Durham University

Durham E-Theses

Shareholders' wealth effects of corporate takeovers in the UK

Huainan Zhao

How to cite:

Zhao, Huainan (2002) Shareholders' wealth effects of corporate takeovers in the UK. Doctoral thesis, Durham University.

Use policy

The full-text may be used and/or reproduced, and given to third parties in any format or medium, without prior permission or charge, for personal research or study, educational, or not-for-profit purposes provided that:

- a full bibliographic reference is made to the original source
- a https://etheses.durham.ac.uk/id/eprint/1063/ is made to the metadata record in Durham E-Theses
- the full-text is not changed in any way

The full-text must not be sold in any format or medium without the formal permission of the copyright holders.

Please consult the full Durham E-Theses policy for further details.

Academic Support Office, The Palatine Centre, Durham University, Stockton Road, Durham, DH1 3LE
e-mail: e-theses.admin@durham.ac.uk Tel: +44 0191 334 6107
https://etheses.durham.ac.uk

University of Durham
Department of Economics & Finance

Shareholders' Wealth Effects of Corporate Takeovers in the UK

By Huainan Zhao

Principle Supervisor: Prof. A. Antoniou/Prof. K. Paudyal

Submitted for the Degree of Doctor of Philosophy in Finance

1 4 APR 2003

September 2002

The copyright of this thesis rests with the author.
No quotation from it should be published without his prior written consent and information derived from it should be acknowledged.

To Xiaorong

Shareholders' Wealth Effects of Corporate Takeovers in the UK

By Huainan Zhao

Abstract

This thesis investigates many issues regarding the financial performance of corporate takeovers. *Firstly*, we test the validity of the control firms approach (advanced by Barber and Lyon 1997) in the countries such as UK where the listed firms have various accounting year endings through examining target and bidding firms' long-run stock returns both before and after takeovers. We find that the differences of the accounting year endings of UK firms do not significantly affect the validity of Barber and Lyon's control firms approach. *Secondly*, we investigate the long-run post acquisition underperformance puzzle, test the impact of overlapping returns to the conventional t-statistics, and also examine the effect of takeover premiums, methods of payment to the shareholders' long-run stock returns. We do not find any statistically significant three-year post acquisition abnormal stock returns for the UK bidding firms in the 1990s, which is consistent with the EMH. We do find that overlapping returns inflate the test statistics through inflating the long-run post acquisition average stock returns. Furthermore, we find an optimal premium region for the bidding firms and reject the overpricing explanation to the post acquisition underperformance puzzle. Moreover, we report that stock offer underperforms the other three methods of payment in two years after the takeover. *Finally*, we test the monitoring role of institutional funds through a new framework of corporate takeover by examining and comparing bidding firms' (with large level of institutional funds ownership or with low or without this ownership) three-year pre- and post takeover stock returns. We do not find any evidence in supporting the monitoring role of institutional funds both in three years pre- and post acquisition period, and even some evidence against it has been detected. Put together, we cast our doubt on the monitoring role of institutional funds to the firms in which they hold large stakes.

The material contained in this thesis has not been previously submitted for a degree in this or any other University.

The copyright of this thesis rests with the author. No quotation from it should be published without his prior consent and information derived from it should be acknowledged.

Acknowledgements

Many people have contributed to the development of this thesis.

First of all, I would like to express my deepest gratitude to my supervisors, Professor Antonios Antoniou and Professor Krishna Paudyal. They have consistently supported me in various ways over the last two years. Firstly, and the most important, they have helped me to open the door of *Finance* research, and guided me through a short and linear way. Their guidance has greatly influenced and shaped my understanding of *Finance*. I have learned a lot from them. Secondly, they have offered me many insight comments and suggestions in each of our research meetings, and this thesis has been improved in a great deal by incorporating their intellectual advices. In a word, I am deeply indebted to Prof. Antoniou and Prof. Paudyal, without them, this work would not have been possible.

I am also very grateful to Prof. Phil Holmes, Dr. Gioia Pescetto, and all the other faculty of the Department of Economics and Finance at the University of Durham for their strong support.

A special thanks goes to my wife, *Xiaorong*, for her encouragement and understanding through difficult times and for her patience and effort required to produce this thesis. Her strong support has sustained me throughout periods of frustration and anxiety, and enables me to do this work.

Finally, I want to thank my parents, who a long time ago put me on the path that led me to the completion of this thesis.

Huainan Zhao

September 2002

TABLE OF CONTENTS

LIST OF TABLES..... 1
LIST OF FIGURES..... 5

CHAPTER 1: INTRODUCTION..... 7

CHAPTER 2: LITERATURE REVIEW..... 19
2.1. Merger and Acquisition Theories..... 19
2.1.1. Definition..... 19
2.1.2. Mode of Acquisitions..... 20
2.2. Motives for Takeovers..... 21
2.2.1. Value Maximization..... 21
2.2.1.1. Financial Motivation..... 21
2.2.1.2. Synergy..... 22
2.2.1.3. Information..... 23
2.2.1.4. Competitions in Corporation Control..... 24
2.2.2. Non-value Maximization..... 25
2.2.2.1. Agency Motive - Size Maximization..... 26
2.2.3. Summary..... 27
2.3. The Efficient Capital Market Hypothesis with respect to Information on Acquisitions..... 28
2.3.1. Definition..... 28
2.3.2. Studies Review..... 29
2.4. The Competitive Acquisition Market Hypothesis..... 30
2.4.1. Definition..... 30
2.4.2. Studies Review..... 30
2.5. Method of Payment..... 32
2.5.1. Definition..... 32
2.5.2. Studies Review..... 36
2.6. Size Effect..... 39
2.6.1. Definition..... 39
2.6.2. Studies Review..... 39
2.7. Main Steps in the Studies of Takeover Returns..... 41
2.7.1. Early Studies (pre-1974)..... 41
2.7.2. Studies in 1970s (post-1974)..... 42
2.7.3. Studies in 1980s..... 48
2.7.4. Studies in 1990s..... 63
2.8. The Wealth Effects of Takeover Activities throughout the Entire Acquisition Process..... 70
2.8.1. Shareholder Returns in Pre-Announcement Period..... 70
2.8.1.1. Target Firm Shareholder Returns..... 70
2.8.1.2. Bidding Firm Shareholder Returns..... 72

2.8.1.3. Summary..... 73
2.8.2. Shareholder Returns in the Announcement Period of the Bid..... 74
2.8.2.1. Target Firm Shareholder Returns..... 74
2.8.2.2. Bidding Firm Shareholder Returns..... 76
2.8.2.3. Summary..... 78
2.8.3. Shareholder Returns Between the Announcement Date and the Outcome Date..... 79
2.8.3.1. Target Firm Shareholder Returns..... 79
2.8.3.2. Bidding Firm Shareholder Returns..... 80
2.8.3.3. Summary..... 81
2.8.4 Shareholder Returns in the Outcome Date of Acquisitions..... 81
2.8.4.1 Target Firm Shareholder Returns..... 81
2.8.4.2. Bidding Firm Shareholder Returns..... 82
2.8.4.3. Summary..... 83
2.8.5. Shareholder Returns in the Post-Acquisition Period..... 83
2.8.5.1. Unsuccessful Target Firm Shareholder Returns..... 83
2.8.5.2. Bidding Firm Shareholder Returns..... 84
2.8.5.3. Summary..... 87
2.9. Review of Methodologies..... 89
2.9.1. Pre-FHT Period..... 89
2.9.1.1. Market Model..... 89
2.9.1.2. Other Models..... 91
2.9.2. Post-FHT Period..... 91
2.9.2.1. Fama-French Three-Factor Model..... 91
2.9.2.2. Size and Book-to-Market Adjusted Method..... 93
2.9.2.3. Other Models..... 94
2.10. Conclusion..... 95

CHAPTER 3: METHODOLOGIES..... 96
3.1. Introduction..... 96
3.2. Control Firms Approach..... 99
3.3. The Fama-French Three-Factor Model..... 101
3.4. The Test Statistics..... 102
3.4.1. Conventional Parametric Student t-test..... 102
3.4.2. Nonparametric Wilcoxon Signed-Rank test..... 103
3.5. Conclusion..... 104

CHAPTER 4: TESTING THE VALIDITY OF THE CONTROL FIRMS APPROACH UNDER VARIOUS ACCOUNTING YEAR ENDINGS: THE UK EVIDENCE..... 105
4.1. Introduction..... 105
4.2. Methodology..... 108
4.2.1. Control Firms Approach under December-June Model..... 108
4.2.2. Control Firms Approach under Various-Year-Ending Model..... 108

4.3. Data and Sample Construction..... 110
4.4. Empirical Results..... 118
4.4.1. Target Firms Three Years Pre-Acquisition Stock Returns..... 118
4.4.2. Bidding Firms Three Years Pre-Acquisition Stock Returns..... 129
4.4.3. Bidding Firms Three Years Post Acquisition Stock Returns..... 141
4.5. Conclusion..... 155

CHAPTER 5: LONG-RUN POST ACQUISITION STOCK RETURNS: THE IMPACT OF OVERLAPPING RETURNS, TAKEOVER PREMIUMS, AND METHODS OF PAYMENT..... 157
5.1. Introduction..... 157
5.1.1. Previous Evidence..... 158
5.1.2. The Overpricing Interpretation..... 162
5.1.3. The Methodological Errors Interpretation..... 163
5.1.4. Methods of Payment..... 164
5.1.5. The Effect of Overlapping Returns..... 165
5.1.6. Summary..... 167
5.2. Methodology..... 168
5.3. Data and Sample Construction..... 170
5.4. Empirical Results..... 175
5.4.1. Long-run Post Acquisition Stock Returns and the Impact of Overlapping Returns..... 175
5.4.2. The Impact of Takeover Premiums to the Long-run Post Acquisition Stock Returns..... 190
5.4.3. The Impact of the Method of Payment to the Long-run Post Acquisition Stock Returns..... 199
5.5. Conclusion..... 207

CHAPTER 6: EXAMING THE MONITORING ROLE OF INSTITUTIONAL FUNDS THROUGH LONG-RUN STOCK RETURNS OF CORPORATE TAKEOVERS: THE UK EVIDENCE..... 209
6.1. Introduction..... 209
6.1.1. Active Monitoring Hypothesis and the Evidence..... 210
6.1.2. Passive Voting Hypothesis and the Evidence..... 212
6.1.3. Summary..... 215
6.2. Methodology..... 216
6.3. Data and Sample Construction..... 217
6.4. Empirical Results..... 224
6.4.1. Do Institutional Funds Monitor Firms in the Pre-Acquisition Period?.. 224
6.4.1.1. Bidding Firms Long-run Pre-Acquisition Stock Returns..... 224
6.4.1.2. Long-run Pre-Acquisition Stock Returns of Bidding Firms with Large Level of Institutional Ownership vs. Bidding Firms with Low or without Institutional Ownership..... 226
6.4.2. Do Institutional Funds Monitor Firms in the Post Acquisition Period?. 247

6.4.2.1. Bidding Firms Long-run Post Acquisition Stock Returns..... 247
6.4.2.2. Long-run Post Acquisition Stock Returns of Bidding Firms with Large Level of Institutional Ownership vs. Bidding Firms with Low or without Institutional Ownership..... 248
6.5. Conclusion..... 268

CHAPTER 7: CONCLUSIONS AND SUGGESTIONS FOR FUTURE RESEARCH..... 270
7.1. Conclusions..... 271
7.2. Suggestions for Future Research..... 275

BIBLIOGRAPHY..... 277

APPENDIX 1. Long-Run Post Acquisition Stock Returns and the Impact of Overlapping Returns: A Sub-Sample (1995-1998)..... 291

APPENDIX 2. Bidding Firms (1997-2001) Long-Run Pre-Acquisition Stock Returns..... 305

APPENDIX 3. Bidding Firms (1994-1998) Long-Run Post Acquisition Stock Returns..... 315

LIST OF TABLES

Table 4.1 Matching firms in 1991-2000..... 112
Table 4.2 UK firms accounting year ending statistics: 1991-2000..... 116
Table 4.3 Target firms (with an accounting year ending at March) three-year pre-takeover abnormal returns and CARs..... 119
Table 4.4 Target firms (with an accounting year ending at March) three-year pre-takeover CARs 120
Table 4.5 Target firms (with an accounting year ending at March) three-year pre-takeover BHARs..... 122
Table 4.6 Target firms (with an accounting year ending at June) three-year pre-takeover abnormal returns and CARs..... 123
Table 4.7 Target firms (with an accounting year ending at June) three-year pre-takeover CARs..... 124
Table 4.8 Target firms (with an accounting year ending at June) three-year pre-takeover BHARs..... 125
Table 4.9 Target firms (with an accounting year ending at Sept) three-year pre-takeover abnormal returns and CARs..... 126
Table 4.10 Target firms (with an accounting year ending at Sept) three-year pre-takeover CARs..... 128
Table 4.11 Target firms (with an accounting year ending at Sept) three-year pre-takeover BHARs..... 129
Table 4.12 Bidding firms (with an accounting year ending at March) three-year pre-takeover abnormal returns and CARs..... 130
Table 4.13 Bidding firms (with an accounting year ending at March) three-year pre-takeover CARs..... 132
Table 4.14 Bidding firms (with an accounting year ending at March) three-year pre-takeover BHARs..... 133
Table 4.15 Bidding firms (with an accounting year ending at June) three-year pre-takeover abnormal returns and CARs..... 134
Table 4.16 Bidding firms (with an accounting year ending at June) three-year pre-takeover CARs..... 135
Table 4.17 Bidding firms (with an accounting year ending at June) three-year pre-takeover BHARs..... 136
Table 4.18 Bidding firms (with an accounting year ending at Sept) three-year pre-takeover abnormal returns and CARs..... 137
Table 4.19 Bidding firms (with an accounting year ending at Sept) three-year pre-takeover CARs..... 139
Table 4.20 Bidding firms (with an accounting year ending at Sept) three-year pre-takeover BHARs..... 140
Table 4.21 Bidding firms (with an accounting year ending at March) three-year post takeover abnormal returns and CARs..... 141
Table 4.22 Bidding firms (with an accounting year ending at March) three-year post takeover CARs..... 143
Table 4.23 Bidding firms (with an accounting year ending at March) three-year post takeover BHARs..... 144
Table 4.24 Bidding firms (with an accounting year ending at June) three-year post takeover abnormal returns and CARs..... 145
Table 4.25 Bidding firms (with an accounting year ending at June) three-year post takeover CARs..... 147
Table 4.26 Bidding firms (with an accounting year ending at June) three-year post takeover

BHARs..... 148
Table 4.27 Bidding firms (with an accounting year ending at Sept) three-year post takeover abnormal returns and CARs..... 149
Table 4.28 Bidding firms (with an accounting year ending at Sept) three-year post takeover CARs..... 151
Table 4.29 Bidding firms (with an accounting year ending at Sept) three-year post takeover BHARs..... 152
Table 4.30 The mean and standard deviation of the first differences of the B/M ratios between sample firms and control firms under different two models..... 153

Table 5.1 Matching firms in 1991-1998..... 172
Table 5.2 Bidding firms (1991-1998) three years post acquisition average ARs and CARs ... 175
Table 5.3 Bidding firms (1991-1998) three years post acquisition average CARs and BHARs..... 178
Table 5.4 Non-overlapping bidding firms (1991-1998) three years post acquisition average ARs and CARs..... 180
Table 5.5 Non-overlapping bidding firms (1991-1998) three years post acquisition average CARs and BHARs..... 182
Table 5.6 Overlapping bidding firms (1991-1998) three years post acquisition average ARs and CARs..... 184
Table 5.7 Overlapping bidding firms (1991-1998) three years post acquisition average CARs and BHARs..... 186
Table 5.8 Bidding firms (1995-1998) three-year post acquisition average CARs, according to the one-month takeover premiums..... 190
Table 5.9 Bidding firms (1995-1998) three-year post acquisition average CARs and BHARs, according to the one-month takeover premiums..... 192
Table 5.10 Non-overlapping bidding firms (1995-1998) three-year post acquisition average CARs, according to the one-month takeover premiums..... 194
Table 5.11 Non-overlapping bidding firms (1995-1998) three-year post acquisition average CARs and BHARs, according to the one-month takeover premiums..... 196
Table 5.12 Bidding firms (1991-1998) three-year post acquisition average CARs, according to the method of payment..... 199
Table 5.13 Bidding firms (1991-1998) three-year post acquisition average CARs and BHARs, according to the method of payment..... 201
Table 5.14 Non-overlapping bidding firms (1991-1998) three-year post acquisition average CARs, according to the method of payment..... 202
Table 5.15 Non-overlapping bidding firm (1991-1998) three-year post acquisition average CARs and BHARs, according to the method of payment..... 204

