+5	-0.0042972	-1.21	-0.0666517	-3.54*
t+6	-0.0043957	-1.23	-0.0710475	-3.77*
t+7	0.001722	0.48	-0.0693254	-3.68*
t+8	-0.0001872	-0.05	-0.0695127	-3.69*
t+9	-0.0033738	-0.95	-0.0728864	-3.87*
t+10	-0.0031935	-0.90	-0.0760799	-4.04*
t+11	0.0001439	0.04	-0.075936	-4.03*
t+12	0.0058472	1.64	-0.0700888	-3.72*
t+13	-0.0011392	-0.30	-0.0723565	-3.65*
t+14	0.0021831	0.57	-0.0701734	-3.54*
t+15	-0.0022321	-0.58	-0.0724055	-3.65*
t+16	-0.0004189	-0.11	-0.0728243	-3.68*
t+17	-8.171E-05	-0.02	-0.072906	-3.68*
t+18	-0.0055424	-1.44	-0.0784484	-3.96*
t+19	-0.0017628	-0.46	-0.0802111	-4.05*
t+20	-0.0015614	-0.41	-0.0817726	-4.13*
t+21	-0.0037212	-0.97	-0.0854938	-4.32*
t+22	-0.0007529	-0.20	-0.0862466	-4.35*
t+23	-0.0025385	-0.66	-0.0887852	-4.48*
t+24	-0.0008893	-0.23	-0.0896744	-4.53*
t+25	-0.0043466	-1.13	-0.0940211	-4.75*
t+26	0.0010558	0.27	-0.0929652	-4.69*
t+27	-0.0037764	-0.98	-0.0967417	-4.88*
t+28	-0.00091	-0.24	-0.0976517	-4.93*
t+29	-0.001036	-0.27	-0.0986877	-4.98*
t+30	0.0026708	0.69	-0.0960169	-4.85*
t+31	-0.0048036	-1.25	-0.1008205	-5.09*
t+32	-0.0025506	-0.66	-0.1033711	-5.22*
t+33	-0.0055732	-1.45	-0.1089442	-5.50*
t+34	-0.0030179	-0.78	-0.1119622	-5.65*
t+35	-3.835E-05	-0.01	-0.1120005	-5.65*
t+36	-0.0049707	-1.29	-0.1169712	-5.90*

Table A4.9 Benchmark-Adjusted Equity Growth Funds AARs and CAARs (* indicates 5% significance level)

Event Time	Average Abnormal Returns	*T-test*	Cumulative Average Abnormal Returns	*T-test*
t-36	0.0124435	2.13*	0.0124435	0.40
t-35	0.0010356	0.18	0.0134791	0.44
t-34	-0.0101119	-1.73*	0.0033672	0.11
t-33	-0.0145762	-2.50*	-0.0112089	-0.36
t-32	0.0060721	1.04	-0.0051368	-0.17
t-31	-0.0004678	-0.08	-0.0056046	-0.18
t-30	-0.001968	-0.34	-0.0075727	-0.25
t-29	0.0054308	0.93	-0.0021419	-0.07
t-28	-0.0039177	-0.67	-0.0060596	-0.20
t-27	-0.0092896	-1.59	-0.0153492	-0.50
t-26	0.0045223	0.77	-0.0108269	-0.35
t-25	0.0021118	0.36	-0.0087151	-0.28
t-24	-0.0060214	-1.03	-0.0147365	-0.48
t-23	-0.0124222	-2.13*	-0.0271587	-0.88
t-22	0.0069325	1.19	-0.0202261	-0.66
t-21	-0.0045458	-0.78	-0.0247719	-0.81
t-20	-0.009639	-1.65*	-0.0344109	-1.12
t-19	-0.0069368	-1.19	-0.0413477	-1.34
t-18	-0.0069758	-1.19	-0.0483236	-1.57
t-17	-0.0070355	-1.20	-0.0553591	-1.80*
t-16	0.000891	0.15	-0.0544681	-1.77*
t-15	0.0042005	0.72	-0.0502675	-1.63
t-14	-0.0044644	-0.76	-0.0547319	-1.78*
t-13	0.0006281	0.11	-0.0541038	-1.76*
t-12	-0.0015112	-0.26	-0.055615	-1.81*
t-11	4.581E-05	0.01	-0.0555692	-1.81*
t-10	-0.0009853	-0.17	-0.0565545	-1.84*
t-9	-0.0083946	-1.44	-0.0649492	-2.11*
t-8	-0.0074055	-1.27	-0.0723547	-2.35*
t-7	-0.0054589	-0.93	-0.0778136	-2.53*
t-6	0.0014017	0.24	-0.0764118	-2.48*
t-5	-0.0018775	-0.32	-0.0782894	-2.55*
t-4	-0.0014613	-0.25	-0.0797507	-2.59*
t-3	-0.000646	-0.11	-0.0803967	-2.61*
t-2	-0.0046755	-0.80	-0.0850722	-2.77*
t-1	0.0003141	0.05	-0.084758	-2.76*
t=0	0.00307	0.53	-0.081688	-2.66*
t+1	-0.0031774	-0.54	-0.0848654	-2.76*
t+2	0.0045379	0.78	-0.0803275	-2.61*

t+3	-0.0020205	-0.35	-0.082348	-2.68*
t+4	0.0025342	0.43	-0.0798138	-2.59*
t+5	0.0007976	0.14	-0.0790162	-2.57*
t+6	0.0040603	0.70	-0.0749559	-2.44*
t+7	0.0016761	0.29	-0.0732798	-2.38*
t+8	0.0042406	0.73	-0.0690391	-2.24*
t+9	0.0012442	0.21	-0.0677949	-2.20*
t+10	-0.0024057	-0.41	-0.0702006	-2.28*
t+11	0.000632	0.11	-0.0695687	-2.26*
t+12	0.0039894	0.68	-0.0655792	-2.13*
t+13	4.037E-05	0.01	-0.0644716	-2.18*
t+14	0.0005433	0.10	-0.0639283	-2.16*
t+15	-0.0014226	-0.26	-0.0653509	-2.21*
t+16	-0.0003066	-0.06	-0.0656574	-2.22*
t+17	-0.0026369	-0.48	-0.0682944	-2.31*
t+18	-0.0008904	-0.16	-0.0691847	-2.34*
t+19	-1.713E-05	0.00	-0.0692019	-2.34*
t+20	-0.0011914	-0.22	-0.0703933	-2.38*
t+21	-0.0027308	-0.49	-0.073124	-2.47*
t+22	-0.0014027	-0.25	-0.0745267	-2.52*
t+23	-0.0009668	-0.17	-0.0754935	-2.55*
t+24	0.0028381	0.51	-0.0726555	-2.45*
t+25	-0.0004146	-0.07	-0.0730701	-2.47*
t+26	-0.0020437	-0.37	-0.0751138	-2.54*
t+27	-0.0025939	-0.47	-0.0777077	-2.62*
t+28	0.0012189	0.22	-0.0764888	-2.58*
t+29	0.000317	0.06	-0.0761717	-2.57*
t+30	-0.0050703	-0.92	-0.081242	-2.74*
t+31	0.0011465	0.21	-0.0800955	-2.71*
t+32	-0.003099	-0.56	-0.0831946	-2.81*
t+33	-0.0025634	-0.46	-0.085758	-2.90*
t+34	-0.0025009	-0.45	-0.0882589	-2.98*
t+35	-0.0015297	-0.28	-0.0897886	-3.03*
t+36	0.001412	0.26	-0.0883766	-2.98*

Table A4.10 Benchmark-Adjusted Equity Value Funds AARs and CAARs (* indicates 5% significance level)

Event Time	Average Abnormal Returns	*T-test*	Cumulative Average Abnormal Returns	*T-test*
t-36	0.0204439	1.13	0.0204439	0.35
t-35	0.0072315	0.40	0.0276754	0.47
t-34	0.0115073	0.63	0.0391827	0.67
t-33	0.0603294	3.33*	0.0995121	1.70*
t-32	0.0567605	3.13*	0.1562726	2.67*
t-31	0.0007915	0.04	0.1570641	2.68*
t-30	-0.0068041	-0.38	0.15026	2.56*
t-29	-0.0027473	-0.15	0.1475127	2.52*
t-28	0.0078052	0.43	0.155318	2.65*
t-27	0.004083	0.23	0.159401	2.72*
t-26	0.0156481	0.86	0.1750491	2.99*
t-25	-0.0039433	-0.22	0.1711057	2.92*
t-24	0.0126006	0.70	0.1837063	3.13*
t-23	0.0003006	0.02	0.1840069	3.14*
t-22	0.0201036	1.11	0.2041105	3.48*
t-21	-0.0138589	-0.76	0.1902516	3.24*
t-20	0.0095814	0.53	0.199833	3.41*
t-19	-0.0132409	-0.73	0.186592	3.18*
t-18	0.0240086	1.32	0.2106006	3.59*
t-17	0.0231212	1.28	0.2337218	3.99*
t-16	0.0005953	0.03	0.2343171	4.00*
t-15	0.0051712	0.29	0.2394883	4.08*
t-14	0.0140983	0.78	0.2535865	4.32*
t-13	-0.0045964	-0.25	0.2489901	4.25*
t-12	0.0176134	0.97	0.2666035	4.55*
t-11	-0.023357	-1.29	0.2432465	4.15*
t-10	-0.0143732	-0.79	0.2288733	3.90*
t-9	-0.0056019	-0.31	0.2232713	3.81*
t-8	-0.0083181	-0.46	0.2149532	3.67*
t-7	0.008403	0.46	0.2233563	3.81*
t-6	-0.0178991	-0.99	0.2054571	3.50*
t-5	-0.0195224	-1.08	0.1859347	3.17*
t-4	-0.0027276	-0.15	0.1832071	3.12*
t-3	0.0096052	0.53	0.1928124	3.29*
t-2	-0.0093283	-0.51	0.1834841	3.13*
t-1	-0.0052442	-0.29	0.1782399	3.04*
t=0	0.0144084	0.79	0.1926483	3.29*
t+1	-0.0068008	-0.38	0.1858474	3.17*
t+2	0.0073041	0.40	0.1931515	3.29*

t+3	0.0007574	0.04	0.1939089	3.31*
t+4	-0.0007219	-0.04	0.1931869	3.29*
t+5	0.0076452	0.42	0.2008321	3.42*
t+6	-0.0122122	-0.67	0.1886198	3.22*
t+7	0.0025051	0.14	0.191125	3.26*
t+8	0.0017932	0.10	0.1929181	3.29*
t+9	-0.0028212	-0.16	0.1900969	3.24*
t+10	-0.0056674	-0.31	0.1844295	3.15*
t+11	-0.005873	-0.32	0.1785565	3.05*
t+12	0.0250893	1.38	0.2036458	3.47*
t+13	0.0056307	0.31	0.2092765	3.57*
t+14	0.0235364	1.30	0.2328128	3.97*
t+15	-0.0087898	-0.48	0.224023	3.82*
t+16	0.0016638	0.09	0.2256868	3.85*
t+17	-0.0117786	-0.65	0.2139082	3.65*
t+18	0.0002486	0.01	0.2141568	3.65*
t+19	-0.0025192	-0.14	0.2116376	3.61*
t+20	0.0066851	0.37	0.2183227	3.72*
t+21	-0.0116254	-0.64	0.2066973	3.52*
t+22	-0.0081706	-0.45	0.1985267	3.39*
t+23	-0.0028212	-0.16	0.1957055	3.34*
t+24	0.0020827	0.11	0.1977882	3.37*
t+25	-0.005252	-0.29	0.1925362	3.28*
t+26	-0.0195301	-1.08	0.173006	2.95*
t+27	0.0102859	0.57	0.1832919	3.13*
t+28	-0.0252545	-1.39	0.1580374	2.70*
t+29	0.003742	0.21	0.1617794	2.76*
t+30	0.0139589	0.77	0.1757382	3.00*
t+31	0.0126305	0.70	0.1883688	3.21*
t+32	-0.0012949	-0.07	0.1870738	3.19*
t+33	-0.0100947	-0.56	0.1769791	3.02*
t+34	0.0089535	0.49	0.1859327	3.17*
t+35	-0.0130457	-0.72	0.172887	2.95*
t+36	0.002908	0.16	0.1757949	3.00*

Table A4.11 Benchmark-Adjusted Equity Small-Cap Funds AARs and CAARs (* indicates 5% significance level)

Event Time	Average Abnormal Returns	*T-test*	Cumulative Average Abnormal Returns	*T-test*
t-36	0.005308	0.75	0.005308	0.08
t-35	-0.0059116	-0.83	-0.0006036	-0.01
t-34	-0.018597	-2.63*	-0.0192006	-0.27
t-33	-0.0056453	-0.80	-0.0248459	-0.35
t-32	0.0075266	1.06	-0.0173193	-0.25
t-31	-0.0032251	-0.46	-0.0205444	-0.29
t-30	-0.0045265	-0.64	-0.0250709	-0.35
t-29	0.0013463	0.19	-0.0237246	-0.34
t-28	-0.0069597	-0.98	-0.0306843	-0.43
t-27	-0.0039675	-0.56	-0.0346519	-0.49
t-26	0.0012733	0.18	-0.0333786	-0.47
t-25	0.0028591	0.40	-0.0305195	-0.43
t-24	-0.0118449	-1.67*	-0.0423644	-0.60
t-23	-0.0155576	-2.20*	-0.057922	-0.82
t-22	-0.0117742	-1.66*	-0.0696962	-0.99
t-21	0.0028212	0.40	-0.066875	-0.95
t-20	-0.016877	-2.38*	-0.083752	-1.19
t-19	0.001854	0.26	-0.081898	-1.16
t-18	-0.0132202	-1.87*	-0.0951181	-1.35
t-17	-0.0088537	-1.25	-0.1039718	-1.47
t-16	-0.008588	-1.21	-0.1125599	-1.59
t-15	-0.0087472	-1.24	-0.1213071	-1.72*
t-14	-0.021635	-3.06*	-0.1429422	-2.02*
t-13	-0.0036174	-0.51	-0.1465595	-2.07*
t-12	-0.005098	-0.72	-0.1516575	-2.15*
t-11	0.0018316	0.26	-0.1498259	-2.12*
t-10	-0.0013851	-0.20	-0.151211	-2.14*
t-9	-0.0125644	-1.77*	-0.1637754	-2.32*
t-8	-0.0044209	-0.62	-0.1681963	-2.38*
t-7	-0.0076676	-1.08	-0.1758639	-2.49*
t-6	-0.0132143	-1.87*	-0.1890782	-2.68*
t-5	-0.0076344	-1.08	-0.1967126	-2.78*
t-4	-0.0059118	-0.83	-0.2026244	-2.87*
t-3	-0.0016554	-0.23	-0.2042798	-2.89*
t-2	-0.0109199	-1.54	-0.2151997	-3.05*
t-1	0.0047088	0.67	-0.2104909	-2.98*
t=0	-0.0023942	-0.34	-0.2128851	-3.01*
t+1	-0.0077679	-1.10	-0.220653	-3.12*
t+2	-0.0056466	-0.80	-0.2262996	-3.20*

t+3	-0.0014536	-0.21	-0.2277532	-3.22*
t+4	-0.0081293	-1.15	-0.2358826	-3.34*
t+5	-0.0055102	-0.78	-0.2413927	-3.42*
t+6	0.0030133	0.43	-0.2383794	-3.37*
t+7	-0.005427	-0.77	-0.2438064	-3.45*
t+8	0.0001862	0.03	-0.2436203	-3.45*
t+9	-0.0034977	-0.49	-0.247118	-3.50*
t+10	0.0103178	1.46	-0.2368002	-3.35*
t+11	0.0015025	0.21	-0.2352977	-3.33*
t+12	0.0067092	0.95	-0.2285884	-3.23*
t+13	-0.0047466	-0.67	-0.233335	-3.30*
t+14	0.0014788	0.21	-0.2318562	-3.28*
t+15	0.003318	0.47	-0.2285382	-3.23*
t+16	0.0020656	0.29	-0.2264726	-3.20*
t+17	0.0035918	0.51	-0.2228808	-3.15*
t+18	-0.0058149	-0.82	-0.2286956	-3.24*
t+19	0.0029552	0.42	-0.2257405	-3.19*
t+20	0.0065629	0.93	-0.2191775	-3.10*
t+21	0.001738	0.25	-0.2174396	-3.08*
t+22	0.0009104	0.13	-0.2165292	-3.06*
t+23	-0.0038	-0.54	-0.2203292	-3.12*
t+24	-0.0022123	-0.31	-0.2225416	-3.15*
t+25	-0.0076961	-1.09	-0.2302377	-3.26*
t+26	-0.0024494	-0.35	-0.2326871	-3.29*
t+27	-0.0003536	-0.05	-0.2330407	-3.30*
t+28	-0.0091249	-1.29	-0.2421656	-3.43*
t+29	0.0029473	0.42	-0.2392183	-3.38*
t+30	-0.0467596	-6.60*	-0.2859779	-4.05*
t+31	0.00453	0.64	-0.2814479	-3.98*
t+32	0.0020713	0.29	-0.2793766	-3.95*
t+33	-0.0035981	-0.51	-0.2829747	-4.00*
t+34	0.0078172	1.10	-0.2751575	-3.89*
t+35	-0.0069104	-0.98	-0.2820679	-3.99*
t+36	-0.0027081	-0.38	-0.284776	-4.03*

APPENDIX 5: Benchmark-Adjusted Average Abnormal Returns for Top/Bottom 10%

Figure A5.1 Benchmark-Adjusted Average Abnormal Returns - Top 10% according to IR pre-event

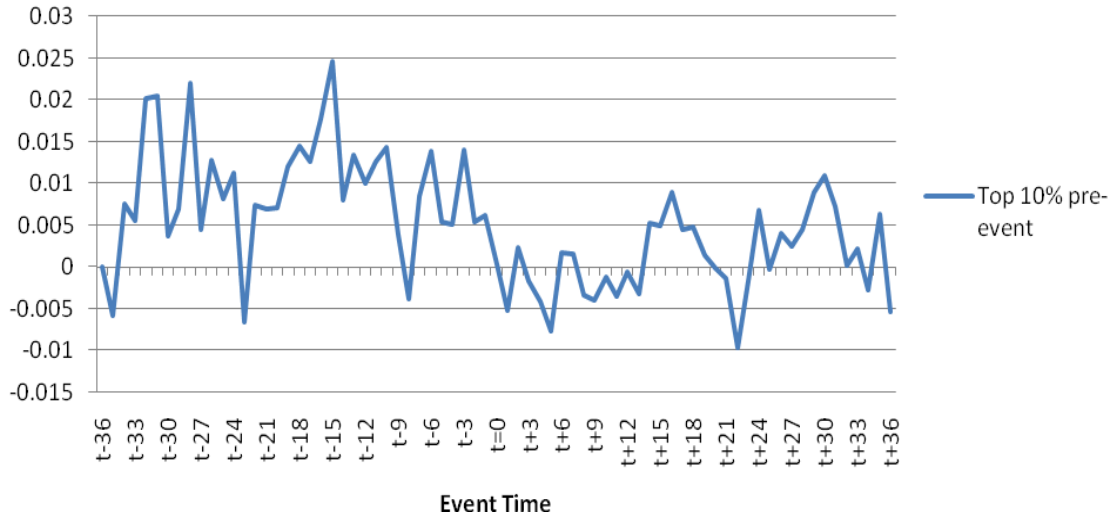


Figure A5.2 Market-Adjusted Average Abnormal Returns - Bottom 10% according to IR pre-event

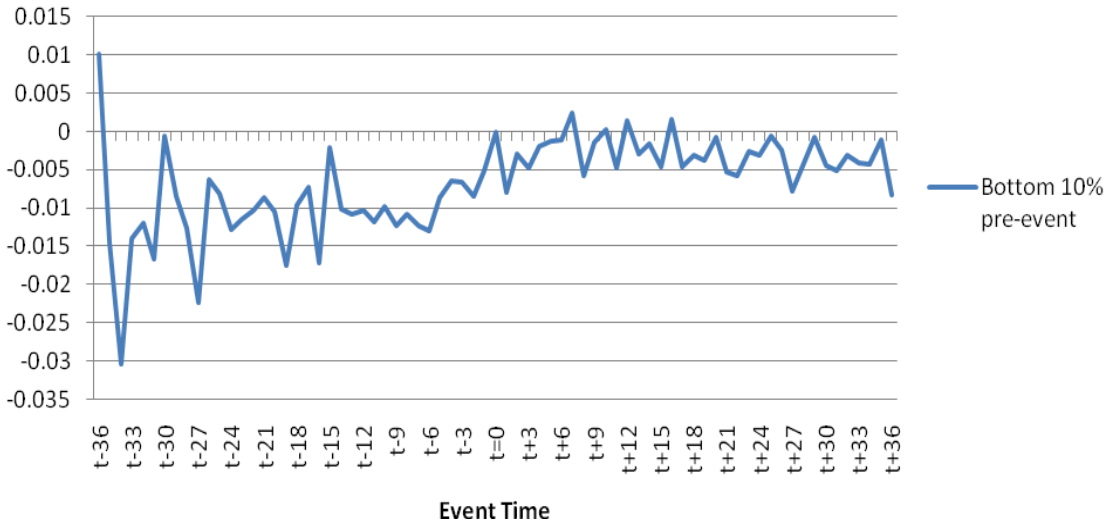


Figure A5.3 Benchmark-Adjusted Average Abnormal Returns - Top 10% according to IR post-event

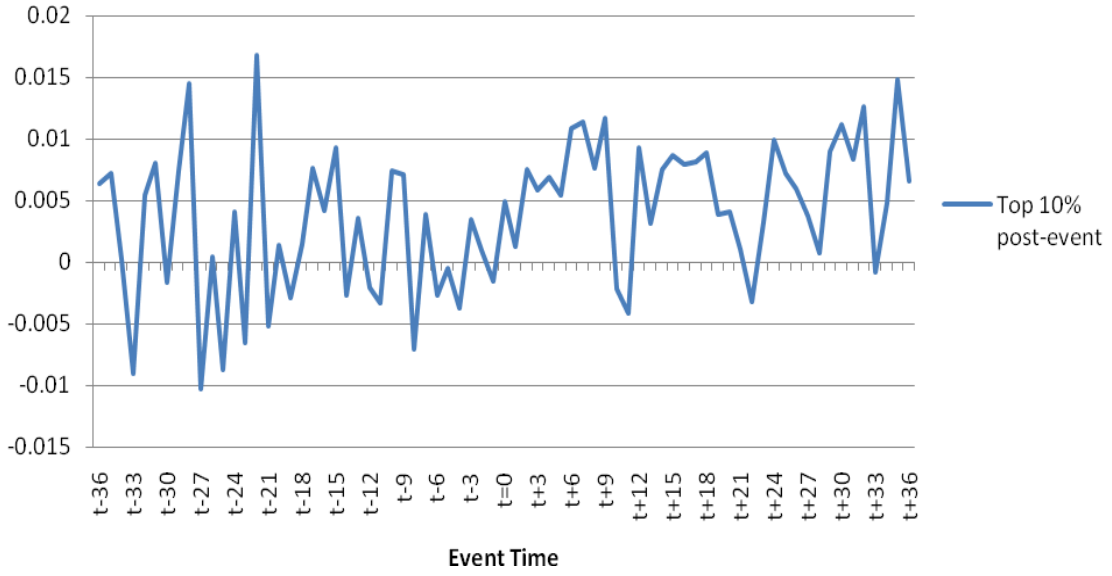
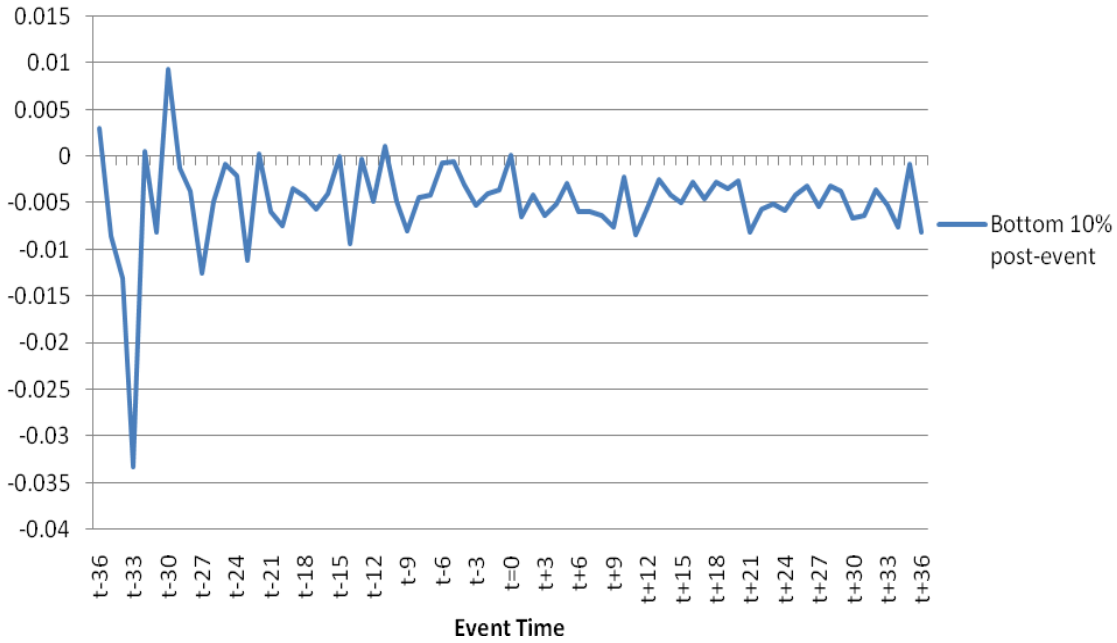


Figure A5.4 Benchmark-Adjusted Average Abnormal Returns - Bottom 10% according to IR post-event



APPENDIX 6

TableA6.1 Mean-Adjusted Total Sample AARs and CAARs (* indicates 5% significance level)

Event Time	Average Abnormal Returns	*T-test*	Cumulative Average Abnormal Returns	*T-test*
t-36	0.003962612	0.711	0.003962612	0.252
t-35	0.005835099	1.048	0.009797712	0.622
t-34	-0.009191206	-1.65*	0.000606506	0.039
t-33	-0.002701489	-0.485	-0.002094983	-0.133
t-32	0.002294173	0.412	0.00019919	0.013
t-31	0.00136271	0.245	0.001561901	0.099
t-30	0.003005351	0.540	0.004567252	0.290
t-29	-0.002114628	-0.380	0.002452624	0.156
t-28	-0.004196414	-0.753	-0.00174379	-0.111
t-27	-0.001275579	-0.229	-0.003019369	-0.192
t-26	-0.002183666	-0.392	-0.005203035	-0.330
t-25	0.003302042	0.593	-0.001900993	-0.121
t-24	-0.008370063	-1.503	-0.010271056	-0.652
t-23	-0.017839078	-3.20*	-0.028110134	-1.785*
t-22	-0.000228192	-0.041	-0.028338326	-1.799*
t-21	-0.000583347	-0.105	-0.028921672	-1.836*
t-20	-0.004070244	-0.731	-0.032991917	-2.095*
t-19	0.006179442	1.109	-0.026812475	-1.703*
t-18	-0.010439704	-1.87*	-0.037252179	-2.365*
t-17	-0.004520818	-0.812	-0.041772997	-2.652*
t-16	0.001717994	0.308	-0.040055003	-2.543*
t-15	0.000941598	0.169	-0.039113405	-2.484*
t-14	0.001259382	0.226	-0.037854024	-2.404*
t-13	0.00812357	1.458	-0.029730453	-1.888*
t-12	-0.006294405	-1.130	-0.036024858	-2.287*
t-11	0.005400291	0.969	-0.030624567	-1.945*
t-10	0.005768379	1.036	-0.024856188	-1.578
t-9	-0.000939357	-0.169	-0.025795546	-1.638
t-8	-0.000879325	-0.158	-0.02667487	-1.694*
t-7	-0.000566606	-0.102	-0.027241477	-1.730*
t-6	0.001482796	0.266	-0.025758681	-1.636
t-5	0.003886512	0.698	-0.021872169	-1.389
t-4	0.00026774	0.048	-0.021604429	-1.372
t-3	0.00889698	1.597	-0.012707449	-0.807
t-2	0.004780539	0.858	-0.00792691	-0.503
t-1	0.004646473	0.834	-0.003280436	-0.208
t=0	-0.010551478	-1.89*	-0.013831914	-0.878

t+1	-0.007977224	-1.432	-0.021809139	-1.385
t+2	-0.000548169	-0.098	-0.022357307	-1.420
t+3	0.000613161	0.110	-0.021744146	-1.381
t+4	-0.00302301	-0.543	-0.024767157	-1.573
t+5	0.006434297	1.155	-0.018332859	-1.164
t+6	0.005161341	0.927	-0.013171519	-0.836
t+7	-0.000628311	-0.113	-0.01379983	-0.876
t+8	0.002552604	0.458	-0.011247226	-0.714
t+9	0.002495207	0.448	-0.008752019	-0.556
t+10	0.003939521	0.707	-0.004812498	-0.306
t+11	0.008711205	1.564	0.003898707	0.248
t+12	0.005995576	1.076	0.009894282	0.628
t+13	0.002538019	0.456	0.012432301	0.789
t+14	0.002641834	0.474	0.015074135	0.957
t+15	0.001969236	0.354	0.017043371	1.082
t+16	0.00031677	0.057	0.017360141	1.102
t+17	0.002620232	0.470	0.019980373	1.269
t+18	-0.001101098	-0.198	0.018879275	1.199
t+19	0.000853757	0.153	0.019733032	1.253
t+20	-0.001169067	-0.210	0.018563965	1.179
t+21	-0.001357021	-0.244	0.017206944	1.093
t+22	-0.004766143	-0.856	0.0124408	0.790
t+23	0.000722835	0.130	0.013163636	0.836
t+24	0.00285578	0.513	0.016019416	1.017
t+25	-0.003795845	-0.681	0.012223571	0.776
t+26	-0.008017928	-1.439	0.004205643	0.267
t+27	-0.001077314	-0.193	0.003128328	0.199
t+28	-5.19017E-05	-0.009	0.003076426	0.195
t+29	0.003556561	0.638	0.006632987	0.421
t+30	-0.004746339	-0.852	0.001886648	0.120
t+31	0.000395081	0.071	0.002281729	0.145
t+32	-0.006096183	-1.094	-0.003814454	-0.242
t+33	-0.000741726	-0.133	-0.004556181	-0.289
t+34	-0.001465317	-0.263	-0.006021498	-0.382
t+35	-0.002618975	-0.470	-0.008640473	-0.549
t+36	0.000351958	0.063	-0.008288515	-0.526