Table 6.1 Matching firms in 1994-2001..... 222
Table 6.2 Bidding firms (1997-2001, held>=3% by institutional funds) three years pre-acquisition average ARs and CARs..... 226
Table 6.3 Bidding firms (1997-2001, held>=3% by institutional funds) three years pre-acquisition average CARs and BHARs..... 228
Table 6.4 Bidding firms (1997-2001, held<3% by institutional funds) three years pre-acquisition average ARs and CARs..... 229
Table 6.5 Bidding firms (1997-2001, held<3% by institutional funds) three years pre-acquisition average CARs and BHARs 231
Table 6.6 Non-overlapping bidding firms (1997-2001, held>=3% by institutional funds) three years pre-acquisition average ARs and CARs 233
Table 6.7 Non-overlapping bidding firms (1997-2001, held>=3% by institutional funds) three years pre-acquisition average CARs and BHARs..... 235
Table 6.8 Non-overlapping bidding firms (1997-2001, held<3% by institutional funds)

three years pre-acquisition average ARs and CARs..... 236
Table 6.9 Non-overlapping bidding firms (1997-2001, held<3% by institutional funds) three years pre-acquisition average CARs and BHARs..... 237
Table 6.10 Overlapping bidding firms (1997-2001, held>=3% by institutional funds) three years pre-acquisition average ARs and CARs..... 240
Table 6.11 Overlapping bidding firms (1997-2001, held>=3% by institutional funds) three years pre-acquisition average CARs and BHARs..... 241
Table 6.12 Overlapping bidding firms (1997-2001, held<3% by institutional funds) three years pre-acquisition average ARs and CARs..... 242
Table 6.13 Overlapping bidding firms (1997-2001, held<3% by institutional funds) three years pre-acquisition average CARs and BHARs..... 244
Table 6.14 Bidding firms (1994-1998, held>=3% by institutional funds) three years post acquisition average ARs and CARs..... 248
Table 6.15 Bidding firms (1994-1998, held>=3% by institutional funds) three years post acquisition average CARs and BHARs..... 250
Table 6.16 Bidding firms (1994-1998, held <3% by institutional funds) three years post acquisition average ARs and CARs..... 251
Table 6.17 Bidding firms (1994-1998, held<3% by institutional funds) three years post acquisition average CARs and BHARs..... 253
Table 6.18 Non-overlapping bidding firms (1994-1998, held>=3% by institutional funds) three years post acquisition average ARs and CARs..... 254
Table 6.19 Non-overlapping bidding firms (1994-1998, held>=3% by institutional funds) three years post acquisition average CARs and BHARs..... 256
Table 6.20 Non-overlapping bidding firms (1994-1998, held<3% by institutional funds) three years post acquisition average ARs and CARs..... 257
Table 6.21 Non-overlapping bidding firms (1994-1998, held<3% by institutional funds) three years post acquisition average CARs and BHARs..... 259
Table 6.22 Overlapping bidding firms (1994-1998, held>=3% by institutional funds) three years post acquisition average ARs and CARs..... 261
Table 6.23 Overlapping bidding firms (1994-1998, held>=3% by institutional funds) three years post acquisition average CARs and BHARs..... 263
Table 6.24 Overlapping bidding firms (1994-1998, held <3% by institutional funds) three years post acquisition average ARs and CARs..... 264
Table 6.25 Overlapping bidding firms (1994-1998, held<3% by institutional funds) three years post acquisition average CARs and BHARs..... 266

Table A1.1 Bidding firms (1995-1998) three-year post acquisition average ARs and CARs... 291
Table A1.2 Bidding firms (1995-1998) three-year post acquisition average CAR and BHAR 293
Table A1.3 Non-overlapping bidding firms (1995-1998) three-year post acquisition average ARs and CARs..... 295
Table A1.4 Non-overlapping bidding firms (1995-1998) three-year post acquisition average CARs and BHARs..... 298
Table A1.5 Overlapping bidding firms (1995-1998) three-year post acquisition average ARs and CARs..... 300
Table A1.6 Overlapping bidding firms (1995-1998) three-year post acquisition average CAR and BHAR..... 303
Table A2.1 Bidding firms (1997-2001) three years pre-acquisition average ARs and CARs.. 305
Table A2.2 Bidding firms (1997-2001) three years pre-acquisition average CARs and BHARs..... 307
Table A2.3 Non-overlapping bidding firms (1997-2001) three years pre-acquisition average ARs and CARs..... 308
Table A2.4 Non-overlapping bidding firms (1997-2001) three years pre-acquisition average CARs and BHARs..... 310

Table A2.5 Overlapping bidding firms (1997-2001) three years pre-acquisition average ARs and CARs..... 311
Table A2.6 Overlapping bidding firms (1997-2001) three years pre-acquisition average CARs and BHARs..... 313
Table A3.1 Bidding firms (1994-1998) three years post acquisition average ARs and CARs. 315
Table A3.2 Bidding firms (1994-1998) three years post acquisition average CARs and BHARs..... 317
Table A3.3 Non-overlapping bidding firms (1994-1998) three years post acquisition average ARs and CARs..... 318
Table A3.4 Non-overlapping bidding firms (1994-1998) three years post acquisition average CARs and BHARs..... 319
Table A3.5 Overlapping bidding firms (1994-1998) three years post acquisition average ARs and CARs..... 320
Table A3.6 Overlapping bidding firms (1994-1998) three years post acquisition average CARs and BHARs..... 322

LIST OF FIGURES

Figure 4.1 The first differences of target firms average abnormal returns (ARs) between December-June model and March-September model..... 120
Figure 4.2 The first differences of target firms average abnormal returns (ARs) between December-June model and June-December model. 124
Figure 4.3 The first differences of target firms average abnormal returns (ARs) between December-June model and September-March model..... 127
Figure 4.4 The first differences of bidding firms (pre-takeover) average abnormal returns (ARs) between December-June model and March-September model..... 131
Figure 4.5 The first differences of bidding firms (pre-takeover) average abnormal returns (ARs) between December-June model and June-December model..... 135
Figure 4.6 The first differences of bidding firms (pre-takeover) average abnormal returns (ARs) between December-June model and September-March model..... 139
Figure 4.7 The first differences of bidding firms (post takeover) average abnormal returns (ARs) between December-June model and March-September model..... 143
Figure 4.8 The first differences of bidding firms (post takeover) average abnormal returns (ARs) between December-June model and June-December model..... 146
Figure 4.9 The first differences of bidding firms (post takeover) average abnormal returns (ARs) between December-June model and September-March model..... 150

Figure 5.1 Bidding firms (1991-1998) three-year post acquisition average CARs..... 177
Figure 5.2 179 three-year CAR observations 1991-1998..... 179
Figure 5.3 179 three-year BHAR observations 1991-1998..... 179
Figure 5.4 Non-overlapping bidding firms (1991-1998) three-year post acquisition average CARs..... 182
Figure 5.5 Overlapping bidding firms (1991-1998) three-year post acquisition average CARs. 185
Figure 5.6 Three years post acquisition average CARs of All, Overlapping and Non-overlapping bidding firms 1991-1998..... 187
Figure 5.7 Bidding firms (1995-1998) three-year post acquisition average CARs, according to the one-month takeover premiums..... 191
Figure 5.8 Non-overlapping bidding firms (1995-1998) three-year post acquisition average CARs, according to the one-month takeover premiums..... 195
Figure 5.9 Bidding firms (1991-1998) three-year post acquisition average CARs, according to the method of payment..... 200
Figure 5.10 Non-overlapping bidding firms (1991-1998) three-year post acquisition average CARs, according to the method of payment..... 204

Figure 6.1 Bidding firms (1997-2001, held>=3% by institutional funds) three-year pre-acquisition average CARs..... 228
Figure 6.2 Bidding firms (1997-2001, held<3% by institutional funds) three-year pre-acquisition average CARs..... 231
Figure 6.3 Three years pre-acquisition average CARs of all, institutional holding and non-institutional holding bidding firms 1997-2001..... 232
Figure 6.4 Non-overlapping bidding firms (1997-2001, held>=3% by institutional funds) three-year pre-acquisition average CARs..... 234
Figure 6.5 Non-overlapping bidding firms (1997-2001, held<3% by institutional funds) three-year pre-acquisition average CARs..... 237
Figure 6.6 Three years pre-acquisition average CARs of all, institutional holding, and non-institutional holding non-overlapping bidding firms 1997-2001..... 239

Figure 6.7 Overlapping bidding firms (1997-2001, held>=3% by institutional funds) three-year pre-acquisition average CARs..... 241
Figure 6.8 Overlapping bidding firms (1997-2001, held<3% by institutional funds) three-year pre-acquisition average CARs..... 244
Figure 6.9 Three years pre-acquisition average CARs of all, institutional holding, and non-institutional holding overlapping bidding firms 1997-2001..... 245
Figure 6.10 Bidding firms (1994-1998, held>=3% by institutional funds) three years post acquisition average CARs..... 249
Figure 6.11 Bidding firms (1994-1998, held<3% by institutional funds) three years post acquisition average CARs..... 252
Figure 6.12 Three years post acquisition average CARs of all, institutional holding, and non-institutional holding bidding firms 1994-1998..... 254
Figure 6.13 Non-overlapping bidding firms (1994-1998, held>=3% by institutional funds) three years post acquisition average CARs..... 256
Figure 6.14 Non-overlapping bidding firms (1994-1998, held<3% by institutional funds) three years post acquisition average CARs..... 259
Figure 6.15 Three years post acquisition average CARs of all, institutional holding, and non-institutional holding non-overlapping bidding firms 1994-1998..... 260
Figure 6.16 Overlapping bidding firms (1994-1998, held>=3% by institutional funds) three years post acquisition average CARs..... 262
Figure 6.17 Overlapping bidding firms (1994-1998, held<3% by institutional funds) three years post acquisition average CARs..... 265
Figure 6.18 Three years post acquisition average CARs of all, institutional holding, and non-institutional holding overlapping bidding firms 1994-1998..... 267

Figure A1.1 Bidding firms (1995-1998) three-year post acquisition average CARs..... 292
Figure A1.2 112 three-year CAR observations 1995-1998..... 294
Figure A1.3 112 three-year BHAR observations 1995-1998..... 295
Figure A1.4 Non-overlapping bidding firms (1995-1998) three-year post acquisition average CARs..... 297
Figure A1.5 89 three-year non-overlapping CAR observations 1995-1998..... 299
Figure A1.6 89 three-year non-overlapping BHAR observations 1995-1998..... 300
Figure A1.7 Overlapping bidding firms (1995-1998) three-year post acquisition average CARs..... 302
Figure A1.8 Three years post acquisition average CARs of All, Overlapping and Non-overlapping bidding firms 1995-1998..... 304
Figure A2.1 Bidding firms (1997-2001) three-year pre-acquisition average CARs..... 306
Figure A2.2 Non-overlapping bidding firms (1997-2001) three-year pre-acquisition average CARs..... 310
Figure A2.3 Overlapping bidding firms (1997-2001) three-year pre-acquisition average CARs..... 313
Figure A2.4 Bidding firms (1997-2001) three-year pre-acquisition average CARs of the whole sample, the non-overlapping sample, and the overlapping sample..... 314
Figure A3.1 Bidding firms (1994-1998) three years post acquisition average CARs..... 316
Figure A3.2 Non-overlapping bidding firms (1994-1998) three year post acquisition average CARs..... 319
Figure A3.3 Overlapping bidding firms (1994-1998) three year post acquisition average CARs..... 321
Figure A3.4 Three years post acquisition average CARs of All, Non-overlapping and Overlapping bidding firms 1994-1998..... 323

Chapter One: Introduction

Mergers and acquisitions is one of the most researched areas in finance. It first became a topic of public policy debate during the greater merger waves in the U.K. and the U.S. at the end of the 19th century. Most research on the financial performance of mergers and acquisition has focused on stock returns surrounding the takeover announcement dates. Virtually all researchers have reported large significant positive average abnormal returns to target firms, a result that is not surprising given the significant premiums typically offered by the bidding firms. Conversely, these researchers have found small abnormal returns to bidding firms over the announcement period. In fact, while some papers have reported significant small positive performance, quite a few others have found either zero performance or even negative performance to the bidding firms at the time around the takeover announcement.

Parallel to the research on announcement period returns, a smaller body of work has investigated long-run post acquisition stock returns of bidding firms. Researcher often pay little attention to the results on long-run stock returns, perhaps because the strong belief in market efficiency indicated what the results should be. However, a large number of previous papers reported significant negative long-run post acquisition abnormal stock returns to the successful bidding firms, and why merged companies on average suffer significant *wealth loss* is still an *anomaly* to us. As Jensen and Ruback (1983, p.20) writes: "These post-outcome negative abnormal returns are unsettling because they are inconsistent with market efficiency and suggest that changes in stock prices overestimate the future efficiency gains from mergers."

In *Chapter 2*, we provide a comprehensive review of these previous studies on mergers and acquisitions, especially the shareholders' wealth effects of corporate takeovers. We firstly review some key issues in the M & A literature, such as motives for takeovers, the impact of methods of payment to the shareholders' returns, and the size effect to the long-run stock returns of corporate takeovers. Secondly, We turn to review a few key papers of the past three decades that contribute a lot to the development of the M & A literature. This provides us a clear picture regarding the evolution of studies in the corporate takeovers. Thirdly, we critically analyze the stock returns of both target and bidding firms in the entire acquisition process (i.e., from several years prior to the takeover announcement to a few years after the completion of the takeover). Finally, we present a detailed review of the methodologies applied in these previous studies. In a word, Chapter 2 provides readers a broad view of the studies in M & A, and helps them to the further understanding of the following empirical chapters.

As mentioned above and concluded from Chapter 2, why bidding firms suffer a statistically significant negative abnormal returns in several years after the completion of takeover is still a puzzle to us. One primary explanation for this anomaly is that the phenomena are caused by methodological errors in calculating and interpreting the long-run stock returns. These errors may arise through choice of inappropriate control models and also the use of inappropriate test statistics. Indeed, the application of test statistics that reflect the non-normal properties of distributions of long-run returns do reduce the significance of results based on parametric tests.

Attempts to provide what are deemed to be more appropriate models have been made in

recent papers by Franks, Harris and Titman (1991), Agrawal, Jaffe and Mandelker (1992), and Rau and Vermaelen (1998) by using US data; and Gregory (1997) by using UK data. In addition to potential errors arising from the inappropriate choice of control models, a number of researchers have most recently pointed out that the process used in the calculation of long-run stock returns is itself biased.

Recent papers by Kothari and Warner (1997) and Barber and Lyon (1997) address biases in long-horizon event studies. Both document that for randomly chosen firms, the traditional t-test of abnormal performance is misspecified and indicates abnormal performance too frequently. Kothari and Warner (1997) examine a variety of abnormal return models, i.e., Market-Adjusted Model, Market Model, CAPM, and the Fama-French three-factor Model. They find that all four models are severely misspecified regardless the use of CARs or BHARs, (all four models significantly over-reject the null hypothesis), and the degree of misspecification is not highly sensitive to the models applied. Based on these findings, Kothari and Warner argue that parametric long-horizon tests will often indicate abnormal performance when none is present, thus the interpretation of long-horizon tests requires extreme caution.

Barber and Lyon (1997) in an independent simulation study argue that many of the common methods used to calculate long-run abnormal stock returns are flawed and lead to biased test statistics. They evaluate three approaches for detecting the long-run abnormal stock returns, i.e., Reference Portfolio Approach, Control Firms Approach, and Fama-French three-factor Model. Barber and Lyon argue that using Reference Portfolio Approach (size portfolios, book-to-market portfolios, size/book-to-market

portfolios, and equally-weighted market index) and the Fama-French three-factor Model to calculate long-run abnormal returns yield mis-specified test statistics (empirical rejection rates exceed theoretical rejection rates). Barber and Lyon point out that misspecification arises from three possible biases: the new listing bias, the rebalancing bias, and the skewness bias. The *new listing* bias arises because sample firms usually have a long pre-event return record, whereas the benchmark portfolio includes firms that have only recently begun trading and are known to have abnormally low returns (Ritter (1991)). The *rebalancing* bias arises because the compounded return on the benchmark portfolio implicitly assumes periodic rebalancing of the portfolio weights, whereas the sample firm returns are compounded without rebalancing. The *skewness* bias refers to the fact that with a skewed-right distribution of abnormal returns, the student t-distribution is asymmetric with a mean smaller than the zero null. They advocate that a more appropriate approach would be a comparison of buy-and-hold returns with an appropriate firm matched on size and book-to-market ratios.

Barber and Lyon (1997) find that the Control Firm Approach yields well-specified test statistics in virtually all-sampling situations they considered. They argue that this control firms approach yields well-specified test statistics because it alleviates the new listing bias (since both the sample firm and control firm must be listed in the identified event month), the rebalancing bias (since both the sample firm and control firm returns are calculated without rebalancing), and skewness biases (since the sample firm and control firm are equally likely to experience large positive returns).

In a following up paper, Lyon, Barber, and Tsai (1999) find that using size/book-to-market control firms approach yields well-specified test statistic for the conventional t-statistic in all random samples. They also find that in random samples the control firm approach yields well-specified test statistics either for using CARs or BHARs to calculate the abnormal returns. We discuss in details about these methodological issues in Chapter 3.

We construct *Chapter 3* as our methodological chapter; it presents all the methodologies that we are going to apply in this thesis. In this chapter, we firstly discuss and analyze the misspecification problems associated with previous methodologies in detecting the long-run abnormal stock returns. We then introduce the control firms approach advanced by Barber and Lyon (1997). Since the control firms approach minimizes the chances that the test statistics are misspecified, we set this approach as our main method to calculate the CARs and the BHARs in the following empirical chapters. In addition to the control firms approach, we also present the Fama-French three-factor model as an alternative to calculate the CARs. Finally, Chapter 3 describes both the conventional parametric t-test and the nonparametric Wilcoxon Signed-Rank test; both of them will be used as the test statistics throughout the following empirical chapters.

According to the discussions above, the control firms approach have so far seemed as a very promising way in the studies of detecting long-run abnormal stock returns. However, the control firms approach advanced by Barber and Lyon (1997) may not be without questions while applying to the out-of-sample studies. In their approach, Barber and Lyon use *June* of year *t* to find the market value (size), and *December* of year *t-1* to

calculate the book-to-market ratio. The use of December to calculate the book-to-market ratio is because that US firms have the same fiscal year ending in December. Thus, it is reasonable and convenient to calculate the book-to-market ratio at the same accounting year ending, i.e., December. However, the accounting year endings of UK firms are different months across the whole year, if we introduce the same approach into UK, we are not able to calculate the book-to-market ratios at the accounting year ending for most of the firms. Due to UK firms accounting year endings vary from January to December; the Barber and Lyon's control firms approach will not be exactly the same when we apply it in the UK. But, how should we apply it in the UK?

In *Chapter 4*, we empirically test the validity of Barber and Lyon's control firms approach under various accounting year endings. We apply both CAR and BHAR to calculate the long-run abnormal stock returns for both target and bidding firms under two different ways. First, we follow Barber and Lyon (1997) by calculating the book-to-market ratio at December of year t-1 and size at June of year t by ignoring the difference of the accounting year endings of UK firms, we call it as the control firms approach under the December-June model. Second, we calculate the book-to-market ratios at different months according to sample firms accounting year endings and find their size in six month after, we name it as the control firms approach under Various-Accounting-Year-Ending model. Finally, we test whether the long-run abnormal stock returns calculated under these two approaches are significantly different, and hence to test whether Barber and Lyon (1997)'s control firms approach can be directly applied in the countries, such as UK, where their firms do not have the same accounting year endings.

We have so far discussed one possible explanation to the post acquisition underperformance puzzle, i.e., the methodological errors; the other possible interpretation to the long-run significant negative post acquisition stock returns is that it represents a delayed market reaction to overpriced takeovers. That is bidding firms might have overvalued and paid too much premiums to the targets that leads to a delayed correction in their post acquisition period. There are two common reasons about it. One is that bidding firms might overestimate the value of the targets and have paid a higher price than their true values. The other is that managers of bidding companies might be too optimistic to think that they could improve the performance of the acquired firms sufficiently to recoup the higher premiums they paid for them. Is this the case that leads to bidding firms post acquisition underperformance?

Furthermore, apart from the explanations for the post acquisition underperformance anomaly, previous studies have consistently reported that bidding firms shareholder returns are methods of payment dependent. Almost all these papers have reported that cash financed bidding firms consistently outperform the equity financed bidding firms. However, these studies have only concentrated on two kinds of methods of payment, the cash offer and the stock offer; few papers have investigated the other two alternative ways: alternative offer and combined offer. Alternative offer means that bidding firms deliver a choice to the targets, target firm shareholders can either choose a full cash offer or a full equity offer, it all depends on the preference of target firms' shareholders. Combined offer means that the payment terms are neither pure stock nor pure cash; both stock and cash are jointly used. Thus, the alternative and combined offer should not be

ignored in the empirical studies; the impact of all four kinds of methods of payment should be examined.

Moreover, based on the work of Barber and Lyon (1997) and Kothari and Warner (1997), Lyon, Barber, and Tsai (1999) conclude that misspecification of test statistics can be traced to (1) the new listing bias, (2) the rebalancing bias, (3) the skewness bias, (4) cross-sectional dependence, and (5) a bad model of asset pricing.

The control firms approach advanced by Barber and Lyon (1997) can not only avoid using a bad asset price model, but also eliminates the new listing, the rebalancing, and skewness biases. Thus the only problem left to the control firms approach is the cross-sectional dependence in sample observations. Cross-sectional dependence inflates test statistics because the number of sample firms overstates the number of independent observations. Two extreme sample situations of the problem of cross-sectional dependence are:

Calendar clustering. It is reasonable to assume that the contemporaneous returns of firms are more likely to be cross-sectionally related than returns from different periods. If true, the problem of cross-sectional dependence will be most severe when all sample firms share the same event date. Lyon, Barber, and Tsai (1999) find that the control firms approach control well for calendar clustering of event dates.

Overlapping return calculation. A common problem in event studies that analyse long-run abnormal returns is overlapping periods of return calculation for the same firm.

Because these returns share several months of overlapping returns. This is the most severe form of cross-sectional dependence in the event study of long-run abnormal returns. Lyon, Barber, and Tsai (1999) find that the lack of independence generated by overlapping returns yields misspecified test statistics, and suggest the only solution to this problem is to remove the sample of observations of overlapping returns.

As we know most of bidding firms have different takeover event dates, they of course do not share the same event date, this makes the *calendar clustering* little problem for the takeover studies. Thus, the most severe problem is the overlapping return calculations. Previous studies have failed to take the overlapping returns problem into account; however, we argue that this is a severe problem and demands full attention.

In *Chapter 5*, we fully investigate the two explanations regarding the post acquisition underperformance puzzle. We apply the control firms approach to eliminate the observed methodology problems, and we also use the Fama-French three-factor model as an alternative to test whether the previous reported anomaly is due to the methodological errors. We then turn to examine the impact of takeover premiums to the bidding firms long-run post acquisition stock returns, and intend to answer the question whether the underperformance is due to a delayed market reaction to overpriced takeovers. We also examine the impact of methods of payment to shareholders returns based on all four kinds of takeover financing methods, and it would be a complete investigation on this topic. Finally, we take the overlapping returns problem into full account throughout the whole investigation process, and intend to find out whether overlapping returns do lead to a misspecified test statistics.

Finally, we are going to examine the monitoring role of institutional funds through a brand new framework of long-run stock returns of corporate takeovers. Institutional funds have become increasingly prominent in the UK over the past two decades. In 1999, institutions held Pounds 2,477bn of funds, nearly three times the 1990 total, and accounted for over 85% of total identified funds under management. In the UK, a substantial proportion of institutional funds are invested in equity. As a result, institutional investors account for a large proportion of shares in the UK than in most industrialized countries, nearly 60% in 1999 (IFSL 2001). UK institutional funds have traditionally favoured investment in equity since the 1960s, given the generally good long-term returns reflecting the higher growth of equity markets relative to other asset classes.

Being the largest shareholder in the UK, institutional funds are expected to play a significant role in the corporate governance and that may well enhance corporate efficiency. However, the issue of involvement of institutional funds in the running of companies is controversial. There are two main hypotheses regarding this issue. One is the "*active monitoring hypothesis*". Institutional funds hold substantial stakes in individual companies. The size of these stakes renders them particularly sensitive to the performance of firms in their portfolios, and provides them powerful incentives to monitor firm management, ensuring that managers choose investment strategies to maximize long-run value rather than to meet short-term earnings goals. This vigilant institutional monitoring enhances managerial efficiency and the quality of corporate decision making. Such institutional monitoring may involve holding discussion with management on corporate plans and performance, supporting (opposing) the

management's wealth enhancing (reducing) policies and decisions, and active participating in board elections and other voting issues.

However, on the other hand, it is well argued that institutional funds are incapable to monitor corporations due to their passivity, myopic goals, legal constraints and conflict of interests. Some argue that institutional funds are passive investors who are more likely to sell their holdings in poorly performing firms than to expand their resources in monitoring and improving their performance. It is further argued that institutional funds are short-termists, because fund managers are under considerable pressures from their clients to perform. For instance, nearly all of the pension schemes set target for their fund managers, it is commonly to beat one specific benchmark by one or two percent. Moreover, many funds are also concerned that they might incur some legal liability if they take on active roles. There is also free-rider problem associated with institutional funds activism or monitoring. This problem arises because small and passive shareholders realize the benefits of monitoring done by large institutions but they incur none of the costs. Thus monitoring will be possible only when the monitoring is sufficient to cover all the associated monitoring costs. In addition to that, institutional funds themselves may be subject to agency problems, because the vast majority of funds are externally managed by fund managers (in 2000, self-managed pension funds accounted for around only 2% of total identified UK funds under management, IFSL 2001), there are possible conflicts of interests between the private and institutional clients and the fund managers. Thus they either always vote with management or sell their shares to avoid voting. This is referred to as the "*passive voting hypothesis*".

In summary, previous studies have provided us contradictory evidence on the monitoring issue. These mixed results make us difficult to judge the monitoring role of institutional funds. If we can find a new approach to examine these two controversial hypotheses, it will create and add fresh evidence on the existing findings. Thus, we believe that the testing of these hypotheses under a different framework is called for.

In *Chapter 6*, we will test the *active monitoring* and *passive voting* hypotheses through the corporate takeover markets by examining the bidding firms' (with large level of institutional ownership or with low or without this ownership, say 3%) long-run stock returns. It is long argued that institutional funds are finance professionals with expertise in the area of investment management, if they are indeed monitoring corporations, then takeovers undertaken by bidding firms with high level of institutional funds ownership may be expected to be more wealth enhancing (higher stock returns) than those with low or without institutional funds ownership.

Finally, this thesis concludes with *Chapter 7*, where the empirical findings of the previous chapters are summarized and also with some suggestions for the topics that demands further investigation.

Chapter Two: Literature Review

2.1. Merger and Acquisition Theories

2.1.1. Definition

Globe merger and acquisition activities have experienced their largest and busiest period in the 1990s. The daily newspapers are filled with a series of case studies of mergers and acquisitions. The value of mergers and acquisitions worldwide picked up again from 1991 and followed a clear and strong increase thereafter. The globe value of mergers and acquisitions notched up $3.5 trillion record in 2000, up from $3.3 trillion in 1999 (*Acquisition Monthly 2001*). Apart from the unresolved puzzles in the past decades, mergers and acquisitions today raise many new issues that needed to be explored. However, first of all, we will review some fundamentals of merger and acquisition theories.

Acquisitions are investment decisions by acquiring firms. The expected benefits of acquisitions are the incremental cash flows generated by the combination of the previously independent firms or by the achievement of control over the operations of acquired firms. The overall cost of this investment decision is equal to the search and negotiating costs plus the actual amount paid or the equivalent amount of the securities issued to the shareholders of the target firm.

2.1.2. Mode of Acquisitions

Mergers are one form of corporate acquisitions. *Merger* is an agreement to combine two or more corporations under procedures established by the state of incorporation of each of the participating firms. These state regulations typically require a favorable vote by at least two-thirds of the target shareholders in general meeting and all shareholders are bound if the required vote is obtained. Furthermore, the merger proposal must be approved by the board of directors of the target firm who then puts the proposal to stockholders vote. In effect, the board has the power to veto all merger proposals and can refuse to put any proposal to stockholder vote. The subsequent of the veto power of incumbent management is that merger proposals become discretionary decisions delegated to management by stockholders. Stockholders must vote to approve or reject any merger proposals that the incumbent management recommend but do not get an opportunity to approve merger proposals that management reject.

An alternative form of corporate acquisition is a tender offer. A *tender offer* is a cash or stock bid by one company (the bidder) for a block of another (the target) company's outstanding common stock. The stockholders accept the offer by tendering their shares, and those not tendering retain their ownership claims to the target firm. A successful tender offer is frequently followed by a merger proposal. However, tender offers do not involve the veto power of incumbent management. The decision to accept or reject the offer is made by each individual shareholder and the success or failure of the offer depends upon the proportion (normally two-thirds or more) of shareholders tendering their shares.

2.2. Motives for Takeovers

2.2.1. Value Maximization

One general motive for takeovers is value maximization motivations in which the acquisition should meet the same criteria as any other investment decision. Thus there should be a positive expected economic gain from the acquisition and depending on the competitiveness of the acquisitions market, some proportion of the economic gain will accrue to the target firm's shareholders. Regardless of this state of competition, the acquiring firm should at least earn a normal rate of return.

2.2.1.1. Financial Motivation

There are a number of acquisition motivations that are consistent with the goal of value maximization. The first is financial motivation. One argument presented is that an acquisition permits a redeployment of excess cash held either by the acquiring firm or the target firm. Another argument is that the diversification benefits provided by an acquisition can reduce the probability of default thereby reducing expected bankruptcy costs and increasing the debt capacity of the new entity. The idea of the co-insurance effect is first advanced by Lewellen (1971). He argues that the combinations of two or more firms whose earning streams were less perfectly correlated would reduce the risk of default of the merged firms and therefore increase the debt capacity of the combined firms. Furthermore, the use of underutilized tax shields and other types of tax advantages are also included in the financial motivation. All of these influences would

increase the market value of the equity after the acquisition relative to the sum of the market values prior to the takeover.

2.2.1.2. Synergy

Another set of economic motivations is captured by the term synergy in which the acquisition results in an increase in the expected cash flow over their sum as independent firms. These gains can occur from economies of scale for horizontal mergers, vertical integration, adoption of more efficient production or organizational technology, excess capacity in some factors of production such as managerial or financial control, or economies of scope which generate cost advantages when output is increased by the post-acquisition entity not in one product but in a vector of products. In sum, the gains in synergistic takeovers are generated by efficiencies that result from combining the physical operations of the bidder and target firm.