APPENDIX 7: Mean-Adjusted Average Abnormal Returns for all Categories

Figure A7.1 Mean-Adjusted Male Managed Funds Average Abnormal Returns

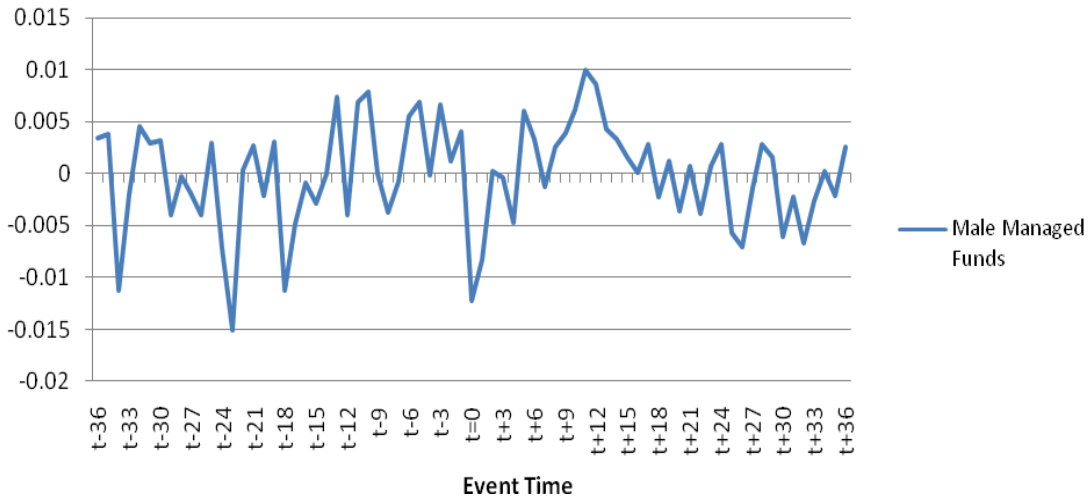


Figure A7.2 Mean-Adjusted Female Managed Funds Average Abnormal Returns

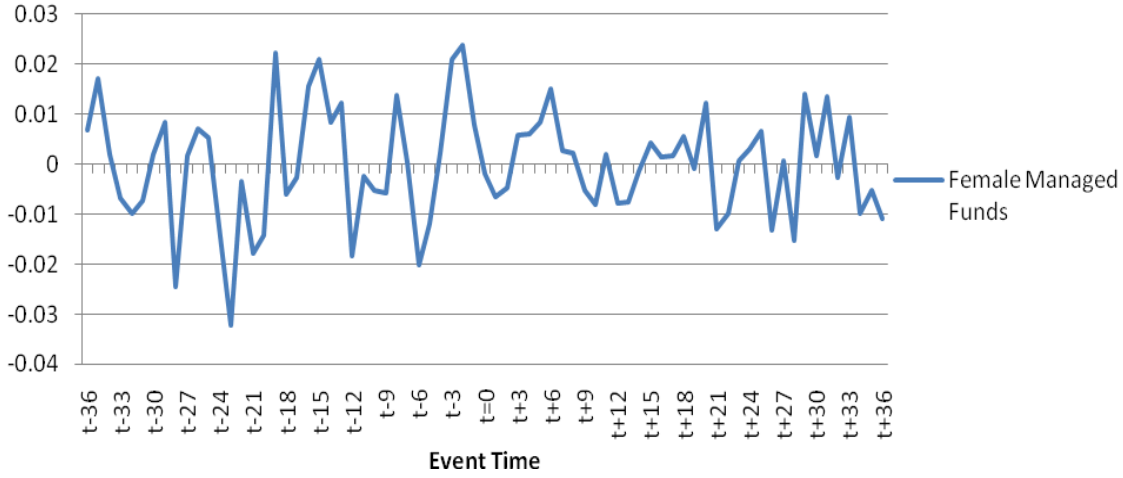


Figure A7.3 Mean-Adjusted UK Managed Funds Average Abnormal Returns

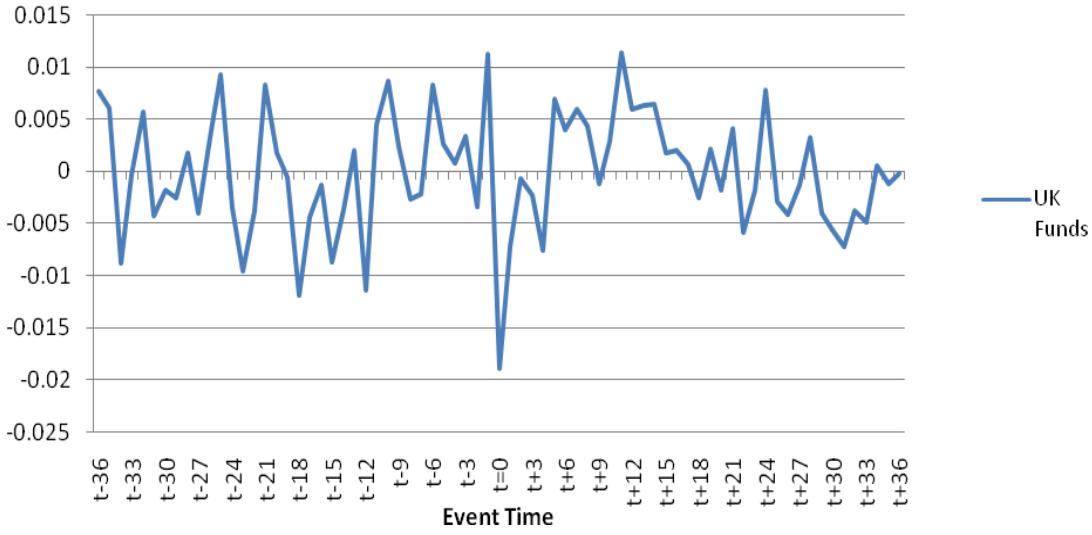


Figure A7.4 Mean-Adjusted International Managed Funds Average Abnormal Returns

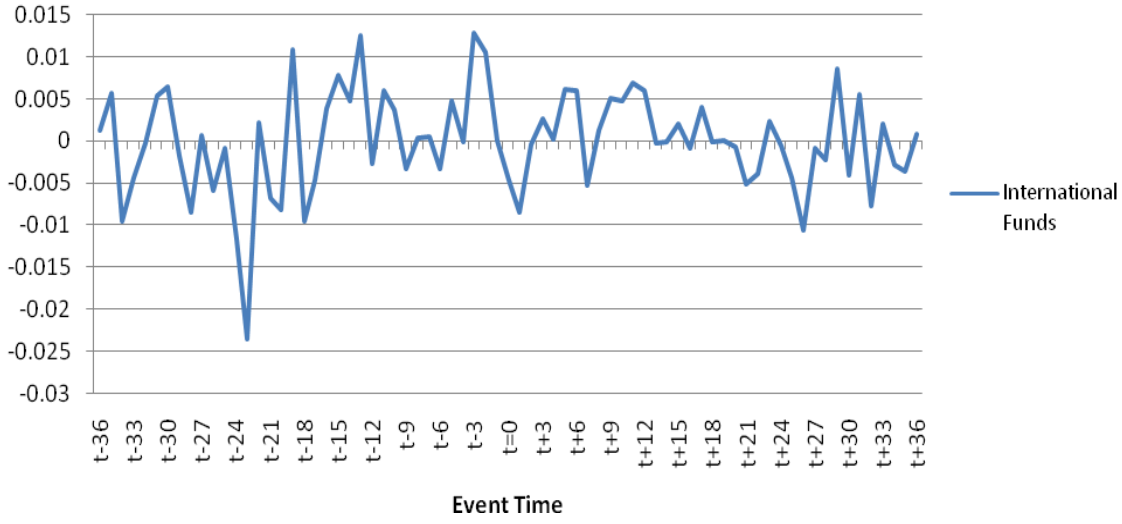


Figure A7.5 Mean-Adjusted Emerging Market Funds Average Abnormal Returns

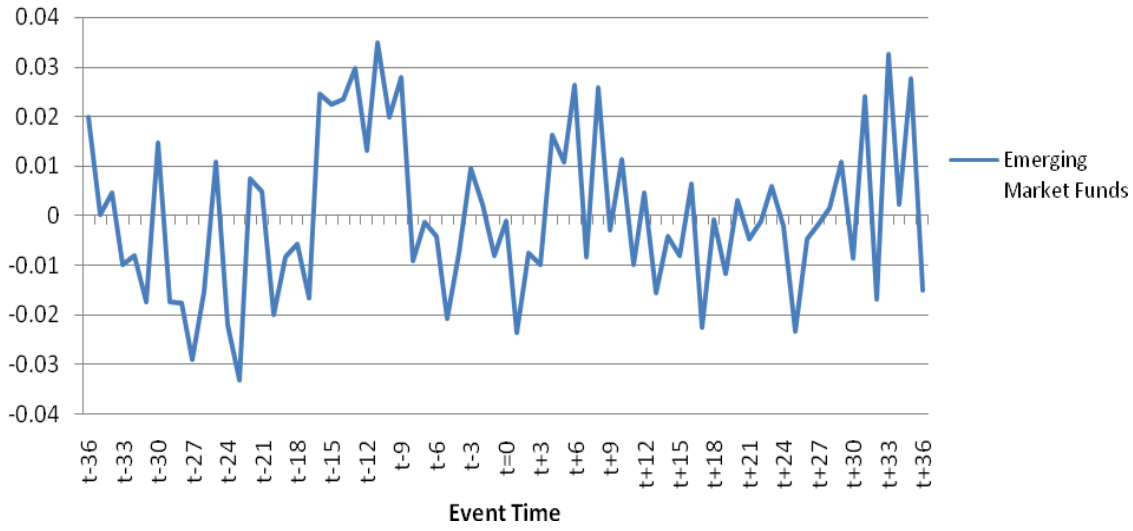


Figure A7.6 Mean-Adjusted Developed Market Funds Average Abnormal Returns

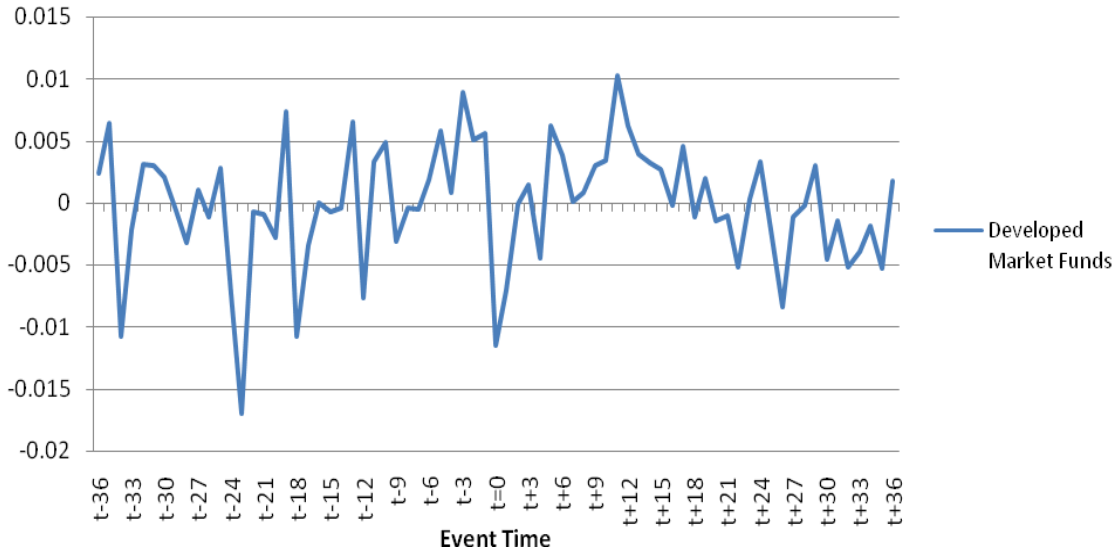


Figure A7.7 Mean-Adjusted Equity Funds Average Abnormal Returns

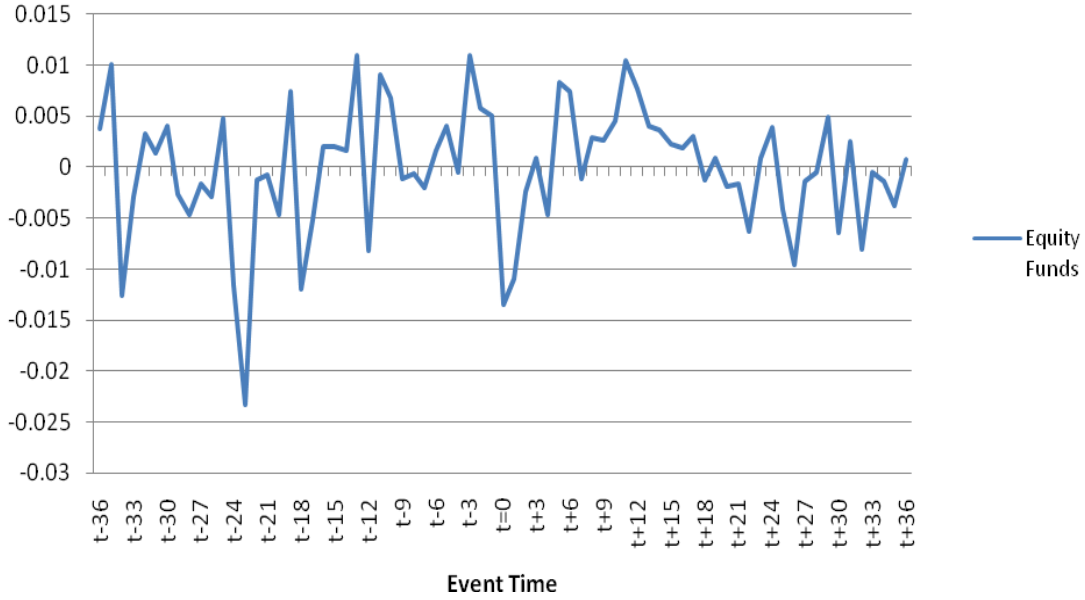


Figure A7.8 Mean-Adjusted Bond Funds Average Abnormal Returns

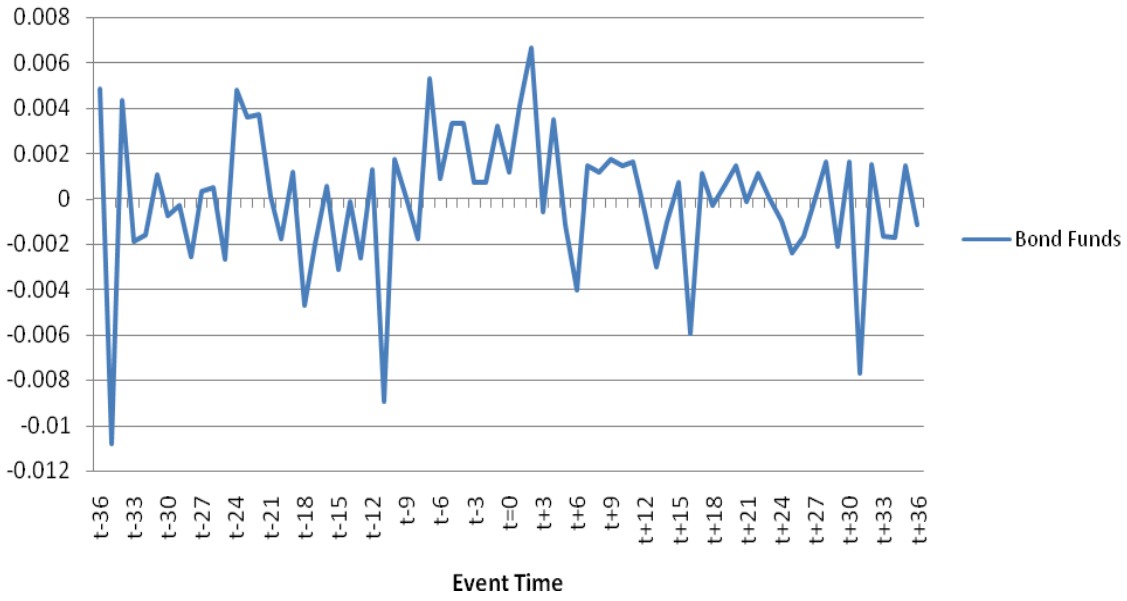


Figure A7.9 Mean-Adjusted Value Funds Average Abnormal Returns

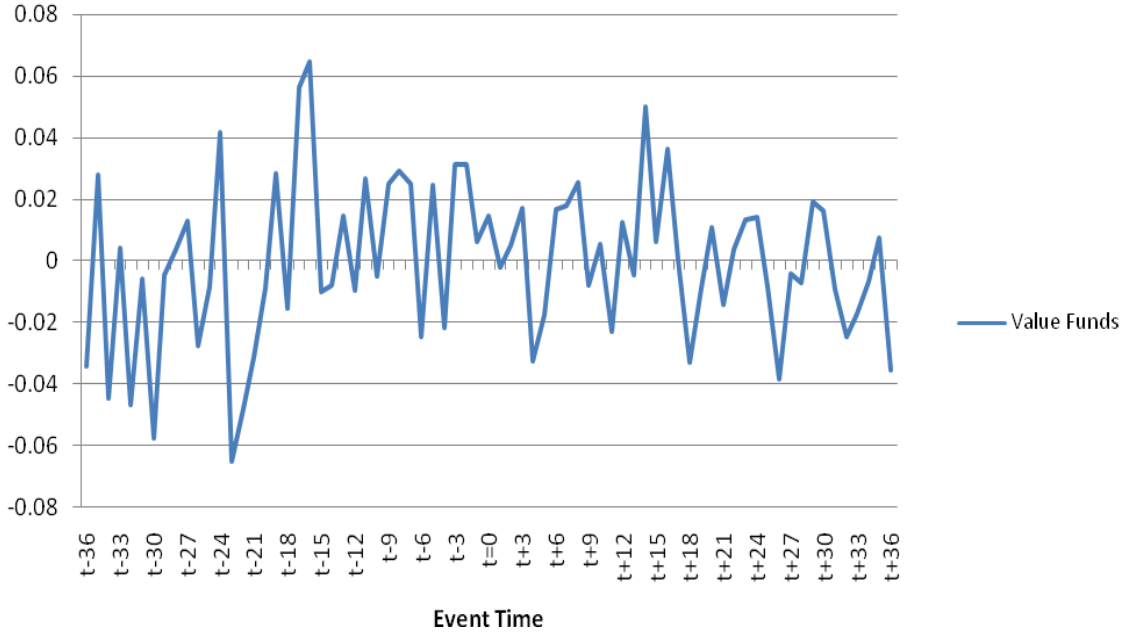


Figure A7.10 Mean-Adjusted Growth Funds Average Abnormal Returns

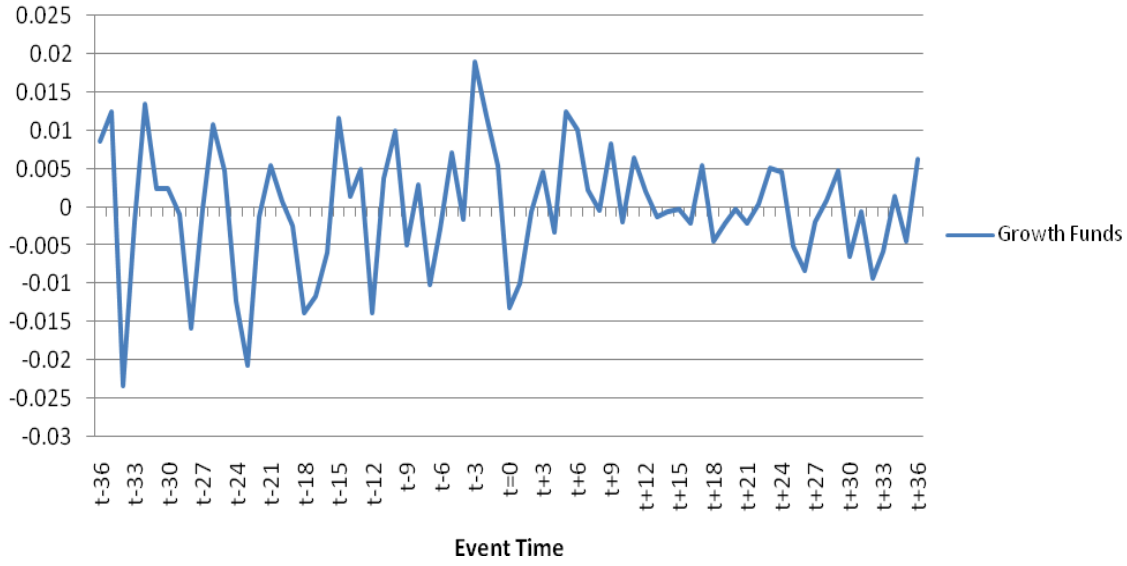
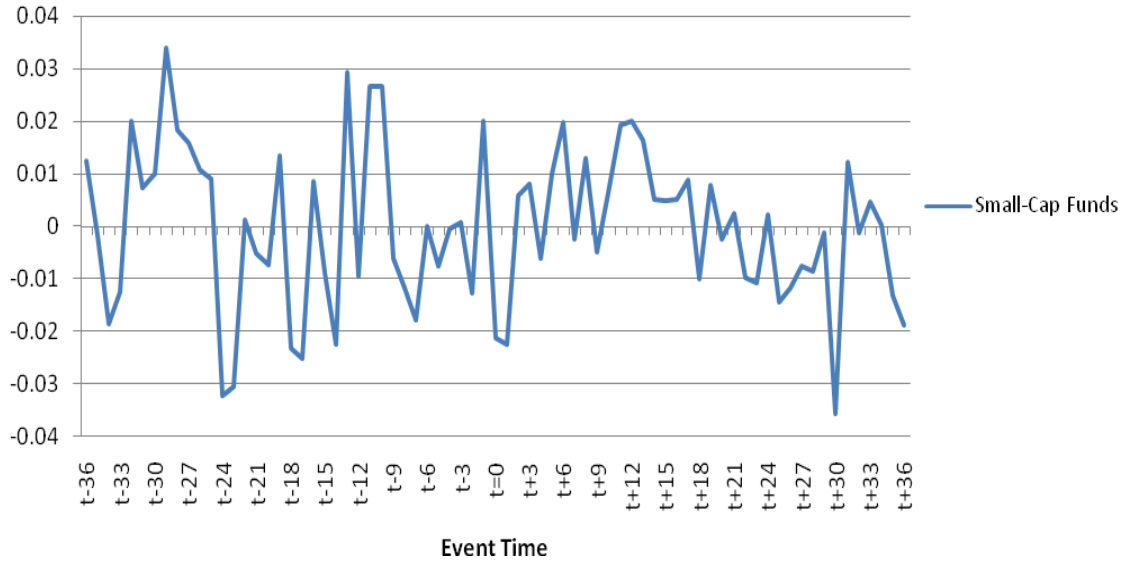


Figure A7.11 Mean-Adjusted Small-Cap Funds Average Abnormal Returns



APPENDIX 8

Table A8.1 Mean-Adjusted Male Managed Funds AARs and CAARs (* indicates 5% significance level)

Event Time	Average Abnormal Returns	*T-test*	Cumulative Average Abnormal Returns	*T-test*
t-36	0.004284757	0.7632	0.0042848	0.297
t-35	0.004954865	0.8825	0.0092396	0.64
t-34	-0.01180166	-2.102*	-0.002562	-0.177
t-33	-0.002667148	-0.475	-0.0052292	-0.362
t-32	0.004161319	0.7412	-0.0010679	-0.074
t-31	0.00442483	0.7881	0.003357	0.232
t-30	0.005574898	0.993	0.0089319	0.618
t-29	-0.002127498	-0.379	0.0068044	0.471
t-28	0.00042883	0.0764	0.0072332	0.501
t-27	-0.002643139	-0.471	0.0045901	0.318
t-26	-0.004679435	-0.833	-8.938E-05	-0.006
t-25	0.00175426	0.3125	0.0016649	0.115
t-24	-0.008109571	-1.444	-0.0064447	-0.446
t-23	-0.014094426	-2.51*	-0.0205391	-1.422
t-22	0.001247112	0.2221	-0.019292	-1.336
t-21	0.002812257	0.5009	-0.0164797	-1.141
t-20	-0.003416598	-0.609	-0.0198963	-1.378
t-19	0.003018864	0.5377	-0.0168775	-1.169
t-18	-0.012002063	-2.138*	-0.0288795	-2.00*
t-17	-0.004830755	-0.86	-0.0337103	-2.334*
t-16	0.000191826	0.0342	-0.0335185	-2.321*
t-15	-0.002996331	-0.534	-0.0365148	-2.528*
t-14	-0.000497633	-0.089	-0.0370124	-2.563*
t-13	0.007429444	1.3233	-0.029583	-2.048*
t-12	-0.004735942	-0.844	-0.0343189	-2.376*
t-11	0.007864395	1.4007	-0.0264545	-1.832*
t-10	0.007449794	1.3269	-0.0190047	-1.316
t-9	-0.001057515	-0.188	-0.0200623	-1.389
t-8	-0.003789955	-0.675	-0.0238522	-1.651*
t-7	-0.000758045	-0.135	-0.0246103	-1.704*
t-6	0.004980713	0.8871	-0.0196295	-1.359
t-5	0.0067712	1.206	-0.0128583	-0.89
t-4	0.00059992	0.1069	-0.0122584	-0.849
t-3	0.006473996	1.1531	-0.0057844	-0.4
t-2	-0.000252468	-0.045	-0.0060369	-0.418
t-1	0.003757325	0.6692	-0.0022796	-0.158
t=0	-0.01308766	-2.331*	-0.0153672	-1.064

t+1	-0.010002813	-1.782*	-0.02537	-1.757*
t+2	-0.001299631	-0.231	-0.0266697	-1.847*
t+3	-0.001440675	-0.257	-0.0281104	-1.946*
t+4	-0.004825131	-0.859	-0.0329355	-2.28*
t+5	0.005102285	0.9088	-0.0278332	-1.927*
t+6	0.001402943	0.2499	-0.0264303	-1.83*
t+7	-0.004178203	-0.744	-0.0306085	-2.119*
t+8	0.00289644	0.5159	-0.027712	-1.919*
t+9	0.00235212	0.4189	-0.0253599	-1.756*
t+10	0.004986764	0.8882	-0.0203731	-1.411
t+11	0.009538397	1.6989*	-0.0108347	-0.75
t+12	0.007842407	1.3968	-0.0029923	-0.207
t+13	0.004341	0.80	0.0146373	0.99
t+14	0.0033432	0.61	0.0179805	1.22
t+15	0.0015325	0.28	0.019513	1.32
t+16	9.083E-05	0.02	0.0196038	1.33
t+17	0.0027443	0.50	0.0223481	1.51
t+18	-0.002299	-0.42	0.0200491	1.36
t+19	0.0011388	0.21	0.0211879	1.44
t+20	-0.0036201	-0.67	0.0175678	1.19
t+21	0.0007525	0.14	0.0183204	1.24
t+22	-0.0038275	-0.70	0.0144929	0.98
t+23	0.0007118	0.13	0.0152047	1.03
t+24	0.0028268	0.52	0.0180314	1.22
t+25	-0.0057765	-1.06	0.0122549	0.83
t+26	-0.0070529	-1.30	0.005202	0.35
t+27	-0.0014508	-0.27	0.0037512	0.25
t+28	0.0028257	0.52	0.0065769	0.45
t+29	0.0015184	0.28	0.0080953	0.55
t+30	-0.0060708	-1.12	0.0020246	0.14
t+31	-0.0022752	-0.42	-0.0002506	-0.02
t+32	-0.0067486	-1.24	-0.0069992	-0.47
t+33	-0.0026767	-0.49	-0.0096759	-0.66
t+34	0.0001733	0.03	-0.0095026	-0.64
t+35	-0.0021377	-0.39	-0.0116403	-0.79
t+36	0.0025392	0.47	-0.0091011	-0.62

Table A8.2 Mean-Adjusted Female Managed Funds AARs and CAARs (* indicates 5% significance level)

Event Time	Average Abnormal Returns	*T-test*	Cumulative Average Abnormal Returns	*T-test*
t-36	0.006909869	0.4988	0.00690987	0.2471
t-35	0.017153754	1.2383	0.02406362	0.8606
t-34	0.002153941	0.1555	0.02621756	0.9376
t-33	-0.006658501	-0.481	0.01955906	0.6995
t-32	-0.009637488	-0.696	0.00992158	0.3548
t-31	-0.007187671	-0.519	0.0027339	0.0978
t-30	0.002127275	0.1536	0.00486118	0.1739
t-29	0.008476926	0.6119	0.0133381	0.477
t-28	-0.024472083	-1.767*	-0.01113398	-0.398
t-27	0.001798295	0.1298	-0.00933568	-0.334
t-26	0.007164397	0.5172	-0.00217129	-0.078
t-25	0.005405648	0.3902	0.00323436	0.1157
t-24	-0.014406836	-1.04	-0.01117247	-0.4
t-23	-0.032090334	-2.317*	-0.04326281	-1.547
t-22	-0.003271247	-0.236	-0.04653405	-1.664*
t-21	-0.017639841	-1.273	-0.0641739	-2.295*
t-20	-0.014152574	-1.022	-0.07832647	-2.801*
t-19	0.022299148	1.6097	-0.05602732	-2.004*
t-18	-0.005899042	-0.426	-0.06192636	-2.215*
t-17	-0.002662066	-0.192	-0.06458843	-2.31*
t-16	0.015562708	1.1234	-0.04902572	-1.753*
t-15	0.02114735	1.5266	-0.02787837	-0.997
t-14	0.008543136	0.6167	-0.01933523	-0.692
t-13	0.012380244	0.8937	-0.00695499	-0.249
t-12	-0.018221021	-1.315	-0.02517601	-0.9
t-11	-0.002281334	-0.165	-0.02745735	-0.982
t-10	-0.005161361	-0.373	-0.03261871	-1.167
t-9	-0.005522627	-0.399	-0.03814133	-1.364
t-8	0.013872426	1.0014	-0.02426891	-0.868
t-7	0.00043345	0.0313	-0.02383546	-0.852
t-6	-0.020063776	-1.448	-0.04389923	-1.57
t-5	-0.011705999	-0.845*	-0.05560523	-1.989
t-4	0.002375186	0.1715*	-0.05323005	-1.904
t-3	0.021009508	1.5166	-0.03222054	-1.152
t-2	0.023904148	1.7256	-0.00831639	-0.297*
t-1	0.007903357	0.5705	-0.00041303	-0.015
t=0	-0.002377955	-0.172	-0.00279099	-0.1
t+1	-0.007164369	-0.517	-0.00995536	-0.356
t+2	-0.005400574	-0.39	-0.01535593	-0.549

t+3	0.005320081	0.384	-0.01003585	-0.359
t+4	0.005356329	0.3867	-0.00467952	-0.167
t+5	0.007718461	0.5572	0.00303894	0.1087
t+6	0.014379588	1.038	0.01741853	0.623
t+7	0.002046044	0.1477	0.01946457	0.6961
t+8	0.001625967	0.1174	0.02109054	0.7543
t+9	-0.005861982	-0.423	0.01522856	0.5446
t+10	-0.00857557	-0.619	0.00665299	0.2379
t+11	0.001366368	0.0986	0.00801936	0.2868
t+12	-0.00843239	-0.609	-0.00041303	-0.015
t+13	-0.0075	-0.54	0.0012828	0.05
t+14	-0.0012441	-0.09	3.868E-05	0.00
t+15	0.0043773	0.32	0.0044159	0.16
t+16	0.0015625	0.11	0.0059785	0.21
t+17	0.0019363	0.14	0.0079148	0.28
t+18	0.005687	0.41	0.0136018	0.49
t+19	-0.0007299	-0.05	0.0128718	0.46
t+20	0.0123115	0.89	0.0251834	0.90
t+21	-0.0127838	-0.92	0.0123995	0.44
t+22	-0.0098506	-0.71	0.0025489	0.09
t+23	0.0007826	0.06	0.0033315	0.12
t+24	0.0030106	0.22	0.0063421	0.23
t+25	0.0066579	0.48	0.013	0.46
t+26	-0.0130845	-0.94	-8.456E-05	0.00
t+27	0.0008835	0.06	0.0007989	0.03
t+28	-0.0151594	-1.09	-0.0143605	-0.51
t+29	0.0140303	1.01	-0.0003302	-0.01
t+30	0.0018758	0.14	0.0015457	0.06
t+31	0.0136702	0.99	0.0152159	0.54
t+32	-0.0025895	-0.19	0.0126264	0.45
t+33	0.0094167	0.68	0.0220431	0.79
t+34	-0.009863	-0.71	0.01218	0.44
t+35	-0.0050707	-0.37	0.0071094	0.25
t+36	-0.0107959	-0.78	-0.0036865	-0.13

Table A8.3 Mean-Adjusted UK Funds AARs and CAARs (* indicates 5% significance level)

Event Time	Average Abnormal Returns	*T-test*	Cumulative Average Abnormal Returns	*T-test*
t-36	0.0080484	1.33	0.0080484	0.59
t-35	0.0068871	1.14	0.0149355	1.10
t-34	-0.0087707	-1.45	0.0061648	0.45
t-33	-0.0005709	-0.09	0.0055939	0.41
t-32	0.0054354	0.90	0.0110293	0.81
t-31	-0.0041657	-0.69	0.0068637	0.50
t-30	0.0001112	0.02	0.0069749	0.51
t-29	-0.001054	-0.17	0.0059208	0.43
t-28	0.0018906	0.31	0.0078114	0.57
t-27	-0.0020675	-0.34	0.005744	0.42
t-26	0.0035931	0.59	0.0093371	0.69
t-25	0.0068198	1.12	0.0161569	1.19
t-24	-0.0027824	-0.46	0.0133745	0.98
t-23	-0.0083903	-1.38	0.0049843	0.37
t-22	-0.0029862	-0.49	0.0019981	0.15
t-21	0.0079096	1.30	0.0099077	0.73
t-20	-1.754E-05	0.00	0.0098901	0.73
t-19	-0.0006864	-0.11	0.0092038	0.68
t-18	-0.0120261	-1.98*	-0.0028223	-0.21
t-17	-0.0038664	-0.64	-0.0066887	-0.49
t-16	-0.000866	-0.14	-0.0075547	-0.55
t-15	-0.0104208	-1.72*	-0.0179755	-1.32
t-14	-0.0046369	-0.76	-0.0226124	-1.66*
t-13	0.0013311	0.22	-0.0212813	-1.56
t-12	-0.0122282	-2.02*	-0.0335095	-2.46*
t-11	0.0060035	0.99	-0.027506	-2.02*
t-10	0.0089186	1.47	-0.0185875	-1.37
t-9	0.0006664	0.11	-0.0179211	-1.32
t-8	-0.0016569	-0.27	-0.019578	-1.44
t-7	-0.0014503	-0.24	-0.0210284	-1.54
t-6	0.0082739	1.36	-0.0127545	-0.94
t-5	0.0031254	0.52	-0.0096291	-0.71
t-4	0.000494	0.08	-0.0091351	-0.67
t-3	0.0023691	0.39	-0.006766	-0.50
t-2	-0.0054946	-0.91	-0.0122607	-0.90
t-1	0.0124486	2.05*	0.0001879	0.01
t=0	-0.0178262	-2.94*	-0.0176383	-1.30
t+1	-0.0087979	-1.45	-0.0264362	-1.94*
t+2	-0.0024842	-0.41	-0.0289204	-2.12*

t+3	-0.0026565	-0.44	-0.0315769	-2.32*
t+4	-0.0069925	-1.15	-0.0385694	-2.83*
t+5	0.0070508	1.16	-0.0315186	-2.32*
t+6	0.0034138	0.56	-0.0281049	-2.06*
t+7	0.0039968	0.66	-0.0241081	-1.77
t+8	0.0062703	1.03	-0.0178378	-1.31
t+9	-0.0022891	-0.38	-0.0201269	-1.48
t+10	0.0026851	0.44	-0.0174418	-1.28
t+11	0.0109773	1.81*	-0.0064645	-0.47
t+12	0.0063124	1.04	-0.0001522	-0.01
t+13	0.0063682	1.06	0.0097046	0.75
t+14	0.0064825	1.08	0.0161871	1.24
t+15	0.0018273	0.30	0.0180145	1.38
t+16	0.0020266	0.34	0.0200411	1.54
t+17	0.0006634	0.11	0.0207044	1.59
t+18	-0.0024914	-0.42	0.018213	1.40
t+19	0.0021017	0.35	0.0203147	1.56
t+20	-0.0018355	-0.31	0.0184792	1.42
t+21	0.0040724	0.68*	0.0225517	1.73
t+22	-0.0058859	-0.98	0.0166658	1.28
t+23	-0.0017287	-0.29	0.014937	1.15
t+24	0.0077861	1.30*	0.0227231	1.75
t+25	-0.0028743	-0.48	0.0198488	1.53
t+26	-0.0041627	-0.69	0.015686	1.21
t+27	-0.0012867	-0.21	0.0143993	1.11
t+28	0.0032283	0.54	0.0176276	1.36
t+29	-0.0039365	-0.66	0.0136911	1.05
t+30	-0.0056525	-0.94	0.0080387	0.62
t+31	-0.0072461	-1.21	0.0007926	0.06
t+32	-0.0038025	-0.63	-0.0030099	-0.23
t+33	-0.0048754	-0.81	-0.0078853	-0.61
t+34	0.0006024	0.10	-0.0072829	-0.56
t+35	-0.0011885	-0.20	-0.0084714	-0.65
t+36	-0.0002178	-0.04	-0.0086892	-0.67

Table A8.4 Mean-Adjusted International Funds AARs and CAARs (* indicates 5% significance level)

Event Time	Average Abnormal Returns	*T-test*	Cumulative Average Abnormal Returns	*T-test*
t-36	0.0023517	0.30	0.0023517	0.11
t-35	0.0068423	0.87	0.009194	0.44
t-34	-0.0102693	-1.30	-0.0010753	-0.05
t-33	-0.0051632	-0.65	-0.0062385	-0.30
t-32	-0.0005057	-0.06	-0.0067441	-0.32
t-31	0.0072938	0.92	0.0005497	0.03
t-30	0.0085045	1.08	0.0090542	0.43
t-29	-6.897E-05	-0.01	0.0089852	0.43
t-28	-0.0074126	-0.94	0.0015726	0.07
t-27	-0.001809	-0.23	-0.0002364	-0.01
t-26	-0.0071542	-0.91	-0.0073906	-0.35
t-25	-0.0007224	-0.09	-0.008113	-0.38
t-24	-0.0134191	-1.70*	-0.0215321	-1.02
t-23	-0.0228491	-2.90*	-0.0443812	-2.10*
t-22	0.0029127	0.37	-0.0414685	-1.96*
t-21	-0.0062751	-0.80	-0.0477436	-2.26*
t-20	-0.0086483	-1.10	-0.0563919	-2.67*
t-19	0.0108221	1.37	-0.0455698	-2.16*
t-18	-0.0102978	-1.31	-0.0558676	-2.64*
t-17	-0.0048939	-0.62	-0.0607615	-2.88*
t-16	0.0051015	0.65	-0.05566	-2.63*
t-15	0.0087802	1.11	-0.0468798	-2.22*
t-14	0.0048254	0.61	-0.0420544	-1.99*
t-13	0.0130476	1.65*	-0.0290068	-1.37
t-12	-0.0032576	-0.41	-0.0322644	-1.53
t-11	0.0064075	0.81	-0.0258569	-1.22
t-10	0.002924	0.37	-0.0229328	-1.09
t-9	-0.0035058	-0.44	-0.0264387	-1.25
t-8	-0.0004187	-0.05	-0.0268573	-1.27
t-7	5.224E-05	0.01	-0.0268051	-1.27
t-6	-0.00417	-0.53	-0.0309751	-1.47
t-5	0.0042728	0.54	-0.0267023	-1.26
t-4	0.0011593	0.15	-0.0255429	-1.21
t-3	0.0133205	1.69*	-0.0122225	-0.58
t-2	0.0100199	1.27	-0.0022026	-0.10
t-1	-0.0011933	-0.15	-0.0033959	-0.16
t=0	-0.0068433	-0.87	-0.0102393	-0.48
t+1	-0.0100704	-1.28	-0.0203097	-0.96

t+2	-0.0015914	-0.20	-0.0219011	-1.04
t+3	0.0012584	0.16	-0.0206427	-0.98
t+4	-0.000525	-0.07	-0.0211677	-1.00
t+5	0.0044534	0.56	-0.0167143	-0.79
t+6	0.0035423	0.45	-0.013172	-0.62
t+7	-0.0081994	-1.04	-0.0213714	-1.01
t+8	0.0001875	0.02	-0.0211839	-1.00
t+9	0.0033558	0.43	-0.0178281	-0.84
t+10	0.0028909	0.37	-0.0149372	-0.71
t+11	0.0062975	0.80	-0.0086397	-0.41
t+12	0.004465	0.57	-0.0041747	-0.20
t+13	-0.0002799	-0.04	0.0143659	0.67
t+14	-0.0001564	-0.02	0.0142095	0.67
t+15	0.0020734	0.27	0.0162829	0.76
t+16	-0.0009379	-0.12	0.015345	0.72
t+17	0.0040562	0.54	0.0194012	0.91
t+18	-9.088E-05	-0.01	0.0193103	0.91
t+19	-3.247E-05	0.00	0.0192778	0.91
t+20	-0.0007055	-0.09	0.0185724	0.87
t+21	-0.0050823	-0.67	0.01349	0.63
t+22	-0.0039978	-0.53	0.0094922	0.45
t+23	0.002387	0.32	0.0118792	0.56
t+24	-0.0005406	-0.07	0.0113386	0.53
t+25	-0.004417	-0.59	0.0069216	0.33
t+26	-0.0105881	-1.40	-0.0036665	-0.17
t+27	-0.0009377	-0.12	-0.0046042	-0.22
t+28	-0.0022387	-0.30	-0.0068429	-0.32
t+29	0.0086087	1.14	0.0017658	0.08
t+30	-0.0041234	-0.55	-0.0023576	-0.11
t+31	0.0055299	0.73	0.0031724	0.15
t+32	-0.0077017	-1.02	-0.0045294	-0.21
t+33	0.0020719	0.27	-0.0024574	-0.12
t+34	-0.0028913	-0.38	-0.0053488	-0.25
t+35	-0.0035932	-0.48	-0.008942	-0.42
t+36	0.0007523	0.10	-0.0081896	-0.38

Table A8.5 Mean-Adjusted Emerging Market Funds AARs and CAARs (* indicates 5% significance level)

Event Time	Average Abnormal Returns	*T-test*	Cumulative Average Abnormal Returns	*T-test*
t-36	0.0199773	1.12	0.0199773	0.33
t-35	0.0002562	0.01	0.0202336	0.33
t-34	0.0045412	0.25	0.0247748	0.41
t-33	-0.0097402	-0.54	0.0150346	0.25
t-32	-0.007968	-0.45	0.0070666	0.12
t-31	-0.0172543	-0.96	-0.0101877	-0.17
t-30	0.0146082	0.82	0.0044205	0.07
t-29	-0.0173107	-0.97	-0.0128902	-0.21
t-28	-0.017529	-0.98	-0.0304192	-0.50
t-27	-0.0290515	-1.62	-0.0594707	-0.98
t-26	-0.0152978	-0.86	-0.0747685	-1.23
t-25	0.0109037	0.61	-0.0638648	-1.05
t-24	-0.0221563	-1.24	-0.0860211	-1.41
t-23	-0.0331625	-1.85*	-0.1191836	-1.96*
t-22	0.0074013	0.41	-0.1117824	-1.84*
t-21	0.0048395	0.27	-0.1069429	-1.76*
t-20	-0.0198974	-1.11	-0.1268403	-2.08*
t-19	-0.0082487	-0.46	-0.1350889	-2.22*
t-18	-0.0057558	-0.32	-0.1408447	-2.31*
t-17	-0.0166013	-0.93	-0.157446	-2.59*
t-16	0.0244977	1.37	-0.1329483	-2.18*
t-15	0.0225987	1.26	-0.1103496	-1.81*
t-14	0.0234269	1.31	-0.0869227	-1.43
t-13	0.0297335	1.66*	-0.0571892	-0.94
t-12	0.0130808	0.73	-0.0441084	-0.72
t-11	0.0349125	1.95*	-0.009196	-0.15
t-10	0.019949	1.12	0.010753	0.18
t-9	0.0280447	1.57	0.0387977	0.64
t-8	-0.0089994	-0.50	0.0297982	0.49
t-7	-0.0013894	-0.08	0.0284088	0.47
t-6	-0.0041558	-0.23	0.0242531	0.40
t-5	-0.0206454	-1.15	0.0036076	0.06
t-4	-0.0076237	-0.43	-0.004016	-0.07
t-3	0.0096707	0.54	0.0056547	0.09
t-2	0.0022763	0.13	0.0079309	0.13
t-1	-0.0079309	-0.44	-3.816E-17	0.00
t=0	-0.0034808	-0.19	-0.0034808	-0.06
t+1	-0.0261673	-1.46	-0.0296482	-0.49

t+2	-0.0100385	-0.56	-0.0396867	-0.65
t+3	-0.0124387	-0.70	-0.0521254	-0.86
t+4	0.0138576	0.77	-0.0382677	-0.63
t+5	0.0083453	0.47	-0.0299225	-0.49
t+6	0.0237665	1.33	-0.006156	-0.10
t+7	-0.0107823	-0.60	-0.0169383	-0.28
t+8	0.0233853	1.31	0.006447	0.11
t+9	-0.0053026	-0.30	0.0011444	0.02
t+10	0.0089239	0.50	0.0100683	0.17
t+11	-0.0122987	-0.69	-0.0022304	-0.04
t+12	0.0022304	0.12	-3.686E-17	0.00
t+13	-0.0156727	-0.88	0.0165691	0.27
t+14	-0.0043014	-0.24	0.0122677	0.20
t+15	-0.008032	-0.45	0.0042357	0.07
t+16	0.0065282	0.36	0.0107638	0.18
t+17	-0.02261	-1.26	-0.0118462	-0.19
t+18	-0.0008673	-0.05	-0.0127135	-0.21
t+19	-0.0115938	-0.65	-0.0243074	-0.40
t+20	0.003036	0.17	-0.0212713	-0.35
t+21	-0.0045741	-0.26	-0.0258454	-0.42
t+22	-0.001187	-0.07	-0.0270324	-0.44
t+23	0.0059399	0.33	-0.0210925	-0.35
t+24	-0.0021807	-0.12	-0.0232732	-0.38
t+25	-0.0234237	-1.31	-0.0466969	-0.77
t+26	-0.0046009	-0.26	-0.0512979	-0.84
t+27	-0.0016941	-0.09	-0.052992	-0.87
t+28	0.0015395	0.09	-0.0514525	-0.84
t+29	0.0108	0.60	-0.0406525	-0.67
t+30	-0.0086157	-0.48	-0.0492682	-0.81
t+31	0.0239428	1.34	-0.0253254	-0.42
t+32	-0.0168878	-0.94	-0.0422132	-0.69
t+33	0.0325923	1.82*	-0.0096208	-0.16
t+34	0.0023108	0.13	-0.00731	-0.12
t+35	0.0275817	1.54	0.0202717	0.33
t+36	-0.0149403	-0.84	0.0053314	0.09

Table A8.6 Mean-Adjusted Developed Market Funds AARs and CAARs (* indicates 5% significance level)

Event Time	Average Abnormal Returns	*T-test*	Cumulative Average Abnormal Returns	*T-test*
t-36	0.0031205	0.56	0.0031205	0.22
t-35	0.0075025	1.34	0.010623	0.74
t-34	-0.011006	-1.97*	-0.0003829	-0.03
t-33	-0.0026644	-0.48	-0.0030473	-0.21
t-32	0.0028681	0.51	-0.0001792	-0.01
t-31	0.0044083	0.79	0.0042291	0.29
t-30	0.0041561	0.74	0.0083853	0.58
t-29	0.0010336	0.18	0.0094189	0.66
t-28	-0.0023761	-0.42	0.0070428	0.49
t-27	0.0004405	0.08	0.0074833	0.52
t-26	-0.0017337	-0.31	0.0057497	0.40
t-25	0.0016362	0.29	0.0073858	0.51
t-24	-0.0080514	-1.44	-0.0006656	-0.05
t-23	-0.0157138	-2.81*	-0.0163794	-1.14
t-22	-3.496E-05	-0.01	-0.0164144	-1.14
t-21	-0.0009023	-0.16	-0.0173166	-1.21
t-20	-0.0039636	-0.71	-0.0212802	-1.48
t-19	0.0072778	1.30	-0.0140024	-0.97
t-18	-0.0114001	-2.04*	-0.0254025	-1.77*
t-17	-0.0035484	-0.63	-0.0289509	-2.01*
t-16	0.0010271	0.18	-0.0279238	-1.94*
t-15	-0.0007552	-0.13	-0.028679	-2.00*
t-14	-0.0007361	-0.13	-0.0294151	-2.05*
t-13	0.0066133	1.18	-0.0228019	-1.59
t-12	-0.0083822	-1.50	-0.0311841	-2.17*
t-11	0.0041492	0.74	-0.0270349	-1.88*
t-10	0.0043454	0.78	-0.0226895	-1.58
t-9	-0.0039418	-0.70	-0.0266313	-1.85*
t-8	-0.0003462	-0.06	-0.0269776	-1.88*
t-7	-0.0005077	-0.09	-0.0274852	-1.91*
t-6	0.0013189	0.24	-0.0261663	-1.82*
t-5	0.0055465	0.99	-0.0206198	-1.43
t-4	0.0014931	0.27	-0.0191267	-1.33
t-3	0.0087497	1.56	-0.010377	-0.72
t-2	0.0037283	0.67	-0.0066487	-0.46
t-1	0.0053064	0.95	-0.0013422	-0.09
t=0	-0.0119289	-2.13*	-0.0132712	-0.92
t+1	-0.0083592	-1.49	-0.0216304	-1.51

t+2	-0.0013819	-0.25	-0.0230123	-1.60
t+3	0.0005096	0.09	-0.0225027	-1.57
t+4	-0.0044057	-0.79	-0.0269084	-1.87*
t+5	0.0053213	0.95	-0.021587	-1.50
t+6	0.002041	0.36	-0.019546	-1.36
t+7	-0.0026342	-0.47	-0.0221803	-1.54
t+8	0.0012141	0.22	-0.0209662	-1.46
t+9	0.0014839	0.27	-0.0194823	-1.36
t+10	0.0023692	0.42	-0.0171131	-1.19
t+11	0.0096904	1.73*	-0.0074227	-0.52
t+12	0.0054396	0.97	-0.0019831	-0.14
t+13	0.0039156	0.71	0.0130704	0.90
t+14	0.0032245	0.59	0.0162949	1.12
t+15	0.0026618	0.48	0.0189567	1.30
t+16	-0.0002319	-0.04	0.0187248	1.28
t+17	0.0045494	0.83	0.0232742	1.59
t+18	-0.0011522	-0.21	0.022122	1.52
t+19	0.0019676	0.36	0.0240896	1.65*
t+20	-0.0014163	-0.26	0.0226732	1.55
t+21	-0.0010816	-0.20	0.0215916	1.48
t+22	-0.0051854	-0.94	0.0164062	1.12
t+23	0.0003493	0.06	0.0167555	1.15
t+24	0.00331	0.60	0.0200655	1.37
t+25	-0.002148	-0.39	0.0179175	1.23
t+26	-0.0083412	-1.52	0.0095763	0.66
t+27	-0.0011372	-0.21	0.0084391	0.58
t+28	-0.0002389	-0.04	0.0082001	0.56
t+29	0.0030096	0.55	0.0112097	0.77
t+30	-0.0045247	-0.82	0.006685	0.46
t+31	-0.0014143	-0.26	0.0052707	0.36
t+32	-0.0051903	-0.94	8.036E-05	0.01
t+33	-0.0039134	-0.71	-0.0038331	-0.26
t+34	-0.001854	-0.34	-0.0056871	-0.39
t+35	-0.005294	-0.96	-0.010981	-0.75
t+36	0.0017375	0.32	-0.0092435	-0.63

Table A8.7 Mean-Adjusted Equity Funds AARs and CAARs (* indicates 5% significance level)

Event Time	Average Abnormal Returns	*T-test*	Cumulative Average Abnormal Returns	*T-test*
t-36	0.0043837	0.60	0.0043837	0.23
t-35	0.0109248	1.49	0.0153085	0.81
t-34	-0.0128388	-1.75*	0.0024698	0.13
t-33	-0.0039266	-0.53	-0.0014568	-0.08
t-32	0.0034693	0.47	0.0020125	0.11
t-31	0.0029102	0.40	0.0049227	0.26
t-30	0.0064203	0.87	0.0113431	0.60
t-29	-0.0008123	-0.11	0.0105307	0.55
t-28	-0.0038094	-0.52	0.0067213	0.35
t-27	-0.0025613	-0.35	0.00416	0.22
t-26	-0.0035973	-0.49	0.0005627	0.03
t-25	0.0040096	0.55	0.0045722	0.24
t-24	-0.0124502	-1.70*	-0.007878	-0.41
t-23	-0.0222372	-3.03*	-0.0301152	-1.58
t-22	-0.0003663	-0.05	-0.0304814	-1.60
t-21	-0.0007779	-0.11	-0.0312593	-1.64
t-20	-0.0059753	-0.81	-0.0372346	-1.96*
t-19	0.0073758	1.00	-0.0298588	-1.57
t-18	-0.0126774	-1.73*	-0.0425362	-2.24*
t-17	-0.0053786	-0.73	-0.0479148	-2.52*
t-16	0.0036972	0.50	-0.0442176	-2.33*
t-15	0.0020172	0.27	-0.0422005	-2.22*
t-14	0.0014553	0.20	-0.0407452	-2.14*
t-13	0.0105501	1.44	-0.0301951	-1.59
t-12	-0.0086338	-1.18	-0.0388289	-2.04*
t-11	0.0098673	1.34	-0.0289615	-1.52
t-10	0.0061676	0.84	-0.022794	-1.20
t-9	-0.0018207	-0.25	-0.0246147	-1.29
t-8	-0.0011283	-0.15	-0.025743	-1.35
t-7	-0.0020082	-0.27	-0.0277512	-1.46
t-6	0.0013099	0.18	-0.0264412	-1.39
t-5	0.0034367	0.47	-0.0230045	-1.21
t-4	0.0005403	0.07	-0.0224642	-1.18
t-3	0.010832	1.48	-0.0116322	-0.61
t-2	0.0047411	0.65	-0.006891	-0.36
t-1	0.0046296	0.63	-0.0022614	-0.12
t=0	-0.0146029	-1.99*	-0.0168643	-0.89
t+1	-0.0124704	-1.70*	-0.0293347	-1.54

t+2	-0.0032483	-0.44	-0.032583	-1.71*
t+3	-0.0003766	-0.05	-0.0329596	-1.73*
t+4	-0.004465	-0.61	-0.0374246	-1.97*
t+5	0.0076449	1.04	-0.0297797	-1.57
t+6	0.0058351	0.79	-0.0239445	-1.26
t+7	-0.0039555	-0.54	-0.0279	-1.47
t+8	0.0031738	0.43	-0.0247262	-1.30
t+9	0.0011643	0.16	-0.0235619	-1.24
t+10	0.0036053	0.49	-0.0199566	-1.05
t+11	0.0103235	1.41	-0.0096331	-0.51
t+12	0.0066311	0.90	-0.003002	-0.16
t+13	0.0039733	0.55	0.0123735	0.63
t+14	0.003598	0.50	0.0159715	0.82
t+15	0.0022919	0.32	0.0182634	0.94
t+16	0.00195	0.27	0.0202134	1.04
t+17	0.0030184	0.42	0.0232318	1.19
t+18	-0.0013143	-0.18	0.0219175	1.12
t+19	0.0009353	0.13	0.0228528	1.17
t+20	-0.0018555	-0.26	0.0209973	1.08
t+21	-0.0016762	-0.23	0.0193211	0.99
t+22	-0.0063185	-0.87	0.0130026	0.67
t+23	0.0009032	0.12	0.0139058	0.71
t+24	0.0038535	0.53	0.0177593	0.91
t+25	-0.0041631	-0.58	0.0135961	0.70
t+26	-0.0096119	-1.33	0.0039843	0.20
t+27	-0.0013532	-0.19	0.0026311	0.13
t+28	-0.0004723	-0.07	0.0021589	0.11
t+29	0.004964	0.69	0.0071228	0.37
t+30	-0.0063755	-0.88	0.0007474	0.04
t+31	0.0025613	0.35	0.0033087	0.17
t+32	-0.0081255	-1.12	-0.0048168	-0.25
t+33	-0.0004941	-0.07	-0.0053109	-0.27
t+34	-0.0014015	-0.19	-0.0067124	-0.34
t+35	-0.0037821	-0.52	-0.0104945	-0.54
t+36	0.0007769	0.11	-0.0097176	-0.50

Table A8.8 Mean-Adjusted Bond Funds AARs and CAARs (* indicates 5% significance level)

Event Time	Average Abnormal Returns	*T-test*	Cumulative Average Abnormal Returns	*T-test*
t-36	0.0060128	1.79*	0.0060128	1.08
t-35	-0.0090819	-2.70*	-0.0030691	-0.55
t-34	0.0030552	0.91	-1.389E-05	0.00
t-33	-0.0007171	-0.21	-0.000731	-0.13
t-32	-0.0037653	-1.12	-0.0044963	-0.81
t-31	0.0013835	0.41	-0.0031129	-0.56
t-30	-0.0001366	-0.04	-0.0032495	-0.58
t-29	0.0007426	0.22	-0.0025069	-0.45
t-28	-0.002823	-0.84	-0.0053299	-0.96
t-27	0.0005755	0.17	-0.0047544	-0.85
t-26	0.0003483	0.10	-0.0044061	-0.79
t-25	-0.0041453	-1.23	-0.0085514	-1.53
t-24	0.004215	1.25	-0.0043364	-0.78
t-23	0.0030969	0.92	-0.0012395	-0.22
t-22	0.0039377	1.17	0.0026982	0.48
t-21	0.0006902	0.21	0.0033885	0.61
t-20	-0.0018513	-0.55	0.0015372	0.28
t-19	0.0015212	0.45	0.0030584	0.55
t-18	-0.0045674	-1.36	-0.001509	-0.27
t-17	-0.0010682	-0.32	-0.0025772	-0.46
t-16	-0.0011391	-0.34	-0.0037164	-0.67
t-15	-0.0035163	-1.05	-0.0072327	-1.30
t-14	-0.0010231	-0.30	-0.0082558	-1.48
t-13	-0.0006555	-0.20	-0.0089113	-1.60
t-12	-0.000256	-0.08	-0.0091673	-1.64
t-11	-0.0075666	-2.25*	-0.0167339	-3.00*
t-10	0.0024381	0.73	-0.0142958	-2.56*
t-9	-0.0016427	-0.49	-0.0159385	-2.86*
t-8	-0.0001521	-0.05	-0.0160906	-2.88*
t-7	0.0050617	1.51	-0.011029	-1.98*
t-6	-0.0004358	-0.13	-0.0114647	-2.06*
t-5	0.0052198	1.55	-0.0062449	-1.12
t-4	0.0022323	0.66	-0.0040126	-0.72
t-3	0.0009217	0.27	-0.0030909	-0.55
t-2	-0.0007001	-0.21	-0.003791	-0.68
t-1	0.0036209	1.08	-0.0001701	-0.03
t=0	0.001272	0.38	0.0011019	0.20
t+1	0.0018683	0.56	0.0029702	0.53

t+2	0.0030741	0.91	0.0060443	1.08
t+3	-0.0002641	-0.08	0.0057802	1.04
t+4	0.0017967	0.53	0.0075768	1.36
t+5	-0.0027611	-0.82	0.0048157	0.86
t+6	-0.0056681	-1.69*	-0.0008524	-0.15
t+7	-0.0001401	-0.04	-0.0009925	-0.18
t+8	0.0008119	0.24	-0.0001805	-0.03
t+9	0.0005127	0.15	0.0003321	0.06
t+10	-0.0003136	-0.09	1.857E-05	0.00
t+11	3.015E-05	0.01	4.872E-05	0.01
t+12	-0.0002609	-0.08	-0.0002121	-0.04
t+13	-0.003002	-0.86	0.01382	2.50*
t+14	-0.0010299	-0.29	0.0127901	2.31*
t+15	0.0007366	0.21	0.0135267	2.45*
t+16	-0.0059221	-1.69*	0.0076046	1.38
t+17	0.0010992	0.31	0.0087039	1.57
t+18	-0.0002909	-0.08	0.008413	1.52
t+19	0.0005502	0.16	0.0089632	1.62
t+20	0.0014909	0.43	0.0104542	1.89*
t+21	-0.0001402	-0.04	0.0103139	1.87*
t+22	0.0011523	0.33	0.0114663	2.07*
t+23	2.051E-05	0.01	0.0114868	2.08*
t+24	-0.0009863	-0.28	0.0105004	1.90*
t+25	-0.0023586	-0.67	0.0081418	1.47
t+26	-0.0016422	-0.47	0.0064996	1.18
t+27	2.607E-05	0.01	0.0065257	1.18
t+28	0.0016295	0.47	0.0081552	1.48
t+29	-0.0021051	-0.60	0.0060501	1.09
t+30	0.0016221	0.46	0.0076721	1.39
t+31	-0.0077283	-2.21*	-5.621E-05	-0.01
t+32	0.001502	0.43	0.0014458	0.26
t+33	-0.001646	-0.47	-0.0002002	-0.04
t+34	-0.0016923	-0.48	-0.0018925	-0.34
t+35	0.0014926	0.43	-0.0003999	-0.07
t+36	-0.0011354	-0.32	-0.0015354	-0.28

Table A8.9 Mean-Adjusted Equity Growth Funds AARs and CAARs (* indicates 5% significance level)

Event Time	Average Abnormal Returns	*T-test*	Cumulative Average Abnormal Returns	*T-test*
t-36	0.0100857	0.97	0.0100857	0.50
t-35	0.0144151	1.39	0.0245008	1.21
t-34	-0.024288	-2.34*	0.0002127	0.01
t-33	-0.0036794	-0.35	-0.0034667	-0.17
t-32	0.0131967	1.27	0.00973	0.48
t-31	0.0059854	0.58	0.0157154	0.78
t-30	0.0068679	0.66	0.0225832	1.12
t-29	0.00108	0.10	0.0236632	1.17
t-28	-0.015929	-1.54	0.0077342	0.38
t-27	-0.0047428	-0.46	0.0029914	0.15
t-26	0.0083586	0.81	0.01135	0.56
t-25	0.0072872	0.70	0.0186372	0.92
t-24	-0.0117871	-1.14	0.0068501	0.34
t-23	-0.0216824	-2.09*	-0.0148323	-0.73
t-22	-0.0014701	-0.14	-0.0163024	-0.81
t-21	0.007662	0.74	-0.0086404	-0.43
t-20	0.0006393	0.06	-0.0080011	-0.40
t-19	-0.0013445	-0.13	-0.0093456	-0.46
t-18	-0.0146876	-1.42	-0.0240333	-1.19
t-17	-0.0140508	-1.36	-0.0380841	-1.88*
t-16	-0.0014821	-0.14	-0.0395662	-1.96*
t-15	0.0129971	1.25	-0.0265692	-1.31
t-14	-0.00074	-0.07	-0.0273092	-1.35
t-13	0.0060756	0.59	-0.0212335	-1.05
t-12	-0.0132823	-1.28	-0.0345158	-1.71*
t-11	0.0045089	0.44	-0.0300069	-1.48
t-10	0.0075772	0.73	-0.0224297	-1.11
t-9	-0.0058193	-0.56	-0.028249	-1.40
t-8	0.0015708	0.15	-0.0266782	-1.32
t-7	-0.009683	-0.93	-0.0363612	-1.80*
t-6	-0.0030429	-0.29	-0.0394041	-1.95*
t-5	0.0046349	0.45	-0.0347691	-1.72*
t-4	0.0009831	0.09	-0.033786	-1.67*
t-3	0.0187884	1.81*	-0.0149976	-0.74
t-2	0.0098981	0.95	-0.0050995	-0.25
t-1	0.005368	0.52	0.0002685	0.01
t=0	-0.0144814	-1.40	-0.0142129	-0.70
t+1	-0.0118812	-1.15	-0.026094	-1.29

t+2	-0.0022886	-0.22	-0.0283826	-1.40
t+3	0.0021765	0.21	-0.0262061	-1.30
t+4	-0.0028467	-0.27	-0.0290528	-1.44
t+5	0.0116349	1.12	-0.0174179	-0.86
t+6	0.0076737	0.74	-0.0097443	-0.48
t+7	-0.0018435	-0.18	-0.0115878	-0.57
t+8	0.0001505	0.01	-0.0114374	-0.57
t+9	0.0063988	0.62	-0.0050386	-0.25
t+10	-0.0047091	-0.45	-0.0097477	-0.48
t+11	0.0068484	0.66	-0.0028993	-0.14
t+12	0.0011896	0.11	-0.0017097	-0.08
t+13	-0.0012568	-0.13	0.0133042	0.63
t+14	-0.0004983	-0.05	0.0128058	0.61
t+15	-0.0001508	-0.02	0.012655	0.60
t+16	-0.0021046	-0.21	0.0105504	0.50
t+17	0.0054924	0.55	0.0160428	0.76
t+18	-0.0043995	-0.44	0.0116433	0.55
t+19	-0.0020795	-0.21	0.0095638	0.45
t+20	-0.00016	-0.02	0.0094038	0.45
t+21	-0.0020735	-0.21	0.0073302	0.35
t+22	0.0004553	0.05	0.0077856	0.37
t+23	0.0051795	0.52	0.0129651	0.61
t+24	0.0045742	0.46	0.0175393	0.83
t+25	-0.0050531	-0.50	0.0124862	0.59
t+26	-0.0083273	-0.83	0.0041589	0.20
t+27	-0.0018413	-0.18	0.0023177	0.11
t+28	0.0009132	0.09	0.0032308	0.15
t+29	0.0048371	0.48	0.008068	0.38
t+30	-0.0063967	-0.64	0.0016713	0.08
t+31	-0.0006018	-0.06	0.0010695	0.05
t+32	-0.0092667	-0.92	-0.0081972	-0.39
t+33	-0.0057997	-0.58	-0.0139969	-0.66
t+34	0.0014142	0.14	-0.0125826	-0.60
t+35	-0.0043818	-0.44	-0.0169644	-0.80
t+36	0.0063713	0.63	-0.0105931	-0.50

Table A8.10 Mean-Adjusted Equity Value Funds AARs and CAARs (* indicates 5% significance level)

Event Time	Average Abnormal Returns	*T-test*	Cumulative Average Abnormal Returns	*T-test*
t-36	-0.0342597	-1.08	-0.0342597	-0.45
t-35	0.0277083	0.87	-0.0065514	-0.09
t-34	-0.0448981	-1.42	-0.0514495	-0.67
t-33	0.0039595	0.13	-0.04749	-0.62
t-32	-0.046692	-1.47	-0.094182	-1.23
t-31	-0.0061736	-0.19	-0.1003556	-1.31
t-30	-0.0575597	-1.82*	-0.1579153	-2.06*
t-29	-0.0049017	-0.15	-0.162817	-2.12*
t-28	0.0036168	0.11	-0.1592002	-2.07*
t-27	0.012735	0.40	-0.1464652	-1.91*
t-26	-0.0275887	-0.87	-0.1740539	-2.27*
t-25	-0.0082733	-0.26	-0.1823272	-2.38*
t-24	0.0416528	1.32	-0.1406743	-1.83*
t-23	-0.0651322	-2.06*	-0.2058066	-2.68*
t-22	-0.0479293	-1.51	-0.2537359	-3.31*
t-21	-0.0312228	-0.99	-0.2849586	-3.71*
t-20	-0.0089412	-0.28	-0.2938999	-3.83*
t-19	0.0283243	0.89	-0.2655755	-3.46*
t-18	-0.0156583	-0.49	-0.2812339	-3.67*
t-17	0.0560776	1.77*	-0.2251562	-2.93*
t-16	0.064448	2.04*	-0.1607083	-2.09*
t-15	-0.0102418	-0.32	-0.1709501	-2.23*
t-14	-0.007983	-0.25	-0.1789331	-2.33*
t-13	0.0144553	0.46	-0.1644778	-2.14*
t-12	-0.0097205	-0.31	-0.1741983	-2.27*
t-11	0.026457	0.84	-0.1477413	-1.93*
t-10	-0.0052437	-0.17	-0.1529851	-1.99*
t-9	0.024715	0.78	-0.1282701	-1.67*
t-8	0.0290103	0.92	-0.0992598	-1.29
t-7	0.0246932	0.78	-0.0745666	-0.97
t-6	-0.0246541	-0.78	-0.0992207	-1.29
t-5	0.0245089	0.77	-0.0747118	-0.97
t-4	-0.0217817	-0.69	-0.0964935	-1.26
t-3	0.0310668	0.98	-0.0654267	-0.85
t-2	0.0310198	0.98	-0.0344068	-0.45
t-1	0.006272	0.20	-0.0281349	-0.37
t=0	0.0121365	0.38	-0.0159984	-0.21
t+1	-0.0044728	-0.14	-0.0204712	-0.27

t+2	0.0025326	0.08	-0.0179385	-0.23
t+3	0.0146494	0.46	-0.0032892	-0.04
t+4	-0.0349757	-1.10	-0.0382648	-0.50
t+5	-0.0199079	-0.63	-0.0581727	-0.76
t+6	0.0141406	0.45	-0.0440321	-0.57
t+7	0.0155805	0.49	-0.0284517	-0.37
t+8	0.0229239	0.72	-0.0055278	-0.07
t+9	-0.0104467	-0.33	-0.0159746	-0.21
t+10	0.0029396	0.09	-0.013035	-0.17
t+11	-0.0253132	-0.80	-0.0383482	-0.50
t+12	0.0102133	0.32	-0.0281349	-0.37
t+13	-0.0048716	-0.15	-0.0040494	-0.05
t+14	0.0500649	1.58	0.0460154	0.60
t+15	0.0061773	0.20	0.0521928	0.68
t+16	0.0362252	1.14	0.088418	1.15
t+17	0.0002227	0.01	0.0886407	1.16
t+18	-0.0331651	-1.05	0.0554756	0.72
t+19	-0.0090571	-0.29	0.0464186	0.60
t+20	0.0108061	0.34	0.0572247	0.75
t+21	-0.0141558	-0.45	0.0430689	0.56
t+22	0.0036662	0.12	0.0467351	0.61
t+23	0.0131405	0.41	0.0598756	0.78
t+24	0.0141965	0.45	0.0740721	0.97
t+25	-0.0084275	-0.27	0.0656446	0.86
t+26	-0.0383256	-1.21	0.027319	0.36
t+27	-0.0043466	-0.14	0.0229723	0.30
t+28	-0.0072904	-0.23	0.0156819	0.20
t+29	0.0189609	0.60	0.0346428	0.45
t+30	0.0160956	0.51	0.0507384	0.66
t+31	-0.0091919	-0.29	0.0415465	0.54
t+32	-0.024683	-0.78	0.0168636	0.22
t+33	-0.0173205	-0.55	-0.000457	-0.01
t+34	-0.0066993	-0.21	-0.0071563	-0.09
t+35	0.0073671	0.23	0.0002109	0.00
t+36	-0.0354322	-1.12	-0.0352213	-0.46

Table A8.11 Mean-Adjusted Equity Small-Cap Funds AARs and CAARs (* indicates 5% significance level)

Event Time	Average Abnormal Returns	*T-test*	Cumulative Average Abnormal Returns	*T-test*
t-36	0.0124922	0.72	0.0124922	0.39
t-35	-0.0017885	-0.10	0.0107037	0.34
t-34	-0.0183511	-1.05	-0.0076474	-0.24
t-33	-0.012323	-0.71	-0.0199704	-0.63
t-32	0.0201082	1.15	0.0001378	0.00
t-31	0.0073296	0.42	0.0074674	0.24
t-30	0.0099456	0.57	0.017413	0.55
t-29	0.0338731	1.95*	0.0512862	1.61
t-28	0.0182493	1.05	0.0695355	2.19*
t-27	0.0157655	0.91	0.085301	2.69*
t-26	0.0107071	0.61	0.0960081	3.02*
t-25	0.0091062	0.52	0.1051143	3.31*
t-24	-0.0321892	-1.85*	0.0729252	2.30*
t-23	-0.0303384	-1.74*	0.0425867	1.34
t-22	0.0011623	0.07	0.043749	1.38
t-21	-0.0050973	-0.29	0.0386517	1.22
t-20	-0.007171	-0.41	0.0314807	0.99
t-19	0.0134854	0.77	0.0449661	1.42
t-18	-0.0230101	-1.32	0.021956	0.69
t-17	-0.0250131	-1.44	-0.0030571	-0.10
t-16	0.0086203	0.50	0.0055632	0.18
t-15	-0.008612	-0.49	-0.0030488	-0.10
t-14	-0.0223843	-1.29	-0.0254331	-0.80
t-13	0.0293564	1.69*	0.0039233	0.12
t-12	-0.0095358	-0.55	-0.0056124	-0.18
t-11	0.026584	1.53	0.0209716	0.66
t-10	0.0264678	1.52	0.0474394	1.49
t-9	-0.0060501	-0.35	0.0413893	1.30
t-8	-0.0116122	-0.67	0.0297771	0.94
t-7	-0.0176616	-1.01	0.0121156	0.38
t-6	3.711E-05	0.00	0.0121527	0.38
t-5	-0.0076019	-0.44	0.0045507	0.14
t-4	-0.0004316	-0.02	0.0041191	0.13
t-3	0.0007406	0.04	0.0048598	0.15
t-2	-0.0126825	-0.73	-0.0078228	-0.25
t-1	0.020043	1.15	0.0122202	0.38
t=0	-0.0247079	-1.42	-0.0124877	-0.39
t+1	-0.0257634	-1.48	-0.0382511	-1.20

t+2	0.0024377	0.14	-0.0358134	-1.13
t+3	0.0045297	0.26	-0.0312837	-0.99
t+4	-0.0094476	-0.54	-0.0407313	-1.28
t+5	0.006604	0.38	-0.0341273	-1.07
t+6	0.0162051	0.93	-0.0179222	-0.56
t+7	-0.0058651	-0.34	-0.0237873	-0.75
t+8	0.009315	0.53	-0.0144723	-0.46
t+9	-0.0084318	-0.48	-0.0229041	-0.72
t+10	0.0029537	0.17	-0.0199505	-0.63
t+11	0.015705	0.90	-0.0042454	-0.13
t+12	0.0164656	0.95	0.0122202	0.38
t+13	0.0163964	0.94	0.0741224	2.33*
t+14	0.0052072	0.30	0.0793295	2.50*
t+15	0.004875	0.28	0.0842045	2.65*
t+16	0.0050415	0.29	0.089246	2.81*
t+17	0.0087698	0.50	0.0980158	3.09*
t+18	-0.0100567	-0.58	0.0879592	2.77*
t+19	0.0079405	0.46	0.0958997	3.02*
t+20	-0.0022813	-0.13	0.0936184	2.95*
t+21	0.002446	0.14	0.0960644	3.02*
t+22	-0.0097188	-0.56	0.0863456	2.72*
t+23	-0.0106774	-0.61	0.0756681	2.38*
t+24	0.0022459	0.13	0.077914	2.45*
t+25	-0.0144129	-0.83	0.0635012	2.00*
t+26	-0.0116838	-0.67	0.0518174	1.63
t+27	-0.0075528	-0.43	0.0442646	1.39
t+28	-0.0085204	-0.49	0.0357442	1.13
t+29	-0.0012801	-0.07	0.0344641	1.09
t+30	-0.0355136	-2.04*	-0.0010495	-0.03
t+31	0.0122253	0.70	0.0111758	0.35
t+32	-0.0012755	-0.07	0.0099003	0.31
t+33	0.004587	0.26	0.0144873	0.46
t+34	0.0003695	0.02	0.0148568	0.47
t+35	-0.0131637	-0.76	0.0016931	0.05
t+36	-0.0187085	-1.07	-0.0170154	-0.54

APPENDIX 9

TableA9.1 Peer Group-Adjusted Total Sample AARs and CAARs (* indicates 5% significance level)

Event Time	Average Abnormal Returns	*T-test*	Cumulative Average Abnormal Returns	*T-test*
t-36	0.0024982	0.97	0.0024982	0.08
t-35	0.0033135	1.29	0.0058117	0.19
t-34	0.0011478	0.45	0.0069596	0.23
t-33	-0.0007302	-0.28	0.0062294	0.21
t-32	-0.0012309	-0.48	0.0049985	0.17
t-31	0.0006551	0.25	0.0056535	0.19
t-30	0.0001156	0.04	0.0057691	0.19
t-29	4.747E-05	0.02	0.0058166	0.19
t-28	-0.0018646	-0.73	0.0039519	0.13
t-27	-0.0047779	-1.86*	-0.0008259	-0.03
t-26	-0.0015129	-0.59	-0.0023388	-0.08
t-25	-0.0013643	-0.53	-0.0037032	-0.12
t-24	-0.0040011	-1.56	-0.0077043	-0.26
t-23	-0.0087974	-3.42*	-0.0165016	-0.55
t-22	-0.0018048	-0.70	-0.0183065	-0.61
t-21	0.0001759	0.07	-0.0181306	-0.61
t-20	-0.0066853	-2.60*	-0.0248159	-0.83
t-19	-0.0013391	-0.52	-0.026155	-0.88
t-18	-0.0053819	-2.09*	-0.0315369	-1.06
t-17	-0.0033707	-1.31	-0.0349076	-1.17
t-16	-0.0018705	-0.73	-0.0367781	-1.23
t-15	-0.0013032	-0.51	-0.0380813	-1.28
t-14	-0.0024492	-0.95	-0.0405305	-1.36
t-13	-9.976E-05	-0.04	-0.0406302	-1.36
t-12	-0.0049157	-1.91	-0.0455459	-1.53
t-11	-0.0023913	-0.93	-0.0479372	-1.61
t-10	-0.0023697	-0.92	-0.0503069	-1.69*
t-9	-0.0064435	-2.51	-0.0567505	-1.90*
t-8	-0.0033275	-1.30	-0.060078	-2.01*
t-7	-0.0037072	-1.44	-0.0637852	-2.14*
t-6	-0.0051587	-2.01	-0.0689439	-2.31*
t-5	-0.0011815	-0.46	-0.0701254	-2.35*
t-4	-0.0045155	-1.76	-0.0746408	-2.50*
t-3	-0.0015018	-0.58	-0.0761427	-2.55*
t-2	-0.0038788	-1.51	-0.0800215	-2.68*
t-1	-0.0027911	-1.09	-0.0828126	-2.77*
t=0	-0.0030751	-1.20	-0.0858877	-2.88*

t+1	-0.001915	-0.75	-0.0878027	-2.94*
t+2	-0.0021721	-0.85	-0.0899748	-3.01*
t+3	-0.0022684	-0.88	-0.0922432	-3.09*
t+4	-0.002442	-0.95	-0.0946852	-3.17*
t+5	0.0002121	0.08	-0.0944731	-3.17*
t+6	-0.0005209	-0.20	-0.094994	-3.18*
t+7	-0.001269	-0.49	-0.096263	-3.23*
t+8	-0.002148	-0.84	-0.098411	-3.30*
t+9	-0.000384	-0.15	-0.098795	-3.31*
t+10	-0.0017559	-0.68	-0.1005509	-3.37*
t+11	-0.0002982	-0.12	-0.1008492	-3.38*
t+12	0.0003781	0.15	-0.100471	-3.37*
t+13	0.003223315	1.280	-0.097168084	-3.257*
t+14	-0.000590134	-0.234	-0.097758218	-3.277*
t+15	-0.001352273	-0.537	-0.099110491	-3.322*
t+16	0.000392705	0.156	-0.098717786	-3.309*
t+17	0.000172231	0.068	-0.098545555	-3.303*
t+18	-0.001033288	-0.410	-0.099578843	-3.338*
t+19	0.000400605	0.159	-0.099178239	-3.325*
t+20	0.00061532	0.244	-0.098562919	-3.304*
t+21	-0.000308609	-0.123	-0.098871527	-3.314*
t+22	-0.003328227	-1.321	-0.102199754	-3.426*
t+23	-0.001630325	-0.647	-0.103830079	-3.480*
t+24	-0.001197503	-0.475	-0.105027582	-3.521*
t+25	-0.003408642	-1.353	-0.108436224	-3.635*
t+26	-0.000784653	-0.312	-0.109220877	-3.661*
t+27	-0.000980741	-0.389	-0.110201618	-3.694*
t+28	-0.000684991	-0.272	-0.11088661	-3.717*
t+29	-0.001171562	-0.465	-0.112058171	-3.756*
t+30	-0.006351595	-2.522*	-0.118409766	-3.969*
t+31	-0.000438275	-0.174	-0.118848041	-3.984*
t+32	-0.000991083	-0.393	-0.119839124	-4.017*
t+33	-0.00043354	-0.172	-0.120272664	-4.032*
t+34	0.000562382	0.223	-0.119710282	-4.013*
t+35	0.00091175	0.362	-0.118798532	-3.982*
t+36	-0.000223058	-0.089	-0.11902159	-3.990*