Asquith (1983) finds that target firms have unique resources that provide synergy when combined across firms. Bradley, Desai and Kim (1983) suggest that a permanent positive revaluation of the unsuccessful target shares requires the target resources be combined with those of an acquiring firm. That is, the gains to the stockholders of unsuccessful targets stem from the anticipation of a future successful acquisition and not simply from the revaluation of new information regarding the true value of the target resources. Thus, they conclude that the synergy hypothesis is more consistent with the evidence than the information hypothesis.

Dennis and McConnell (1986) find that mergers, on average, are value-creating activities for combined bidding and target firms. This result is consistent with the synergy hypothesis of mergers. Bradley, Desai, and Kim (1988) investigate a nearly exhausted sample of successful tender offers between 1963 and 1984. They find that the average synergistic gain of the sample is 117 million dollars, and that represents a 7.4% increase in the combined wealth of the shareholders of the target and acquiring firms. This is once again consistent with the synergy hypothesis. Berkovitch and Narayanan (1993) study the motives for corporate takeovers, their evidence indicates that synergy is the primary motive in value maximization acquisitions.

2.2.1.3. Information

Another motivation is an attempt by the acquiring firm management to take advantage of asymmetric information. This information hypothesis postulates that the acquiring firm has information concerning the target firm that is not available to other participants in the market and is not reflected in the current share price of the target firm. There are two forms of this information hypothesis. First, the information may be that the target shares are undervalued based on publicly available information. The second argues there are more efficient operating strategies that could be used by the target's management and if the existing management knew these strategies they could become more efficient and the stock price would increase.

Dodd and Ruback (1977) find shareholders of unsuccessful target firms earn large positive abnormal returns in the event month and normal returns thereafter. This

evidence is consistent with the information hypothesis and inconsistent with the synergy hypothesis. Since the information hypothesis predicts positive returns for unsuccessful targets as the information of future potential gains from elimination of the source of the inefficiency is revealed by the tender offer, and the synergy hypothesis predicts negative performance for the unsuccessful offer.

2.2.1.4. Competitions in Corporation Control

Another takeover motivation is based on the attempt by acquiring firms to obtain control of targets. In its most general form the acquiring firm desires control to replace an incompetent management or to force existing management to follow a profit maximizing strategy. Under either situation it is expected that the shareholders of target firms would be earning below normal returns in some period preceding the acquisition.

Mandelker (1974) investigates the market for acquisitions and the impact of mergers to stockholders of participating firms. The evidence for the acquired firms is consistent with the hypothesis that mergers act as a mechanism by which the market system replaces incompetent management. Jensen and Ruback (1983) conduct a comprehensive survey on the market for corporate control. They conclude that corporate takeovers create positive gains. Target firm shareholders benefit, and bidding firm shareholders do not loss. They point out that the market for corporate control is best viewed as an arena in which managerial teams compete for the right to manage corporate resources.

Martin and McConnell (1991) examine the hypothesis that corporate takeovers act as an important role to discipline the top managers of poorly performing target firms. Their findings indicate that corporate takeovers played an important role in controlling the non-value maximizing behavior of top corporate managers. This finding is consistent with the competition for corporate control hypothesis. Kennedy and Limmack (1996) investigate the CEO turnover in the acquisition activities. They compare the CEO turnover rate from five years prior to the bid announcement date to two years after the completion date. The result reveals a significant rate in CEO turnovers in the two years after the takeover and target companies that change their CEO in the two years after the bid experience lower returns before the takeover than other targets. This evidence once again provides the support for the hypothesis that takeovers result in the replacement of inefficient management.

2.2.2. Non-value Maximization

Acquisitions are attempts to maximize growth in sales or assets or to control a large empire. Acquisitions of this type have no economic gains to be divided among the corporations and given the costs of negotiating and the potential problems of coordination of the expanding corporate empire, it is likely that there would be an overall economic loss. Thus, any positive gains obtained by the target shareholders would be offset by a loss to the bidding firm's shareholders.

2.2.2.1. Agency Motive - Size Maximization

This theory holds that beyond achieving a certain satisfactory level of profits, incumbent managers will attempt to maximize their own self-interests, and these do not necessarily correspond to maximizing shareholder wealth. Management self-interests are likely to include the factors such as reducing the risk of losing their jobs, increasing their salary levels, and increasing their power and job satisfaction. These self-interests can be aided by growth in *size*, and takeovers are the quick way of growing.

In previous studies, Newbould (1970) and Singh (1975) find that the percentage chance of small firms being taken over is greater than that of large firms. Firth (1980) carries out a regression analysis to examine whether the percentage increase in management remuneration is associated with the percentage growth in assets of the acquiring firm. His finding indicates that the larger the increase in the firm's assets, the greater the increase in directors' remuneration. Furthermore, while takeovers have resulted in loss to shareholders, they have result in monetary benefits to directors.

Malatesta (1983) shows that acquiring firm shareholders suffer significant wealth loss both immediately before and well before a merger. Based on this result, he point out that merger is a negative net present value project for acquiring firms, and this result appear to support the non-value maximizing hypothesis. Berkovitch and Narayanan (1993) investigate the motives for corporate takeovers, they find that agency is the primary motive for non-value maximization takeovers.

2.2.3. Summary

Many of these hypotheses reviewed in this section appear to be reasonable explanations of merger and tender offer activities. However, a number of these hypotheses have similar implications for the impact of acquisitions on security prices of affected firms. Thus, it may be quite difficult to distinguish among these competitive hypotheses. Perhaps the best for us is to identify whether the value or non-value maximizing behavior is the dominant explanation.

2.3. The Efficient Capital Market Hypothesis with respect to Information on Acquisitions

2.3.1. Definition

An efficient market is defined as one in which a share price fully incorporates all available information on that security and that share prices provide accurate signals for optimal resource allocation. Further, any new items of information are speedily incorporated in the share price and in an unbiased manner. In a word, the efficient capital market hypothesis says that stock prices adjust instantaneously to new information and provide unbiased signals for efficient resource allocation. Hence, the efficient market theory states that the price of a security at any time is correct and represents the combined best judgment of the economic value of the share.

If the capital market is efficient with respect to the acquisition, then any information about the acquisition should be incorporated instantaneously into the corresponding stock prices, the stock prices will then correctly reflect any economic gains or losses of the acquisition. Thus the efficient capital market hypothesis states that the stock market reacts efficiently to information about the acquisition activity. Assuming an efficient market, we can measure the movement of share prices around the time of the takeover event, and this provides us the economic impact of that event and gives a direct measure of the increase or decrease in shareholders wealth.

2.3.2. Studies Review

Mandelker (1974) find that anticipatory price movements preceding the effective date of a merger exhaust all valuable information in mergers. Thus, the stock prices of the participating firms at the time of the merger already reflect all economic gains expected from the acquisition. Franks, Broyles and Hecht (1977) find that capital market prices fully reflect relevant information of acquisitions. Langetieg (1978) reports that the evidence regarding the post-merger abnormal returns is consistent with the efficient capital market hypothesis. Firth (1979) applies an efficient market framework to examine the profitability of takeovers. His finding shows that the stock market is efficient with respect to reacting to takeover information.

As we know, in an efficient capital market, increases in the probability of merger should cause prices of target firms to adjust in one direction and decreases in the probability of merger should cause prices of target firms to adjust in the opposite direction. Asquith (1983) finds that target firm returns exhibit precisely this pattern and the evidence of the excess returns for bidding firms is also consistent with the hypothesis that the market efficiently evaluates uncertainty.

2.4. The Competitive Acquisition Market Hypothesis

2.4.1. Definition

In a perfectly competitive market, competition will equate the expected rates of return on assets of similar risk. If the acquisition market offers higher expected returns than equivalent activities of similar risk, more resources will be directed to this activity until expected rates of return are reduced to a competitive level. In a competitive acquisition market, competition among potential acquiring firms will raise the price of the target firms; consequently, the acquiring firms should earn a normal rate of return.

2.4.2. Studies Review

Mandelker (1974) tests the competition in the acquisition market. His findings are consistent with the hypothesis that the acquiring firms operate in a perfectly competitive acquisition market, in that the prices they pay for the acquired firms' stocks enable their stockholders to earn normal returns on the acquisitions, i.e., they earn a rate of return equal to other investment-production activities of similar risk. Franks, Broyles and Hecht (1977) find evidence that is consistent with the perfectly competitive acquisition market hypothesis that the value of all expected net benefits from a merger are paid to the acquired firm shareholders. Asquith (1983) argues that the lack of significant positive abnormal performance on average for bidding firms was consistent with perfect competition in the acquisition market.

In Ruback (1983) study of assessing competition in the market for corporate acquisitions, he defines that competition in the acquisition market is characterized in terms of gains that accrue to potential bidding firms: in a competitive acquisition market the stock price of the target firm rises until the acquisition is a negative net present value investment for all unsuccessful bidders. Ruback also point out that Mandelker and Asquith's tests are not a direct test of competition in the acquisition market since the potential gains to unsuccessful bidders are not examined. Mandelker (1974) and Asquith (1983) studies do not testify that the successful offer price exhaust the potential gains for unsuccessful bidders. The results of Ruback (1983) are consistent with the competitive acquisition market hypothesis; the successful offer price, on average, exhausts the potential gains for unsuccessful bidders.

Travlos (1987) argue that the lack of statistically significant positive abnormal returns to the bidding firms is consistent with the hypothesis that a competitive markets for corporate control forces the bidding firms to pay the target firm stockholders a fair price for any shares they obtain from the acquisition.

Bradley, Desai, and Kim (1988) provide an empirical analysis of competitions among bidding firms for control of the target firms. Their evidence indicates that competitions increase the returns to target firms and decease the returns to acquiring firms. They find that competitions reduce the bidding firm shareholders returns to a level that is not significantly different from zero. This finding once again gives support to the competitive acquisition market hypothesis.

2.5. Method of Payment

2.5.1. Definition

In early studies of mergers and acquisitions, especially prior to 1983, there is little effort to be made to explore the role played by the method of payment in the acquisition. However, we think it is possible that takeovers consummated by different types of payments stem from quite different motives and hence that firms acquired by different forms of payment have quite different financial characteristics. Thus, shareholders returns of participating firms may differ from different methods of payment.

Previous studies show that there has been steady increasing in the cash payment as opposed to security exchanges as a means of financing takeovers since 1970s. A number of reasons have been suggested for the increased use of cash as a means of financing takeovers. In the 1960s, many mergers were consummated with convertible bonds. The interest payments on such convertible bonds were tax deductible. However, interest payments on convertible debt issued for acquisitions have not been allowed as tax-deductible expenses since 1969, thus reducing their desirability as a means of financing takeovers.

Other possible explanations for the increased use of cash rest on market imperfections or agency considerations. It was often alleged that in the 1960s acquired firm shareholders did not understand the true value of convertible securities used as payment in mergers, since there was no requirement that earning figures be reported to reflect the

diluting effect upon conversion. Whether such market inefficiency existed then or not, accounting regulations now requires that earnings per share must be reported on a fully diluted basis adjusting for potential conversion.

Another factor that may contribute to the increased use of cash is the increase in the number of hostile takeovers. Wansley, Lane and Yang (1983) argue that in stock offers a bidding firm must obtain approval from the Securities and Exchange Commission (SEC) before target shareholders begin to tender their shares. This process could take several months. In contrast, a bidding firm paying cash could start to acquire target shares within several weeks. Thus, cash offers facilitate speedy acquisition transactions. Faster transactions could be crucial for the success of a hostile offer. Longer processing time for a stock offer gives target management more opportunity to implement a defense. Additional bidders favored by target management also could be induced to join the competition. For example, target management can selectively reveal inside information about the target firm's value to preferred bidders. This information may result in an upward revision of cash flow estimates or reduction in uncertainty faced by such bidders. As a result favored bidders could offer higher premiums. Consequently, hostile stock offers may have a lower probability of success than those for cash.

Finally, the increased use of cash may be further understood by looking at current differences between the taxes and accounting consequences of cash and security payments. Acquisitions can be treated as a pooling for accounting purposes and as a tax-deferred transaction if there is a continuity of ownership on the part of the shareholders of the acquired firm. An acquisition of one company by another may be ruled either

taxable or tax-free. The method of payment used in acquisitions is directly related to whether a takeover is ruled as taxable or tax-free. Generally speaking, a tax-free acquisition can result only if the owners of the acquired firm maintain a continuity of ownership after the takeover. As a result, acquisitions consummated by a cash payment would necessarily be taxable; an exchange of securities on the other hand would result in a tax-free takeover. There are two methods for accounting for an acquisition: purchase and pooling. Cash takeovers will be taxable acquisitions accounted for as purchases. Security exchanges, on the other hand, will be tax-free acquisitions that can be treated for accounting purposes as pooling of interest.

In viewing different methods of payments employed to finance corporate acquisitions, it is reasonable to argue that these differences may lead to a different valuation effect to the participating firms' common stock prices. First, in a world of asymmetric information, the method of payment may signal valuable information to the market. If the bidding firms' managers possess information about the intrinsic value of their firms, independent of the acquisition, which is not fully reflected in the pre-acquisition stock price, they will finance the takeover in the most profitable way for the existing stockholders. In the context of the Myers and Majluf (1984) model, the managers will prefer cash offers if they believe that their firms are undervalued, while a common stock exchange offer will be preferred in the opposite case. Accordingly, the market participants interpret a cash offer as good news and a common stock exchange offer as bad news about the bidding firm's true value. Furthermore, cash offers allow the bidding firm's current shareholders to retain all of the future (positive) returns.

Conversely, stock offers shift part of the (possible negative) future returns to the new shareholders.

Hansen (1987) and Fishman (1989) argue that a stock offer benefits the bidder when the target has private information about its assets. Since the target only accepts cash offers that exceed its private valuation, cash offers subject that bidder to adverse selection and result in overpayments to the target. Stock offers reduce overpayments, because target shareholders share in any subsequent decrease of the merged firm's stock if the bidder overpays. Therefore, other things being equal, the returns to the merging firms in cash offers will be higher than in common stock offers. Furthermore, since most tender offers are financed via cash, whereas most merger proposals call for the exchange of common stocks, the information effect argument implies that returns in tender offers will be higher than in mergers.

Second, cash offers and stock exchange offers have different tax implications. The taxability of gains to target shareholders is determined largely by the method of payment. In general, a tax-deferred acquisition requires target shareholders to continue ownership in the combined firm after acquisition. A stock transaction that involves exchange of voting shares is tax-deferred. Since a cash acquisition requires target shareholders to exchange ownership for cash, the transaction is necessarily taxable. According to the tax argument, cash offers have higher returns than stock offers to compensate target shareholders for the immediate payment of taxes.

2.5.2. Studies Review

Carleton et al (1983) might be the first study to examine the role of the medium of exchange in mergers. They argue that cash takeovers might be sufficiently different from security exchange takeovers. In this study, they provide evidence of the mid 1970s and point out that cash takeovers and stock exchange takeovers are motivated by different considerations. Lower dividend payout ratios and lower market-to-book ratios increase the probability of being acquired in a cash takeover relative to being acquired through a stock exchange.

Travlos (1987) examines the effect of the method of payment to the bidding firms' common stock returns at the announcement of takeover bids. The result on the pure stock exchange bidding firms indicates that their shareholders experience significant loss at the announcement of the takeover proposal. On the other hand, the result on the cash financing bidding firms indicates that their stockholders earn normal rate of return at the announcement period. Moreover, the difference in the abnormal returns between these two groups is statistically significant and independent of the type of takeover studied (i.e., mergers versus tender offers). In addition, the evidence based on unsuccessful bids indicated that stock exchange offers are associated with negative abnormal returns regardless of the outcome of the bid. These findings are consistent with the signaling hypothesis, which implies that financing a takeover through exchange of common stock conveys the negative information that the bidding firm is overvalued.

Huang and Walking (1987) find that target firm abnormal returns related with cash offers are significantly higher than those associated with stock offers. They argue that this effect are consistent with a tax explanation, shareholders demand higher premiums to offset the immediate tax payment on their gains.