APPENDIX 10

Table A10.1 Information Ratio and Summary of Peer Group-Adjusted AARs and CAARs pre-and post-event

Information Ratio, Peer Group-Adjusted AARs and CAARs 36 months pre- and post-event								
	Average Tracking Error		Information Ratio		Average Abnormal Returns		Sum Average Abnormal Return	
	Pre-event	Post-event	Pre-event	Post-event	Pre-event	Post-event	Pre-event	Post-event
Total Sample	0.0225	0.0178	-0.1258	-0.0750	-0.0025	-0.0010	-0.0823	-0.0366
Male	0.0220	0.0172	-0.1154	-0.0674	-0.0023	-0.0012	-0.0745	-0.0403
Female	0.0254	0.0206	-0.1811	-0.1153	-0.0035	-0.0003	-0.1248	-0.0176
UK Funds	0.0195	0.0127	-0.1733	-0.0892	-0.0036	-0.0014	-0.1179	-0.0513
International Funds	0.0247	0.0213	-0.0922	-0.0649	-0.0018	-0.0008	-0.0575	-0.0264
Emerging Markets	0.0271	0.0242	-0.0873	-0.0507	-0.0015	0.0009	-0.0531	0.0514
Developed Markets	0.0221	0.0173	-0.1286	-0.0767	-0.0026	-0.0012	-0.0847	-0.0441
Equity	0.0244	0.0193	-0.1266	-0.0682	-0.0028	-0.0010	-0.0893	-0.0339
Bonds	0.0153	0.0118	-0.1228	-0.1019	-0.0016	-0.0013	-0.0549	-0.0474
Value	0.0185	0.0190	-0.1289	-0.1061	-0.0027	-0.0015	-0.0694	-0.0552
Growth	0.0262	0.0182	-0.1287	-0.0276	-0.0039	0.0005	-0.1252	-0.0201
Small	0.0319	0.0255	-0.1910	-0.1099	-0.0061	-0.0030	-0.1793	-0.1022

APPENDIX 11: Peer Group-Adjusted Average Abnormal Returns for all Categories

Figure A11.1 Peer Group-Adjusted Male Managed Average Abnormal Returns

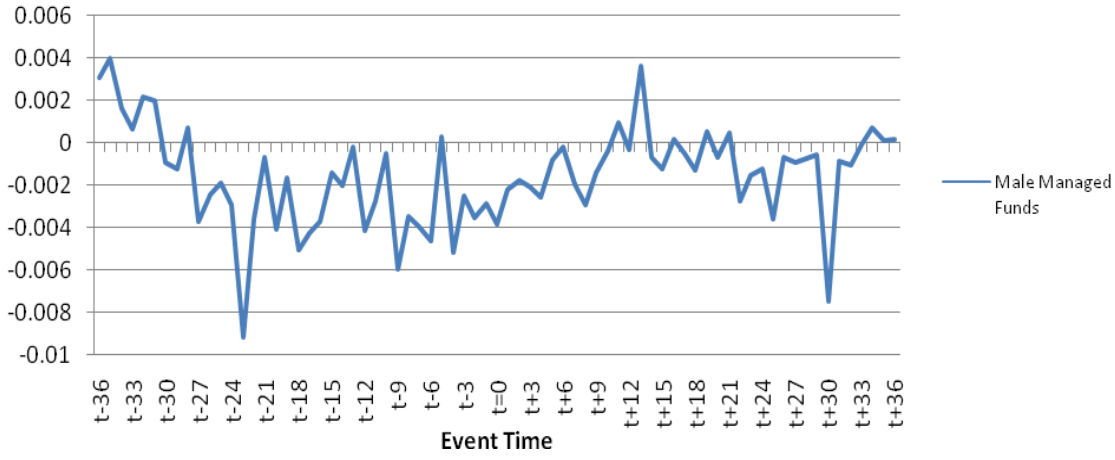


Figure A11.2 Peer Group-Adjusted Female Average Abnormal Returns

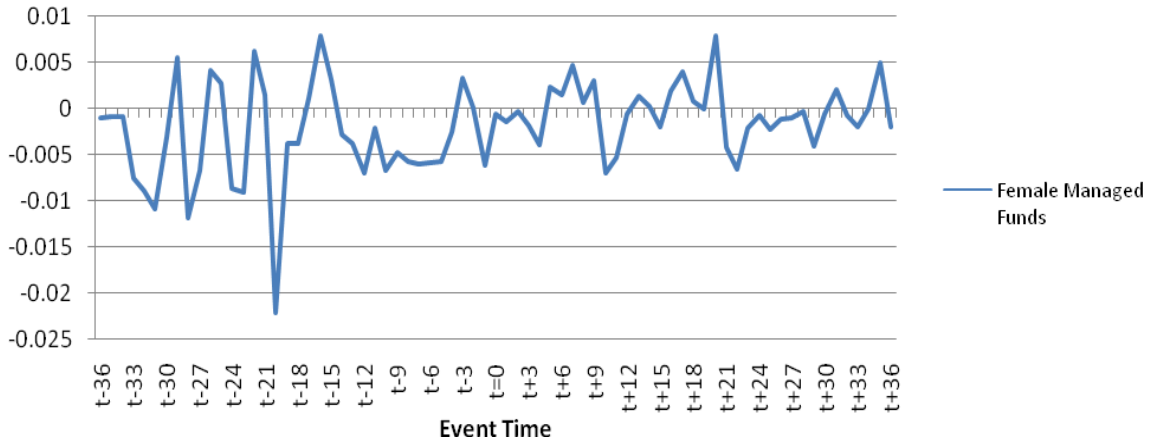


Figure A11.3 Peer Group-Adjusted UK Funds Average Abnormal Returns

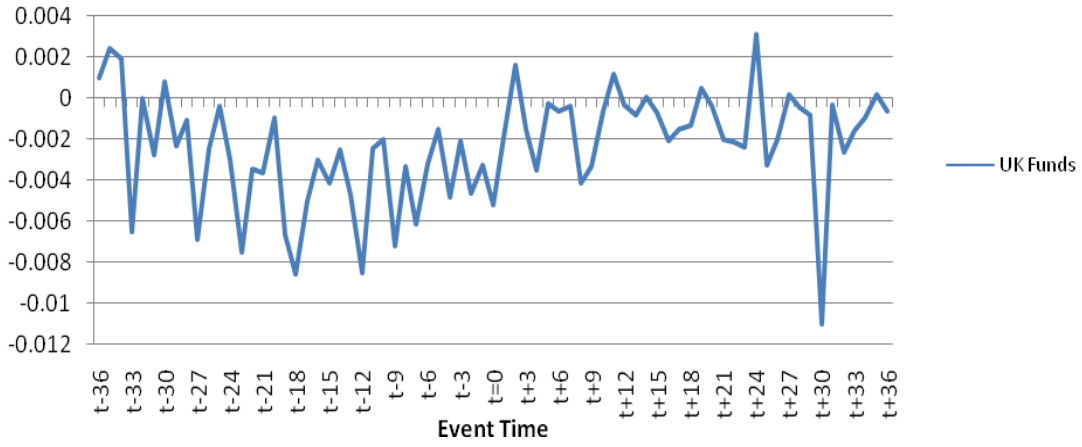


Figure A11.4 Peer Group-Adjusted International Funds Average Abnormal Returns

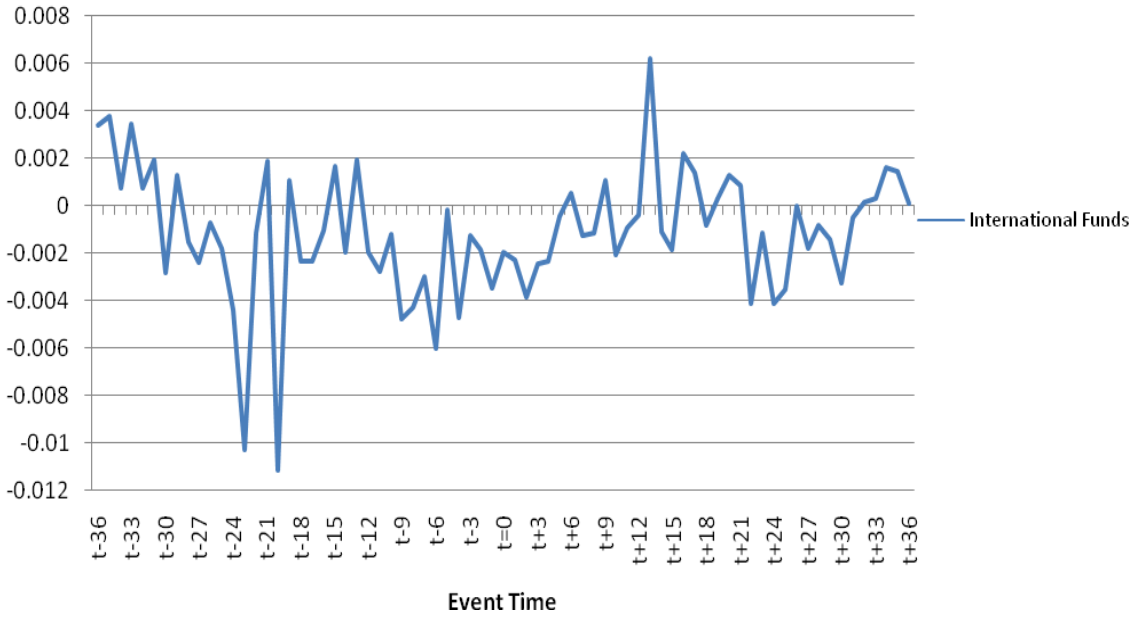


Figure A11.5 Peer Group-Adjusted Emerging Market Funds Average Abnormal Returns

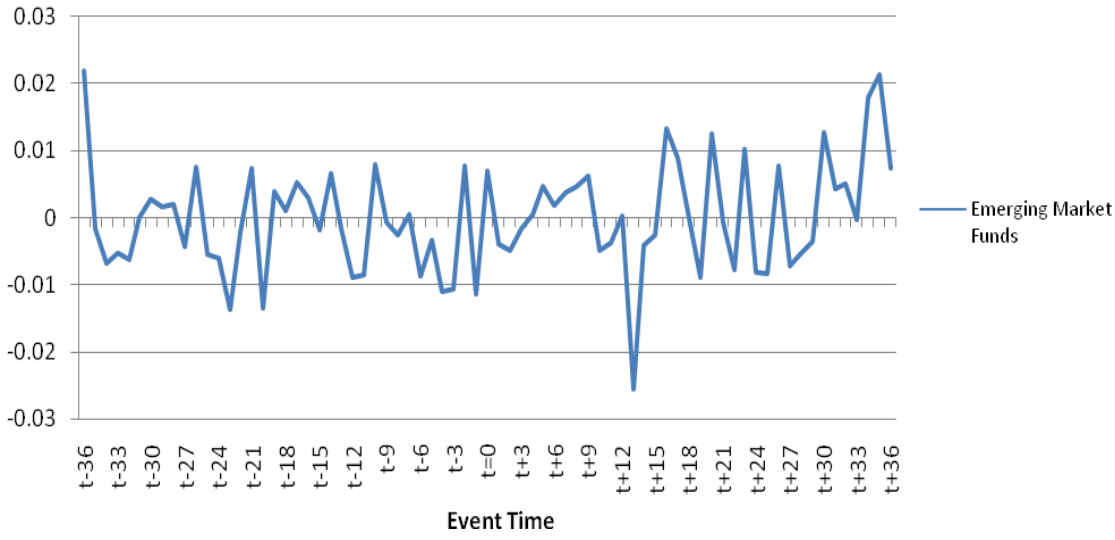


Figure A11.6 Peer Group-Adjusted Developed Market Funds Average Abnormal Returns

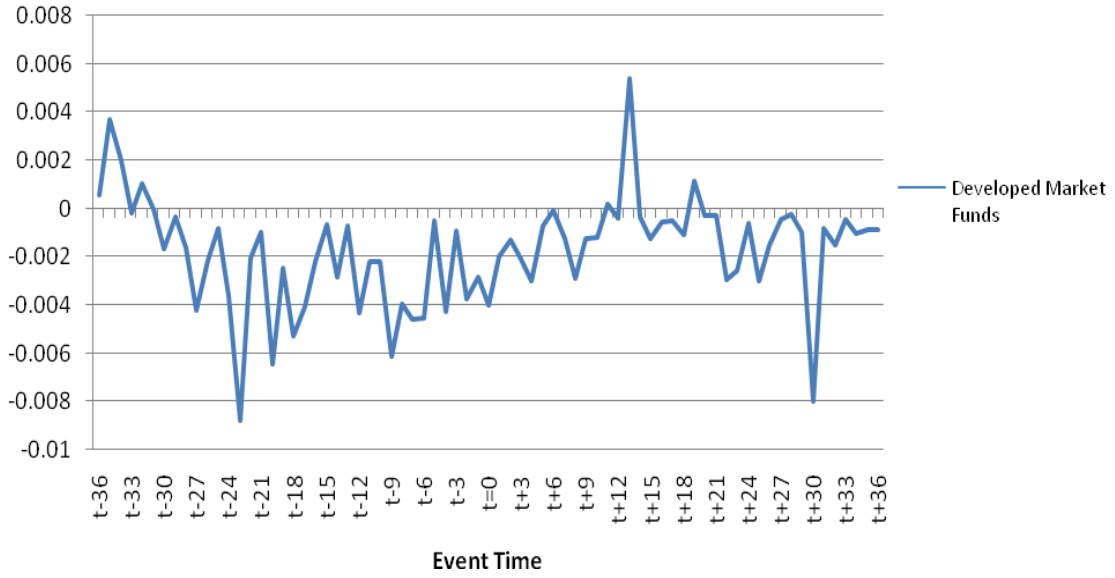


Figure A11.7: Peer Group-Adjusetd Equity Funds Average Abnormal Returns

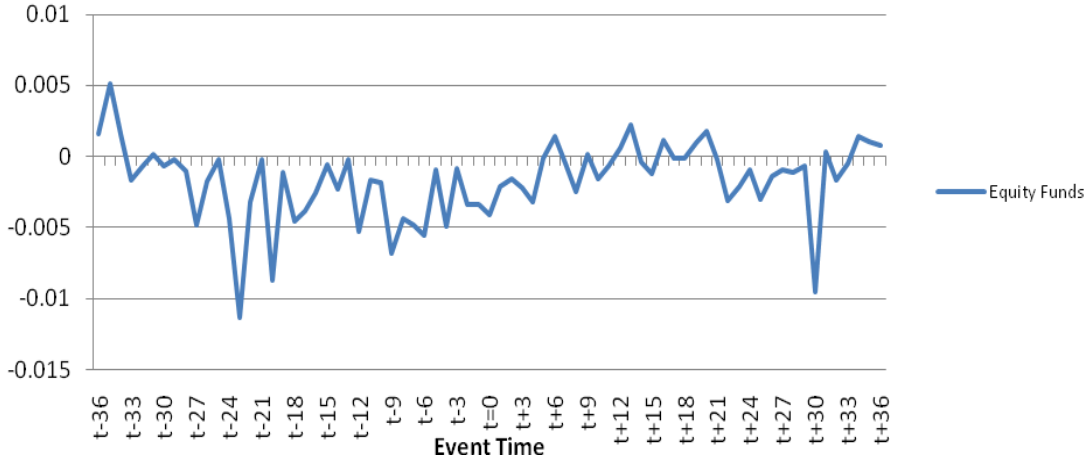


Figure A11.8 Peer Group-Adjusted Bond Funds Average Abnormal Returns

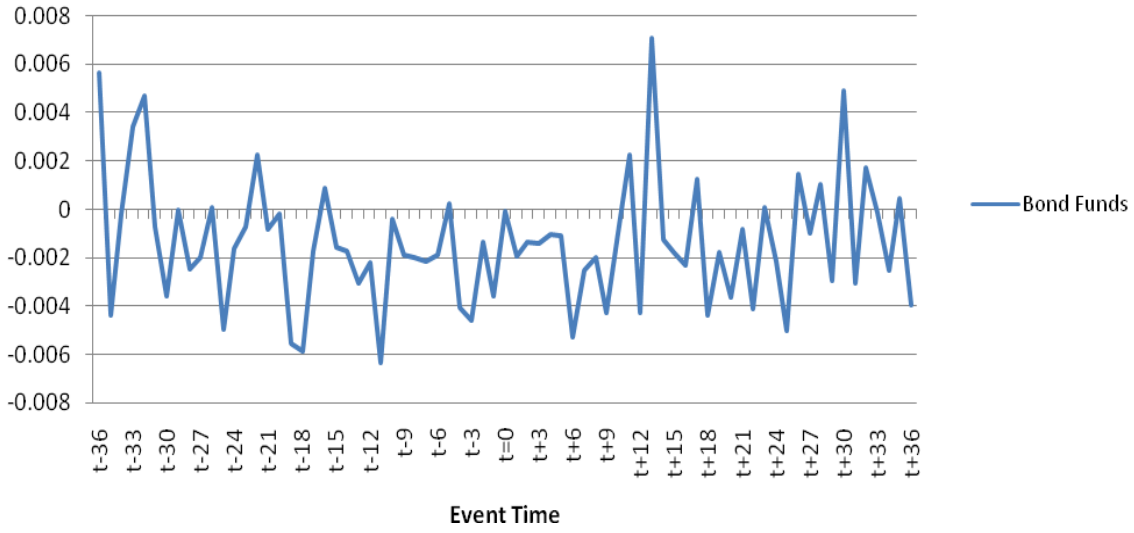


Figure A11.9: Peer Group-Adjusted Growth Funds Average Abnoraml Returns

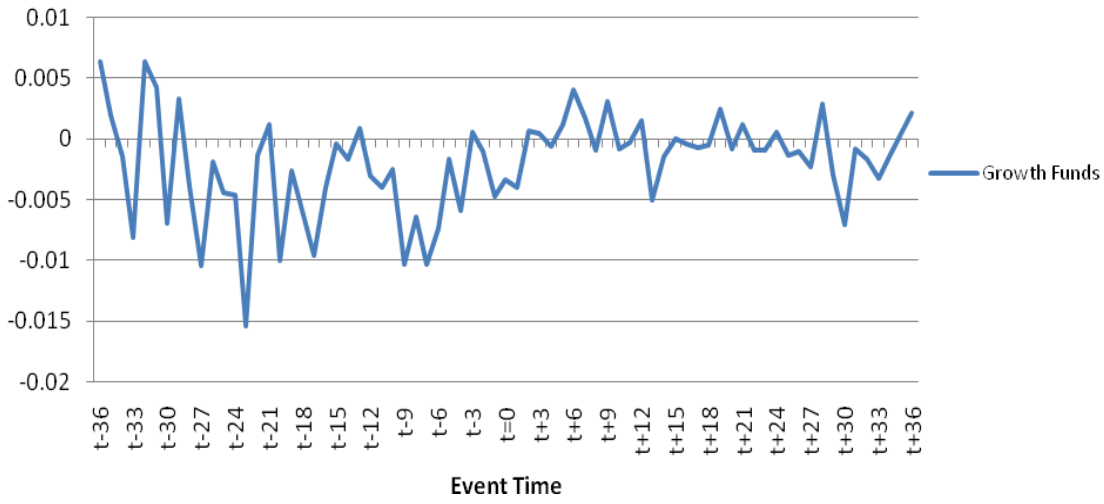


Figure A11.10 Peer Group-Adjusted Value Funds Average Abnormal Returns

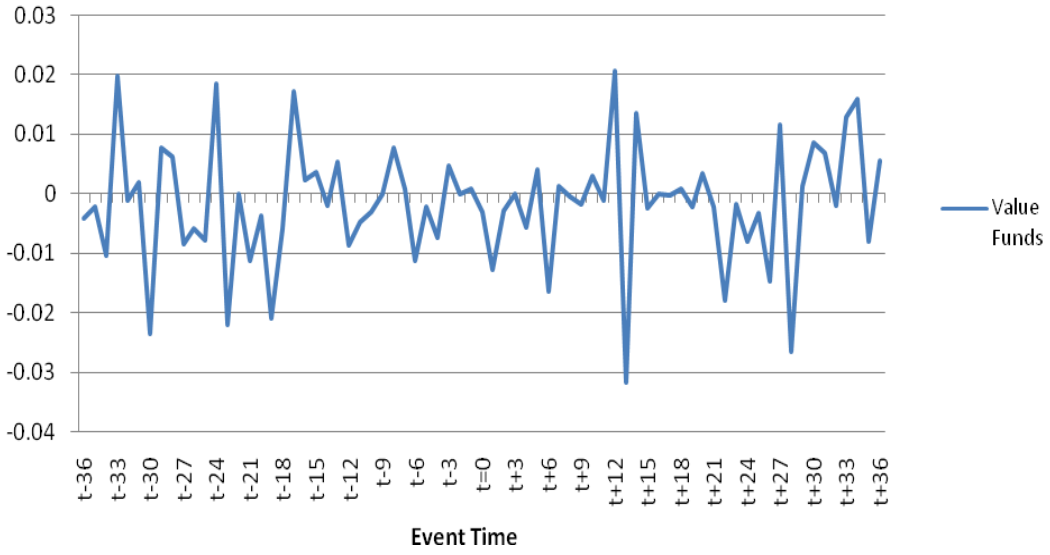
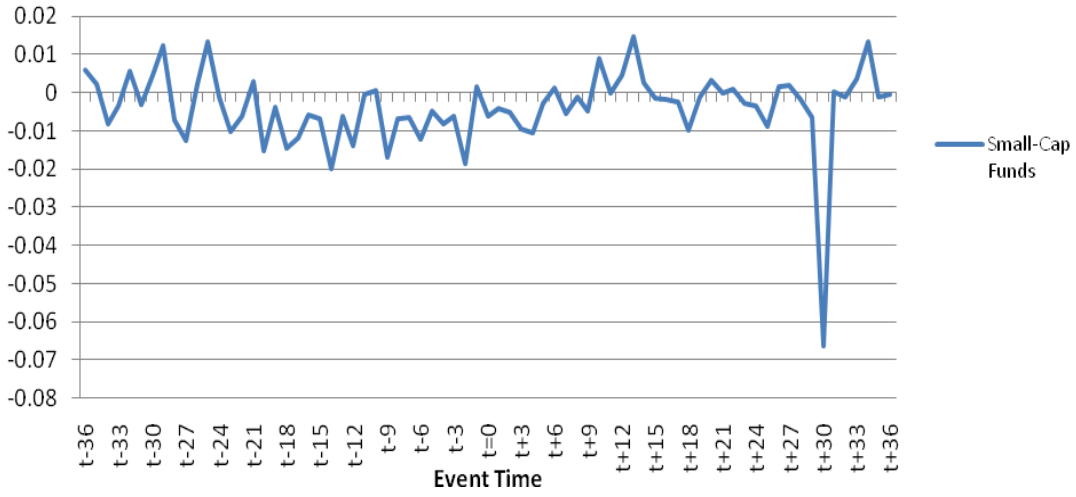


Figure A11.11: Peer Group-Adjusted Small-Cap Funds Average Abnormal Returns



APPENDIX 12

Table A12.1 Peer Group-Adjusted Male Managed Funds AARs and CAARs (* indicates 5% significance level)

Event Time	Average Abnormal Returns	*T-test*	Cumulative Average Abnormal Returns	*T-test*
t-36	0.0031386	1.13	0.0031386	0.11
t-35	0.0040713	1.46	0.0072099	0.25
t-34	0.0015107	0.54	0.0087206	0.30
t-33	0.0005134	0.18	0.009234	0.32
t-32	0.0002239	0.08	0.0094578	0.33
t-31	0.0028003	1.00	0.0122581	0.42
t-30	0.0007109	0.25	0.012969	0.45
t-29	-0.0009477	-0.34	0.0120213	0.42
t-28	3.305E-05	0.01	0.0120543	0.42
t-27	-0.0044005	-1.58	0.0076539	0.27
t-26	-0.0025617	-0.92	0.0050922	0.18
t-25	-0.0021351	-0.77	0.0029571	0.10
t-24	-0.0031366	-1.12	-0.0001795	-0.01
t-23	-0.0087492	-3.14	-0.0089287	-0.31
t-22	-0.0032905	-1.18	-0.0122191	-0.42
t-21	-4.779E-05	-0.02	-0.0122669	-0.43
t-20	-0.0037271	-1.34	-0.0159941	-0.55
t-19	-0.00084	-0.30	-0.0168341	-0.58
t-18	-0.0056848	-2.04	-0.0225189	-0.78
t-17	-0.0042085	-1.51	-0.0267274	-0.93
t-16	-0.0037126	-1.33	-0.0304399	-1.06
t-15	-0.0021165	-0.76	-0.0325564	-1.13
t-14	-0.0023781	-0.85	-0.0349345	-1.21
t-13	0.0006026	0.22	-0.034332	-1.19
t-12	-0.0045039	-1.61	-0.0388359	-1.35
t-11	-0.0024352	-0.87	-0.0412711	-1.43
t-10	-0.0015206	-0.55	-0.0427916	-1.48
t-9	-0.0067567	-2.42	-0.0495483	-1.72
t-8	-0.0028519	-1.02	-0.0524002	-1.82
t-7	-0.0032627	-1.17	-0.0556629	-1.93
t-6	-0.0050224	-1.80	-0.0606853	-2.10
t-5	-0.0003041	-0.11	-0.0609893	-2.11
t-4	-0.0048902	-1.75	-0.0658795	-2.28
t-3	-0.0023885	-0.86	-0.068268	-2.37
t-2	-0.0046183	-1.66	-0.0728863	-2.53
t-1	-0.0021388	-0.77	-0.0750251	-2.60
t=0	-0.0035435	-1.27	-0.0785687	-2.72

t+1	-0.0020014	-0.72	-0.0805701	-2.79
t+2	-0.0024994	-0.90	-0.0830695	-2.88
t+3	-0.0023315	-0.84	-0.0854011	-2.96
t+4	-0.0021515	-0.77	-0.0875526	-3.04
t+5	-0.0001716	-0.06	-0.0877241	-3.04
t+6	-0.0009	-0.32	-0.0886241	-3.07
t+7	-0.0023818	-0.85	-0.0910059	-3.16
t+8	-0.0026722	-0.96	-0.0936781	-3.25
t+9	-0.0010108	-0.36	-0.0946889	-3.28
t+10	-0.0007537	-0.27	-0.0954426	-3.31
t+11	0.0006463	0.23	-0.0947963	-3.29
t+12	0.0005706	0.20	-0.0942257	-3.27
t+13	0.0035807	1.31	-0.090577	-3.14*
t+14	-0.0007314	-0.27	-0.0913084	-3.17*
t+15	-0.001239	-0.45	-0.0925474	-3.21*
t+16	0.0001221	0.04	-0.0924253	-3.21*
t+17	-0.0004944	-0.18	-0.0929197	-3.22*
t+18	-0.0013366	-0.49	-0.0942563	-3.27*
t+19	0.0004993	0.18	-0.093757	-3.25*
t+20	-0.0006813	-0.25	-0.0944382	-3.28*
t+21	0.0004274	0.16	-0.0940109	-3.26*
t+22	-0.0027315	-1.00	-0.0967424	-3.36*
t+23	-0.0015222	-0.56	-0.0982646	-3.41*
t+24	-0.0012696	-0.46	-0.0995342	-3.45*
t+25	-0.0036192	-1.32	-0.1031534	-3.58*
t+26	-0.0006973	-0.25	-0.1038507	-3.60*
t+27	-0.0009694	-0.35	-0.1048201	-3.64*
t+28	-0.0007493	-0.27	-0.1055694	-3.66*
t+29	-0.0006032	-0.22	-0.1061726	-3.68*
t+30	-0.0074855	-2.73*	-0.1136581	-3.94*
t+31	-0.0008984	-0.33	-0.1145565	-3.97*
t+32	-0.0010411	-0.38	-0.1155976	-4.01*
t+33	-0.0001104	-0.04	-0.1157079	-4.01*
t+34	0.0007016	0.26	-0.1150063	-3.99*
t+35	7.521E-05	0.03	-0.1149311	-3.99*
t+36	0.0001594	0.06	-0.1147717	-3.98*

Table A12.2 Peer Group-Adjusted Female Managed Funds AARs and CAARs (* indicates 5% significance level)

Event Time	Average Abnormal Returns	*T-test*	Cumulative Average Abnormal Returns	*T-test*
t-36	-0.0010569	-0.03	-0.0010569	-0.03
t-35	-0.0008798	-0.03	-0.0019367	-0.05
t-34	-0.0008961	-0.03	-0.0028328	-0.08
t-33	-0.0075897	-0.22	-0.0104225	-0.28
t-32	-0.0090049	-0.15	-0.0194275	-0.53
t-31	-0.0109424	-0.30*	-0.0303698	-0.83
t-30	-0.0031403	-0.07	-0.0335101	-0.91
t-29	0.0054154	0.20	-0.0280946	-0.76
t-28	-0.0118555	-0.34*	-0.0399501	-1.09
t-27	-0.0067403	-0.21	-0.0466905	-1.27
t-26	0.0040906	0.16	-0.0425999	-1.16
t-25	0.0026607	0.09	-0.0399392	-1.09
t-24	-0.0086119	-0.18	-0.048551	-1.32
t-23	-0.0090499	-0.21	-0.057601	-1.57
t-22	0.0060651	0.13	-0.0515358	-1.40
t-21	0.0013666	0.05	-0.0501692	-1.36
t-20	-0.0220991	-0.24*	-0.0722684	-1.97*
t-19	-0.0038856	-0.17	-0.0761539	-2.07*
t-18	-0.003821	-0.13	-0.0799749	-2.17*
t-17	0.0009901	0.03	-0.0789848	-2.15*
t-16	0.0077652	0.24	-0.0712196	-1.94*
t-15	0.0030135	0.11	-0.0682061	-1.85*
t-14	-0.0028283	-0.12	-0.0710344	-1.93*
t-13	-0.0037694	-0.16	-0.0748038	-2.03*
t-12	-0.0070877	-0.23	-0.0818915	-2.23*
t-11	-0.0021575	-0.13	-0.084049	-2.29*
t-10	-0.006802	-0.29	-0.0908509	-2.47*
t-9	-0.0048092	-0.27	-0.0956601	-2.60*
t-8	-0.0058333	-0.30	-0.1014934	-2.76*
t-7	-0.0060598	-0.33	-0.1075532	-2.92*
t-6	-0.0058801	-0.37	-0.1134333	-3.08*
t-5	-0.0058255	-0.36	-0.1192588	-3.24*
t-4	-0.0025322	-0.16	-0.121791	-3.31*
t-3	0.0031912	0.14	-0.1185998	-3.22*
t-2	3.492E-05	0.00	-0.1185649	-3.22*
t-1	-0.0062437	-0.38	-0.1248086	-3.39*
t=0	-0.0005958	-0.05	-0.1254044	-3.41*
t+1	-0.0014576	-0.08	-0.126862	-3.45*
t+2	-0.0004392	-0.02	-0.1273012	-3.46*

t+3	-0.0019341	-0.12	-0.1292353	-3.51*
t+4	-0.0039798	-0.26	-0.1332152	-3.62*
t+5	0.0022427	0.12	-0.1309725	-3.56*
t+6	0.0014854	0.07	-0.1294871	-3.52*
t+7	0.0046203	0.18	-0.1248668	-3.40*
t+8	0.0006267	0.03	-0.1242401	-3.38*
t+9	0.0029334	0.09	-0.1213067	-3.30*
t+10	-0.0070601	-0.31	-0.1283668	-3.49*
t+11	-0.0052973	-0.27	-0.1336642	-3.63*
t+12	-0.0006406	-0.03	-0.1343048	-3.65*
t+13	0.0012239	0.21	-0.1330809	-3.62*
t+14	0.0001962	0.03	-0.1328847	-3.61*
t+15	-0.0019798	-0.34	-0.1348644	-3.67*
t+16	0.001892	0.32	-0.1329724	-3.62*
t+17	0.0038658	0.66	-0.1291066	-3.51*
t+18	0.0006941	0.12	-0.1284126	-3.49*
t+19	-0.0001506	-0.03	-0.1285632	-3.50*
t+20	0.0077825	1.33	-0.1207807	-3.28*
t+21	-0.0043157	-0.74	-0.1250963	-3.40*
t+22	-0.0065769	-1.12	-0.1316732	-3.58*
t+23	-0.0022159	-0.38	-0.1338891	-3.64*
t+24	-0.0008129	-0.14	-0.134702	-3.66*
t+25	-0.0023267	-0.40	-0.1370288	-3.73*
t+26	-0.0012191	-0.21	-0.1382479	-3.76*
t+27	-0.0010414	-0.18	-0.1392892	-3.79*
t+28	-0.0003459	-0.06	-0.1396352	-3.80*
t+29	-0.0040822	-0.70	-0.1437174	-3.91*
t+30	-0.0006136	-0.10	-0.144331	-3.92*
t+31	0.0019366	0.33	-0.1423943	-3.87*
t+32	-0.0007459	-0.13	-0.1431402	-3.89*
t+33	-0.0019765	-0.34	-0.1451167	-3.95*
t+34	-8.898E-05	-0.02	-0.1452057	-3.95*
t+35	0.0048993	0.84	-0.1403064	-3.82*
t+36	-0.0020562	-0.35	-0.1423626	-3.87*

Table A12.3 Peer Group-Adjusted UK Funds AARs and CAARs (* indicates 5% significance level)

Event Time	Average Abnormal Returns	*T-test*	Cumulative Average Abnormal Returns	*T-test*
t-36	0.0011033	0.03	0.0011033	0.03
t-35	0.0030216	0.11	0.0041249	0.10
t-34	0.0022205	0.05	0.0063453	0.16
t-33	-0.0057343	-0.25*	0.0006111	0.02
t-32	-0.0015649	-0.04	-0.0009538	-0.02
t-31	-0.0034721	-0.11	-0.004426	-0.11
t-30	0.0011161	0.04	-0.0033098	-0.08
t-29	-0.0022063	-0.07	-0.0055162	-0.14
t-28	-0.0012789	-0.06	-0.0067951	-0.17
t-27	-0.0068683	-0.22*	-0.0136634	-0.34
t-26	-0.0022849	-0.10	-0.0159483	-0.39
t-25	-0.0001808	-0.01	-0.0161291	-0.40
t-24	-0.0028032	-0.11	-0.0189323	-0.47
t-23	-0.0079468	-0.33*	-0.0268791	-0.66
t-22	-0.0028076	-0.10	-0.0296867	-0.73
t-21	-0.003425	-0.23	-0.0331117	-0.81
t-20	-0.0011363	-0.05	-0.034248	-0.84
t-19	-0.0060478	-0.21*	-0.0402959	-0.99
t-18	-0.0083996	-0.33*	-0.0486954	-1.20
t-17	-0.004478	-0.20	-0.0531734	-1.31
t-16	-0.0033602	-0.12	-0.0565336	-1.39
t-15	-0.0048816	-0.18*	-0.0614152	-1.51
t-14	-0.0036062	-0.18	-0.0650214	-1.60
t-13	-0.0038141	-0.20	-0.0688354	-1.69*
t-12	-0.0089074	-0.34*	-0.0777429	-1.91*
t-11	-0.0019053	-0.11	-0.0796482	-1.96*
t-10	-0.0019162	-0.10	-0.0815644	-2.01*
t-9	-0.0084011	-0.41*	-0.0899654	-2.21*
t-8	-0.0017659	-0.09	-0.0917314	-2.26*
t-7	-0.005089	-0.28*	-0.0968204	-2.38*
t-6	-0.0031767	-0.15	-0.0999971	-2.46*
t-5	-0.0018436	-0.11	-0.1018407	-2.51*
t-4	-0.0050237	-0.25*	-0.1068644	-2.63*
t-3	-0.002782	-0.17	-0.1096464	-2.70*
t-2	-0.0065863	-0.32*	-0.1162326	-2.86*
t-1	-0.001365	-0.10	-0.1175977	-2.89*
t=0	-0.0035883	-0.23	-0.121186	-2.98*
t+1	-0.0025894	-0.13	-0.1237754	-3.05*
t+2	0.0001932	0.01	-0.1235822	-3.04*

t+3	-0.0016061	-0.10	-0.1251883	-3.08*
t+4	-0.0036932	-0.23	-0.1288815	-3.17*
t+5	0.000953	0.07	-0.1279285	-3.15*
t+6	-0.0009042	-0.06	-0.1288327	-3.17*
t+7	-0.0010837	-0.07	-0.1299165	-3.20*
t+8	-0.0030765	-0.21	-0.132993	-3.27*
t+9	-0.0031809	-0.22	-0.1361739	-3.35*
t+10	-0.0012236	-0.11	-0.1373975	-3.38*
t+11	0.0015257	0.08	-0.1358718	-3.34*
t+12	0.0006821	0.05	-0.1351897	-3.33*
t+13	-0.0008299	-0.30	-0.1374302	-3.38*
t+14	8.72E-05	0.03	-0.137343	-3.37*
t+15	-0.0006846	-0.24	-0.1380277	-3.39*
t+16	-0.0020413	-0.73	-0.140069	-3.44*
t+17	-0.0014869	-0.53	-0.1415558	-3.48*
t+18	-0.0013029	-0.46	-0.1428587	-3.51*
t+19	0.0005325	0.19	-0.1423262	-3.50*
t+20	-0.0003365	-0.12	-0.1426628	-3.50*
t+21	-0.0020012	-0.71	-0.1446639	-3.55*
t+22	-0.0021319	-0.76	-0.1467959	-3.61*
t+23	-0.0023485	-0.84	-0.1491443	-3.66*
t+24	0.0031439	1.12	-0.1460004	-3.59*
t+25	-0.0032564	-1.16	-0.1492568	-3.67*
t+26	-0.0019759	-0.70	-0.1512327	-3.71*
t+27	0.0002177	0.08	-0.151015	-3.71*
t+28	-0.0004504	-0.16	-0.1514655	-3.72*
t+29	-0.0008114	-0.29	-0.1522768	-3.74*
t+30	-0.0110064	-3.92*	-0.1632833	-4.01*
t+31	-0.0003046	-0.11	-0.1635879	-4.02*
t+32	-0.002622	-0.93	-0.1662099	-4.08*
t+33	-0.0015381	-0.55	-0.1677481	-4.12*
t+34	-0.0009266	-0.33	-0.1686747	-4.14*
t+35	0.0001706	0.06	-0.1685041	-4.14*
t+36	-0.0006396	-0.23	-0.1691437	-4.15*

Table A12.4 Peer Group-Adjusted International Funds AARs and CAARs (* indicates 5% significance level)

Event Time	Average Abnormal Returns	*T-test*	Cumulative Average Abnormal Returns	*T-test*
t-36	0.0034697	0.09	0.0034697	0.15
t-35	0.0035235	0.09	0.0069932	0.31
t-34	0.0003803	0.01	0.0073735	0.33
t-33	0.0027601	0.09	0.0101336	0.45
t-32	-0.0009952	-0.02	0.0091384	0.40
t-31	0.0035785	0.09	0.0127169	0.56
t-30	-0.0006099	-0.02	0.0121071	0.54
t-29	0.00166	0.05	0.013767	0.61
t-28	-0.002277	-0.07	0.01149	0.51
t-27	-0.0033518	-0.12	0.0081382	0.36
t-26	-0.0009766	-0.03	0.0071616	0.32
t-25	-0.0021892	-0.07	0.0049724	0.22
t-24	-0.0048264	-0.14	0.0001461	0.01
t-23	-0.009381	-0.27*	-0.0092349	-0.41
t-22	-0.0011022	-0.03	-0.0103371	-0.46
t-21	0.0026808	0.12	-0.0076563	-0.34
t-20	-0.0104904	-0.20*	-0.0181466	-0.80
t-19	0.0019002	0.07	-0.0162464	-0.72
t-18	-0.0033349	-0.12	-0.0195813	-0.87
t-17	-0.0026041	-0.08	-0.0221854	-0.98
t-16	-0.0008463	-0.03	-0.0230317	-1.02
t-15	0.0012315	0.05	-0.0218002	-0.97
t-14	-0.0016353	-0.05	-0.0234355	-1.04
t-13	0.0025206	0.11	-0.0209149	-0.93
t-12	-0.0021376	-0.08	-0.0230525	-1.02
t-11	-0.002736	-0.13	-0.0257886	-1.14
t-10	-0.0026924	-0.12	-0.028481	-1.26
t-9	-0.0050509	-0.21	-0.0335319	-1.48
t-8	-0.0044237	-0.18	-0.0379556	-1.68*
t-7	-0.002728	-0.11	-0.0406836	-1.80*
t-6	-0.0065631	-0.29*	-0.0472468	-2.09*
t-5	-0.0007124	-0.04	-0.0479591	-2.12*
t-4	-0.0041553	-0.19	-0.0521145	-2.31*
t-3	-0.0005947	-0.02	-0.0527091	-2.33*
t-2	-0.0019603	-0.07	-0.0546695	-2.42*
t-1	-0.0038017	-0.16	-0.0584712	-2.59*
t=0	-0.0027114	-0.15	-0.0611826	-2.71*
t+1	-0.0014371	-0.07	-0.0626197	-2.77*
t+2	-0.0038481	-0.17	-0.0664678	-2.94*

t+3	-0.0027377	-0.13	-0.0692054	-3.06*
t+4	-0.0015555	-0.09	-0.0707609	-3.13*
t+5	-0.0003129	-0.01	-0.0710738	-3.15*
t+6	-0.0002493	-0.01	-0.0713231	-3.16*
t+7	-0.0014003	-0.07	-0.0727235	-3.22*
t+8	-0.00149	-0.08	-0.0742135	-3.29*
t+9	0.0015979	0.07	-0.0726156	-3.21*
t+10	-0.0021331	-0.09	-0.0747487	-3.31*
t+11	-0.0015907	-0.08	-0.0763394	-3.38*
t+12	0.0001628	0.01	-0.0761766	-3.37*
t+13	0.0061842	1.86*	-0.068883	-3.06*
t+14	-0.0010801	-0.32	-0.0699631	-3.11*
t+15	-0.0018387	-0.55	-0.0718018	-3.19*
t+16	0.002166	0.65	-0.0696358	-3.10*
t+17	0.001381	0.41	-0.0682548	-3.03*
t+18	-0.0008388	-0.25	-0.0690936	-3.07*
t+19	0.0003076	0.09	-0.0687859	-3.06*
t+20	0.0012727	0.38	-0.0675132	-3.00*
t+21	0.0008443	0.25	-0.0666689	-2.96*
t+22	-0.0041431	-1.24	-0.070812	-3.15*
t+23	-0.0011464	-0.34	-0.0719584	-3.20*
t+24	-0.0041344	-1.24	-0.0760927	-3.38*
t+25	-0.0035113	-1.05	-0.079604	-3.54*
t+26	-5.751E-06	0.00	-0.0796098	-3.54*
t+27	-0.0017957	-0.54	-0.0814054	-3.62*
t+28	-0.0008389	-0.25	-0.0822443	-3.66*
t+29	-0.0014127	-0.42	-0.083657	-3.72*
t+30	-0.0032484	-0.98	-0.0869054	-3.86*
t+31	-0.0005305	-0.16	-0.0874359	-3.89*
t+32	0.0001162	0.03	-0.0873197	-3.88*
t+33	0.0003272	0.10	-0.0869925	-3.87*
t+34	0.0016177	0.49	-0.0853748	-3.80*
t+35	0.0014401	0.43	-0.0839348	-3.73*
t+36	6.726E-05	0.02	-0.0838675	-3.73*

Table A12.5 Peer Group-Adjusted Emerging Market Funds AARs and CAARs (* indicates 5% significance level)

Event Time	Average Abnormal Returns	*T-test*	Cumulative Average Abnormal Returns	*T-test*
t-36	0.0220099	2.96*	0.0220099	1.21
t-35	-0.0015147	-0.20	0.0204953	1.13
t-34	-0.006646	-0.89	0.0138493	0.76
t-33	-0.0052586	-0.71	0.0085908	0.47
t-32	-0.0062221	-0.84	0.0023687	0.13
t-31	0.0002075	0.03	0.0025762	0.14
t-30	0.0028139	0.38	0.0053901	0.30
t-29	0.0016207	0.22	0.0070109	0.39
t-28	0.0021086	0.28	0.0091195	0.50
t-27	-0.0042033	-0.57	0.0049162	0.27
t-26	0.0075693	1.02	0.0124855	0.69
t-25	-0.0054302	-0.73	0.0070553	0.39
t-24	-0.0059027	-0.79	0.0011526	0.06
t-23	-0.013595	-1.83*	-0.0124424	-0.69
t-22	-0.0021164	-0.28	-0.0145588	-0.80
t-21	0.007417	1.00	-0.0071417	-0.39
t-20	-0.0135247	-1.82*	-0.0206664	-1.14
t-19	0.0039136	0.53	-0.0167528	-0.92
t-18	0.0010367	0.14	-0.015716	-0.87
t-17	0.0052865	0.71	-0.0104295	-0.57
t-16	0.002944	0.40	-0.0074855	-0.41
t-15	-0.0017308	-0.23	-0.0092163	-0.51
t-14	0.0067268	0.90	-0.0024894	-0.14
t-13	-0.0016065	-0.22	-0.004096	-0.23
t-12	-0.0087796	-1.18	-0.0128756	-0.71
t-11	-0.0084809	-1.14	-0.0213566	-1.18
t-10	0.0080075	1.08	-0.0133491	-0.74
t-9	-0.0006324	-0.09	-0.0139815	-0.77
t-8	-0.0024964	-0.34	-0.0164778	-0.91
t-7	0.0005442	0.07	-0.0159336	-0.88
t-6	-0.0085856	-1.15	-0.0245192	-1.35
t-5	-0.0032738	-0.44	-0.027793	-1.53
t-4	-0.0110169	-1.48	-0.0388099	-2.14*
t-3	-0.0106446	-1.43	-0.0494544	-2.72*
t-2	0.0078164	1.05	-0.041638	-2.29*
t-1	-0.0114296	-1.54	-0.0530677	-2.92*
t=0	0.0069762	0.94	-0.0460915	-2.54*
t+1	-0.0038968	-0.52	-0.0499883	-2.75*
t+2	-0.0048517	-0.65	-0.05484	-3.02*

t+3	-0.0015254	-0.21	-0.0563654	-3.11*
t+4	0.0005646	0.08	-0.0558008	-3.07*
t+5	0.0048015	0.65	-0.0509992	-2.81*
t+6	0.0018772	0.25	-0.0491221	-2.71*
t+7	0.0038712	0.52	-0.0452509	-2.49*
t+8	0.0047186	0.63	-0.0405323	-2.23*
t+9	0.0062426	0.84	-0.0342897	-1.89*
t+10	-0.004898	-0.66	-0.0391877	-2.16*
t+11	-0.0036449	-0.49	-0.0428326	-2.36*
t+12	0.0004056	0.05	-0.0424271	-2.34*
t+13	-0.0255177	-3.43*	-0.0679448	-3.74*
t+14	-0.0039993	-0.54	-0.0719441	-3.96*
t+15	-0.0025239	-0.34	-0.074468	-4.10*
t+16	0.0133185	1.79*	-0.0611495	-3.37*
t+17	0.0089862	1.21	-0.0521632	-2.87*
t+18	-5.93E-05	-0.01	-0.0522225	-2.88*
t+19	-0.0088564	-1.19	-0.0610789	-3.36*
t+20	0.0126911	1.71*	-0.0483878	-2.67*
t+21	-0.0006307	-0.08	-0.0490185	-2.70*
t+22	-0.0077201	-1.04	-0.0567386	-3.13*
t+23	0.0102774	1.38	-0.0464613	-2.56*
t+24	-0.0079845	-1.07	-0.0544457	-3.00*
t+25	-0.0082863	-1.11	-0.062732	-3.46*
t+26	0.0078718	1.06	-0.0548602	-3.02*
t+27	-0.0070331	-0.95	-0.0618933	-3.41*
t+28	-0.005276	-0.71	-0.0671693	-3.70*
t+29	-0.003445	-0.46	-0.0706143	-3.89*
t+30	0.0127393	1.71*	-0.057875	-3.19*
t+31	0.0043405	0.58	-0.0535345	-2.95*
t+32	0.0051593	0.69	-0.0483752	-2.67*
t+33	-0.000158	-0.02	-0.0485332	-2.67*
t+34	0.0179858	2.42*	-0.0305473	-1.68*
t+35	0.0214287	2.88*	-0.0091186	-0.50
t+36	0.0074586	1.00	-0.0016601	-0.09

Table A12.6 Peer Group-Adjusted Developed Market Funds AARs and CAARs (* indicates 5% significance level)

Event Time	Average Abnormal Returns	*T-test*	Cumulative Average Abnormal Returns	*T-test*
t-36	0.0005809	0.23	0.0005809	0.02
t-35	0.0037721	1.48	0.0043529	0.14
t-34	0.0018758	0.74	0.0062288	0.20
t-33	-0.000314	-0.12	0.0059147	0.19
t-32	-0.0007748	-0.30	0.00514	0.17
t-31	0.0006955	0.27	0.0058355	0.19
t-30	-0.0001259	-0.05	0.0057096	0.18
t-29	-9.04E-05	-0.04	0.0056192	0.18
t-28	-0.0022093	-0.87	0.00341	0.11
t-27	-0.0048267	-1.89*	-0.0014167	-0.05
t-26	-0.0022661	-0.89	-0.0036828	-0.12
t-25	-0.0010304	-0.40	-0.0047132	-0.15
t-24	-0.0038479	-1.51	-0.0085611	-0.28
t-23	-0.0084163	-3.30*	-0.0169773	-0.55
t-22	-0.0017803	-0.70	-0.0187576	-0.61
t-21	-0.0003914	-0.15	-0.0191491	-0.62
t-20	-0.0061544	-2.41*	-0.0253035	-0.82
t-19	-0.0017432	-0.68	-0.0270467	-0.88
t-18	-0.0058712	-2.30*	-0.0329179	-1.07
t-17	-0.0040248	-1.58	-0.0369427	-1.20
t-16	-0.0022326	-0.88	-0.0391753	-1.27
t-15	-0.0012714	-0.50	-0.0404467	-1.31
t-14	-0.0031274	-1.23	-0.0435741	-1.41
t-13	1.065E-05	0.00	-0.0435635	-1.41
t-12	-0.0046349	-1.82*	-0.0481984	-1.56
t-11	-0.0019526	-0.77	-0.0501511	-1.62
t-10	-0.003111	-1.22	-0.053262	-1.72*
t-9	-0.0068586	-2.69*	-0.0601206	-1.95*
t-8	-0.0033864	-1.33	-0.063507	-2.06*
t-7	-0.0040071	-1.57	-0.0675141	-2.19*
t-6	-0.004917	-1.93*	-0.0724311	-2.35*
t-5	-0.0010339	-0.41	-0.073465	-2.38*
t-4	-0.0040569	-1.59	-0.0775219	-2.51*
t-3	-0.0008569	-0.34	-0.0783788	-2.54*
t-2	-0.0047038	-1.84*	-0.0830826	-2.69*
t-1	-0.0021818	-0.86	-0.0852643	-2.76*
t=0	-0.0037841	-1.48	-0.0890484	-2.88*
t+1	-0.0017752	-0.70	-0.0908236	-2.94*
t+2	-0.001983	-0.78	-0.0928067	-3.01*

t+3	-0.0023208	-0.91	-0.0951275	-3.08*
t+4	-0.0026541	-1.04	-0.0977816	-3.17*
t+5	-0.0001116	-0.04	-0.0978932	-3.17*
t+6	-0.0006901	-0.27	-0.0985833	-3.19*
t+7	-0.0016316	-0.64	-0.1002149	-3.25*
t+8	-0.0026324	-1.03	-0.1028473	-3.33*
t+9	-0.0008514	-0.33	-0.1036987	-3.36*
t+10	-0.0015343	-0.60	-0.105233	-3.41*
t+11	-6.217E-05	-0.02	-0.1052951	-3.41*
t+12	0.0003762	0.15	-0.1049189	-3.40*
t+13	0.0053757	2.16*	-0.0994351	-3.22*
t+14	-0.0003337	-0.13	-0.0997688	-3.23*
t+15	-0.0012637	-0.51	-0.1010326	-3.27*
t+16	-0.0005839	-0.23	-0.1016165	-3.29*
t+17	-0.0004937	-0.20	-0.1021102	-3.31*
t+18	-0.0011072	-0.44	-0.1032174	-3.34*
t+19	0.0011159	0.45	-0.1021015	-3.31*
t+20	-0.0003264	-0.13	-0.1024279	-3.32*
t+21	-0.0002831	-0.11	-0.102711	-3.33*
t+22	-0.002981	-1.20	-0.105692	-3.42*
t+23	-0.0025763	-1.03	-0.1082682	-3.51*
t+24	-0.0006507	-0.26	-0.1089189	-3.53*
t+25	-0.0030022	-1.21	-0.1119211	-3.63*
t+26	-0.0015279	-0.61	-0.113449	-3.68*
t+27	-0.0004476	-0.18	-0.1138966	-3.69*
t+28	-0.0002742	-0.11	-0.1141708	-3.70*
t+29	-0.000976	-0.39	-0.1151468	-3.73*
t+30	-0.0080117	-3.22*	-0.1231585	-3.99*
t+31	-0.0008456	-0.34	-0.124004	-4.02*
t+32	-0.0015402	-0.62	-0.1255443	-4.07*
t+33	-0.0004587	-0.18	-0.126003	-4.08*
t+34	-0.0010609	-0.43	-0.1270639	-4.12*
t+35	-0.0008948	-0.36	-0.1279587	-4.15*
t+36	-0.0008673	-0.35	-0.128826	-4.17*

Table A12.7 Peer Group-Adjusted Equity Funds AARs and CAARs (* indicates 5% significance level)

Event Time	Average Abnormal Returns	*T-test*	Cumulative Average Abnormal Returns	*T-test*
t-36	0.0018896	0.62	0.0018896	0.06
t-35	0.0052877	1.73*	0.0071773	0.22
t-34	0.001287	0.42	0.0084643	0.26
t-33	-0.0016875	-0.55	0.0067768	0.21
t-32	-0.0018176	-0.59	0.0049592	0.15
t-31	0.0002909	0.09	0.0052501	0.16
t-30	0.0004985	0.16	0.0057487	0.18
t-29	-0.0001553	-0.05	0.0055934	0.17
t-28	-0.0019556	-0.64	0.0036378	0.11
t-27	-0.0050285	-1.64	-0.0013907	-0.04
t-26	-0.0015052	-0.49	-0.002896	-0.09
t-25	-0.0003158	-0.10	-0.0032118	-0.10
t-24	-0.004586	-1.50	-0.0077978	-0.24
t-23	-0.0110687	-3.61*	-0.0188665	-0.58
t-22	-0.002905	-0.95	-0.0217714	-0.67
t-21	0.0002466	0.08	-0.0215248	-0.66
t-20	-0.0083702	-2.73*	-0.029895	-0.91
t-19	-0.0007346	-0.24	-0.0306296	-0.94
t-18	-0.0053335	-1.74*	-0.0359631	-1.10
t-17	-0.0043158	-1.41	-0.0402789	-1.23
t-16	-0.0023882	-0.78	-0.0426671	-1.30
t-15	-0.0002273	-0.07	-0.0428944	-1.31
t-14	-0.0026275	-0.86	-0.0455219	-1.39
t-13	0.0002154	0.07	-0.0453065	-1.38
t-12	-0.0054787	-1.79*	-0.0507852	-1.55
t-11	-0.0020389	-0.67	-0.052824	-1.61
t-10	-0.0027415	-0.89	-0.0555655	-1.70*
t-9	-0.0068406	-2.23*	-0.0624061	-1.91*
t-8	-0.004097	-1.34	-0.0665031	-2.03*
t-7	-0.0042795	-1.40	-0.0707827	-2.16*
t-6	-0.005358	-1.75*	-0.0761407	-2.33*
t-5	-0.0014879	-0.49	-0.0776286	-2.37*
t-4	-0.0044048	-1.44	-0.0820334	-2.51*
t-3	-0.0011457	-0.37	-0.0831792	-2.54*
t-2	-0.0042443	-1.38	-0.0874234	-2.67*
t-1	-0.0029904	-0.98	-0.0904138	-2.76*
t=0	-0.0038224	-1.25	-0.0942363	-2.88*
t+1	-0.0018784	-0.61	-0.0961147	-2.94*
t+2	-0.0023733	-0.77	-0.098488	-3.01*

t+3	-0.0025205	-0.82	-0.1010085	-3.09*
t+4	-0.0029779	-0.97	-0.1039865	-3.18*
t+5	0.0002367	0.08	-0.1037498	-3.17*
t+6	0.0008644	0.28	-0.1028854	-3.14*
t+7	-0.0011359	-0.37	-0.1040213	-3.18*
t+8	-0.0025567	-0.83	-0.106578	-3.26*
t+9	0.0003181	0.10	-0.1062599	-3.25*
t+10	-0.0022214	-0.72	-0.1084813	-3.31*
t+11	-0.0003537	-0.12	-0.108835	-3.33*
t+12	0.0012172	0.40	-0.1076178	-3.29*
t+13	0.00221	0.73	-0.1035497	-3.19*
t+14	-0.0004097	-0.13	-0.1039594	-3.20*
t+15	-0.0012281	-0.40	-0.1051875	-3.24*
t+16	0.0011209	0.37	-0.1040665	-3.20*
t+17	-0.0001063	-0.03	-0.1041729	-3.20*
t+18	-0.0001359	-0.04	-0.1043087	-3.21*
t+19	0.0010018	0.33	-0.1033069	-3.18*
t+20	0.0017375	0.57	-0.1015694	-3.12*
t+21	-0.0001726	-0.06	-0.101742	-3.13*
t+22	-0.0031184	-1.02	-0.1048604	-3.23*
t+23	-0.0020802	-0.68	-0.1069407	-3.29*
t+24	-0.0009502	-0.31	-0.1078909	-3.32*
t+25	-0.0029763	-0.98	-0.1108672	-3.41*
t+26	-0.0013727	-0.45	-0.1122399	-3.45*
t+27	-0.0009769	-0.32	-0.1132168	-3.48*
t+28	-0.0011391	-0.37	-0.1143558	-3.52*
t+29	-0.0006771	-0.22	-0.115033	-3.54*
t+30	-0.009526	-3.13*	-0.124559	-3.83*
t+31	0.0003285	0.11	-0.1242305	-3.82*
t+32	-0.0016942	-0.56	-0.1259247	-3.87*
t+33	-0.0005087	-0.17	-0.1264334	-3.89*
t+34	0.0014135	0.46	-0.12502	-3.85*
t+35	0.0010529	0.35	-0.1239671	-3.81*
t+36	0.0008284	0.27	-0.1231387	-3.79*

Table A12.8 Peer Group-Adjusted Bond Funds AARs and CAARs (* indicates 5% significance level)

Event Time	Average Abnormal Returns	*T-test*	Cumulative Average Abnormal Returns	*T-test*
t-36	0.0051017	1.97*	0.0051017	0.27
t-35	-0.0046337	-1.79*	0.0004679	0.02
t-34	0.0005767	0.22	0.0010447	0.06
t-33	0.0030292	1.17	0.0040738	0.22
t-32	0.0010181	0.39	0.0050919	0.27
t-31	0.002027	0.78	0.0071189	0.38
t-30	-0.0013452	-0.52	0.0057738	0.31
t-29	0.0008169	0.31	0.0065907	0.35
t-28	-0.0015153	-0.58	0.0050754	0.27
t-27	-0.0037923	-1.46	0.0012831	0.07
t-26	-0.001543	-0.59	-0.0002599	-0.01
t-25	-0.0055351	-2.13*	-0.005795	-0.31
t-24	-0.0016226	-0.63	-0.0074176	-0.39
t-23	9.473E-05	0.04	-0.0073229	-0.39
t-22	0.0025488	0.98	-0.004774	-0.25
t-21	-0.0001058	-0.04	-0.0048799	-0.26
t-20	-8.614E-05	-0.03	-0.004966	-0.26
t-19	-0.0036708	-1.42	-0.0086368	-0.46
t-18	-0.0055658	-2.15*	-0.0142026	-0.75
t-17	0.0002585	0.10	-0.0139441	-0.74
t-16	0.000128	0.05	-0.0138161	-0.73
t-15	-0.0055208	-2.13*	-0.0193368	-1.02
t-14	-0.0017466	-0.67	-0.0210834	-1.12
t-13	-0.0013233	-0.51	-0.0224067	-1.19
t-12	-0.0027078	-1.04	-0.0251145	-1.33
t-11	-0.0037535	-1.45	-0.028868	-1.53
t-10	-0.0009184	-0.35	-0.0297865	-1.58
t-9	-0.0048935	-1.89*	-0.03468	-1.84*
t-8	-0.000294	-0.11	-0.034974	-1.85*
t-7	-0.0014398	-0.56	-0.0364138	-1.93*
t-6	-0.004369	-1.68*	-0.0407829	-2.16*
t-5	3.234E-05	0.01	-0.0407505	-2.16*
t-4	-0.0049538	-1.91*	-0.0457043	-2.42*
t-3	-0.0029124	-1.12	-0.0486167	-2.58*
t-2	-0.0024312	-0.94	-0.0510479	-2.70*
t-1	-0.0020017	-0.77	-0.0530496	-2.81*
t=0	-0.0001144	-0.04	-0.053164	-2.82*
t+1	-0.00206	-0.79	-0.0552241	-2.93*
t+2	-0.0013746	-0.53	-0.0565987	-3.00*

t+3	-0.0012695	-0.49	-0.0578682	-3.07*
t+4	-0.0003192	-0.12	-0.0581874	-3.08*
t+5	0.0001147	0.04	-0.0580727	-3.08*
t+6	-0.0060089	-2.32*	-0.0640816	-3.39*
t+7	-0.0017964	-0.69	-0.065878	-3.49*
t+8	-0.0005289	-0.20	-0.0664069	-3.52*
t+9	-0.0031652	-1.22	-0.0695721	-3.69*
t+10	8.825E-05	0.03	-0.0694839	-3.68*
t+11	-7.858E-05	-0.03	-0.0695625	-3.69*
t+12	-0.0029457	-1.14	-0.0725082	-3.84*
t+13	0.0070579	2.61*	-0.072101	-3.69*
t+14	-0.0012695	-0.47	-0.0733705	-3.75*
t+15	-0.0018174	-0.67	-0.0751879	-3.84*
t+16	-0.0023346	-0.86	-0.0775225	-3.96*
t+17	0.0012154	0.45	-0.0763071	-3.90*
t+18	-0.0043767	-1.62	-0.0806838	-4.12*
t+19	-0.001792	-0.66	-0.0824758	-4.22*
t+20	-0.0036445	-1.35	-0.0861203	-4.40*
t+21	-0.0008164	-0.30	-0.0869367	-4.44*
t+22	-0.0041118	-1.52	-0.0910485	-4.65*
t+23	8.495E-05	0.03	-0.0909635	-4.65*
t+24	-0.0021499	-0.80	-0.0931135	-4.76*
t+25	-0.0050534	-1.87	-0.0981669	-5.02*
t+26	0.0014368	0.53	-0.09673	-4.95*
t+27	-0.0009952	-0.37	-0.0977252	-5.00*
t+28	0.0009971	0.37	-0.0967281	-4.94*
t+29	-0.002947	-1.09	-0.0996751	-5.10*
t+30	0.0049031	1.81*	-0.094772	-4.84*
t+31	-0.0030772	-1.14	-0.0978493	-5.00*
t+32	0.0016919	0.63	-0.0961573	-4.92*
t+33	-0.0001545	-0.06	-0.0963119	-4.92*
t+34	-0.0025284	-0.94	-0.0988403	-5.05*
t+35	0.0004103	0.15	-0.09843	-5.03*
t+36	-0.0039457	-1.46	-0.1023757	-5.23*

Table A12.9 Peer Group-Adjusted Equity Growth Funds AARs and CAARs (* indicates 5% significance level)

Event Time	Average Abnormal Returns	*T-test*	Cumulative Average Abnormal Returns	*T-test*
t-36	-0.0042208	-0.43	-0.0042208	-0.16
t-35	-0.0021095	-0.22	-0.0063302	-0.25
t-34	-0.010326	-1.05	-0.0166562	-0.65
t-33	0.0197476	2.01*	0.0030914	0.12
t-32	-0.001136	-0.12	0.0019554	0.08
t-31	0.0019577	0.20	0.0039131	0.15
t-30	-0.0235243	-2.40*	-0.0196113	-0.76
t-29	0.0077261	0.79	-0.0118851	-0.46
t-28	0.0061909	0.63	-0.0056943	-0.22
t-27	-0.0083412	-0.85	-0.0140355	-0.55
t-26	-0.0057452	-0.59	-0.0197807	-0.77
t-25	-0.007733	-0.79	-0.0275137	-1.07
t-24	0.0185782	1.89*	-0.0089355	-0.35
t-23	-0.0219767	-2.24*	-0.0309122	-1.20
t-22	-0.0001031	-0.01	-0.0310153	-1.21
t-21	-0.0111403	-1.14	-0.0421556	-1.64
t-20	-0.0036659	-0.37	-0.0458215	-1.78*
t-19	-0.0210035	-2.14*	-0.066825	-2.60*
t-18	-0.0057769	-0.59*	-0.0726019	-2.83*
t-17	0.0172075	1.75	-0.0553944	-2.16*
t-16	0.0023285	0.24	-0.0530659	-2.07*
t-15	0.0037106	0.38	-0.0493554	-1.92*
t-14	-0.0019237	-0.20	-0.051279	-2.00*
t-13	0.0052439	0.53	-0.0460351	-1.79*
t-12	-0.0086531	-0.88	-0.0546882	-2.13*
t-11	-0.0048309	-0.49	-0.0595192	-2.32*
t-10	-0.0030352	-0.31	-0.0625543	-2.44*
t-9	6.91E-05	0.01	-0.0624852	-2.43*
t-8	0.0076664	0.78	-0.0548188	-2.14*
t-7	0.0007363	0.08	-0.0540825	-2.11*
t-6	-0.0113072	-1.15	-0.0653897	-2.55*
t-5	-0.0021379	-0.22	-0.0675276	-2.63*
t-4	-0.0073759	-0.75	-0.0749035	-2.92*
t-3	0.0047192	0.48	-0.0701843	-2.73*
t-2	2.562E-05	0.00	-0.0701587	-2.73*
t-1	0.0007364	0.08	-0.0694223	-2.70*
t=0	-0.0029565	-0.30	-0.0723788	-2.82*
t+1	-0.012687	-1.29	-0.0850658	-3.31*
t+2	-0.0027749	-0.28	-0.0878407	-3.42*

t+3	1.111E-05	0.00	-0.0878296	-3.42*
t+4	-0.0055853	-0.57	-0.0934149	-3.64*
t+5	0.0040677	0.41	-0.0893472	-3.48*
t+6	-0.0164938	-1.68*	-0.105841	-4.12*
t+7	0.0011842	0.12	-0.1046568	-4.08*
t+8	-0.0004951	-0.05	-0.1051518	-4.10*
t+9	-0.001851	-0.19	-0.1070028	-4.17*
t+10	0.0030118	0.31	-0.103991	-4.05*
t+11	-0.0010877	-0.11	-0.1050787	-4.09*
t+12	0.0206407	2.10*	-0.084438	-3.29*
t+13	-0.0045251	-0.94	-0.1372736	-2.82*
t+14	-0.0014484	-0.30	-0.1387221	-2.85*
t+15	-0.0009779	-0.20	-0.1397	-2.87*
t+16	0.0009464	0.20	-0.1387536	-2.85*
t+17	-0.0004133	-0.09	-0.1391669	-2.86*
t+18	0.0002422	0.05	-0.1389247	-2.86*
t+19	0.001953	0.41	-0.1369717	-2.82*
t+20	-0.000369	-0.08	-0.1373407	-2.82*
t+21	0.0005055	0.11	-0.1368352	-2.81*
t+22	0.0002123	0.04	-0.1366229	-2.81*
t+23	-0.0004452	-0.09	-0.1370681	-2.82*
t+24	0.0005905	0.12	-0.1364776	-2.81*
t+25	-0.000982	-0.20	-0.1374595	-2.83*
t+26	-0.0007633	-0.16	-0.1382228	-2.84*
t+27	-0.0027875	-0.58	-0.1410103	-2.90*
t+28	0.0014296	0.30	-0.1395807	-2.87*
t+29	-0.00261	-0.54	-0.1421908	-2.92*
t+30	-0.0075358	-1.57	-0.1497266	-3.08*
t+31	-0.0006035	-0.13	-0.1503301	-3.09*
t+32	-0.0012295	-0.26	-0.1515595	-3.12*
t+33	-0.0027472	-0.57	-0.1543068	-3.17*
t+34	-0.0015544	-0.32	-0.1558612	-3.20*
t+35	0.0008326	0.17	-0.1550286	-3.19*
t+36	0.002371	0.49	-0.1526576	-3.14*

Table A12.10 Peer Group-Adjusted Equity Value Funds AARs and CAARs (* indicates 5% significance level)