Amihud, Lev, and Travlos (1990) examine the relationship between corporate control (i.e., the extent of managerial ownership of corporations) and the means of financing corporate acquisitions. They find that the higher the managerial ownership fraction of the acquiring company the larger the probability of the acquisition being financed by cash rather than by a stock offer. This finding is consistent with the hypothesis that managers who value control and hold a significant ownership fraction of their firm's stock will be reluctant to reduce their holdings and take the risk of loss of control by issuing stock to finance investments. In this study, they also examine the information effect of the method of takeover financing in conjunction with managerial ownership. They find that stock financing is not associated with significant negative abnormal returns for firms with relatively high managerial ownership, although the evidence, in general, shows that announcement of stock financing is associated with negative abnormal returns. In addition, the evidence indicates that negative abnormal returns associated with stock financing are concentrated mainly in firms with low managerial ownership.

Loughran and Vijh (1997) observe significant relations between stock returns and method of payment. Their result reports, on average, acquiring firms stock returns are greater than matching stock returns in cases where a tender offer is made and where

cash is used for payment. Acquiring firms stock returns are smaller than matching stock returns in cases where a merger is made and where stock is used for payment. The difference is statistically significant, ranging from -25.0% for stock mergers to 61.7% for cash tender offers. Gregory (1997) reports that cash offers are associated with post-merger performance that is not significantly different from zero, while stock offers are associated with significant negative post-merger performance.

Thus, so far, almost all the previous studies have tried to examine the impact of method of payment to the common stock returns of bidding firms that acquire the publicly traded targets, however, few studies have examined this impact when the target firm is privately held. Chang (1998) finds that the method of payment also plays an important role in acquiring privately held firms. Bidding firms shareholders experience a positive abnormal return in stock offers, which contrasts with the negative abnormal return typically found for bidders acquiring a publicly traded target. On the other hand, bidding firms shareholders do not earn any significant abnormal returns in cash offers.

Draper and Paudyal (1999) examine the impact of the method of payment on common stock returns of both target and bidding firms. Firstly, their finding is consistent with previous studies that common stock returns of both target and bidding firms are method of payment dependent. Secondly, they find that the trading activities on the announcement of bid proposals are also dependent on the method of payment.

2.6. Size Effect

2.6.1. Definition

Size effect in the share price studies of takeover event is regarded as the effect generated by the relative size of bidding to target firms. The size effect can distort long-run performance measures and hence affect the event study results, unless it is explicitly taken into account in the research.

2.6.2. Studies Review

Asquith, Bruner and Mullins (1983) point out that previous merger studies of bidding firm returns have ignored the size effect (i.e., the relative size of bidding to target firms). They argue that if bidding firms' share prices are affected by the merger, the observed abnormal return should be related to the relative size of the bidding and target firms. In this study, they apply regression analysis by taking into account of the size. The finding indicates that the relationship between the bidding firm's cumulative abnormal return and the relative size of the target firm's equity to the bidders is positive and statistically significant. On average, a bid for a target firm half the bidding firm's size produces a cumulative abnormal return 1.8% greater than a bid for a target one tenth of the bidder's size.

In analysis of abnormal rates of return, Malatesta (1983) finds that acquiring firm shareholders earn negative abnormal returns in the post-merger period, and the

magnitude of post merger abnormal returns is related to the acquiring firm's size. Smaller firms suffer significant loss. In percentage terms, post merger abnormal returns to large firms are trivial. Dimson and Marsh (1986) provide fresh insights into the impact of the size effect on event studies. Based on their findings, they conclude that an adjustment for firm size is quite important in studies of long-run stock performance; the long-term performance measures that ignored the size effect might be of no value to researchers. This adjustment is likely to be particularly important in studies of takeovers since acquiring firms are usually large firms.

Franks and Harris (1989) find that when targets are relatively large in comparison with bidders, there is no evidence that bidders lose. In contrast, target firms abnormal returns do appear higher when the target is small in relation to the bidder. Loughran and Vijh (1997) examine the influence of the relative size of target to bidding firms within stock mergers. They find that abnormal returns became smaller and eventually negative as the relative size of target to acquiring firm increase. In the top quartile of target to acquiring size ratio, they earn negative excess return.

2.7. Main Steps in the Studies of Takeover Returns

2.7.1. Early Studies (pre-1974)

Early empirical studies of mergers and acquisitions (pre-1974) applied comparative studies of firm performance to test for synergy in mergers and acquisitions. Kelly (1967) might be the first study to investigate merger profitability using measures including security price changes. His sample consists of 42 firms matched in 21 pairs of one merging and one non-merging firm. He compares pre-merger and post-merger performance based on five measures of profitability (percentage changes in stock price, P/E ratios, earnings per share, sales per share, and profit margin) and concludes that mergers have little impact on acquiring firm shareholders.

Hogarty (1970) constructs indices of investment performance based on changes in stock prices. His sample consists of 43 acquiring firms whose indexes are compared with similarly constructed indexes of their respective industries. He concludes that mergers have a negative effect on the profitability of the acquiring firms; investment performance of acquiring firms is 5% less (significant at a 10% level) than their industries' performance, and a neutral effect on the sum of acquired plus acquiring firms.

Lev and Mandelker (1972) face a similar problem of selecting a standard against which to compare merging firms' performance. Measuring profitability by the annual stock market return on each of 69 acquiring firms, they calculate the average return for the

five pre-merger and five post-merger years for each firm; they then deduct the respective pre- and post-merger average returns of 69 matching firms to control for factors presumed to identically affect each pair of firms. They find that the market value of acquiring firms rise an average of 5.6% (significant at the 10% level) more than that of the matching control firms.

To this point the evidence on security price changes resulting from mergers is conflicting, and these studies suffer from various shortcomings. Most employ small sample sizes and used rather primitive models, i.e., they neither adjusted for risk nor do they take into account of changes in risk. To solve these problems, the study of Mandelker (1974) appears.

2.7.2. Studies in 1970s (post-1974)

Mandelker (1974) and Ellert (1976)

Mandelker (1974) is generally considered the first modern treatment of the financial consequences of mergers, with merger completion dates being precisely determined and abnormal returns being calculated relative to a benchmark. Mandelker applies the Fama and MacBeth (1973) methodology to examine the profitability of mergers. He argues that betas of individual stock might be influenced by specific company-connected events. An acquisition might influence risk through a change in the mix of products produced by the acquiring firm. It might also indicate changes in its investment and growth policy. Mandelker estimates the betas for individual firms involved in mergers

by using the *ex post* form of the CAPM and measures the time period from months prior to the merger to months following the merger.

Mandelker (1974) tests two hypotheses. One is the perfectly competitive acquisition market hypothesis. The other is the efficient capital market hypothesis with respect to information on acquisitions. His findings are consistent with the hypothesis that the acquiring firms operate in a perfectly competitive market. The competition in the market for acquisitions resulted in competitive prices for the acquired firms. The acquiring firms thus earn normal rate of returns on the acquisitions. (The CAR of acquiring firms is 2.8% at month -1, and there is no increase in CAR during the period -7 to -1). They earn a rate of return equal to other investment or production activities of similar risk. The average residuals for the acquiring firms are generally positive but not statistically significant. However, He finds that stockholders of the acquired firms receive positive cumulative abnormal returns, (the CAR of the acquired firms rise by 13.1% during the seven-month period prior to the merger), indicating that they earn abnormal returns from the mergers. This evidence suggests that the acquired firms may have had some unique resources whose potential values are realized at the time of merger. Alternatively, the acquired firms may have been operating at below their optimal levels of efficiency, and the mergers have increased the effectiveness of their operations.

With respect to the hypothesis of efficient capital markets, Mandelker's findings are consistent with the view that the stock market operates efficiently with respect to information on mergers (i.e., anticipatory price movements preceding the effective date

of a merger reflect all valuable information in mergers). Thus, the stock prices of the participating firms at the time of the merger have already reflected all economic gains expected from the takeover. There no post-merger adjustment is observed in the stock prices of the merged firm. While significant changes in betas are observed, the rates of return adjusted efficiently to the changes in risk.

The findings of Mandelker (1974) are consistent with the two-parameter portfolio models and highlight the importance of appropriate measures of risk in estimating expected returns. It has been shown that failure to adjust for risk or take into account changes in risk lead to erroneous results in some previous research on mergers.

Ellert (1976) also employs the Fama & MacBeth (1973) methodology and uses a much larger sample for an overlapping period. Although his study is not primarily concerned with the market reaction to mergers in general, he provides evidences directly comparable to that of Mandelker's. Like earlier findings of Mandelker (1974), Ellert also finds that the impact on the common stock prices of merging firms takes place seven to twelve months prior to the actual merger. For acquiring firms, he finds that stockholders of acquiring firms earn significant positive abnormal returns over the seven to twelve months before the effective date of merger. This finding is inconsistent with Mandelker's. In study of the returns to acquired firms, he finds that the CAR rise by 14.6% from the beginning of month -7 to the end of the merger month and the t-statistic is very large. This result is consistent with that of Mandelker's.

Both Mandelker and Ellert find that very substantial increases in the CAR of acquiring firms take place during the period from four to eight years prior to the merger activity. This is consistent with the hypothesis that the differentially higher efficiency of acquiring firms prior to mergers leads to their subsequent expansion both internally and externally. With respect to acquired firms, both Mandelker and Ellert find that their CARs are significantly negative in the years and months running up to the period when information about their upcoming acquisition by other firms become available. The long history of negative abnormal returns for the sample of acquired firms is consistent with the hypothesis that these firms have been poorly managed. The dramatic gains experienced in the eight months leading to merger suggests that the owners of these assets receive prices that reflects the value of the asset bases under more efficient management. Such evidence is consistent with the hypothesis that mergers perform a useful economic function in reallocating resources from less efficient to more efficient users.

Dodd and Ruback (1977)

Mandelker (1974) reports that acquiring firms earn a normal rate of return from their acquisitions and that any gains from mergers accrue to shareholders of the acquired firms. His result confirms that the capital market is efficient with respect to information released in merger announcements. However, there are a number of limitations to be considered in assessing Mandelker's results.

First, he selected the 'effective date of merger' as his announcement date, thus 85 percent of his acquired firms are delisted in that month. He is unable to identify the

market reaction in the month of merger for acquired firms. Second, Mandelker(1974) reveals that shareholders of acquired firms earn abnormal positive returns over the seven months before the effective month. The pre-merger gains may reflect the market reaction to the earlier release of this information. In fact, accurate estimation of the market response to corporate acquisitions requires use of an earlier date (i.e., the date of public announcement of the acquisition). Third, Mandelker (1974) and previous studies consider only successful mergers and ignored many attempts that failed. The market reactions to unsuccessful attempts have rarely been estimated.

Due to above limitations, Dodd and Ruback (1977) apply the market model to estimate the market reaction to tender offers, and include both successful and unsuccessful tender offers into their sample. They define month 0 as the month of first public announcement of the tender offer. The most striking aspect of their findings is the large positive abnormal return earned by stockholder of successful and unsuccessful target firms in the month of the first public announcement of the tender offer. The abnormal return in month 0 is 20.58% with t-statistics of 25.81 for successful targets and 18.96% with t-statistics of 12.41 for unsuccessful targets. In contrast to the target firms, the abnormal return for successful bidders is 2.83% with t-statistics of 2.16 and 0.58% with t-statistics of 1.19 for unsuccessful bidders. Shareholders of bidding firms, both successful and unsuccessful, earn positive abnormal returns before the announcement of the tender offer. (CARs from month -60 to month -1 go from zero to 11.69% for successful bidders and from zero to 5.93% for unsuccessful bidders). Conversely, the stockholders of target firms appear to earn normal returns over the same period. For all classes of

firms there is no obvious pattern in the cumulative abnormal returns after the offer (i.e., period from month +1 to month +60).

Dodd and Ruback (1977) conclude that the gains to the unsuccessful target firms (abnormal positive returns in the event month and normal returns thereafter) are consistent with the information hypothesis and inconsistent with the synergy hypothesis. The information hypothesis predicts positive returns for unsuccessful targets as the information of future potential gains from elimination of the source of the inefficiency is revealed by the tender offer.

Firth (1979)

Studies of measuring common stock returns of takeovers in the 1970s have been primarily carried out in the U.S., such as Mandelker (1974), Ellert (1976), Dodd and Ruback (1977), Langetieg (1978). What does the U.K. evidence show? In order to conduct an independent investigation of the shareholders' wealth effects of takeovers in the U.K., Firth (1979) examines the profitability of takeovers in the U.K. His findings indicate that on average there are no gains associated with the takeovers and indeed there is a very small loss (possibly due to the expenses involved with the takeover process). The gain-loss is divided between the acquired firms and the acquiring firms and it is found that large gains is earned by the former and that these are offset with the loss by the latter. Regression analysis shows that the premium paid to target firms expressed as a percentage of the acquiring firm's market capitalization, is a major determinant of the loss suffered by the acquiring firm's shareholders.

Firth's study indicates that takeovers do not lead to any overall gains and the acquiring firm's shareholders lost wealth. These findings are consistent with the non-value maximization hypothesis (in the form of size maximization) other than the alternative value maximization hypothesis. However, we must notice that there are only three years data (1972-1974) in Firth's studies, his results may seriously suffer from the short sample period, and may not robust in the long time sample specification.

2.7.3. Studies in 1980s

Dodd (1980)

Mandelker (1974) and Ellert (1976) choose the effective date (the date of completion of the merger) as the event date to examine the impact of mergers to the shareholder returns. Dodd and Ruback (1977) use different methodology by choosing the announcement date as the event date to test the impact of tender offers to shareholders wealth in both successful and unsuccessful tender offers. However, there are few studies that have chosen the announcement date as the event date to study the impact of mergers to stockholders wealth. Furthermore, previous studies only consider completed mergers; merger proposals that are rejected by either the incumbent management or the target shareholders have been ignored. Moreover, as we notice, previous studies examine only the monthly returns to mergers and tender offers; no studies have examined the daily stock returns to the event of acquisitions.

To bridge the gap mentioned above, Dodd (1980) is the first study to examine the daily stock returns of mergers by choosing the announcement date as the event date. Daily

returns are studied for 151 merger proposals announced in the *Wall Street Journal* from 1971 to 1977. Among them, 71 are eventually completed, and 80 are canceled by either target or bidder management. The evidence indicates that target firm shareholders earn large positive abnormal returns from the announcement of merger proposals, irrespective of the outcome of the proposal. In both completed and canceled merger proposals, target shareholders, on average, earn approximately 13% abnormal return at the time the offer is initially announced. For those completed merger proposals, target firm shareholders earn positive abnormal returns after the announcement date. Over the duration of the merger proposals (defined as 10 days before the first announcement through 10 days after approval by target shareholders), target shareholders earn abnormal returns of 33.96%, on average.

For merger proposals that are subsequently canceled, target firms shareholders earn, on average, significant negative abnormal returns on the date of the announcement of the termination of negotiations. Over the duration of the proposal (defined as 10 days before the first announcement through 10 days after the termination) these shareholders earn abnormal returns of 3.68%. However, when the sample of canceled merger proposals is classified on the basis of whether or not the target firm's management terminating the negotiations, the market reaction is different. Where, the merger proposal vetoed by incumbent management, target stockholders earn, on average, 10.95% over the duration of proposal and this represents a permanent revaluation of the target shares. In the remaining canceled proposals, either bidder firm managements retract their offers or no reason for the terminations are given. Shareholders of target firms in these cases earn only 0.18% over the duration of the proposal, i.e., after an

initial gain of 13.43% at the time of first announcement of the merger proposal, the stock price returns to its pre-proposal level. In contrast, for stockholders of bidding firms, in both completed and canceled merger proposals, there is evidence of negative abnormal returns of -7.22% and -5.50% respectively, over the duration of the proposals.