Event Time	Average Abnormal Returns	*T-test*	Cumulative Average Abnormal Returns	*T-test*
t-36	-0.0042208	-0.43	-0.0042208	-0.16
t-35	-0.0021095	-0.22	-0.0063302	-0.25
t-34	-0.010326	-1.05	-0.0166562	-0.65
t-33	0.0197476	2.01*	0.0030914	0.12
t-32	-0.001136	-0.12	0.0019554	0.08
t-31	0.0019577	0.20	0.0039131	0.15
t-30	-0.0235243	-2.40*	-0.0196113	-0.76
t-29	0.0077261	0.79	-0.0118851	-0.46
t-28	0.0061909	0.63	-0.0056943	-0.22
t-27	-0.0083412	-0.85	-0.0140355	-0.55
t-26	-0.0057452	-0.59	-0.0197807	-0.77
t-25	-0.007733	-0.79	-0.0275137	-1.07
t-24	0.0185782	1.89*	-0.0089355	-0.35
t-23	-0.0219767	-2.24*	-0.0309122	-1.20
t-22	-0.0001031	-0.01	-0.0310153	-1.21
t-21	-0.0111403	-1.14	-0.0421556	-1.64
t-20	-0.0036659	-0.37	-0.0458215	-1.78*
t-19	-0.0210035	-2.14*	-0.066825	-2.60*
t-18	-0.0057769	-0.59*	-0.0726019	-2.83*
t-17	0.0172075	1.75	-0.0553944	-2.16*
t-16	0.0023285	0.24	-0.0530659	-2.07*
t-15	0.0037106	0.38	-0.0493554	-1.92*
t-14	-0.0019237	-0.20	-0.051279	-2.00*
t-13	0.0052439	0.53	-0.0460351	-1.79*
t-12	-0.0086531	-0.88	-0.0546882	-2.13*
t-11	-0.0048309	-0.49	-0.0595192	-2.32*
t-10	-0.0030352	-0.31	-0.0625543	-2.44*
t-9	6.91E-05	0.01	-0.0624852	-2.43*
t-8	0.0076664	0.78	-0.0548188	-2.14*
t-7	0.0007363	0.08	-0.0540825	-2.11*
t-6	-0.0113072	-1.15	-0.0653897	-2.55*
t-5	-0.0021379	-0.22	-0.0675276	-2.63*
t-4	-0.0073759	-0.75	-0.0749035	-2.92*
t-3	0.0047192	0.48	-0.0701843	-2.73*
t-2	2.562E-05	0.00	-0.0701587	-2.73*
t-1	0.0007364	0.08	-0.0694223	-2.70*
t=0	-0.0029565	-0.30	-0.0723788	-2.82*
t+1	-0.012687	-1.29	-0.0850658	-3.31*
t+2	-0.0027749	-0.28	-0.0878407	-3.42*

t+3	1.111E-05	0.00	-0.0878296	-3.42*
t+4	-0.0055853	-0.57	-0.0934149	-3.64*
t+5	0.0040677	0.41	-0.0893472	-3.48*
t+6	-0.0164938	-1.68*	-0.105841	-4.12*
t+7	0.0011842	0.12	-0.1046568	-4.08*
t+8	-0.0004951	-0.05	-0.1051518	-4.10*
t+9	-0.001851	-0.19	-0.1070028	-4.17*
t+10	0.0030118	0.31	-0.103991	-4.05*
t+11	-0.0010877	-0.11	-0.1050787	-4.09*
t+12	0.0206407	2.10*	-0.084438	-3.29*
t+13	-0.0316964	-3.23*	-0.1161344	-4.52*
t+14	0.0135175	1.38	-0.1026169	-4.00*
t+15	-0.00243	-0.25	-0.1050469	-4.09*
t+16	-2.21E-05	0.00	-0.105069	-4.09*
t+17	-0.0002446	-0.02	-0.1053136	-4.10*
t+18	0.0008876	0.09	-0.104426	-4.07*
t+19	-0.0022444	-0.23	-0.1066704	-4.15*
t+20	0.0033388	0.34	-0.1033316	-4.02*
t+21	-0.0021831	-0.22	-0.1055147	-4.11*
t+22	-0.0178411	-1.82	-0.1233558	-4.80*
t+23	-0.0017268	-0.18	-0.1250827	-4.87*
t+24	-0.0079508	-0.81	-0.1330335	-5.18*
t+25	-0.0032749	-0.33	-0.1363084	-5.31*
t+26	-0.014713	-1.50	-0.1510213	-5.88*
t+27	0.0116661	1.19	-0.1393553	-5.43*
t+28	-0.0264778	-2.70*	-0.1658331	-6.46*
t+29	0.0013136	0.13	-0.1645195	-6.41*
t+30	0.0086483	0.88	-0.1558712	-6.07*
t+31	0.0068931	0.70	-0.1489781	-5.80*
t+32	-0.0020402	-0.21	-0.1510182	-5.88*
t+33	0.0129193	1.32	-0.1380989	-5.38*
t+34	0.0159266	1.62	-0.1221723	-4.76*
t+35	-0.0079352	-0.81	-0.1301074	-5.07*
t+36	0.0055278	0.56	-0.1245796	-4.85*

Table A12.11 Peer Group-Adjusted Equity Small-Cap Funds AARs and CAARs (* indicates 5% significance level)

Event Time	Average Abnormal Returns	*T-test*	Cumulative Average Abnormal Returns	*T-test*
t-36	0.0059246	0.73	0.0059246	0.09
t-35	0.00211	0.26	0.0080346	0.12
t-34	-0.0082133	-1.02	-0.0001786	0.00
t-33	-0.0035665	-0.44	-0.0037451	-0.06
t-32	0.0056421	0.70	0.001897	0.03
t-31	-0.0031574	-0.39	-0.0012604	-0.02
t-30	0.0044309	0.55	0.0031705	0.05
t-29	0.0124908	1.54	0.0156613	0.24
t-28	-0.006999	-0.87	0.0086623	0.13
t-27	-0.0126368	-1.56	-0.0039745	-0.06
t-26	0.0024038	0.30	-0.0015706	-0.02
t-25	0.0133248	1.65*	0.0117542	0.18
t-24	-0.0011332	-0.14	0.010621	0.16
t-23	-0.0101128	-1.25	0.0005081	0.01
t-22	-0.0061389	-0.76	-0.0056308	-0.09
t-21	0.0030265	0.37	-0.0026043	-0.04
t-20	-0.0151376	-1.87*	-0.0177419	-0.27
t-19	-0.0037791	-0.47	-0.0215209	-0.33
t-18	-0.0146189	-1.81*	-0.0361398	-0.55
t-17	-0.012021	-1.49	-0.0481608	-0.74
t-16	-0.005794	-0.72	-0.0539548	-0.83
t-15	-0.0067703	-0.84	-0.0607251	-0.93
t-14	-0.0197914	-2.45*	-0.0805165	-1.24
t-13	-0.0061415	-0.76	-0.086658	-1.33
t-12	-0.0137687	-1.70*	-0.1004267	-1.54
t-11	-0.0005111	-0.06	-0.1009378	-1.55
t-10	0.0006458	0.08	-0.100292	-1.54
t-9	-0.0169256	-2.09*	-0.1172176	-1.80*
t-8	-0.0067819	-0.84	-0.1239995	-1.90*
t-7	-0.0064811	-0.80	-0.1304806	-2.00*
t-6	-0.0123143	-1.52	-0.142795	-2.19*
t-5	-0.0048748	-0.60	-0.1476698	-2.27*
t-4	-0.0082283	-1.02	-0.1558981	-2.39*
t-3	-0.0062599	-0.77	-0.162158	-2.49*
t-2	-0.018562	-2.29*	-0.18072	-2.77*
t-1	0.0014346	0.18	-0.1792854	-2.75*
t=0	-0.0062473	-0.77	-0.1855328	-2.85*
t+1	-0.0040687	-0.50	-0.1896015	-2.91*
t+2	-0.0053101	-0.66	-0.1949116	-2.99*

t+3	-0.0096709	-1.20	-0.2045825	-3.14*
t+4	-0.0105614	-1.31	-0.2151439	-3.30*
t+5	-0.002833	-0.35	-0.2179769	-3.34*
t+6	0.0012074	0.15	-0.2167696	-3.33*
t+7	-0.0053776	-0.66	-0.2221472	-3.41*
t+8	-0.0009735	-0.12	-0.2231206	-3.42*
t+9	-0.0047706	-0.59	-0.2278912	-3.50*
t+10	0.0089475	1.11	-0.2189437	-3.36*
t+11	-4.875E-06	0.00	-0.2189486	-3.36*
t+12	0.0046621	0.58	-0.2142865	-3.29*
t+13	0.0148068	1.83*	-0.1994797	-3.06*
t+14	0.0024328	0.30	-0.1970468	-3.02*
t+15	-0.0014535	-0.18	-0.1985004	-3.05*
t+16	-0.0016828	-0.21	-0.2001831	-3.07*
t+17	-0.0025504	-0.32	-0.2027335	-3.11*
t+18	-0.009781	-1.21	-0.2125145	-3.26*
t+19	-0.0011157	-0.14	-0.2136302	-3.28*
t+20	0.0034059	0.42	-0.2102243	-3.23*
t+21	2.635E-05	0.00	-0.2101979	-3.22*
t+22	0.0008281	0.10	-0.2093698	-3.21*
t+23	-0.0027733	-0.34	-0.2121431	-3.25*
t+24	-0.0033738	-0.42	-0.2155169	-3.31*
t+25	-0.008816	-1.09	-0.2243329	-3.44*
t+26	0.0016014	0.20	-0.2227315	-3.42*
t+27	0.0017803	0.22	-0.2209512	-3.39*
t+28	-0.0019303	-0.24	-0.2228815	-3.42*
t+29	-0.0063685	-0.79	-0.22925	-3.52*
t+30	-0.0664246	-8.21*	-0.2956745	-4.54*
t+31	6.855E-05	0.01	-0.295606	-4.53*
t+32	-0.0011726	-0.14	-0.2967786	-4.55*
t+33	0.0035684	0.44	-0.2932102	-4.50*
t+34	0.0134446	1.66*	-0.2797656	-4.29*
t+35	-0.0012704	-0.16	-0.281036	-4.31*
t+36	-0.000479	-0.06	-0.2815149	-4.32*

APPENDIX 13: Peer Group Adjusted Average Abnormal Returns for Top/Bottom 10% Funds

Figure A13.1 Peer Group-Adjusted Average Abnormal Returns - Top 10% according to IR pre-event

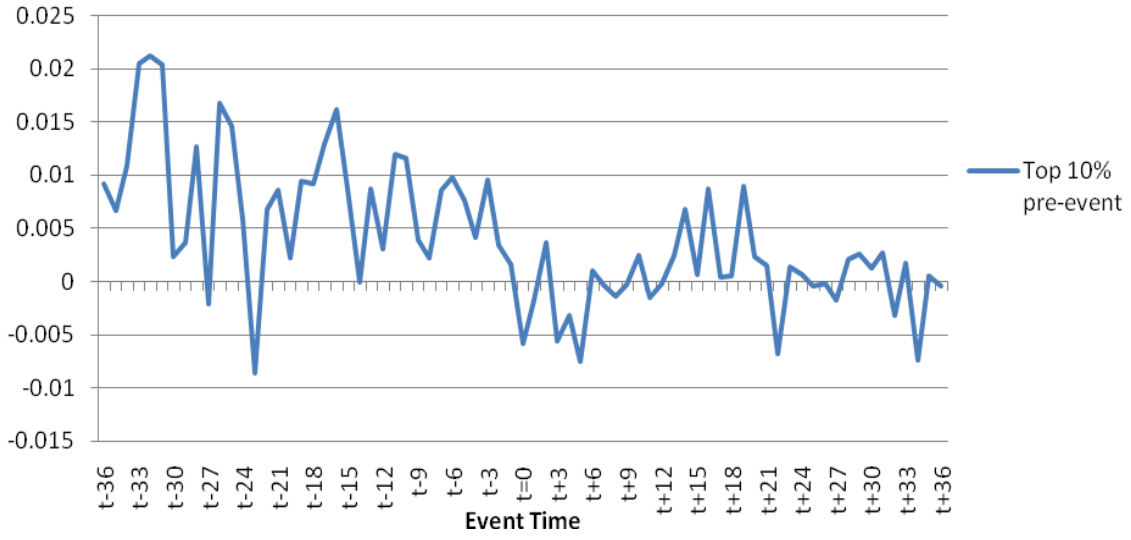


Figure A13.2 Peer Group-Adjusted Average Abnormal Returns - Bottom 10% according to IR pre-event

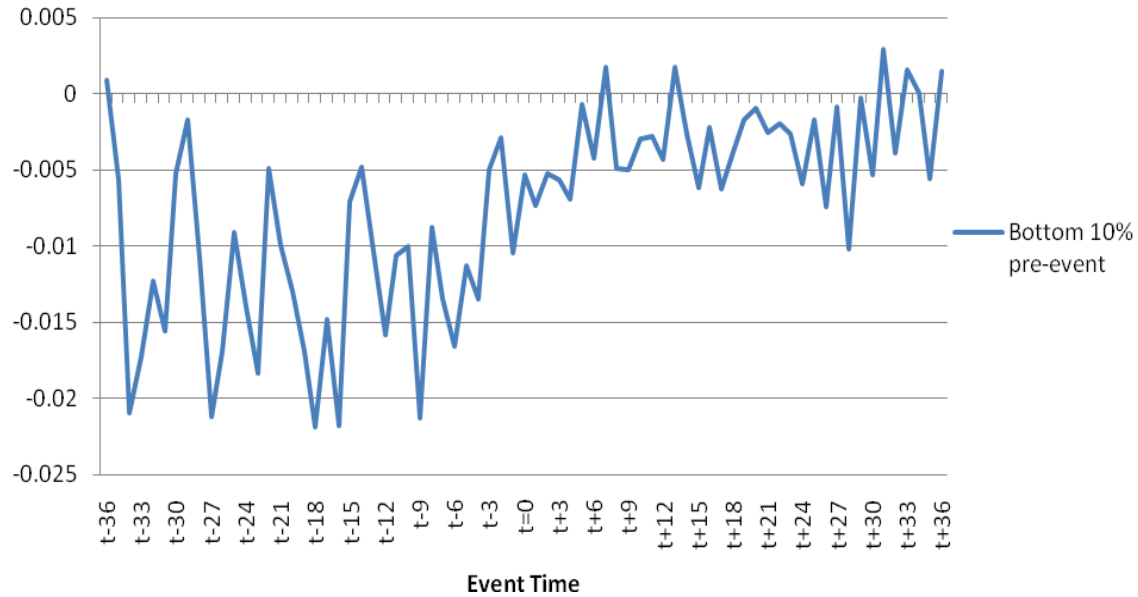


Figure A13.3 Peer Group-Adjusted Average Abnormal Returns - Top 10% according to IR post-event

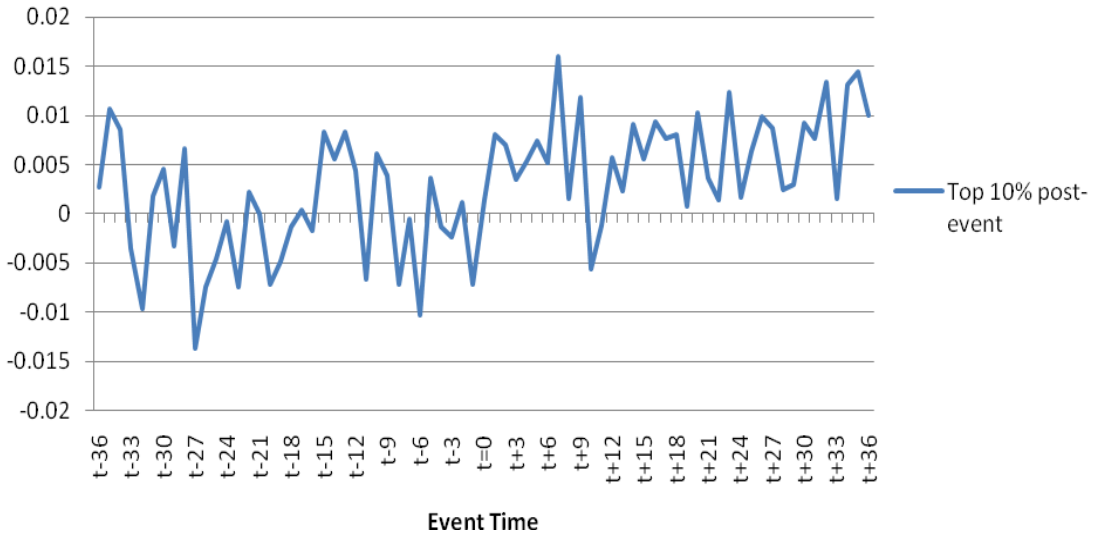
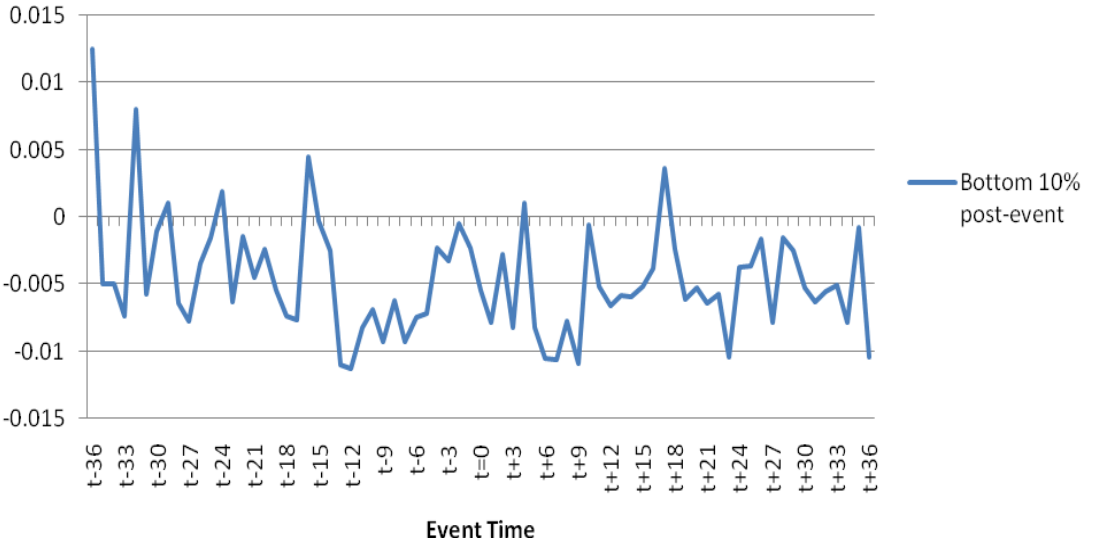


Figure A13.4 Peer Group-Adjusted Average Abnormal Returns - Bottom 10% according to IR post-event



APPENDIX 14: Test in Difference of Means of all categories for each method (Market-, Peer group- and mean-adjusted), *Significant at 5% significance level

Test in Difference of Means for Male and Female Managed Funds			
	MARKET	PEER	MEAN
T-Statistic	13.437*	30.742*	-0.365
P-Value	0.000	0.000	0.717

Test in Difference of Means for UK and International Funds			
	MARKET	PEER	MEAN
T-Statistic	-17.546*	-18.809*	4.119*
P-Value	0.000	0.000	0.000

Test in Difference of Means for Emerging and Developed Market Funds			
	MARKET	PEER	MEAN
T-Statistic	18.570*	12.995*	-3.565*
P-Value	0.000	0.000	0.001

Test in Difference of Means for Equity and Bonds Funds			
	MARKET	PEER	MEAN
T-Statistic	24.544*	-14.428*	-5.455*
P-Value	0.000	0.000	0.000

Test in Difference of Means for Small-Cap and Growth Funds			
	MARKET	PEER	MEAN
T-Statistic	-15.236*	-8.225*	10.495*
P-Value	0.000	0.000	0.000

REFERENCES

Allen, D.E. and Tan, M.L. "A Test in Persistence of the Performance of UK Managed Funds", *Journal of Business Finance and Accounting*, (1999), Vol. 24(2), pp.155-178.

Atkinson, S. M., Baird, B.S. and Frye, M.B "Do Female Mutual Fund Mangers Manage Differently?", *Journal of Financial Research*, (2003), Vol. (26), pp.1-18.

Blake, D. and Timmerman, A. "Mutual Fund Performance: Evidence from the UK", *European Finance Review*, (1998), Vol. (2), pp.57-77.

Bliss, R.T., Potter, M. and Schwarz, C. (2008), Performance Characteristics of Individual vs. Team Managed Mutual Funds, *The Journal of Portfolio Management*, Vol. 34 (3), pp. 110-19.

Bliss, R.T. and Potter, M. (2002), Mutual Fund Managers: Does Gender Matter?, *Journal of Business and Economic Studies*, Vol. 8 (1), pp. 1-15.

Brown, S.J. and Goetzmann, W.N. "Performance Persistence", *The Journal of Finance*, June (1995), Vol. (2), pp.679-699.

Brown, S.J., Goetzmann, W., Ibbotson, R.G. and Ross, S.A. "Survivorship Bias in Performance Studies", *The Review of Financial Studies*, (1992), Vol. (5), pp.533-580.

Brown, S.J. and Warner, J.B. "Measuring Security Price Performance", *Journal of Financial Economics*, (1980), Vol. 8, pp. 205-258.

Brown, S.J. and Warner, J.B. "Using Daily Stock Returns: The Case of Event Studies", *Journal of Financial Economics*, (1985), Vol. 14, pp. 3-31.

Campbell, J.Y., Lo, A.W. and MacKinlay, A.C. "The Econometrics of Financial Markets", (1997), Princeton University Press.

Carhart, M.M. “On Persistence in Mutual Fund Performance”, *The Journal of Finance*, March (1997), Vol. (1), pp.57-83.

Chevalier, J. and Ellison, G. “Are Some Mutual Fund Managers Better Than Others? Cross-Sectional Patterns in Behavior and Performance”, *The Journal of Finance*, June (1999), Vol. (3), pp.875-899.

Daniel, K., Grinblatt, M., Titman, S. and Wermers, R. “Measuring Mutual Fund Performance with Characteristic-Based Benchmarks”, *The Journal of Finance*, (1997), Vol. (52), pp.1035-1058.

Elton, E.J., Gruber, M.J. and Blake, M.R “The Persistence of Risk-Adjusted Mutual Fund Performance”, *Journal of Business*, (1996), Vol. 62(2), pp.133-157.

Gaspar, J.M, Massa, M. and Matos, M., 2006, Favoritism in Mutual Fund Families? Evidence on Strategic Cross-Fund Subsidization, *Journal of Finance*, Vol. 61, 73-104.

Goetzman, W. and Ibbotson, R. “Do Winners Repeat?”, *Journal of Portfolio Management*, Winter (1994), Vol. (20), pp.9-18.

Grinblatt, M. and Titman, S. “The Persistence of Mutual Fund Performance”, *The Journal of Finance*, December (1992), Vol. (5), pp.1977-1985.

Hendricks, D., Patel, J. and Zeckhauser, R. “Hot Hands in Mutual Funds: Short-run Persistence of Relative Performance, 1974-1988”, *The Journal of Finance*, March (1993), Vol. (1), pp.93-125.

Jianakoplos, N., and Bernasek, A., (1998). Are women more risk averse? *Economic Inquiry*, Vol. 36(4), pp. 620–630.

Keswani, A. and Stolin, D. “Determinants of Mutual Fund Performance Persistence: A Cross-Sector Analysis”, *Journal of Financial Research*, (2004).

Keswani, A. and Stolin, D. “Mutual Fund Performance Persistence and Competition: A Cross-Sector Analysis”, *Journal of Financial Research forthcoming*, Fall (2006), Vol. 30(3), pp.349-366.

Khorana, A “Performance Changes following Top Management Turnover: Evidence from Open-End Mutual Funds”, *Journal of Financial and Quantitative Analysis*, (2001), Vol. 36(3), pp. 371-393.

Malkiel, B.G. “Returns in Investing in Equity Mutual Funds 1971 to 1991”, *The Journal of Finance*, June (1995), Vol. (2), pp.549-572.

Niessen, A. and Ruenzi, S. “Sex Matters: Gender and Mutual Funds”, *Working Paper*, (2006)

Prather, L.J. and Middleton, K.L., (2002), Are N+1 heads better than one?: The case of mutual fund managers, *Journal of Economic Behaviour and Organization*, Vol. 47 (1), pp. 203-20.

Quigley, G. and Sinquefield, R.A. “Performance of UK Equity Unit Trusts”, *Journal of Asset Management*, (1998), Vol. (1) pp.72-92.

Volkman, D.A. and Wohar, M.E. “Determinants in Persistence in Relative Performance of Mutual Funds”, *Journal of Financial Research*, (1995), Vol. 18, pp.415-430.

Wermers, R. “Predicting Mutual Fund Returns”, *Working Paper*, *Robert H. Smith School of Business*, University of Maryland, (2001).

Wermers, R. and Ding, B. **“**Mutual Fund Performance and Governance Structure: The Role of Portfolio Managers and Boards of Directors”, *EFA 2005 Moscow Meetings Paper*.

CHAPTER THREE

Do Fund Flows Play a Role in UK Fund Manager Changes?

ABSTRACT

This study investigates the relationship between manager changes and mutual fund flows. Using our unique, hand-constructed database of fund manager changes, we examine whether the fund flows are influenced by the change in manager and in turn by the past performance, gender of the fund manager, market in which the fund invests or the type of fund by asset class. The study uses an unbalanced panel data and an event study methodology to trace fund flows. We show that fund flows substantially deteriorate after the manager leaves the fund. Moreover, we find that there is a negative relationship between fund flows and returns over longer period horizons and a positive relationship over shorter periods. In addition, our results suggest that poor past performance causes significant fund withdrawals, however, we find no evidence that the gender of the fund manager, the market in which the fund invests, or the type of fund plays any role in determining the size of the fund flows.

1. INTRODUCTION

There is an extensive empirical literature analysing the relationship between the performance of mutual funds and subsequent inflows of new money into these funds. Examining the mutual fund flow data, one is able to implicitly study the behaviour and decisions of individual investors, which in turn may affect fund returns. One of the most divisive topics within the fund management performance literature is the debate on the interdependence between fund performance and the size of the fund. Khorana and Servaes (1999) and Chen et al. (2004) find a positive relationship between fund size and fund performance. On the other hand, Grinblatt and Titman (1994), Dahlquist et al. (2000) and Gallagher and Martin (2005) find no association between these outlined factors. However, there has been little evidence devoted to the impact that a manager has on the level of fund flows[31]. Mutual fund managers come and go, as companies look for new superstars or shift top managers to underperforming funds in their family or as managers simply leave the mutual fund industry. Be it as it may, such changes could have a large impact on the inflows into the funds and eventually returns of the funds.

The aim of this study is to investigate the relationship between fund manager changes and fund flows into and out of UK funds over the period April 2002 to December 2006. In other words, we attempt to answer whether fund manager changes have an impact on the inflows into the funds and eventually the returns of these funds. This study attempts to fill the gap in the literature by offering a comprehensive study of fund manager changes and gender influences in different types of funds in the UK managed fund industry and to highlight the effect a fund manager change (replacement) has on fund flows. Therefore, using an event study methodology, we aim to highlight the influence of fund flows on manager change. To the best of our knowledge, there have been no previous studies looking at the interdependence of mutual fund flows and fund manager change. In addition, we further examine whether fund characteristics, such as gender of fund manager, type of fund and the market in which the fund invests, plays a role in determining the level of fund flows. Our study is aimed at addressing these issues.

[31] Chevalier and Ellison (1999) examined the labour market for mutual fund manages and find that, among other things, termination of their jobs is positively linked with an outflow of funds.

1.2 Objectives and Significance of Research

The objective of this study is to examine the flow of mutual funds and to determine whether manager changes play a role in influencing these trends of fund flows. Using our unique, hand-constructed database of UK fund manager changes and an event study methodology, we intend to highlight the apparent trends of fund flows before and after the manager change. Through our event study methodology we aim to examine whether the level of fund flows leads to a fund manager change and whether the change in manager has an impact on the level of fund flows after the change. In addition, we test whether the level of fund flows persists after the fund manager change has occurred.

Numerous studies have analysed the relationship between the level of flow and the performance of mutual funds, among other determinants that may influence the level of fund flows. However, to the best of our knowledge, this is the first study that examines the relationship between fund flows and fund manager change. In particular, this study is devoted to determining whether fund manager changes affect the level of fund flows.

Furthermore, using a panel least squares model, we examine whether the impact of fund manager changes on the level of fund flows varies depending upon whether the fund manager is male or female, whether the fund is a developed or emerging market, and depending upon the fund's asset class, that is, equity or bond.

The structure of this chapter is organized as follows. Section two comprises the literature review, which discusses the earlier findings related to this study. Section three explains the data and methodology used in this chapter. Section four is devoted to the results of our findings.

2. LITERATURE REVIEW

There is an extensive empirical literature focusing on the relationship between the performance of mutual funds and subsequent inflows or outflows of money into and out of those funds. Most studies have found that the relationship between performance and flow is positive, where investors tend to move cash into the funds that had the highest returns in the previous year. However, there is no evidence on the study of the impact of fund managers on fund flows. This review of the literature is intended to cover most indicative and influential studies that have been carried out so far in the US and the UK.

2.1 Fund Flows and Returns

One of the most contentious issues within the fund management performance literature is the nature of the relationship between fund performance and the size of the fund. Khorana and Servaes (1999) and Chen at al. (2004) find a positive relationship between fund size and fund performance. However, Grinblatt and Titman (1994), Dahliquist et al. (2000) and Gallagher and Martin (2005) find no association between the fund's size and performance. However, studies by Arshanapalli et al. (1998) and Chevalier and Ellison (1999) argue that small-sized US mutual funds tend to outperform larger funds. Nevertheless, most studies agree that mutual funds, as well as hedge funds that exhibit higher returns experience higher net inflows (Ippolito (1992), Chevalier and Ellison (1997), Goetzmann and Peles (1997), Gruber (1996), and Agarwal et al. (2004)).

Warther (1995) performed a study using U.S. aggregate mutual fund flows and security returns. Using monthly data he divided fund flows into anticipated and unanticipated flows, using time-series models to estimate anticipated flows. Results suggest that monthly returns are strongly correlated with unexpected flows and that they are uncorrelated with expected flows. He also found a positive relation between flows and subsequent returns in weekly data and evidence of a negative relation between returns and subsequent flows in monthly data.

Ippolito (1992) used annual US data to examine investors reaction to funds that had performed well in the recent past and compared with these that had performed poorly. He shows that this is rational investor behaviour as they are aiming to maximise their

returns, which in turn regulates the fund manager and aligns their interests with those of the investors. Sirri and Tufano (1993) examine flows at an individual level and using yearly data, they find that money flows into the fund with the best performance in the previous year. This is also consistent with the findings of Hendricks, Patel and Zeckhauser (1993).

Furthermore, Sirri and Tufano (1998) study the flows of funds into and out of individual U.S. equity mutual funds concentrating on the impact of search costs on fund flows. In particular their study focused on the period from December 1971 through to December 1990. Using a linear regression they analysed the relationship between returns, risk, fees and flows. They treated search costs, such as marketing expenses as the fees that the investor has to incur. They found that investors of equity funds chase high performing funds while failing to flee lower performing funds at the same rate. They also document that mutual fund flows are affected by factors related to the search costs that investors must bear. In addition, high-fee funds, which spend more on marketing than their rivals, enjoy a much stronger performance-flow relationship than do their rivals. They also report that funds that are part of a large fund complex are an important determinant of fund flows and larger complexes reduce investors' search costs.

Kempf and Ruenzi (2008) extended the study of Sirri and Tufano and argued that funds not only compete for flows within their market segment but also within their fund family. Using US equity mutual funds from 1993 to 2001 they found that there is a positive and convex relationship between the family rank of a fund and its subsequent growth in size.

Keswani and Stolin (2006) examine whether performance persistence within a peer group of competing mutual funds depends on the group's composition. In particular, they construct several variables intended to capture the intensity of competition in a sector, including the number of funds in a sector, the proportion of mature funds, and the Herfindahl index of asset concentration. Their data consist of UK mutual funds comprised from the Unit Trust Yearbook, from 1991 to 2001. In their study they employ the Spearman rank correlation coefficient and the log-odds ratio to test the performance persistence and use variables such as the number of funds in the sector and the proportion of mature funds in the sector in order to measure the intra-sector rivalry.

According to their results persistence is higher in sectors where concentration of assets under management is higher.

Taking a different approach, Berk and Tonks (2007) study the relationship between return persistence and fund flows in the worst performing mutual funds. Using a large data set of US mutual funds from January 1962 to December 2004, they use relative and absolute methods to measure the level of yearly fund flow. The reason for using the absolute method is due to the fact that the relative measure does not capture the growth in the number of very small funds. Furthermore, they implement Carhart's 4 factor model to test for performance. They also divide the results in best/worst performing and examine the flow of funds in those categories. To investigate the flow of funds-performance relation in the subcategories of the bottom decile they use the controls that have been identified by prior research. Finally, they regress fund flows on the prior year return, including the annualized Jensen-alpha, estimated over the previous 36 months from a 4-factor model, the associated tracking error estimated as the variance of the residuals from the 4-factor model, fund size, fees, age, and the prior year fund flow. The authors show that the observed persistence in the returns of the worst performing funds can be attributed to funds that do not have a strong flow of funds-performance relation. However, funds in the worst performing decile that do show evidence of a strong flow of funds-performance relation do not have persistent returns.

Moreover, Friesen and Sapp (forthcoming) focus their research on the timing ability of mutual fund investors using cash flow data at an individual level. Using a data of 7,125 US mutual funds, they compute monthly dollar-weighted returns and find that the average active fund investor substantially underperforms the growth of a dollar invested in the fund over the entire measurement period. They further test this on various subcategories based on size, objective or risk preference and find consistent results. Their results suggest that due to the underperformance of new cash flows losses from poor market timing decisions are most likely to overshadow any potential gains from over performing funds.

Green and Hodges (2001) show that mutual fund flows that are correlated with subsequent fund returns have a diluting impact on the performance of open-ended funds. In previous studies Gruber (1996) and Zheng (1999) outlined the "smart money"

effect where fund flows tend to find funds that have a higher likelihood of good future performance. On the other hand, Green and Hodges show that daily fund flows in international funds are able to predict subsequent day returns whereas the flows in domestic funds have no relation with the following day's return. Using a sample of 833 US mutual funds, their results suggest that the domestic equity funds show no dilution impact. However, international funds demonstrate an annualized negative impact of 0.48%.

In fact, a body of literature has revealed that investors are potentially rewarded for chasing returns. A study by Wermers (2003) examined fund returns and cash flows over a 20-year period for the US market. In his study, Wermers found prior-year top funds beat bottom funds by 5% during the following year, and the S&P500 index by 2%. He argues that the behaviour of fund managers is influenced by the flow of new money. Winning fund managers use cash inflows to increase existing equity positions and to take new positions in new winning stocks, thus reinforcing the positive momentum effect. Therefore, at least a portion of the persistence in fund returns is the result of investors aggressively upgrading or moving into funds with superior returns over the last year.

2.2 Do other factors affect Fund Flows?

One of the studies that look at different factors that affect fund flows is by Cooper et al. (2004). In particular, they analyse the effect a mutual fund name change has on the fund flow and subsequent returns. Using an event study methodology, their sample data comprises 296 US mutual funds that had a style name changed over the period April 1994 to July 2001. Applying the change of name of fund as the event date, they measure the level of fund flow and abnormal return before and after the event date. According to their results, the funds that had changed names had experienced a negative fund flow over the six months before the name change, earned lower excess returns, are older and had lower marketing fees. Once the name change occurs, these funds experience significantly positive abnormal fund flows. This is most pronounced for the funds that had made a hot-style name change, or the current glamour style fund name. Cooper et al. argue that the funds that had taken up a hot-style name had increased their advertising expenditures, leading to increased fund inflows and a rise in abnormal

returns. However, the increase in abnormal returns does not occur in the period immediately after the name change, but shows a steady increase one year after the name change. The study by Copper et al. documents irrational behaviour by the investors, as they seem to disregard the underlying performance of the fund and invest in those that had a hot-style name change.

On the other hand, Barber et al. (2005) take a different approach and concentrate on the effect that expenses have on mutual fund flows. Morse specifically, they analyse the changes in how investors treat various mutual fund expenses such as load fees, commissions and operating expenses. Analysing the period from 1970 to 1999, they measure US mutual fund flows and actual mutual fund purchase and sale decisions by investors at a large discount broker from 1991 to 1996. Their results show consistently negative relations between fund flows and load fees or commissions, but no relation between fund flows and operating expenses. Furthermore, they divided the operating expenses into marketing expenses and other expenses and found that the inflow of funds increased for the mutual funds that had higher marketing expenses and decreased for those that had higher other operating expenses. This is also consistent with Jain and Wu (2000) and Sirri and Tufano (1998) who argue that increased flows are associated with increased marketing expenditure.

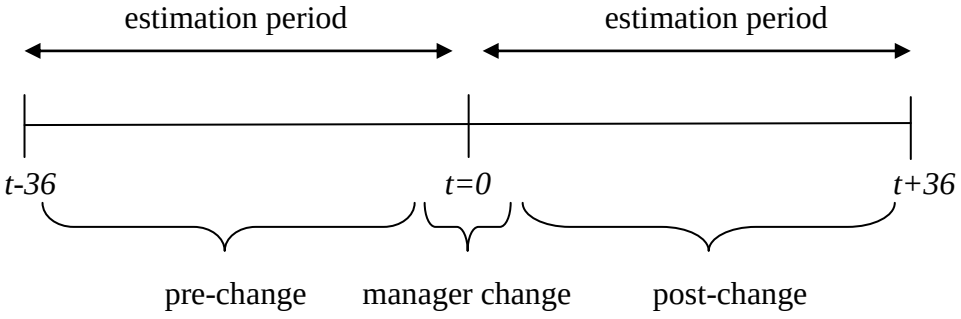
It is evident from the literature review that there are numerous studies on the relationship between fund flows and returns, as well as factors such as expenses and fund name changes. Most literature advocates that it is primarily the fund's returns that influence the level of fund flow. Our study differs from the others due to the fact that we take into account a different factor, fund manager replacement. Therefore, to the best of our knowledge, this is the first study that examines the impact of a fund manager replacement on the subsequent level of fund flows. Using an event study methodology and an empirical model we examine the level of fund flows before and after the replacement of fund manager. As a result, we attempt to fill the gap in the literature that it is in fact a fund manager that has plays a role in determining the level of fund flows.

3. DATA AND METHODOLOGY

3.1 Data

In this study, we utilize the unique, hand-constructed data set of fund manager changes that we have employed in the second chapter, 'The Impact of Manager Changes on UK Fund Performance'. In the second chapter, the Standard & Poor's data source provided us with information of manager replacements from April 2002 to December 2005. However, for this study we extended the data to December 2006. The monthly fund size or the total net assets for each fund was provided by our primary data source Lipper. However, out of the initial 258 funds, some were excluded from our study as the data on fund size provided by Lipper did not cover the manager change. More specifically, the monthly fund size provided for these funds was either before the manager change or after the manager change, leaving a final sample of 207 funds.

Similarly to the second chapter, we use an event study methodology to examine the relationship between the level of abnormal fund flow in the pre and post manager change periods. The time line for our event study is as follows:



In our analysis, we measure the abnormal level of fund flow three years before and after the fund manager change, *t=0*. In this way we will not only be able to determine whether the level of fund flow pre-manager change is associated with a manager change[32], but also whether the change in manager had an impact on the level of fund flow.

[32] Increasing fund flow pre-manager change may indicate that manager was headhunted for another fund, while decrease in the flow may contribute to the reason why the manager left.

3.2 Methodology

3.2.1 Event Study

We use an event study methodology in order to assess the trend of fund flow before and after the manager change. Due to data limitations, we do not observe inflows (outflows) into (out of) a fund directly. Instead, we employ the standard procedure to calculate the growth of fund *i* in month *t* and as in Sirri and Tufano (1998), define the fund flow over the period *t-1* to *t* by the formula

$$\text{Fund Flow}_t = [\ \text{TNA}_t - (1+r_t)\ \text{TNA}_{t-1}\ ] / \text{TNA}_{t-1} \tag{1}$$

where TNA*t* is a fund's total net assets at time *t*, and r_t is the fund's return at time *t*. Fund Flow reflects the percentage growth of a fund in excess of the growth that would have been earned had no new funds flows in and had all dividends been reinvested. In particular, this measure reflects the growth of the fund that is not due to the rate of return earned on the assets under management, but due to new external money. Sirri and Tufano (1998) show that this assumption is robust throughout the results in their study. We assume that the new money flows in and out of each fund at the end of each month since we do not know the exact timing of cash flows.

The monthly price data for each fund is obtained from Datastream. We calculate the monthly return of each fund simply as the log difference between month *t* and *t-1*. We carry out the calculation of the fund flow three years before and after the event date for all 207 funds. For the event study methodology, we calculate the abnormal fund flow levels, AF_{it}, before and after the fund manager change, using the mean-adjusted method:

$$AF_{it} = F_{it} - \overline{F}_i \tag{2}$$

where $\overline{F_i}$ is the mean flow of fund *i* for which the management change has occurred over the 36 months prior to the change of fund manager.

Subsequently, we calculate the Average Abnormal Flow for the entire data sample:

$$\overline{AAF_t} = \frac{1}{n}\sum_{i=1}^{n} AF_{it} \tag{3}$$

where n is the number of funds in which the change of a fund manager occurred and AF_{it} is the abnormal flow of fund *i* at period *t*. Furthermore, we assess the impact of the event by evaluating the difference between cumulative average abnormal flow before and after the change in fund manager:

$$CAAF_{it} = \sum_{t=-36}^{+36} AFi_t \tag{4}$$

In the previous chapter, we ascertained that the prior three year performance of a fund had a substantial impact of managerial change. In other words, from the overall sample of funds, the three year underperformance of the funds in relation to their respective benchmarks had led to a change in fund manager. By evaluating the level of fund flow three years before the fund manager change, we will be able to determine whether in fact it was the flow, in particular the outflow, that was the reason behind the managerial change. Furthermore, we will also be able to compare the two factors of performance and fund flow before and after the fund manger change. Many studies have confirmed that performance and fund flow are highly correlated and our study will in part add to this area of literature.

3.2.2 Significance Tests

In order to test the significance of the average abnormal fund flow and cumulative average abnormal fund flow we calculate the aggregate pre-event standard deviation of average abnormal flow for each of the funds as shown by Brown and Warner (1985):

$$\sigma_{i,pre-event} = \sqrt{\frac{\sum_{t=-36}^{-1}(\overline{AF}_{it} - \overline{AF}_{pre-event})^2}{n-1}} \tag{5}$$

where $\sigma_{i,pre-event}$ is the standard deviation of average abnormal flow of fund *i* estimated from pre-event period, $\overline{AF}_{pre-event}$ is the average abnormal flow of fund *i* in the pre-event period and n is the number of months in the pre-event period (in our case 36). Therefore, the aggregate standard deviation across all funds is calculated as:

$$\sigma_{N,pre-event} = \sqrt{\frac{\sum_{i=1}^{N} \sigma_{i,pre-event}^2}{N}} \tag{6}$$

where N is the number of funds in the sample. Using these standard deviations, we compute the T-test for AFs and CAFs as:

$$\overline{AF}t_{T-test} = \frac{\overline{AF_t}}{\sigma_{N,pre-event}} \tag{7}$$

and

$$\overline{CAF}t_{T-test} = \frac{\overline{CAF_t}}{\sigma_{N,pre-event}\sqrt{t_2 - t_1 + 1}} \tag{8}$$

where t_1 is the first day and t_2 is the last day in the period over which we calculate cumulative returns.

3.2.3 Empirical Model

Through the event study we will be able to determine whether the level of fund flow had an impact on the change in fund manager. In order to evaluate whether a change in fund manager had an impact on the level of fund flow, we propose to run a number of Ordinary Least Squares regressions. To begin with, the average abnormal fund flow[33] is used as our dependent variable and the fund manager change is the independent variable. The fund manager change is a dummy variable which takes the value of 0 for

[33] The average abnormal fund flow is calculated as shown in Equation (3).

the three years before the event date, and the value of 1 for the three years after the event date.

$$\text{Fund Flow}_t = \alpha + \beta_1 \text{Fund Manager Change}_{1t} + \varepsilon_t \quad (9)$$

where α is the intercept and ε is the error term. This will provide us with a simple result as to whether a change in fund manager solely has an impact on the level of fund flows that occur in the following three years.

Second, in order to determine whether fund flows are a function of other factors and to test the existing literature that fund flows are positively correlated with current and past performance, we add monthly returns of the funds as an independent variable:

$$\text{Fund Flow}_t = \alpha + \beta_1 \text{Fund Manager Change}_{1t} + \beta_2 \text{Performance}_{2t} + \beta_3 \text{Performance}_{3t-1} + \varepsilon_t \quad (10)$$

where Performance denotes the return of the funds at month *t*. We initially carry out these regressions on the aggregate mutual fund flows. In other words, we run the regressions for the aggregate average fund flows and the aggregate cumulative fund flows.

In addition to the aggregate empirical model, we test our hypothesis at an individual level as well. This necessitates the use of panel data or longitudinal data where the same economic units (here fund manager change and returns) are observed over time (Baltagi (2001)). Therefore, the data is an unbalanced panel dataset including fund flows, returns (current and period lagged) and fund manager change (value of 0 and 1 three years before and after the manager change respectively). Furthermore, we include other fund characteristic variables such as manager gender (value of 0 if male and 1 if female), market (value of 0 for developed market funds and 1 for emerging market funds) and type (value of 0 for equity funds and 1 for bond funds). The complete model then reads:

$$\text{Fund Flow}_t = \alpha + \beta_1 \text{Fund Manager Change}_{1t} + \beta_2 \text{Performance}_{2t} + \beta_3 \text{Performance}_{3t-1} + \beta_4 \text{Gender}_{4t} + \beta_5 \text{Market}_{5t} + \beta_6 \text{Type}_{6t} + \varepsilon_t \quad (11)$$

The results of the regressions will be able to determine the effects that a new fund manager and the performance of the fund has had on the level of fund flow. Moreover, our results will indicate whether the gender of the fund manager influences the inflows of funds and if the fund characteristics play a role in determining the inflow of funds.

4. EMPIRICAL RESULTS

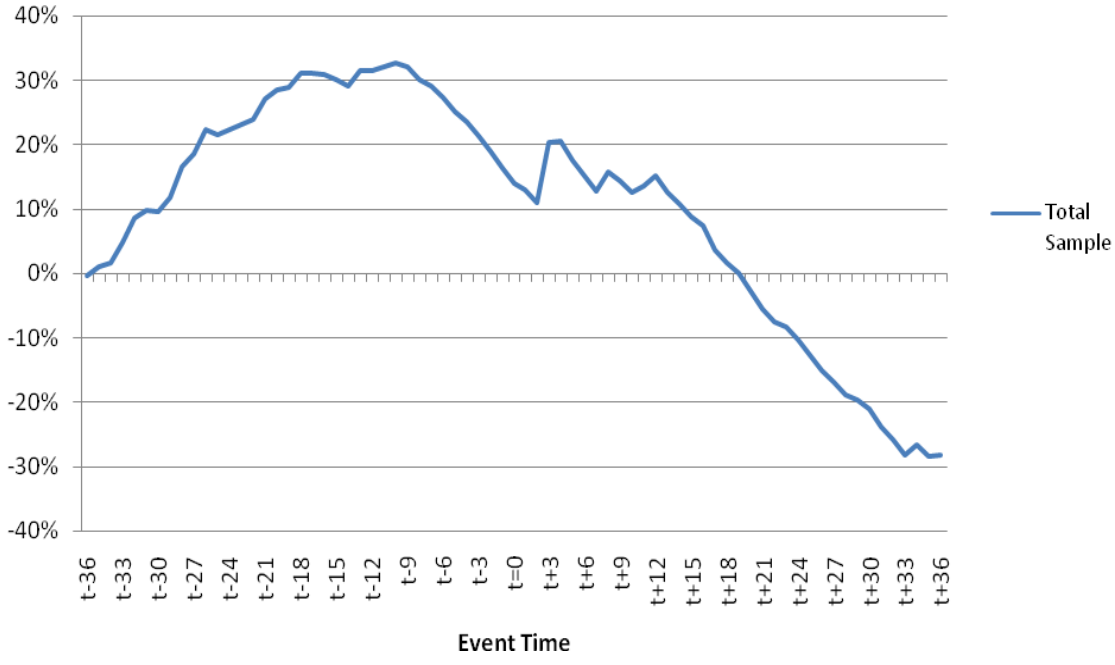
Due to the fact that we have used two different sets of methodologies (event study and regression analysis) in our study, we report the results separately for each. The first set of results corresponds to the event study, which will show the trend of the fund flows over our event period. This is followed by the results from the regression models, which will confirm whether the change in fund manager has had an effect on the level of fund flow and whether the gender of the fund manager and fund characteristics play a part in determining the level of flow.

4.1 Fund Flow for All Funds

Applying our event study methodology, we measure the level of abnormal fund flow three years before (pre-event) and after (post-event) the change in fund manager (event date). Table A1.1 in Appendix 1 depicts the average abnormal fund flow and the cumulative average abnormal fund flow for the entire event period in our estimation. The period *t-36* to *t-1* corresponds to the pre-event period. The period *t=0* is the event date, which corresponds to the month that the fund manager has stopped running the particular fund. The period *t+1* to *t+36* relate to the post-event period, where the previous manager has been replaced. At the outset, the results for the average abnormal fund flow show a less volatile and decreasing trend during the pre-event period as opposed to the post-event, with predominantly positive values. This can also be seen in Figure A2.1 in Appendix 2, which graphically depicts this trend. However, only months *t-32*, *t-28*, *t-26* and *t-21* are statistically significant. Furthermore, we see that the average abnormal returns are decreasing in value from *t-11* leading to the change in fund manager. On the other hand, the post-event period shows a somewhat different picture. Three months after the change in fund manager, the level of fund flow increase sharply due to an increase in flow for a specific developed market equity fund. However, during the period *t+4* and onwards the trend continues to decrease up to the end of our analysis, *t-36*, with predominantly negative average abnormal flow. During the post-event period, the average abnormal level of flow is more volatile as compared to the pre-event period and we see an decrease in inflows as a new fund manager takes over. Furthermore, months *t+3*, and *t+17* are statistically significant.

Furthermore, Table A1.1 (Appendix 1) gives results for the cumulative average abnormal fund flows for all of the 207 funds in our data sample and their corresponding tests for significance. During the third and second year of the pre-event period, *t-36* to *t-10*, the cumulative average abnormal flow is increasing in values and from periods *t-28* to *t-1* they are statistically significant. This can also be clearly seen in Figure 3.1, which shows that the monthly cumulative average abnormal fund flow increases by about 32% a year before the change in fund manager. Nevertheless, during the ten months leading to the change in fund manager the flow of the funds decreases substantially, albeit remaining in positive values. Three months after the change in fund manager, the funds in our sample experience a small increase in inflow, which is attributed to the large increase in flow for the one specific fund. However, after *t+3* the cumulative average abnormal fund flow begins to decline once again and continues to do so until the end of our post-event. In fact, during the last three months of the post-event analysis, the fund flows decrease by approximately 28%. Moreover, our results indicate that the cumulative average abnormal fund flows are statistically significant during *t+3* to *t+5* and *t+27* to *t+36* (Table A1.1 in Appendix 1).

Figure 3.1: Monthly Cumulative Average Abnormal Fund Flow - All Funds



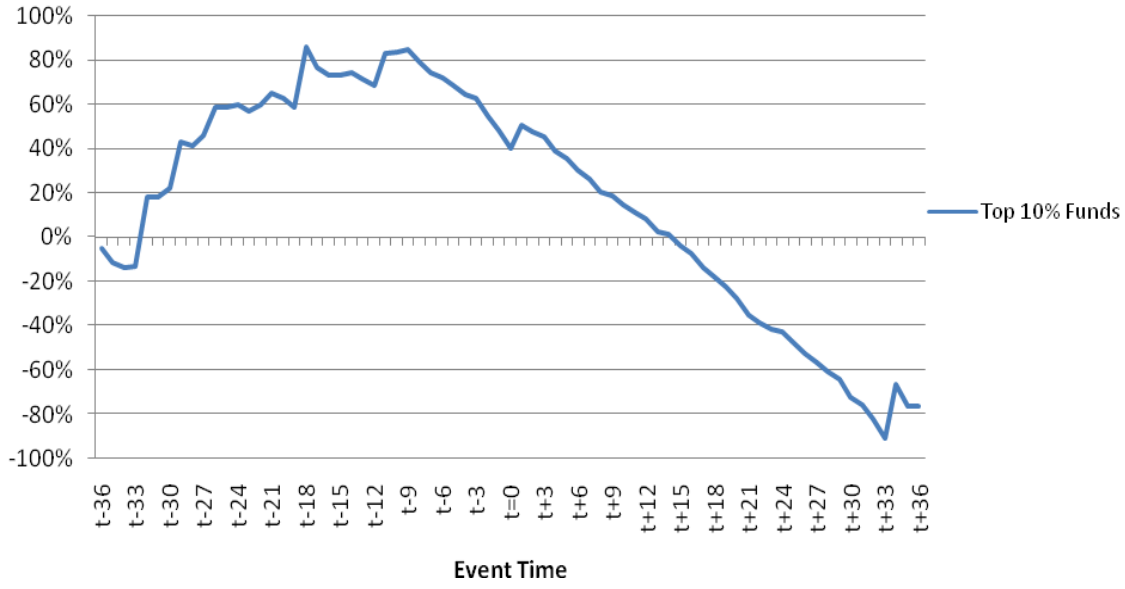
There are two clear conclusions that can be drawn from Figure 3.1: 1) one of the reasons that led to manager replacement may have been the decrease in fund flows in the year before the replacement and 2) on average fund flows start deteriorating after the manager change and continue to do so until the end of our sample period. In particular, three years before the change in fund manager the level of fund flow improves substantially and continues to do so up to a year before the event date, when the fund manager is replaced. Once a new fund manager takes over, the level of fund flow decreases considerably up to *t+36*. Due to the fact that 96 out of 207 funds in our analysis belong to the 2004 and 2005 period, the 36 months post-event period includes the severe market downturn of 2007 and 2008. Therefore, the obvious decrease in flow for our funds in the last two years of the post-event analysis may have been affected by the market crisis of 2007 and 2008. Our results coincide with those from our previous study, where the performance or the return of the funds deteriorated during the same period. Therefore, we can conclude that level of fund flow exhibited a poor outcome a year before the change in fund manager, and once a new manager takes over the fund flow depict a slight improvement followed by a substantial decrease up to three years post change.

A wide literature is devoted to the relationship between fund flows and performance or the returns of the funds. The fund flow literature has shown that investors base their fund purchase decisions on previous performance (Spitz (1970), Smith (1978), Warther (1995) and Chevalier and Ellison (1997)). In our study, we also attempt to answer whether the performance of the funds in return influences the level of flow into those funds. In order to emphasise the extent of the relationship between performance and flow, we take into account only the top and bottom ten percent of the funds according to their information ratios. Primarily, we rank the funds according to the corresponding information ratios 36 months before the event date and identify the top and bottom ten percent. Subsequently, this allows us to examine the level of fund flows for those top and bottom ten percent of funds during the post-event period.

Our results indicate that the level of fund flow in the post-event period decreases as a comparison to the pre-event period. This can be seen in Figure 3.2. During the pre-event period the top ten percent of the funds show a more volatile movement in their level of flows. Furthermore, we see positive fund flows for approximately two years, starting

from *t-32* to *t-10*, reaching an increase of about 80% a year before the change. These specific funds exhibited the highest information ratios during the pre-event period and the positive fund flows during this period may be attributed to the superior performance of these funds. In other words, from the pre-event results we can deduce that a positive relationship exists between fund flows and the return of these funds. However, once a new fund manager takes over, we see deterioration in the level of fund flows. In the previous chapter, we find that there is no persistence in the top performers as the performance of these funds declines once a new fund manager takes over. Our results for the fund flows in the post-event period also highlight this trend where we see a substantial decrease in flow as a new fund manager takes over. Once more, we see a positive relationship between fund flows and returns over approximately a year. From this result we can conclude that the pre-event outperformance of the top ten percent funds according to returns had a negative impact on the flow of funds in the post-event period. Therefore, we see a negative relationship between fund flows and returns over longer period horizons and a positive relationship over shorter periods.

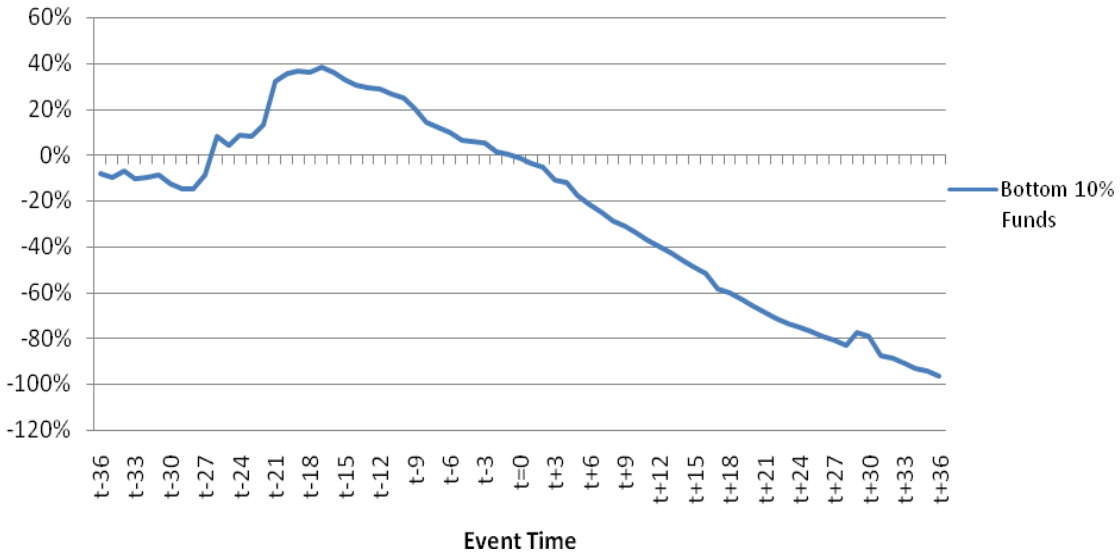
Figure 3.2: Cumulative Average Abnormal Fund Flows - Top 10% Funds according to IR Pre-Event



When taking into account the bottom ten percent of funds, the trend of the fund flows in the post-event period is very similar compared to the top ten percent, as shown in Figure 3.3. Two years before the event date the funds experience an increase of about 36% in

the level of flow, which may have been caused by the performance of the funds in the previous years, which is before *t-36*. However, the level of flow into these funds deteriorates one and a half years before the change in fund manager and continues to decline up to the end of our analysis, *t+36*. This is not surprising as these worst performing funds had the lowest information ratios during the pre-event period and their performance continued to persist even after the fund manager was replaced. As a result, the poor performance of these funds had led to negative fund flows throughout the entire post-event period. Based on our results, we can conclude that there is a lagged positive relationship between performance and fund flow where investors seem to base their purchase decisions on previous performance and changing the fund manager makes little difference.

Figure 3.3: Cumulative Average Abnormal Fund Flows - Bottom 10% Funds according to IR Pre-Event

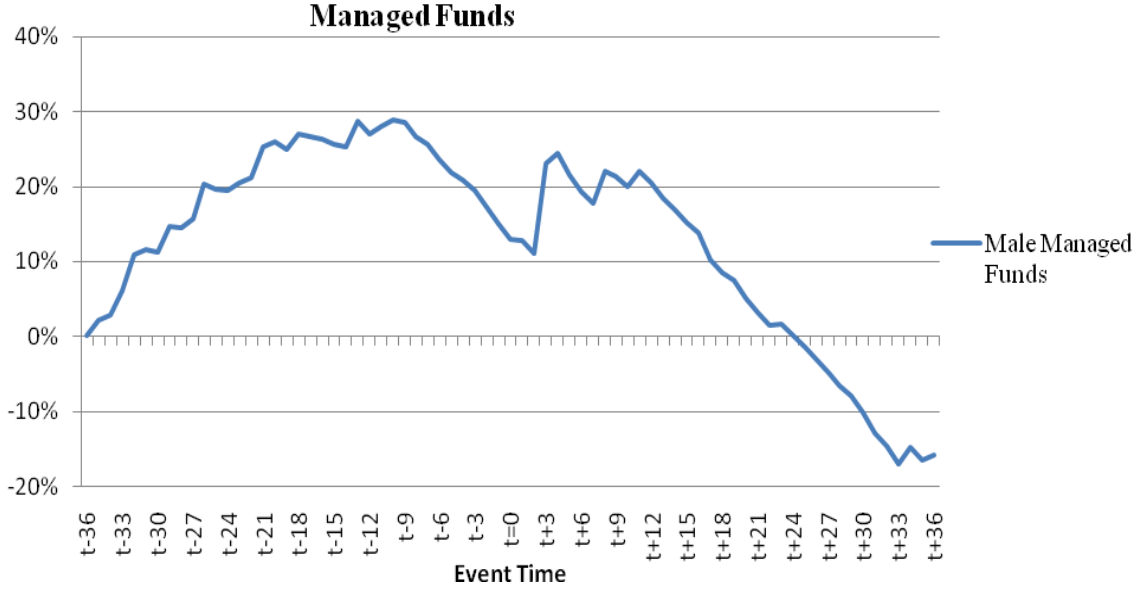


4.1.2 Fund Flow for Male vs. Female Managed Funds

In order to determine whether the gender of a fund manager has an impact on the level of fund flows, we initially identify the funds that are managed by males and those by females during the pre-event period. Out of total sample of 207 funds, 32 are female managed and the remaining funds are male managed. Even though the female managed funds are a minority in relation to the male managed funds, the results obtained are worth reporting.

Due to the fact that the majority of funds in our data sample are managed by men, fund flows for male managers throughout our event analysis are similar to that of the total sample. Table A3.1 in Appendix 3 reports the results for the monthly average abnormal and cumulative average abnormal fund flows for the male managed funds. During the pre-event period the average abnormal fund flows depict a more volatile movement and mainly positive average abnormal fund flows (Figure A2.2 in Appendix 2), with months *t-33, t-32, t-29, t-26, t-21* and *t-13* being statistically significant. Once the male fund manager is replaced, the level of fund flow decreases, experiencing negative fund flows for the most part. However, only months *t+3, t+8* and *t+17* are statistically significant. This trend is more pronounced when taking into account the cumulative average abnormal fund flows. As shown in Figure 3.4, the cumulative average abnormal fund flows for the male managed funds show an increase in flow of about 29% followed by a decrease leading up to the event date, albeit still remaining positive. Once the male manager has been replaced the funds experience an increase in fund flows for about a year. However, this trend does not persist and the abnormal flow decreases up to the end of our analysis, with a decline of about 16% in fund flow in *t-33*. Furthermore, our results indicate that the cumulative average fund flows are statistically significant from *t-29* to *t-1*, *t+3* to *t+16* and *t+32* to *t+36*. We can conclude that a change in the male fund manager has had a negative impact on the level of fund flow, as we see a significant decrease in the flow during the post-event period.

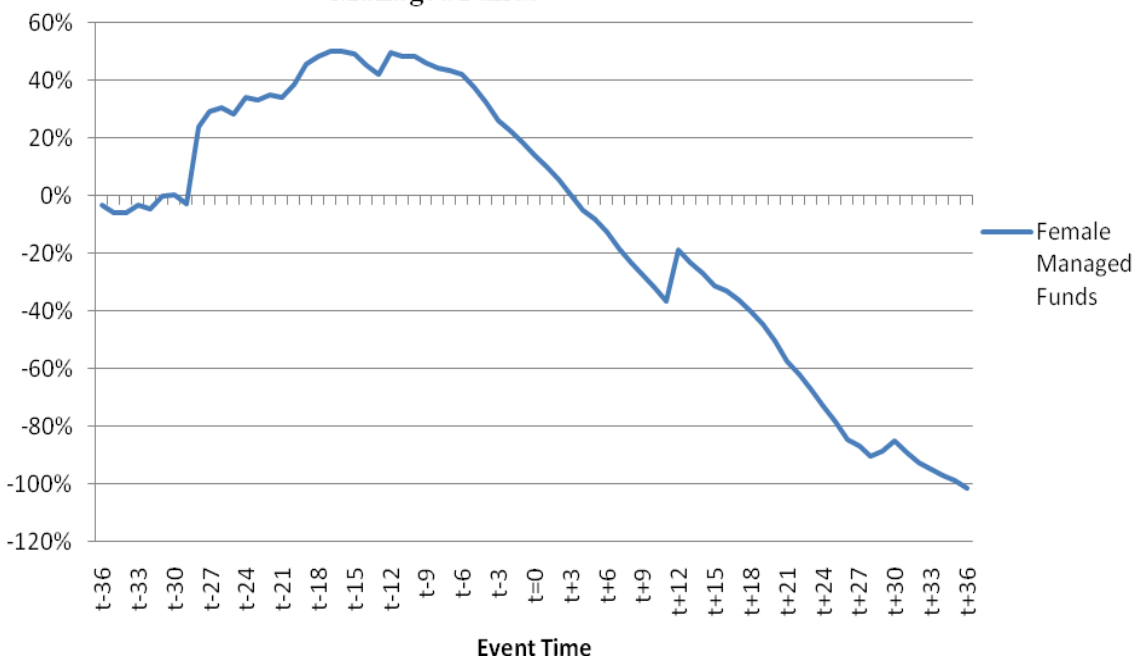
Figure 3.4: Cumulative Average Abnormal Fund Flow for Male Managed Funds



When comparing the female fund managers and their male counterparts, the results indicate that the former obtain less constant and more volatile average abnormal fund flows (Figure A2.3 in Appendix 2). During the first year of the pre-event period (*t-36* to *t-24*), the female fund managers experience a rise in fund flows followed a declining trend which continues up to the end of the pre-event period, *t-1*. Table A3.2 in Appendix 3 reports the results for the monthly average and cumulative average abnormal fund flows for the female managed funds, with months *t-28* and *t+12* being statistically significant when taking into account the average fund flows. In terms of the cumulative average abnormal fund flows, shown in Figure 3.5, the female managed funds depict a rising trend from *t-29* to *t-12*, with a substantial increase in flow of about 50% in *t-12*. This is contrast to the findings of Atkinson et al. (2003), who advocate that the net assets flows into funds managed by females are lower than for males. In fact, our results indicate that female fund managers exhibit greater flows as compared to the male fund managers during the pre-event period. Similar to the male managed funds, approximately a year before the change of the female fund manager, the funds depict a decrease in the level of flow and continue to do so until the end of the post event analysis. Additionally, our results indicate that the cumulative average abnormal flows are statistically significant from *t-24* to *t-4*, *t+11* and from *t+16* to *t+36*. Although both the previously male and female managed funds depict a decrease in flow after they are replaced, it is interesting to note that the decrease is much earlier for the previously

female managed funds. Once the female fund manager is replaced, the fund flows continue to decline to greater extent reaching an outflow of almost 100% in *t-36*. Figure 3.5 suggests that the level of fund flows in the pre-event period is more favourable when compared to the post-event period. As a result, the replacement of the female fund manager has decreased the inflow of funds.

Figure 3.5: Cumulative Average Abnormal Fund Flow for Female Managed Funds



Indeed, when comparing the female and male fund managers, our results suggest that the replacement of the female fund managers has caused a more adverse effect on the level of fund flow during the post-event. We can conclude that the female managed funds exhibit a substantially higher level of flow during the pre-event period as opposed to the male managed funds. In addition, the replacement of the female fund manager proves to have a significantly more unfavourable outcome on the fund flow as compared to the replacement of male fund managers. We also carried out a significance test of the difference between the previously male and female managed funds categories as shown in Appendix 4. The results show that there is a difference between their corresponding abnormal flows.

4.2 Aggregate Mutual Fund Flow Results

Through the event study methodology, we were able to determine the trend of the fund flows preceding the fund manager change and the outcome that resulted from the replacement on the fund flows. However, through our empirical model we are able to further test the impact that the fund manager change has had on the level of fund flows and whether specific fund characteristics, or the gender of the fund manager are significant in the outcome. Primarily, we estimate regressions on the aggregate data of fund flows, following Warther (1995). More specifically, we carry out our analysis on the average abnormal fund flows.

4.2.1 Average Abnormal Fund Flows

In order to determine whether a manager change solely has an effect on the level of fund flows, we estimate a simple regression model with 73 included observations. Seventy-two observations correspond to the three years before and after the fund manager change respectively and one observation corresponds to the month the fund manager change took place. Table 3.1 reports the results of the regression, where average abnormal fund flows are treated as the dependent variable and the manager change is the independent variable. Manager change is a dummy variable which takes the value of 0 for the thirty-six observations before the change in fund manager, and a value of 1 for the remaining observations. According to the results in Table 3.1, a replacement of a fund manager does influence the level of fund flows. Due to the fact that the manager change dummy is significant at a 5% significance level, we can conclude that when a change in fund manager occurs, the level of fund flow will decrease by about 1.66%.

Table 3.1: Determinants of Average Abnormal Mutual Fund Flows

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Constant	0.004552	0.003503	1.299380	0.1980
Manager Change	-0.016589**	0.004921	-3.371393	0.0012
R-squared	0.047394			

**Significant at 5% significance level

4.3 Individual Mutual Fund Flow Results

In our study we also estimate the impact of manager change and performance on the individual fund flows. More specifically, we apply a cross-sectional panel least squares approach with 207 cross-sections and 12,043 total panel unbalanced observations. We implement an unbalanced approach due to the fact that some fund managers in our data sample were in control of the funds for less than three years before and after the replacement. However, we did impose a restriction of one year minimum period of running the fund before and after the event date. Table 3.2 reports the results for the panel regression, where the mutual fund flows are the monthly abnormal flow for each fund and the Performance (AR(-1)) is the one month lagged abnormal return variable for each fund. There has been a wide literature that documents the relationship between the performance of funds and the level of their flows. Cooper et al. (2004) demonstrate evidence of a lagged relationship between performance and fund flows, where the performance of funds are able to affect the flow of funds up to a year. Due to the fact that our results in the event study methodology indicated a lagged positive relationship between performance and fund flow, we further investigate this link by using the lagged abnormal returns as a regressor. The results indicate that a change in fund manager will lead to a 1% decrease in the level of fund flows, as the manager change dummy variable is significant at 10% level. In addition, as expected, we find a positive relationship between one month lagged performance (AR(-1)) of the funds and their corresponding fund flows. Therefore, a one percent increase in returns of each fund will lead to a 22% increase in fund flows in the following month. According to the F-statistic, the two independent variables are jointly statistically significant and are able to explain the variation of fund flows throughout the period in our study.

Table 3.2: Determinants of Individual Mutual Fund Flows
Cross-sectional Panel Least Squares Regression

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Constant	-0.000474	0.004200	-0.112976	0.9101
Manager Change	-0.010431*	0.005609	-1.859512	0.0630
Performance (AR (-1))	0.221736*	0.129489	1.712395	0.0868
R-squared	0.000504	F-statistic		3.037074**
		Prob(F-statistic)		0.048012

*Significant at 10% significance level
**Significant at 5% significance level

4.3.1 Do Gender and Fund Characteristics affect Mutual Fund Flows?

In our empirical model of individual fund flows, we further examine whether the gender of mutual fund managers has an impact on the level of fund flow. In particular, we assign a dummy variable that takes a value of 1 for all the female managed funds and a value of 0 for the male managed funds. In addition, we also assess the different categories of funds to evaluate whether their traits may have different effects on the level of fund flow. In particular, we group the funds according to whether they belong to developed markets or emerging market, and whether they are bond mutual funds or equity mutual funds. In the case of the developed and the emerging market funds, we assign a dummy variable of a value of 1 for the funds that are emerging market funds and a value of 0 for the developed market funds. We call this dummy variable Market. In the case of the bond and equity funds, we assign a dummy variable, Type, which takes the value of 1 for bond funds and a value of 0 for equity funds.

Table 3.3 reports the results for the panel least squares regression, which includes the mutual fund flows as the dependent variable and manager change, one month lagged performance, gender, market and type as independent variables. The results of the regression indicate that only the one month lagged performance and the manager change dummy variables are statistically significant at a 10% level respectively. Therefore, when a manager change occurs, we expect the level of fund flows to decrease by approximately 1%. In addition, our results indicate a positive relationship between the past performance of the funds and their corresponding fund flows, where a one percent

increase in returns will lead to an approximate 22% increase in fund flows in the subsequent month. However, observing the remaining three dummy variables, Gender, Market and Type, the results of the t-statistic imply that all three variables are not statistically different from zero. Consequently, neither the gender of the fund manager, the market our funds invest in (emerging or developed) nor the type of fund according to asset class (equity or bond fund) has an impact on the level of fund flows. From this we can conclude that it is only the replacement of the fund manager, the past fund flow and performance that affects the level of fund flows incurred[34]. It should not make a difference on the level of fund flows when we are taking into account the gender of the fund manager, the market the fund belongs to or the type of fund in question.

Table 3.3: Determinants of Individual Mutual Fund Flows
Cross-sectional Panel Least Squares Regression

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Constant	0.001326	0.004596	0.288567	0.7729
Manager Change	-0.010479*	0.005610	-1.867999	0.0618
Performance (AR(-1))	0.219969*	0.129527	1.698242	0.0895
Gender	-0.011137	0.008138	-1.368485	0.1712
Market	0.006374	0.011234	0.567356	0.5705
Type	-0.003381	0.007045	-0.479873	0.6313
R-squared	0.000699	F-statistic		1.682754
		Prob(F-statistic)		0.134950

*Significant at 10% significance level
**Significant at 5% significance level

[34] When testing these independent variables in univariate OLS regression models, the same conclusions were reached.

5. CONCLUSION

This chapter examined the relationship between fund manager changes and fund flows of UK funds over the period April 2002 to December 2006. In particular, our study focused on determining the impact of a manger change on subsequent fund flows. We are able to answer this by using an event study methodology and an empirical model where we assessed whether the fund flows are influenced by the change in manager and in turn by the current and past performance. In order to accentuate the potential link between past performance and fund flows, we ranked the funds in the pre-event period (before fund manager replacement) according to their information ratios and examined the level of fund flow in the post-event period (after fund manager replacement). Furthermore, we assessed whether the gender of the fund manager and certain characteristics of the funds have a bearing on the level of fund flows. In particular, we categorize funds according to the gender of the fund manager, the market in which the fund invests (emerging or developed market) and the type of fund by asset class (bond or equity).