Asquith and Kim (1982)

Previous empirical studies on mergers and acquisitions focused only on the effects of acquisitions on the shareholder returns of participating firms, these studies examine the wealth effects of only one group of the firm's claimants, the stockholders. However, acquisitions might have impact on other claimants of the participating firms. Shareholders positive abnormal returns might come at the expense of other claimants (especially the bondholders). There are two arguments on this issue. One supports that stockholder may earn positive abnormal returns at the expenses of bondholders by increasing the firm's risk level through acquisition activities. Thus the positive abnormal returns to stockholders would be a wealth transfer from bondholders. The other argues that acquisitions reduce the risk of the merging firms by combining two separate cash flows that are less perfectly correlated. The reduction in the risk level increases the market value of the merging firms' outstanding debt. This is the co-insurance effect for corporate debt. Lewellen (1971) first point out that the consolidation of two or more less perfectly correlated firms would reduce the risk of default and increase the debt capacity of the combined firms. However, without any real synergy or pure financial effects, the market value of the post-acquisition firm is simply the sum of the pre-acquisition firms market value. This means that the increase in the market value of outstanding debt leads to a decline in the market value of the equity.

Thus, the question is, are there any real wealth transfer between stockholders and bondholders?

Based on this point of view, Higgins and Schall (1975) and Galai and Masulis (1976) conduct further investigation and find that the co-insurance effect would lead to an increase in the market value of the merging firms' debt and a subsequent decline in the market value of their equity. Thus they conclude that the net financial result of non-synergistic mergers would be a wealth transfer from shareholders to bondholders. Kim and McConnell (1977) apply both theoretical and empirical approaches to investigate the co-insurance effect of corporate takeovers. Their findings indicate that bondholders of merging firms do not earn any positive abnormal returns around the time of merger, and there is no statistically significant wealth transfer from shareholders to bondholders.

To further examine the issue of wealth transfer between stockholders and bondholders, Asquith and Kim (1982) choose 50 firms out of 2870 firms involved in the acquisitions and announced in the *Wall Street Journal* from 1960 to 1978 by using four criteria. Their findings indicate that bondholders on average do not earn positive or negative abnormal returns. If wealth transfer does occur, it is offset by other effects. The evidence reveals that only acquired firm stockholders gain from the merger, and their gains do not come at the expense of other security holders. This finding is consistent with a market that efficiently resolves conflicts of interest between stockholders and bondholders. Finally, they conclude that mergers generate no noticeable impact on bondholders and no noticeable wealth transfers between bondholders and stockholders.

Asquith (1983)

Many previous studies such as Mandelker (1974), Ellert (1976), Langetieg (1978) and Dodd (1980) have already examined the effect of mergers on stockholder returns. However, all of these studies only valued the participating firms' stock at points during a merger bid, none of them examined the merging firms shareholder returns for the entire merger process. There was no thorough investigation of stock price behavior for merging firms before a merger bid. Mandelker (1974), Ellert (1976) and Langetieg (1978) all examine the period before the merger date, but they all use the outcome date of the merger as the event date and inevitably hide the stock market reactions before the merger bid begin. In addition, none of them examine the stock returns during the merger bid, (i.e., the period between the event date and the outcome date). Furthermore, the question of whether the bidding firm's shareholders gain on average from a merger bid was unresolved.

Asquith (1983) constructs a sample of successful and unsuccessful merger bids where the target firms were listed on the NYSE during 1962-1976. He investigates the stock returns in the entire merger process by using this sample. The evidence shows that abnormal returns occur throughout the period from the event date to the outcome date as new information is released and do not merely occur at the time of the announcement. Furthermore, the market reverses the initial positive abnormal returns for both target and bidding firms in unsuccessful merger bids. These results suggest that the announcement of a merger bid contains only limited information.

Asquith reports large significant negative CARs for both successful and unsuccessful target firms during the pre-announcement period. On the announcement day and the day before, both successful and unsuccessful target firms experience similar significant positive abnormal returns. On the outcome date, successful target firms earn significantly positive abnormal return, and unsuccessful target firms experience negative abnormal returns. During the interim period (period between the event date and the outcome date), the CAR rise for successful target firms and fell for unsuccessful target firms. Unsuccessful target firms suffer significant wealth loss in the post-merger period. On the other hand, the successful bidding firms experience a large significant positive CAR during the pre-announcement period and no significant CAR for unsuccessful biding firms at this period. There are no significant abnormal returns for successful bidding firms either on the event date and the outcome date or on the interim period. In contrast, there is significant negative CAR for unsuccessful bidding firms during the interim period. Both successful and unsuccessful bidding firms experience significant negative CAR during the post-merger period.

Schipper and Thompson (1983) & Asquith, Bruner, and Mullins (1983)

Almost all the previous studies so far have only examined the impact of the single acquisition to the participating firm shareholders. However, in some cases, individual mergers and tender offers are often a part of extensive acquisitions programs taking place over a number of years.

Schipper and Thompson (1983) examine the market reactions to the announcement of a major acquisitions program. They test the hypothesis that share prices of firms which

undertaking acquisition programs should fully reflect the expected value of those programs as soon as the entire program is announced or anticipated, (i.e., the stock prices at the time of the announcement fully capitalize the expected value of the program). They argue that the relevant measure of the benefit of acquisition activities is the original capitalized value of the programs that encompass the individual mergers.

Based on the findings, Schipper and Thompson (1983) conclud that acquisition programs undertaken before the merger-related regulatory changes of 1967-1970 (such as the Williams Amendments) are capitalized as positive net present value projects at the time the programs are announced. The view that positive pre-acquisition performance found in previous studies is consistent with the merger program announcement. The small positive returns for the acquiring firms at the acquisition event found in previous studies is consistent with the hypothesis that the initial capitalization of the acquisition program is relatively accurate, with only a minor adjustment required at the actual merger. They also find a significant adverse impact on share prices of acquiring firms after the regulatory changes. They explain the negative post acquisition performance found in some prior studies are because that many of the post acquisition months in these studies fell in the time after the date of the regulatory changes.

Asquith, Bruner and Mullins (1983) directly test the Schipper and Thompson hypothesis discussed above. They examine the market reaction to the first four merger bids in the merger program. The period before 1969 is also compared to the period after 1969. They also point out that measurement difficulties in calculating abnormal returns may

arise if the relative size of two participating firms was disparate (i.e., the size effect). The evidence shows that statistically significant CARs are observed for the acquiring firms' from the first to the fourth merger bids. This finding does not support the argument that all the benefits from mergers are capitalized in the acquiring firms' stock prices at or before the announcement of a merger program.

Regression analysis indicates that the relationship between the relative size of the target firm's equity and the acquiring firm's cumulative abnormal returns is positive and statistically significant. On average, a bid for a target firm half the acquiring firm's size experienced a cumulative abnormal return 1.8% greater than a bid for a target one tenth of the acquiring firm's size. Furthermore, the evidence indicates the excess returns to the acquiring firms prior to 1969 are higher than that after 1969, this is consistent with the hypothesis that the market for mergers have changed. Finally, they conclude that mergers are positive net present value activities for acquiring firms, and that merger programs are consistent with value-maximizing behavior by management.

Bradley, Desai and Kim (1983) & Fabozzi et al (1988)

Dodd and Ruback (1977) and Bradley (1980) find that firms in the unsuccessful tender offers experience significant and permanent increases in the share prices. Furthermore, Bradley (1980) finds that in unsuccessful tender offers, this permanent revaluation of the target shares exceeds the per share premium of the rejected bid. These evidences are consistent with the information hypothesis of tender offers and contradict the synergy hypothesis. While the revaluation of targets' shares of unsuccessful tender offers is consistent with the information hypothesis, it is not a sufficient evidence to reject the

synergy hypothesis. The positive returns to unsuccessful targets may be due to the anticipation of a future higher-valued bid.

Bradley, Desai and Kim (1983) investigates the rationale behind inter-firm tender offers by examining the stock returns realized by the target firm stockholders in unsuccessful tender offers and firms that have made unsuccessful offers. They point out that the information hypothesis does not predict that the value of target shares that receive no subsequent bid would fall back to their pre-offer level. The findings indicate that share prices of the target firms that are not targets of subsequent, successful acquisition attempts within five years of an unsuccessful offer fell back to their pre-offer level within two years. Share prices of those targets that received a successful subsequent bid experience an additional significant positive revaluation. This evidence reveals that the revaluation is due primary to the anticipation of another acquisition bid (i.e., gains to the stockholders of unsuccessful targets stem from the anticipation of a future successful acquisition and not simply from the revelation of new information regarding the true value of the target resources).

In addition to examining the unsuccessful target firms, they also investigate the stock returns of unsuccessful bidding firms. They argue that under information hypothesis the returns to unsuccessful bidding firm shareholders should not be affected by whether or not there is a change in control of the target resources. The empirical results indicate that, on average, the stockholders of unsuccessful bidding firms suffer a significant wealth loss in the wake of an unsuccessful offer. Further investigation reveals that this wealth loss is due primarily to the negative returns realized by firms that lost bids for

their targets to rival bidding firms. That is, if a firm makes an unsuccessful offer and the target is not acquired by another bidding firm, then there is no effect on the wealth of the unsuccessful bidding firms shareholders. However, if the offer fails because another rival firm successfully acquires the target, then the stockholders of the unsuccessful bidding firm suffer a significant wealth loss. This result is once again consistent with the synergy hypothesis. The successful bidding firm possesses specialized resources that allow for acquisition and that these resources are eventually used to put the unsuccessful bidding firm at a competitive disadvantage in the market.

Fabozzi et al (1988) extend the work of Bradley, Desai, and Kim (1983)'s by analyzing returns to target shares in the time between the date of offer and one year after the offer's failure and public withdrawal (i.e., the time from announcement to withdrawal and the first year after that event). Their findings give support to Bradley, Desai, and Kim (1983) studies. They find that all of offer premiums disappear by the time failure became public and abnormal returns are zero in the post failure year.

Malatesta (1983)

The studies discussed above are all investigated by using the abnormal rate of returns to examine the bidding and target firms shareholder returns. Malatesta (1983) examine the same question by using a different distinctive methodology. He calculates the wealth effects of mergers by the abnormal *dollar* returns in addition to abnormal rate of returns.

Malatesta's findings based on abnormal rate of returns are generally consistent with those of previous studies. However, his findings on abnormal dollar returns are

somewhat different. The evidence indicates that merger itself have a positive impact on acquired firm shareholders wealth. Cumulative abnormal dollar returns to target firms from five month before to the announcement date average 19.67 million dollars and it is statistically significant. However, acquired firm shareholders suffer wealth losses during the period well before a merger. Estimated cumulative abnormal dollar returns average -9.42 million dollars 61 months prior to the announcement date. Hence, the estimated net impact of the merger to the target firm shareholders wealth is negative prior to the announcement of the bid.

The results on the bidding firm side reveal that acquiring firm shareholders suffer wealth loss both immediately before and well before a merger. Cumulative abnormal dollar returns to acquiring firms from five months before to the announcement date average -27.65 million dollars. The cumulative abnormal dollar returns over the 61 month prior to the announcement date is -111.17 million dollars. Both of these estimates are statistically significant. According to these results, Malatesta conclude that merger is negative net present value project for acquiring firms and this is inconsistent with previous studies by using the abnormal rate of returns. The evidence of previous studies shows that acquiring firms experienced a quite good performance prior to the merger announcement.

Dennis and McConnell (1986)

A number of empirical studies have documented the effect of merger on the wealth of the common shareholders of merging firms, and a much smaller number of studies examined the returns to the senior securities of merging firms. However, these studies

investigate returns only to non-convertible bonds, leaving the question of what effect the merger have on the market values of firms' other senior securities unanswered. Dennis and McConnell (1986) bridge the gap by examining the effect of merger on the wealth of the various classes of merging firms' securityholders (i.e., common stockholders, preferred stockholders, both convertible and non-convertible, and bondholders, both convertible and non-convertible).

Dennis and McConnell examine the returns to above security-holders of both target and bidding firms around the announcement date of bids. The evidences indicates that, on average, target firms' common stockholders, convertible and non-convertible preferred stockholders, and convertible bondholders receive statistically significant gains in mergers as did bidding firms' convertible preferred stockholders. The results also indicate that, on average, target firms' non-convertible bondholders and bidding firms' convertible bondholders, non-convertible preferred stockholders, and non-convertible bondholders neither gain nor lose by a statistically significant amount in mergers. Finally, for bidding firms' common stocks, the results are sensitive to the time period used to measure returns. However, on average, there is no evidence that bidding firms' stockholders lose, and there is some statistically significant evidence that they gain in mergers. When the abnormal returns are calculated by dollars, the evidence indicates that, on average, the total value of both the target and bidding firm increase by a statistically significant amount around the date of merger announcements. The evidence also suggests, that, on average, the combined dollar value of the target and bidding firms increase by a statistically significant amount.

A number of previous studies have reported that the common stockholders of bidding firms received negligible gains in mergers. So one question left to us is what is the exact reason for bidding firms to undertake mergers if there is no gains. Dennis and McConnell's studies provide us some insight of this question. As the evidence revealed that some classes of security-holders other than common stockholders reap the gain and the total value of the firm increase by a statistically significant amount in merger, this is the sufficient motive to undertake the merger. Pervious studies of mergers have investigated only common stock returns to examine the total wealth effect of merging firms. In principle, such studies should examine the returns to all classes of the merging firms' securities. Thus, the failure of previous studies to consider the effect of merger on the other various classes of merging firms' securities would lead to a biased estimate of the total value created by the merger.

Travlos (1987)

Previous studies on corporate takeovers provided inconclusive results on the wealth effects of takeovers on the common stock of bidding firms. The existence of mixed empirical findings for the bidding firms makes it difficult to interpret existing evidence and to draw conclusions about the managers' acquisition motives. However, it is observed that mergers are usually common stock exchange offers whereas tender offers are usually cash offers. Since the different methods of financing have different signaling implications, the mixed stock returns of bidding firms in mergers and tender offers may be due to the method of payment in financing takeovers. Although the method of payment in acquisitions have been suggested to be important (Carleton et al 1983), no

previous studies provided a direct confirmation of the bidding firms' differential return relationship across different methods of payment.

Travlos (1987) examines the impact of the method of payment on the common stock prices of bidding firms at the announcement of unanticipated takeover proposals by investigating a sample of successful takeovers during the period 1972-1981. His analysis is mainly concerned with the wealth effects associated with two distinct methods of payment: common stock exchanges and cash offers. The findings on the pure stock exchange offer bidding firms indicate that their shareholders suffer statistically significant loss at the announcement of the takeover proposals. In contrast, the results on the cash offer bidding firms show that shareholders earn normal rates of return at the announcement period. Furthermore, the differences in the abnormal returns between these two groups are statistically significant and independent of the type of takeover studied (i.e., mergers or tender offers). Based on these evidences, Travlos points out that the results are consistent with the signaling hypothesis, which implies that financing a takeover through pure stock exchange offer conveys the negative information that the bidding firm is overvalued. The results also suggest that the mixed results of earlier studies might be due to the failure to control for the method of finance.

Franks and Harris (1989)

Jensen and Ruback (1983) provide a comprehensive survey on the shareholders wealth effects of corporate takeovers in the U.S. They conclude that target firms clearly gain and bidding firms gain or at least do not lose. However, There are not as many studies in the U.K. as that in the U.S.

The evidences in the U.K. studies are mixed and lacked of such consensus shown in the U.S. studies. Furthermore, previous U.K. studies suffered from either small samples or samples confined to short periods. Thus a comprehensive U.K. study of the wealth effects of takeovers is very much demanded.

Franks and Harris (1989) conduct a comprehensive U.K. study by using a sample of more than 1,800 U.K. acquisitions covering a 30-year period (from 1955 to 1985). Their study provides independent tests of many issues addressed in studies of U.S. acquisitions and also offers us the opportunity to see whether parallel findings emerge for the U.K.

Their findings indicate that, on average, mergers are value creating for shareholders as measured by equity market prices around the date of merger announcement. Shareholders of target firms gain, and bidding firm shareholders gain or do not lose. Target shareholders gains and merger benefits appear to be higher in revised or contested bids. This evidence is similar to that found in many U.S. studies. By comparing the institutional differences between the two countries, they find that target wealth gains in both the U.K. and U.S. increased after 1968, this suggests that increases in U.S. target gains at the same period might not be attributed to the Williams Act. Finally, after the mode of acquisition (merger or tender offer) is controlled for, gains to U.K. targets are strikingly similar to those in the U.S.; this suggests the wealth effects of acquisitions are quite comparable in the two countries.