By using our unique, hand-constructed dataset of UK fund manager changes from April 2002 to December 2006 we are able to study the level of fund flows throughout our estimation period and determine whether the level of fund flows influences the occurrence of a fund manager replacement and to what extent that replacement has an effect on the level of fund flow. Specifically we measured fund flows as defined by Sirri and Tufano (1998) three years before and after the fund manager change. In addition to using a number of ordinary least squares models to test the impact of manager change on fund flows on an aggregate level, we further implemented unbalanced panel least squares models on an individual level as well, together with other potential determinants of fund flows.

Our findings suggest that one of the factors that leads to a manager replacement may have been a fall in fund flows. In particular, one year before the change in fund manager the level of fund flow deteriorates substantially and continues to do so up to the point when the fund manager is replaced. Furthermore, we show that fund flows continue to decrease even after the manager leaves the fund, which we believe is largely influenced

by the market downturn of 2007 and 2008, which was included in the last two years of our post-event data.

Indeed, using event study methodology and panel least squares we showed that good (poor) past performance leads to increases (decreases) in subsequent fund flows. In fact, we show that a twelve month past performance of funds remains significant in influencing the current level of fund flow. On the other hand, our findings suggest that funds with the highest information ratios in the pre-event period showed a substantial decrease in the level of fund flow during the post-event period, indicating a negative lagged relationship between past performance and fund flows over longer period horizons. However, we find no evidence that the gender of the fund manager, the market in which the fund invests or the type of the fund plays any determining role for the size of the fund flows. As a result, it is only the replacement of the fund manager and past performance of the fund that affects the level of fund flows. This paper presents the first evidence of such phenomena in the UK's fund management industry.

APPENDIX 1

Table A1.1 Total Sample Fund Flow AAFs and CAAFs

Event Time	Average Fund Flow	*T-test*	Cumulative Average Fund Flow	*T-test*
t-36	-0.0029825	-0.16	-0.0029825	-0.03
t-35	0.012954	0.68	0.0099715	0.10
t-34	0.006261	0.33	0.0162325	0.16
t-33	0.031373	1.64	0.0476055	0.48
t-32	0.039113	2.04*	0.0867185	0.87
t-31	0.0122459	0.64	0.0989644	1.00
t-30	-0.0029277	-0.15	0.0960367	0.97
t-29	0.0227591	1.19	0.1187958	1.20*
t-28	0.0465956	2.43*	0.1653914	1.67*
t-27	0.0193446	1.01	0.184736	1.86*
t-26	0.039619	2.07*	0.224355	2.26*
t-25	-0.0085378	-0.45	0.2158172	2.17*
t-24	0.008299	0.43	0.2241163	2.26*
t-23	0.006324	0.33	0.2304403	2.32*
t-22	0.0090002	0.47	0.2394404	2.41*
t-21	0.0321681	1.68*	0.2716085	2.74*
t-20	0.0143039	0.75	0.2859124	2.88*
t-19	0.0036452	0.19	0.2895576	2.92*
t-18	0.0209415	1.09	0.3104991	3.13*
t-17	0.0007577	0.04	0.3112568	3.13*
t-16	-0.0024333	-0.13	0.3088235	3.11*
t-15	-0.0081659	-0.43	0.3006575	3.03*
t-14	-0.0095716	-0.50	0.2910859	2.93*
t-13	0.0244045	1.27	0.3154905	3.18*
t-12	-0.0009081	-0.05	0.3145824	3.17*
t-11	0.0058418	0.30	0.3204241	3.23*
t-10	0.0065309	0.34	0.326955	3.29*
t-9	-0.0061207	-0.32	0.3208343	3.23*
t-8	-0.0192541	-1.00	0.3015803	3.04*
t-7	-0.0102359	-0.53	0.2913443	2.93*
t-6	-0.0186504	-0.97	0.2726939	2.75*
t-5	-0.0220742	-1.15	0.2506198	2.52*
t-4	-0.0161322	-0.84	0.2344876	2.36*
t-3	-0.02126	-1.11	0.2132276	2.15*
t-2	-0.024241	-1.27	0.1889866	1.90*
t-1	-0.0251174	-1.31	0.1638692	1.65*
t=0	-0.0247052	-1.29	0.139164	1.40
t+1	-0.0083306	-0.43	0.1308333	1.32
t+2	-0.0206582	-1.08	0.1101751	1.11
t+3	0.0931706	4.86*	0.2033458	2.05*
t+4	0.0024233	0.13	0.205769	2.07*
t+5	-0.0296015	-1.55	0.1761675	1.77*
t+6	-0.0243673	-1.27	0.1518002	1.53

t+7	-0.022871	-1.19	0.1289292	1.30
t+8	0.0287582	1.50	0.1576874	1.59
t+9	-0.0130857	-0.68	0.1446017	1.46
t+10	-0.0183275	-0.96	0.1262743	1.27
t+11	0.0098554	0.51	0.1361297	1.37
t+12	0.0152303	0.79	0.1513599	1.52
t+13	-0.0253175	-1.32	0.1260424	1.27
t+14	-0.0180324	-0.94	0.10801	1.09
t+15	-0.0204649	-1.07	0.0875451	0.88
t+16	-0.0143279	-0.75	0.0732172	0.74
t+17	-0.0362021	-1.89*	0.0370151	0.37
t+18	-0.0203404	-1.06	0.0166747	0.17
t+19	-0.0153484	-0.80	0.0013263	0.01
t+20	-0.0294885	-1.54	-0.0281622	-0.28
t+21	-0.0265025	-1.38	-0.0546647	-0.55
t+22	-0.0200933	-1.05	-0.074758	-0.75
t+23	-0.0082555	-0.43	-0.0830135	-0.84
t+24	-0.0207252	-1.08	-0.1037387	-1.04
t+25	-0.0225353	-1.18	-0.126274	-1.27
t+26	-0.023651	-1.23	-0.149925	-1.51
t+27	-0.0181172	-0.95	-0.1680422	-1.69*
t+28	-0.0202916	-1.06	-0.1883339	-1.90*
t+29	-0.0071993	-0.38	-0.1955332	-1.97*
t+30	-0.0141708	-0.74	-0.209704	-2.11*
t+31	-0.0284912	-1.49	-0.2381951	-2.40*
t+32	-0.0207619	-1.08	-0.2589571	-2.61*
t+33	-0.0233087	-1.22	-0.2822658	-2.84*
t+34	0.0157896	0.82	-0.2664762	-2.68*
t+35	-0.0175418	-0.92	-0.284018	-2.86*
t+36	0.0025033	0.13	-0.2815147	-2.84*

*significant at 5% level

APPENDIX 2

Figure A2.1: Monthly Average Abnormal Fund Flow - All Funds

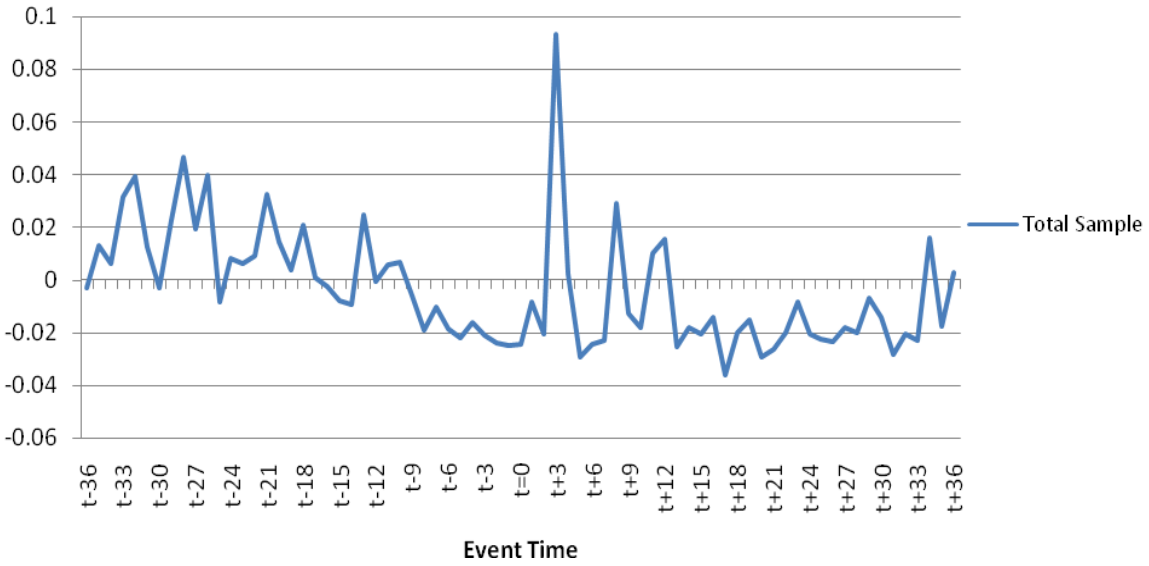


Figure A2.2: Monthly Average Abnormal Fund Flow - Male Managed Funds

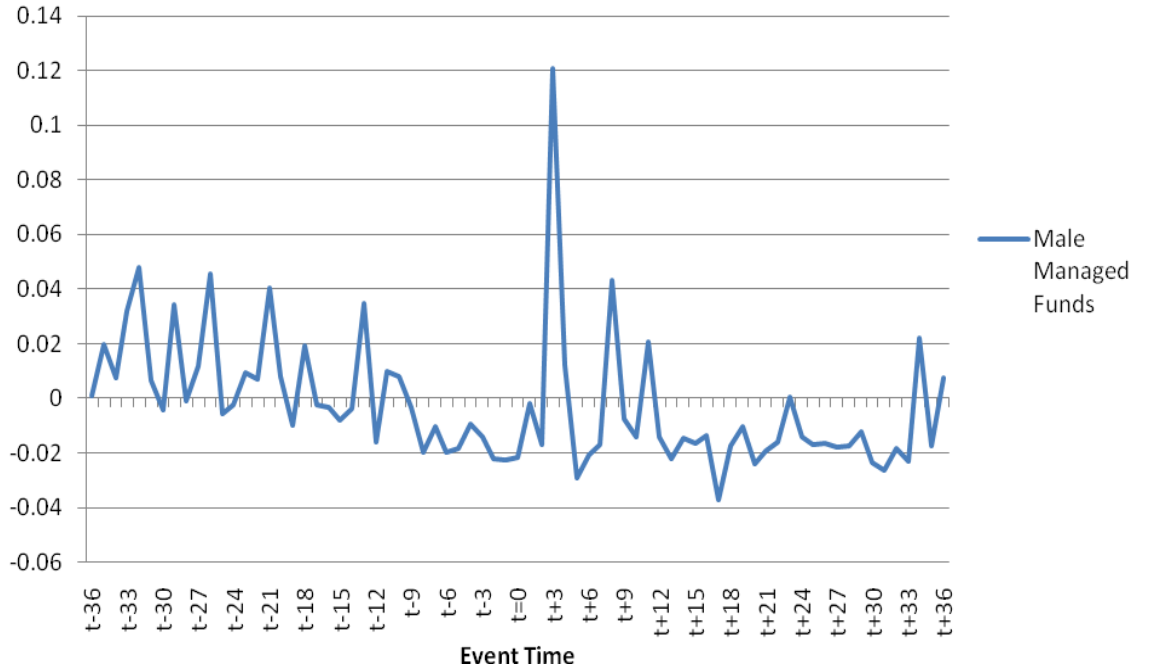
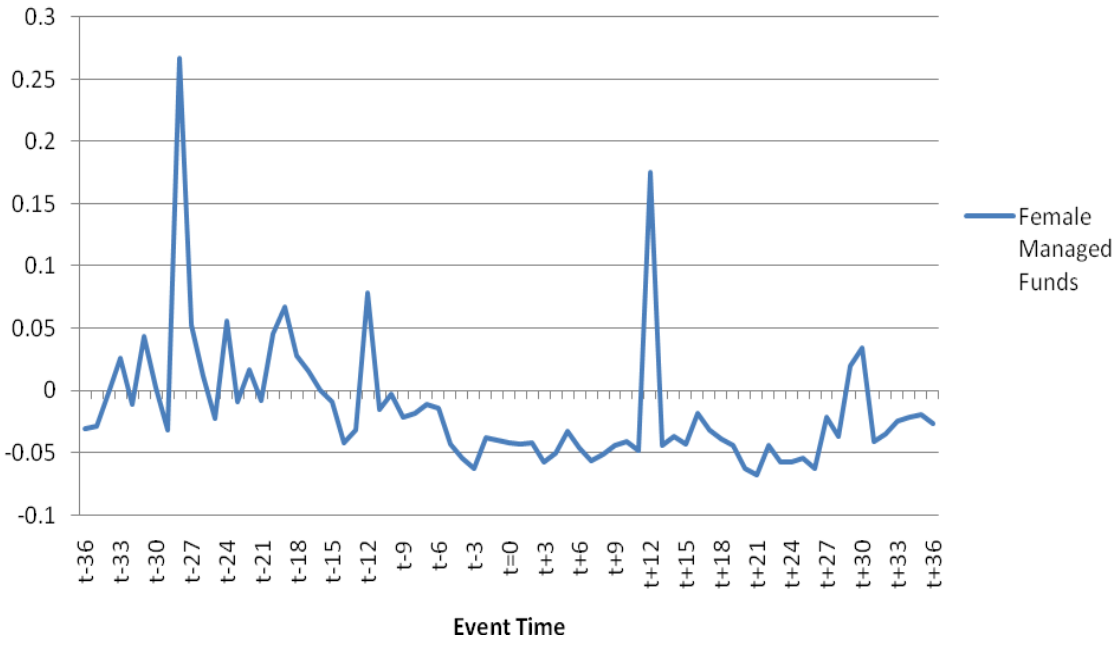


Figure A2.3: Monthly Average Abnormal Fund Flow - Female Managed Funds



APPENDIX 3

Table A3.1 Male Managed Fund Flow AAFs and CAAFs

Event Time	Average Fund Flow	*T-test*	Cumulative Average Fund Flow	*T-test*
t-36	0.00108	0.06	0.00108	0.01
t-35	0.0198104	1.02	0.0208904	0.26
t-34	0.0074204	0.38	0.0283108	0.35
t-33	0.0321266	1.66*	0.0604374	0.75
t-32	0.0482243	2.49*	0.1086617	1.35
t-31	0.0066108	0.34	0.1152725	1.44
t-30	-0.0041033	-0.21	0.1111693	1.39
t-29	0.0342427	1.76*	0.1454119	1.81*
t-28	-0.0010765	-0.06	0.1443354	1.80*
t-27	0.0119057	0.61	0.1562411	1.95*
t-26	0.0457015	2.36*	0.2019426	2.52*
t-25	-0.0053361	-0.27	0.1966066	2.45*
t-24	-0.0023828	-0.12	0.1942237	2.42*
t-23	0.0095138	0.49	0.2037375	2.54*
t-22	0.0072037	0.37	0.2109413	2.63*
t-21	0.0405172	2.09*	0.2514585	3.13*
t-20	0.0079422	0.41	0.2594007	3.23*
t-19	-0.0098392	-0.51	0.2495615	3.11*
t-18	0.019245	0.99	0.2688065	3.35*
t-17	-0.0024886	-0.13	0.2663179	3.32*
t-16	-0.0030781	-0.16	0.2632397	3.28*
t-15	-0.0080306	-0.41	0.2552092	3.18*
t-14	-0.0035801	-0.18	0.251629	3.14*
t-13	0.0346871	1.79*	0.2863162	3.57*
t-12	-0.0160731	-0.83	0.270243	3.37*
t-11	0.0098306	0.51	0.2800737	3.49*
t-10	0.0081598	0.42	0.2882335	3.59*
t-9	-0.0032046	-0.17	0.2850289	3.55*
t-8	-0.0194842	-1.00	0.2655447	3.31*
t-7	-0.0102522	-0.53	0.2552925	3.18*
t-6	-0.0196211	-1.01	0.2356715	2.94*
t-5	-0.0182109	-0.94	0.2174606	2.71*
t-4	-0.0092063	-0.47	0.2082543	2.60*
t-3	-0.0138274	-0.71	0.1944269	2.42*
t-2	-0.0218132	-1.12	0.1726137	2.15*
t-1	-0.0224426	-1.16	0.1501711	1.87*
t=0	-0.0215898	-1.11	0.1285813	1.60
t+1	-0.0019881	-0.10	0.1265932	1.58
t+2	-0.0168138	-0.87	0.1097794	1.37
t+3	0.1208547	6.23*	0.2306341	2.87*
t+4	0.0122551	0.63	0.2428892	3.03*
t+5	-0.0290955	-1.50	0.2137937	2.66*
t+6	-0.020563	-1.06	0.1932307	2.41*
t+7	-0.0167912	-0.87	0.1764394	2.20*
t+8	0.0434575	2.24*	0.219897	2.74*

t+9	-0.0073574	-0.38	0.2125396	2.65*
t+10	-0.0140921	-0.73	0.1984474	2.47*
t+11	0.0206338	1.06	0.2190813	2.73*
t+12	-0.0139078	-0.72	0.2051734	2.56*
t+13	-0.0220979	-1.14*	0.1830756	2.28*
t+14	-0.0147342	-0.76	0.1683413	2.10*
t+15	-0.0165164	-0.85	0.151825	1.89*
t+16	-0.0137688	-0.71	0.1380562	1.72*
t+17	-0.0370588	-1.91	0.1009974	1.26
t+18	-0.0171415	-0.88	0.0838559	1.05
t+19	-0.0103666	-0.53	0.0734893	0.92
t+20	-0.0237169	-1.22	0.0497723	0.62
t+21	-0.0190897	-0.98	0.0306827	0.38
t+22	-0.0157451	-0.81	0.0149376	0.19
t+23	0.0005932	0.03	0.0155308	0.19
t+24	-0.0140551	-0.72	0.0014757	0.02
t+25	-0.0168559	-0.87	-0.0153802	-0.19
t+26	-0.0165662	-0.85	-0.0319464	-0.40
t+27	-0.0176103	-0.91	-0.0495567	-0.62
t+28	-0.0173217	-0.89	-0.0668783	-0.83
t+29	-0.0122262	-0.63	-0.0791045	-0.99
t+30	-0.023615	-1.22	-0.1027195	-1.28
t+31	-0.0261953	-1.35	-0.1289148	-1.61
t+32	-0.0183856	-0.95	-0.1473004	-1.84*
t+33	-0.0231491	-1.19	-0.1704495	-2.12*
t+34	0.0223709	1.15	-0.1480786	-1.85*
t+35	-0.0173197	-0.89	-0.1653983	-2.06*
t+36	0.0077106	0.40	-0.1576877	-1.97*

*significant at 5% level

Table A3.2 Female Managed Fund Flow AAFs and CAAFs

Event Time	Average Fund Flow	*T-test*	Cumulative Average Fund Flow	*T-test*
t-36	-0.0305172	-0.54	-0.0305172	-0.16
t-35	-0.0281842	-0.50	-0.0587015	-0.30
t-34	-0.001117	-0.02	-0.0598185	-0.31
t-33	0.0267884	0.47	-0.0330301	-0.17
t-32	-0.010348	-0.18	-0.0433781	-0.22
t-31	0.0444461	0.78	0.001068	0.01
t-30	0.0030971	0.05	0.0041651	0.02
t-29	-0.030831	-0.54	-0.0266658	-0.14
t-28	0.2673928	4.71*	0.240727	1.24
t-27	0.0535637	0.94	0.2942907	1.51
t-26	0.0123924	0.22	0.3066831	1.58
t-25	-0.0220407	-0.39	0.2846424	1.46
t-24	0.0561353	0.99	0.3407777	1.75*
t-23	-0.008296	-0.15	0.3324818	1.71*
t-22	0.0171532	0.30	0.349635	1.80*
t-21	-0.007651	-0.13	0.3419839	1.76*
t-20	0.0463572	0.82	0.3883411	2.00*
t-19	0.067696	1.19	0.4560371	2.34*
t-18	0.0288973	0.51	0.4849344	2.49*
t-17	0.0163401	0.29	0.5012745	2.58*
t-16	0.0008981	0.02	0.5021726	2.58*
t-15	-0.0088699	-0.16	0.4933028	2.53*
t-14	-0.0415259	-0.73	0.4517769	2.32*
t-13	-0.0307786	-0.54	0.4209982	2.16*
t-12	0.0788304	1.39	0.4998286	2.57*
t-11	-0.0147258	-0.26	0.4851028	2.49*
t-10	-0.0019194	-0.03	0.4831834	2.48*
t-9	-0.0212477	-0.37	0.4619357	2.37*
t-8	-0.018046	-0.32	0.4438897	2.28*
t-7	-0.0101496	-0.18	0.4337401	2.23*
t-6	-0.0134936	-0.24	0.4202465	2.16*
t-5	-0.0428392	-0.75	0.3774073	1.94*
t-4	-0.0535756	-0.94	0.3238317	1.66*
t-3	-0.0616746	-1.09	0.2621571	1.35
t-2	-0.0374422	-0.66	0.2247149	1.15
t-1	-0.0397452	-0.70	0.1849697	0.95
t=0	-0.041548	-0.73	0.1434217	0.74
t+1	-0.0426198	-0.75	0.1008018	0.52
t+2	-0.041442	-0.73	0.0593598	0.31
t+3	-0.0564963	-1.00	0.0028635	0.01
t+4	-0.0501155	-0.88	-0.047252	-0.24
t+5	-0.0323929	-0.57	-0.0796449	-0.41
t+6	-0.0453526	-0.80	-0.1249975	-0.64
t+7	-0.0560154	-0.99	-0.181013	-0.93
t+8	-0.0504282	-0.89	-0.2314412	-1.19
t+9	-0.0439446	-0.77	-0.2753858	-1.42

t+10	-0.0410069	-0.72	-0.3163927	-1.63
t+11	-0.0475137	-0.84	-0.3639064	-1.87*
t+12	0.1754898	3.09*	-0.1884166	-0.97
t+13	-0.0436364	-0.77	-0.232053	-1.19
t+14	-0.0365703	-0.64	-0.2686233	-1.38
t+15	-0.0426584	-0.75	-0.3112817	-1.60
t+16	-0.0174705	-0.31	-0.3287521	-1.69*
t+17	-0.0313866	-0.55	-0.3601387	-1.85*
t+18	-0.0387342	-0.68	-0.3988729	-2.05*
t+19	-0.0434598	-0.77	-0.4423327	-2.27*
t+20	-0.0618508	-1.09	-0.5041835	-2.59*
t+21	-0.0672733	-1.19	-0.5714567	-2.94*
t+22	-0.0440083	-0.78	-0.615465	-3.16*
t+23	-0.0569231	-1.00	-0.6723881	-3.46*
t+24	-0.0571724	-1.01	-0.7295605	-3.75*
t+25	-0.0535696	-0.94	-0.7831301	-4.02*
t+26	-0.0623648	-1.10	-0.8454949	-4.34*
t+27	-0.020887	-0.37	-0.8663819	-4.45*
t+28	-0.0365204	-0.64	-0.9029023	-4.64*
t+29	0.0200894	0.35	-0.8828129	-4.54*
t+30	0.0347366	0.61	-0.8480763	-4.36*
t+31	-0.0406507	-0.72	-0.8887269	-4.57*
t+32	-0.0348218	-0.61	-0.9235487	-4.75*
t+33	-0.0242135	-0.43	-0.9477622	-4.87*
t+34	-0.0206818	-0.36	-0.968444	-4.98*
t+35	-0.0187541	-0.33	-0.9871981	-5.07*
t+36	-0.0259197	-0.46	-1.0131178	-5.21*

*significant at 5% level

APPENDIX 4

Test in Difference of Means for Male and Female Managed Funds	
T-Statistic	5.191*
P-Value	0.000

*Significant at 5% significance level

REFERENCES

Agarwal, V. Daniel, N. D. and Naik, N. Y. (2004), Flows, Performance, and Managerial Incentives in Hedge Funds, George State University Working Paper.

Arshanapalli, B., Coggin, T., Douskas, D. and Shea, H. (1998), The dimensions of international equity style, *Journal of Investing*, Vol. 7, pp. 15-30.

Atkinson, S.M., Baird, S.B., Frye, M.B. (2003), "Do female mutual fund managers manage differently?", *Journal of Financial Research*, Vol. 26 (1), pp.1-18.

Baltagi, B., (2001), *Econometric Analysis of Panel Data*, 2nd Edition, John Willey &Sons, England.

Barber, B.M., Odean, T. and Zheng, L. (2005), Out of Sight, Out of Mind: The Effects of Expenses on Mutual Fund Flows, *Journal of Business*, Vol. 78 (6), pp.2095-2120

Berk, J.B. and Tonks, I. (2007), Return persistence and fund flows in the worst performing mutual funds, *NBER Working Paper*, No. W13042.

Brooks, C. (2008), Introductory Econometrics for Finance, 2nd Edition, Cambridge University Press.

Brown, S., and Warner, J. (1985), Using daily stock returns: The case of event studies, *Journal of Financial Economics*, Vol.14, pp.3-31.

Chen, J., H. H., Huang, M. and Kubik, J. D. (2004), Does fund size erode mutual fund performance? The Role of Liquidity and Organization, *American Economic Review*, Vol. 94, pp. 1276-1302.

Chevalier, J. and Ellison, G. (1997), Risk taking by mutual funds as a response to incentives, *Journal of Political Economy*, Vol. 105, pp.1167-1200.

Chevalier, J. and Ellison, G. (1999), Are some mutual fund managers better than others? Cross-sectional patterns in behaviour and performance, *Journal of Finance* Vol. 54 (3), pp. 875-899.

Cooper, M.J., Gulen, H. and Rau, P. R. (2004), Changing names with style: Mutual fund name changes and their effects on fund flows, *Journal of Finance*, Vol. 60 pp. 2825-2858.

Dahlquist, M., S. Engstrom, and P. Soderlind, (2000), Performance and characteristics of Swedish mutual funds, *Journal of Financial and Quantitative Analysis*, 35, 3: 409-423.

Frazzini, A. and Lamont, O. A. (2008), Dumb Money: Mutual Fund Flows and the cross-section of stock returns, *Journal of Financial Economics*, Vol. 88 (2), pp. 299-322.

Friesen, G. C. and Sapp, T. , Mutual Fund Flows and Investor Returns: An Empirical Examination of Fund Investor Timing Ability, *Journal of Banking and Finance*, Forthcoming.

Gallagher, D. and Martin, K. (2005), Size and Investment Performance: A Research Note, *Abacus*, Vol. 41 (1), pp. 55-65.

Goetzmann, W. and Peles, N. (1997), Cognitive dissonance and mutual fund investors, *Journal of Financial Research*, Vol. 20, pp. 145-158.

Green, J. T. and Hodges, C. W. (2001), The dilution impact of daily fund flows on open-end mutual funds, *Journal of Financial Economics*, Vol. 65(1), pp. 131-158.

Grinblatt, M., and Titman, S. (1994), A study of monthly mutual fund returns and performance evaluation techniques, *Journal of Financial and Quantitative Analysis*, Vol. 29, pp. 419-444.

Gruber, M., (1996), Another puzzle: The growth of actively managed mutual funds, *Journal of Finance*, Vol. 51, pp. 783-810.

Hendricks, D., Patel, J. and Zeckhauser, R. (1993), Hot hands in mutual funds: short run persistence of relative performance 1974-1988, *Journal of Finance*, Vol. 48, pp. 93-130.

Huang, J., Wei, K.D. and Yan, H. (2007), Participation Costs and the Sensitivity of Fund Flows to Past Performance, *Journal of Finance*, Vol. 62 (3), pp. 1273-1311.

Ippolito R., (1992), Consumer reaction to measures of poor quality: Evidence from the mutual fund industry", *Journal of Law and Economics*, Vol. 35, pp. 45-70.

Jain, P.C., and Wu, J. S. (2000), Truth in mutual fund advertising: Evidence on future performance and fund flows, *Journal of Finance*, Vol. 55, pp. 937-958.

Kempf, A. and Ruenzi, S. (2008), Family Matters: The Performance Flow Relationship in the Mutual Fund Industry, *Journal of Business Finance and Accounting*, Vol. 35 (1) & (2), pp. 177–199.

Keswani, A. and Stolin, D. (2006), Mutual fund performance persistence and competition: A cross-sector analysis, *Journal of Financial Research*, Vol. 29(3), p.349-366.

Khorana, A. and Servaes, H. (1999), The Determinants of Mutual Fund Starts, *Review of Financial Studies*, Vol. 12, pp. 1043-1974.

Sharpe, W.F. (1992), Asset Allocation: Management Style and Performance Measurement, *Journal of Portfolio Management*, Vol.18 (2), pp. 7-19.

Sharpe, W.F. (1998), Morningstar Performance Measures, *Financial Analysts Journal*, July/August, pp. 21-33.

Sirri, E. and Tufano, P. (1993), Buying and selling mutual funds: Flows, performance, fees, and Services, Harvard Business School.

Sirri, E. and Tufano, P. (1998), Costly search and mutual fund flows, *Journal of Finance*, Vol. 53, pp. 1589-1622.

Smith, K. (1978), Is Fund Growth related to Fund Performance?, *Journal of Portfolio Management*, Vol. 5, pp. 49-54.

Spitz, A. E. (1970), Mutual Fund Performance and Cash Inflows, *Applied Economics*, Vol. 2, pp. 141-145.

Warther, V.A. (1995), Aggregate Mutual Fund Flows and Security Returns, *Journal of Financial Economics*, Vol. 39, pp. 209-35.

Wermers, R. (2003), Is Money Really "Smart"? New Evidence on the Relation between Mutual Fund Flows, Manager Behaviour, and Performance Persistence, University of Maryland.

Zheng, L., (1999), Is Money Smart? A study of mutual fund investors' fund selection ability, *Journal of Finance*, Vol. 54, pp. 901-933.

CONCLUDING REMARKS AND POTENTIAL EXTENSIONS OF THE THESIS

The three chapters of this thesis have distinctively shown that performance is, if not most important then, one of the most crucial factors in asset management. Past studies have shown that investors base their investment decisions on past performance and for this reason it is imperative to examine various trading strategies and factors that influence and determine good performance.

Using a multinomial ordered logit model in the first chapter, which to the best of our knowledge is the first research that uses a multinomial logit model for this question in the UK equity market, we demonstrate ways in which an investor can enhance the performance of the portfolio using style rotation strategies. We compare the profitability of the ordered logit model to momentum style rotation between four different market segments: FTSE Small-Cap, FTSE Large-Cap, FTSE Value 350 and FTSE Growth 350 Indices, from February 1987 to April 2006. In the case of the ordered logit model, we applied macroeconomic, market and fundamental variables and the findings for the out-of-sample tests suggest that the active multi-style rotation strategies can be developed in order to outperform the best performing buy-and-hold strategy even when accounting for transaction costs. In fact, our trading strategies are profitable at transaction cost levels up to 15 bps and 30bps. The results from our out-of-sample forecasts (February 1997 to April 2006) indicate that forecasting the best performing index with accuracy of 33%, was found to be sufficient to outperform the buy-and-hold strategies.

Nevertheless, our results indicate that applying momentum based style rotation strategies achieve higher Sharpe ratios and even higher end-of-period wealth than the strategies based on the ordered logit model. Furthermore, the momentum-based strategies are profitable at transaction costs ranging from 13 basis points to 257 basis points, which is significantly higher than the multinomial ordered logit model. For future research it would be intriguing to examine and test whether our quantitative and momentum based strategies remain profitable during the turbulent market conditions of 2007 and 2008, and possibly the extent of the impact that the financial crisis has on our strategies.

Sharpe (1992) showed that portfolio performance is driven mainly by the portfolio's asset allocation and that fund managers should classify equities into asset classes according to style and size. Therefore, the appropriate style classification will enable investors to experience benefits of diversification. This implies that in order to achieve a good portfolio performance the portfolio or fund manager essentially needs to have adequate skill to be able to successfully categorize the portfolio across a number of major asset classes. In the second chapter we test whether it is indeed the fund manager that determines the performance of a fund. In particular, we construct a unique database of 258 UK fund manager changes, from April 2002 to December 2005, which inevitably delivered a few data problems. In particular, many of the funds that had a manager change from our initial database had to be excluded as they were terminated after the change or the fund manager was in charge of the fund less than a year before s/he was replaced. A further limitation was the fact that there were only five value funds in our data sample, which indicates that the results for this particular group are not representative. Subsequently, we use an event study methodology in order to examine the trend of the mutual funds' performance three years before and after the change in manager. We also categorised the funds in order to assess whether the change in manager is particularly pronounced in female or male managed funds, emerging or developed market funds, UK or international funds, bond or equity funds, and small-capitalization, value or growth funds. Furthermore, we test whether the top and bottom performing funds of the pre-event period (i.e. three years before the change in fund manager), persist in their respective performance once a new fund manager takes over. Using three different methodologies: (i) benchmark-adjusted model, (ii) mean-adjusted model and (iii) information ratio, our findings suggest that the funds performed poorly before the change and the performance of the funds broadly improves up to a year following the manager change. Therefore, on average the replacement of the fund managers was most likely a result of underperformance. Nonetheless, in the second and third year following fund managers' change, the performance deteriorates which we believe is the result of the 2007 and 2008 downturn of the financial markets. It would be interesting to have been able to examine the performance of these funds without the influence of the 2007 and 2008 market disturbances. Nonetheless, potential for further research and extension of the chapter remains. In particular, fund manager changes are continuously being updated and added to our database, which will allow us to examine the performance of these funds over different and longer periods.

Our results further suggest that female fund managers exhibited a more volatile performance in comparison to the male managers and the performance of the previously female managed funds improves more on average in the post-change period. We also find that for the majority of the categories of funds the improvement of the performance in the post event period lasts for duration of about eighteen months after a new fund manager takes over. Finally, our findings indicate that the past top ten percent of funds, or 'winners', do not persist in their performance after the change in fund manager, while the bottom ten percent of funds continue to underperform when a new fund manager takes over. Although this chapter focuses on one of the main aspects of asset management, that is performance, it would be interesting to investigate the shifts in style of these mutual funds. In particular, determining whether the mutual funds change an investment style once a new fund manager takes over would be worthy to address. A shift in investment style after a new fund manager takes over may expose the investors to higher levels of style risk which would reduce the benefits of style diversification.

The final chapter of this thesis studies the extent to which the level of fund flows change when a new fund manager takes over, and whether it is in fact the fund flows that lead to a manager being replaced. By studying the trend of the UK mutual fund flows from April 2002 to December 2006, we are able to indirectly study the behaviour of investors and fund manager asset allocation decisions, which ultimately, affect the fund performance. We used an event study methodology and an unbalanced panel analysis to determine the relationship between the change in fund manager and fund flows. Furthermore, we further test if gender of the fund manager, the market in which the fund invests (emerging or developed market) and the type of fund by asset class (bond or equity) shape the trend of fund flows throughout the estimation period. As argued by various literature, we further analyze whether investors base their investment decisions on prior performance by ranking the funds before fund manager replacement according to their information ratios and examining the level of fund flow after fund manager replacement. It is important to note the limitation that out of the initial 258 funds, some were excluded from our study as the data on fund size provided by Lipper did not cover the manager change. More specifically, the monthly fund size provided for these funds was either before the manager change or after the manager change, leaving a final sample of 207 funds.

Our results indicate that the level of fund flows broadly deteriorate a year before the change in fund manager, which provides us with a possible reason for the replacement of the fund manager. In fact, the returns of these funds were at their lowest during this period, which may have caused the decline in fund flows and hence led to the replacement in fund manager. However, once the new fund manager takes over the funds continue to experience a withdrawal of flow, which we believe is highly influenced by the financial crisis of 2007 and 2008. Furthermore, our findings in the event study is concurred by the empirical model, unbalanced panel least squares, results. We show that there is a positive twelve month lagged relationship between performance and fund flow, whereas the relationship becomes negative over longer period horizons. However, our results indicate no significant relationship between the fund flows and the gender of the fund manager, the market in which the fund invests or the type of the fund. Sharpe (1998) documents that Morningstar's risk-adjusted ratings influence the investors' decisions and it would be interesting to further test this relationship on our data sample to validate whether the flow of funds is affected by their ratings. Furthermore, expenses, load fees and participation costs are worth exploring as they could be other factors that add to the sensitivity of fund flow movements (Sirri and Tufano (1998), Barber et al. (2005), Huang et al. (2007) and Gruber (1996)).