2.7.4. Studies in 1990s

Franks, Harris and Titman (1991)

Previous studies on the wealth effect of acquisition activities surveyed by Jensen and Ruback (1983) report an average abnormal returns of -5.5% during the twelve months after the completion of takeovers. They interpret such negative abnormal returns as an unsettled issue, since it is inconsistent with the market efficiency hypothesis and suggests that changes in share prices during takeovers overestimate the future gains from acquisitions. Negative post acquisition abnormal returns are also found by Franks, Harris, and Mayer (1988), they examine a comprehensive sample of U.S. and U.K. acquisitions during the period of 1955-1985. In interpreting these results, Ruback (1988) notes that 'Franks, Harris and Mayer use almost all mergers, and so the selection bias argument seems less plausible' and suggested again that the evidence is inconsistent with the market efficiency.

However, the conclusion on the post-merger performance of acquiring firms is not all one-sided. Langetieg (1978) finds that post-merger abnormal performance is not significantly different from that of a control firm in the same industry. Neither Mandelker (1974) nor Malatesta (1983) find significant underperformance after the acquisition. In addition, Bradley and Jarrell (1988) find little evidence of significant underperformance in the three years following acquisitions.

To examine this unsettled issue, Franks, Harris and Titman (1991) provide a more comprehensive analysis of post-merger performance by investigating 399 U.S.

takeovers undertaken in the 1975-1984, they examine in particular whether the negative abnormal returns found in prior studies are due to an incorrect adjustment for risk. In their study, they analyze various subsets of the sample in order to evaluate the possible determinants of post-merger performance. They divided their sample by the method of payment, the relative size of the target and the bidder, the level of opposition by incumbent management and the presence of competing bidders. In addition to using the equal-weighted index and the value-weighted index as single index benchmarks, they also apply two multi-portfolio benchmarks: a ten-factor benchmark and an eight-portfolio benchmark. They highlight the results by using the eight-portfolio benchmark and include the other three benchmarks for comparison purposes.

By using the equal-weighted index, their findings confirm earlier studies that find negative abnormal returns in post-merger period. However, this result is not robust to the choice of the benchmark. By using the value-weighted benchmark, they report positive post-merger performance. In contrast, the results generated with multi-factor benchmarks, in particular the eight-portfolio benchmark; show no statistically significant abnormal performance for the overall sample of bidders. The traditional single-factor benchmarks are quite sensitive to the method of payment, the relative size of the target to the bidder, and whether or not the bid is contested by incumbent management or other bidders; they generate significant differences in post-merger performance in examining these sub-samples. However, the eight-portfolio benchmark reveals smaller difference that is not statistically significant in these sub-samples. According to these findings, Frank, Harris and Titman point out that the prior findings

of negative post acquisition abnormal returns for biding firm shareholders are 'more likely due to benchmark errors than to mispricing at the time of the announcement'.

Agrawal, Jaffe and Mandelker (1992)

Agrawal, Jaffe and Mandelker (1992) also conduct a thorough analysis of the post-merger performance of bidding firms. They select a nearly exhaustive sample of mergers over 1955 to 1987 between NYSE acquirers and NYSE/AMEX targets. After adjusting for the firm size effect as well as beta risk. They find that shareholders of the bidding firms suffer a statistically significant wealth loss of about 10% over the five years following the merger completion. This finding is robust to a variety of specifications and does not seem to be caused by changes in beta following the merger. With these evidences, they conclude that the efficient market anomaly of post-merger underperformance highlighted in Jensen and Ruback's (1983) review is not resolved. In comparing with Franks, Harris and Titman's (1991) results, they point out that the contrary results were specific to their sample time period (1975-1984) and are due to the mixing of tender offers with mergers in their sample. To interpret what causes the large negative abnormal returns after the merger, they suggest that one possibility is that the market is slow to adjust to the merger event (i.e., the long-run performance reflects that part of the NPV of the merger to the acquiring firms which is not captured by the announcement period return). However, their results are inconsistent with this hypothesis.

Healy, Palepu and Ruback (1992)

While almost all the previous studies in examining the wealth effects of acquisitions have used common stock price approaches, this methodology has obvious shortcomings. Stock price studies are unable to distinguish between the real economic gains and the market inefficiency explanations; stock price studies are also unable to identify the sources of any merger-related gains. Motivated by the inability of the stock price studies, Healy, Palepu and Ruback (1992) apply post-merger accounting data to test directly for changes in operating performance that resulted from mergers.

Healy, Palepu and Ruback (1992) investigate post-acquisition performance for the 50 largest U.S. mergers between 1979 and 1984. In the study, they examine the post-merger cash flow performance of bidding and target firms, and explore the sources of merger-related changes in cash flow performance. Their findings indicate that merged firms have significant improvements in operating cash flow returns after the merger, the improvement result from increases in asset productivity relative to their industries. These improvements are particularly strong for transactions involving firms in overlapping business. The evidence shows that post-merger cash flow improvements do not come at the expenses of long-term performance, since sample firms maintain their capital expenditure and R & D rates relative to their industries after the merger. Finally, they find a strong positive relation between post-merger increases in operating cash flows and abnormal stock returns at merger announcement, indicating that expectations of economic improvements explain a significant portion of the equity reevaluations of the merging firms.

Loughran and Vijh (1997)

A few studies have already in particularly examined the assumption of market efficiency by measuring abnormal returns after the takeover effective date. However, their findings are mixed. Frank, Harris and Titman (1991) find no evidence of significant abnormal returns over a three-year period after the merger outcome date. In contrast, Agrawal, Jaffe and Mandelker (1992) find that tender offers are followed by insignificant abnormal returns, but mergers are followed by significant abnormal returns of -10% over a five-year period after the merger effective date.

Loughran and Vijh (1997) reexamine this controversial issue by investigating a sample of 947 firms delisted from the NYSE, AMEX and NASDAQ during 1970-1989, this study distinguishes with previous studies in two important aspects. First, the previous studies recognize that post-acquisition underperformance are inconsistent with market efficiency, and the abnormal returns imply that wealth gains from corporate acquisitions are overstated if measured simply over the pre-acquisition period. But they do not report the overall wealth gains by combining the pre-acquisition and post-acquisition returns. Second, Loughran and Vijh apply a different methodology to compute the excess returns; they measure abnormal returns by the difference between five-year holding period returns of sample stocks and matching stocks (chosen to control for size and book to market effects).

Their findings reveal that during a five-year period following the acquisition, on average, firms that complete stock mergers earn significant negative abnormal returns of -25% whereas firms that complete cash tender offers earn significant positive abnormal

returns of 61.7%. Over the combined pre and post acquisition period, target shareholders who sold out soon after the acquisition effective date gain from all acquisitions, those who held on to the acquirer's stock received as payment find their gains diminish over time. Furthermore, target shareholders in the top quartile of target to bidding firm size ratio find their gains reverse and became negative. This findings suggest that wealth gains following the announcement of an acquisition do not only disappear in cases where the current bid failed and no subsequent bid materialized (as shown in Bradley, Desai and Kim (1983) and Asquith (1983)), but also in cases where the bid succeeded and the target is large relative to the bidder.

Chang (1998)

The studies on the shareholders wealth effects of corporate takeovers to the acquiring firms so far examined only the takeovers of publicly traded targets, few studies have examined the acquiring firms' common stock returns on taking over privately held targets. Takeovers of privately held targets seem as a quite interesting issue when they are financed with common stock. Because in this case, the financing of takeovers is similar to private placements of equity since target firms are owned by one or a small number of shareholders. It is quite interesting to know that if the results of takeovers of privately held firms are consistent with what we have found in takeovers of publicly traded targets.

Chang (1998) constructs a sample of 281 firms that successfully acquire privately held firms during the period of 1981-1992. This sample is divided into 131 cash offers, 100 stock offers and 50 mixed offers. He examines the bidding firm stock returns at the

announcement of a takeover proposal to a privately held firm. The evidences shows, on average, bidding firms offering common stock experience a positive return, and those choosing cash offer do not find any significant abnormal returns. The finding of positive abnormal return earned by stock financing strikingly contrasts with the negative abnormal return earned by common stock financing in acquiring a publicly held firm. In interpreting this result, Chang suggests that ownership is highly concentrated in privately held firms, acquiring these firms through stock offer tends to create large blockholders. These large shareholders effectively monitor the managerial performance and enhance the takeover prospects of the firm.

2.8. The Wealth Effects of Takeover Activities throughout the Entire Acquisition Process

2.8.1. Shareholder Returns in Pre-Announcement Period

2.8.1.1. Target Firm Shareholder Returns

Mandelker (1974) finds that target firms' CAR is slightly negative during the period of month –30 to –7, and during the 12-month period –20 to –9, eight of the monthly average residuals are negative. However, There are increasing positive abnormal returns from month –7 to –1 and a big increase in the CAR during these periods. This evidence suggests that positive information regarding the merger starts to leak out to the market about 7 months before the merger. Ellert (1976) applies the same methodology and a much larger sample, to target firm shareholders, he finds that the CAR is strictly negative and accumulate to –11.7% over the months –100 to –8, and then the CAR rise by 14.6% from the beginning of month –7 to the end of the merger month and the t-statistic is very large. This result is consistent with that of Mandelker's. Langetieg (1978) finds target firms experience a significant negative average CAR over period of month –72 to –19.

Since the limitation of Mandelker and Ellert studies (They both choose the outcome date of merger as the announcement date), Dodd and Ruback (1977) apply different methodology by distinguishing the announcement date and the outcome date (use month 0 as the first public announcement of the bid). They find that shareholders of target

firms earn normal returns over the period of month –60 to –1. Franks, Broyles and Hecht (1977) find that shareholders of target firms have enjoyed positive abnormal returns averaging 26% during the four months prior to the merger announcement. Firth (1979) reports that target firms experience slightly negative returns from month –24 to month –4, and the CAR at month –4 is –2.3% and that 56% of firms have negative CAR. This evidence is consistent with Mandelker (1974) that acquired firms have a poor stock market performance prior to the takeover. However, abnormal returns of target firms' shareholders increase sharply in months –3 to –1.

Firth (1980) reveals that there is no evidence of significant abnormal returns to the target firm shareholders from 48 months to 2 months prior to the takeover announcement. However, in month –1, successful target firm shareholders earn an abnormal return of 6.5% with a t-statistic of 5.423 and unsuccessful target firm shareholders earn an abnormal return of 8.4% with a t-statistic of 6.171. Asquith (1983) defines the period from –480 days to –20 days prior to the announcement date as the pre-announcement period. He finds that the CAR for both successful and unsuccessful target firms have declined to –14.1% and –10.5% respectively from day –480 to –20. Martin and McConnell (1991) examine the pre-takeover performance of the targets. They find that the CAR is 4.31% with a t-statistic of 1.03 for the whole sample over the period from 48 months before through 3 months before the tender offer.

Apart from using only the abnormal rate of return to evaluate the wealth effect of the takeover activity, Malatesta (1983) report that the cumulative abnormal dollar return to target firms from five month before to the announcement date average 19.67 million

dollars and it is statistically significant. However, acquired firm shareholders suffer wealth loss during the period well before a merger. The cumulative abnormal dollar return of target firms is -9.42 million dollars 61 months up to the announcement of the takeover. Hence, he concludes that the estimated net impact of the merger to the target firm shareholders wealth is negative prior to the announcement of the bid.

2.8.1.2. Bidding Firm Shareholder Returns

In study of pre-announcement stock returns to bidding firms, Mandelker (1974) finds that the CAR start to rise from 30 months prior to the merger, and the CAR increase during the 30 months prior to merger by 5.1%. This evidence suggests that the informational impact of a forthcoming merger is spread over about 30 months before the outcome date. However, there is no increase in CAR during the period –7 to –1. By applying the same methodology and a much large sample, Ellert (1976) finds that shareholders of bidding firms earn significantly positive abnormal returns over the seven to twelve months before the effective date of merger. This finding is inconsistent with Mandelker's.

Dodd and Ruback (1977) find that bidding firm stockholders, both in successful and unsuccessful takeovers, earn positive abnormal returns before the announcement of the tender offer. The CAR goes from 0 to 11.69% for successful bidders and from 0 to 5.93% for unsuccessful bidders during the period of month –60 to –1. Franks, Broyles and Hecht (1977) report that shareholders of acquiring firms have experienced small but positive abnormal returns during the four months prior to a merger. Firth (1979) shows

that shareholders of acquiring firms earn normal rate of returns during the period from month –24 to month-1.

Firth (1980) indicates that there are no significant abnormal returns to the bidding firm shareholders from 48 months prior to the month of the takeover announcement. Asquith (1983) finds that the CAR for both successful and unsuccessful bidding firms has risen to +14.3% and +2.2% respectively during that period. Schipper and Thompson (1983) find the CAR of bidding firms start to rise 30 months prior to the announcement of the takeover bid. The evidence indicates the increase in CAR from month –24 to the event month is over 20% with a t-statistic of 2.77, with particularly in the year that covers month –11 through the event month, the CAR is about 13.5% with a t-statistic of 2.26.

Malatesta (1983) reports that acquiring firm stockholders suffer wealth loss both immediately before and well before a merger. Cumulative abnormal dollar returns to acquiring firms from five months prior to the announcement date average -27.65 million dollars. The cumulative abnormal dollar returns over the 61 month prior to the announcement date is -111.17 million dollars. Both of these estimates are statistically significant. Based on these results, Malatesta concludes that merger is negative net present value project for acquiring firms.

2.8.1.3. Summary

The target firm shareholder returns, on average, experience negative abnormal returns from five to two years prior to the takeover announcement, the CARs are negative

during these periods. There is also some evidences show that target shareholders earn normal returns four or two years prior to the announcement of the bid. However, there is little evidence of the outperformance of the target shares during the period well before the takeover announcement.

In contrast, vast majority of studies on the bidding firms side reveal that bidding firm shareholders earn a significant positive abnormal returns from five to two years prior to the takeover announcement. These results are consistent with the hypothesis that bidding firms have a good performance several years prior to the takeover bid. However, Firth (1979, 1980) found normal returns to bidding firm shareholders four or two years before the announcement of the takeover proposal. In sum, bidding firm stockholders, on average, earn significant positive abnormal returns several years prior to the announcement of the takeover bids.

2.8.2. Shareholder Returns in the Announcement Period of the Bid

2.8.2.1. Target Firm Shareholder Returns

Dodd and Ruback (1977) find striking large positive abnormal returns earned by shareholders of both successful and unsuccessful target firms in the month of the first public announcement of the tender offer. The average residual in month 0 is 20.58% with t-statistic 25.81 for successful targets and 18.96% with t-statistic 12.41 for unsuccessful targets. Firth (1979) reports the abnormal returns of target firms at the announcement month of takeover is 22%. Firth (1980) investigates the takeover

announcement month abnormal returns to both successful and unsuccessful targets in the U.K., shareholders of successful targets earn an abnormal return of 28.1% with a t-statistic of 31.07, and shareholders of unsuccessful targets earn an abnormal return of 31.2% with a t-statistic of 31.866.

Instead of applying monthly rate of returns, Dodd (1980) investigates the daily market reaction to the announcement of merger proposals. There is striking evidence of the large positive abnormal returns earn by shareholders of target firms on the day of public announcement of the takeover proposal and the day before. The abnormal return on day –1 (the accurate announcement date is in fact day –1 for some firms) is 8.74% with a t-statistic of 23.80, and on day 0 is 4.3% with a t-statistic of 11.71. Asquith (1983) findings are similar with Dodd's, the two-day (day –1 and day 0) abnormal return is 6.2% for successful target firms and 7.0% for unsuccessful target firms. The t-statistics are +23.07 for target firms in successful merger bids and +12.83 for target firms in unsuccessful merger bids.

Dennis and McConnell (1986) find that the market-adjusted returns on days –1 and 0 are 4.50% and 4.06% for target firms' common stocks, respectively. The t-statistics are 4.04 and 4.52 respectively. The two-day announcement period market-adjusted return is 8.56% and with a t-statistic of 7.07. Huang and Walkling (1987) report that target firms abnormal returns on day –1 is 14.3% with a t-statistic of 85.738, and on day 0 is 9.3% with a t-statistic of 55.694. For the two-day announcement period, target firm shareholders earn an average abnormal return of 23.4%.

Bradley, Desai, and Kim (1988) present that target firm shareholders receive a statistically significant abnormal return of 14.5%, and the CAR is 24.57% on the day of tender offer announcement. Franks and Harris (1989) show that target shareholders earn statistically significant positive abnormal returns of about 23% at the month of announcement of the takeover proposal.

Sudarsanam, Holl, and Salami (1996) investigate shareholders wealth gains in mergers by using a sample of 429 completed U.K. acquisitions during 1980-1990. They find that target firm shareholders experience statistically significant returns of 13.96% on the day of the merger announcement. Kennedy and Limmack (1996) using U.K. data of 1980-1989 find that target firm shareholders earn a large significant positive abnormal return of 28.75% in the month of takeover announcement. Draper and Paudyal (1999) report that UK target firm shareholders earn a significant abnormal return of 7.66% (equally weighted) and 7.18% (value weighted) on the day of announcement of the bids, respectively.

2.8.2.2. Bidding Firm Shareholder Returns

Dodd and Ruback (1977) shows that successful bidding firm shareholders earn 2.83% abnormal return with a t-statistic of 2.16 in the month of the first public announcement of the tender offer, and unsuccessful bidding firm shareholders earn only 0.5% abnormal returns with a t-statistic of 1.19 in the same period. Firth (1979) finds that abnormal returns at month 0 for firms offering cash payment is –2.4%, and for firms offering equity payment is –3%. Firth (1980) reports successful bidding firm

shareholders suffer a significant negative wealth loss of –6.3%, and unsuccessful bidding firm shareholders also experience a significant negative wealth loss of –6%.

Dodd (1980) reveals a small but negative return to bidding firms on the announcement day of merger proposals. The abnormal return at day –1 is –0.4% (the accurate announcement date is in fact day –1 for some firms) with a t-statistic of –2.46, and at day 0 is –0.62% with a t-statistics of –2.83. Asquith (1983) finds little reaction on the announcement day of a merger bid for both successful and unsuccessful bidding firms. The two-day (day –1 and day 0) abnormal returns are 0.2% for successful bidding firms and 0.5% for unsuccessful bidding firms, and the t-statistics are 0.78 for successful bidding firms and 1.92 for unsuccessful bidding firms respectively.

Asquith, Bruner and Mullins, Jr. (1983) report that average announcement date abnormal return for all merger bids is 0.9% with a t-statistic of 4.68. Dennis and McConnell (1986) find bidding firms market-adjusted returns on day –1 and day 0 are 0.22% with a t-statistic of 0.81 and –0.34% with a t-statistic of –1.48, respectively. The market-adjusted return for the two-day announcement period is –0.12% with a t-statistic of –0.33.

Travlos (1987) finds that bidding firms choosing common stock financing had a negative effect on their common stock returns at the announcement period. Abnormal return on day –1 is –0.78% with a t-statistic of –3.95 and on day 0 is –0.69% with a t-statistic of –3.22. In addition, the abnormal return in the two-day announcement period is –1.47% with a t-statistic of –5.07. In contrast, bidding firms using cash offers

experience, on average, normal rate of returns. Abnormal returns are –0.05% with a t-statistic of +0.02 on day –1 and 0.29% with a t-statistic of 1.56 on day 0, respectively. In addition, the two-day announcement period abnormal return is 0.24% with a t-statistic of 1.11.

Bradley, Desai, and Kim (1988) find a small but insignificant abnormal return on the day when the tender offers are first announced. The average CAR to all the 236 bidding firms from event day –5 to +5 is 0.79% with a t-statistic of 1.69. Franks and Harris (1989) report that UK bidding firm shareholders earn statistically significant positive but small abnormal returns (about 1%) in the month of takeover announcement. Sudarsanam, Holl, and Salami (1996) find that UK bidding firm shareholders suffers a significant negative abnormal return of –1.26% at the day of the merger proposal announcement.

Kennedy and Limmack (1996) find that UK bidding firm shareholders earns a small but significant positive abnormal return of 1.40% in the month of takeover announcement. Draper and Paudyal (1999) observe that UK bidding firm shareholders experiences a small but significant negative abnormal return of –0.82% (equally weighted) and –0.66% (value weighted) on the announcement day of merger proposals, respectively.

2.8.2.3. Summary

There are striking evidences of large significant abnormal returns to the target firm shareholders at the period of takeover announcement. Studies either based on the

monthly rate (month 0) of returns or daily rate (day –1 and/or day 0) of returns report a high significant abnormal return to the target shareholders, and all study is consistent with this result.

The results on the bidding firms side are mixed. There are three groups based on the various results. One group finds that bidding firm stockholders earn a small but significant abnormal return on the takeover proposal announcement date. Another group argues bidding firm stockholders experience a normal rate of return during the bid announcement date. The final group reveals a small but significant negative abnormal return at the announcement of the bid. Since the significant positive or negative abnormal returns were quite small in all the studies, we might able to conclude that, on average, bidding firm stockholders earn a normal return at the announcement date of takeover bids.

2.8.3. Shareholder Returns Between the Announcement Date and the Outcome Date

2.8.3.1. Target Firm Shareholder Returns

Dodd and Ruback (1977) estimate the shareholder returns after the announcement month of takeover proposals. They find no statistically significant abnormal returns for target firm shareholders (both for successful and unsuccessful targets) during 12 months after the takeover announcement. Firth (1980) fails to find any statistically significant abnormal returns for both successful and unsuccessful target firms in the period of 12

month after the month of takeover announcement. Bradley, Desai, and Kim (1988) report normal rate of returns to the target firm shareholders in the four months period after the day of takeover announcement.

Asquith (1983) examines the interim period (i.e., the period from one day after the event day until two days before the outcome day) abnormal returns. The evidence shows that successful target firm shareholders earn a large positive CAR of 8.0% with a t-statistic of 4.00, and unsuccessful target firms in contrast experience a wealth loss of –8.1% with a t-statistic of –3.43.

2.8.3.2. Bidding Firm Shareholder Returns

Dodd and Ruback (1977) do not find any statistically significant abnormal returns both for successful and unsuccessful bidding firm shareholders in the 12 months immediately after the month of takeover announcement. In contrast with Dodd and Ruback's finding, Firth (1980) finds that unsuccessful bidding firm shareholders experience a statistically significant abnormal return of 4.3% in the 12 months period after the takeover announcement. Bradley, Desai, and Kim (1988) report a normal return to the bidding firm shareholders within this period. Kennedy and Limmack (1996) find that there is no significant abnormal return to the UK bidding firm shareholders in the twelve months beginning with the month of bid announcement.

By examining the interim period (i.e., the period from one day after the press day until two days before the outcome day) abnormal returns. Asquith (1983) finds that during

the interim period the average CAR for successful bidding firms is small, -0.46% and insignificant. However, the CAR for unsuccessful bidding firms is –6.19% with a t-statistic of –3.83.

2.8.3.3. Summary

There are not many studies on examining both the target and bidding firm shareholder returns during the period between the takeover announcement date and the outcome date. Asquith (1983) may be the only specific study to examine the merging firms stock returns in this interim period. However, his results either to the targets or to the bidders are inconsistent with the studies that investigated the merging firm returns in the 12 months period after the takeover announcement.

2.8.4. Shareholder Returns at the Outcome Date of Acquisitions

The outcome date of acquisitions for the completed mergers is the date of announcement of the approval of the merger by the target stockholders and for the cancelled proposals it is the date of announcement of the termination of the merger negotiations by either or both boards of directors.

2.8.4.1 Target Firm Shareholder Returns

Dodd (1980) finds that the final approval of the mergers by stockholders have little impact on the value of the shares of target firms, the average abnormal return for target

firms is 0.08% at the approval day and 0.68% with a t-statistic of 2.58 at the day before. According to this result, he argues that most of the uncertainty as to the completion of the merger has been resolved before the final stockholder vote. In contrast, the abnormal returns to target firm shareholders in the announcement of termination of merger proposals is striking. On the day of the public termination announcement, target firm stockholders experience a negative abnormal return of –4.52% with a t-statistic of –10.39, and –4.16% with a t-statistic of –9.56 on the day before, respectively.

Asquith (1983) investigates the shareholder returns on the date of merger approval. The evidence indicates that shareholders of successful target firms earn an abnormal return of 1.3% with a t-statistic of 5.99 on the outcome date and the day before. This result differs with Dodd (1980)'s. On the other hand, the abnormal return for the target firm shareholders in the unsuccessful mergers is dramatic. The two-day (outcome date and the day before) abnormal return is –6.4% with a t-statistic of –11.37.

2.8.4.2. Bidding Firm Shareholder Returns

Mandelker (1974) finds that bidding firm stockholders earn a normal rate of return at the month of the announcement of merger outcome. Dodd (1980) examines the market reaction to the announcement of the outcome of merger proposals. He finds that the final approval of mergers by stockholders have little impact on the values of shares of bidding firm stockholders, the average abnormal return at the approval date for bidders is 0.23%. On the other hand, he finds a slight positive abnormal returns to stockholders of bidding firms in cancelled mergers. On the day of the public termination

announcement, the average abnormal return to the bidding firm shareholders is 0.18%, and 1.06% with a t-statistic of 3.50 at the day before.

Asquith (1983) reports that there are no significant stock price changes for both successful and unsuccessful bidding firms on the announcement date of the merger outcome. Lahey and Conn (1990) show that on the month of approval the CAR is –4.47% for using MM model and is –3.11 for using MAR model. However, these results are failed to be significant at a 5% level of significance.

2.8.4.3. Summary

Empirical findings on the common stock returns to both target and bidding firm shareholders are quite consistent with each other. Successful target firms experience a slightly significant positive abnormal return at the outcome date. However, unsuccessful target firms suffered a large and significant wealth loss. In contrast, both successful and unsuccessful bidding firms, on average, experienced a normal rate of return at the takeover outcome date.

2.8.5. Shareholder Returns in the Post-Acquisition Period

2.8.5.1. Unsuccessful Target Firm Shareholder Returns

Asquith (1983) examines the post-merger stock returns to the unsuccessful target firms, his findings indicate that the decline of the CAR is small and insignificant for the first

80 days following the outcome date, but then decrease swiftly over the next 160 days becoming significant for days +100 to +240. The total decline of the CAR from the outcome date (day 0) to the day +240 is 8.7%.

Bradley, Desai and Kim (1983) find that the entire abnormal returns gain from the announcement of takeover proposals to the target firms that are not subsequently taken over within five years of an unsuccessful offer dissipate within two years of the initial unsuccessful bid.

2.8.5.2. Bidding Firm Shareholder Returns

There are quite a few studies conducted on the bidding firms long-run post acquisition stock returns. We shall firstly have a brief look of the studies conducted in the UK. Firth (1979) shows the CAR (cumulative abnormal returns) of acquiring firms choosing cash offer decreases by 2.6%, and the CAR of acquiring firms offering equity decreases by 7.8% at the end of 24 months after the takeover announcement. Barnes (1984), Dodds and Quek (1985) report a CAR of –6.3% and –6.8% over the 60 months following the takeover announcement, respectively. Franks and Harris (1989) find that successful bidding firms suffer significant wealth loss in the two years period after the completion of takeovers, the CAR by using the market model is –12.6% by 24 months after the merger. Limmack (1991) uses three benchmarks to compute the post-acquisition abnormal returns. All the benchmarks produce significant negative CARs by 24 months following the completion of takeovers, and on average, the CAR is –9%. Kennedy and Limmack (1996) take into account of the size effect, they show that overall size

adjusted returns are negative with bidder abnormal returns being a significant –4.92% for the period 12 to 24 months post bid. Gregory (1997) examines the post-merger performance of UK bidding companies by using six benchmarks. He finds the two years CARs between –11.8% to –18% under these six different models, all of which are statistically significant.

The evidence of long-term significantly negative abnormal returns of the merged firms following takeovers is echoed in the US. Langetieg (1978) reports significant CARs between –2.23% and –2.62% over 70 months using four different statistical methods. Asquith (1983) reports that the CAR decreases by 7.2% for the merged firms in the 240 days following the merger completion date. Malatesta (1983) finds statistically significant CARs of –7.6% for the year after the first public announcement of the merger proposal. Jensen and Ruback (1983) survey seven previous studies of bidding firms' post-takeover performance and report an average CAR of –5.5% in 12 months after the takeover. Magenheim and Mueller (1988) find a significantly negative CAR of 2.4% over three years after the merger announcement. Lahey and Conn (1990) apply two benchmarks and report a CAR of –10.2% and –38.57% respectively by three years after the merger approval. Agrawal, Jaffe and Mandelker (1992) provide a thorough analysis of the post-merger share performance of acquiring firms by using a nearly exhaustive sample of US mergers over 30 years. They find that shareholders of bidding firms suffer a statistically significant wealth loss of about -10% over five years after the merger. Anderson and Mandelker (1993) report significant five-year CARs of –9.6% and –9.3% under a size and a size & book-to-market adjustment model, respectively. Loughran and Vijh (1997) find a statistically significant BHAR (buy-and-hold abnormal

return) relative to a size and book-to-market control of –15.9%. Rau and Vermaelen (1998) use the size and book-to-market adjustment method and report a statistical significant three-year CAR of –4%. Most recently, Agrawal and Jaffe (2000) review 22 different papers of both UK and US examining the long-term post-acquisition stock returns, and conclude that merged firms' long-run performance is significantly negative following mergers.

However, although the above evidence both in the UK and the US reports a significant negative long-run stock returns after the takeover, the findings are not all one sided. Mandelker (1974) finds that shareholders of bidding firms suffer a wealth loss in the 40 months after the merger, the CAR decreases by 1.4%. However, it is economically small and no t-statistics are provided for this entire 40 months post-acquisition period, t-statistics for both a 10-month and a 20-month period are insignificant. Malatesta (1983) finds statistically significant abnormal returns for the year after the takeover announcement but insignificant results for the year after the management approval. Using the same data but different methodologies, Magenheim and Mueller (1988) and Bradley and Jarrell (1988) reach opposite conclusion. MM find significant CAR over three years, while BJ find insignificant results over the same time period.

Lahey and Conn (1990) find a negative CAR of –10.20% in three years after the acquisition but it is statistically insignificant. Franks, Harris and Titman (1991) investigate the post-merger share price performance of acquiring firms by using two single-factor benchmarks (the equally-weighted index and the value-weighted index) and two multi-factor benchmarks (the eight-portfolio benchmark and ten-factor

benchmark). They find negative post-merger abnormal returns to the bidding firm shareholders by using an equal-weighted index. However, the value-weighted benchmark yields positive post-merger performance. In contrast, the result generated by using multi-factor benchmarks especially the eight-portfolio benchmark reveal no statistically significant abnormal performance for the overall sample of bidding firms during post-merger period. Loderer and Martin (1992) find a negative five-year abnormal returns but it is not statistically different from zero.

In order to avoid the inability of stock price performance studies to determine whether takeovers create real economic gains and to identify the sources of such gains. Healy, Palepu, and Ruback (1992) examine the post-merger cash flow performance of successful bidding firms. Their findings indicate that merged firms have a significant improvement in operating cash flow returns after the merger, resulting from increases in asset productivity relative to their industries. Based on the similar method, Manson, Stark and Thomas (1994) in the UK find that operational cash flow gains after the takeovers. However, the evidence is not one-sided, Ravenscraft and Scherer (1987) and Herman and Lowenstein (1988) report poor accounting performance after takeovers.

2.8.5.3. Summary

Successful target firms are unlisted after the outcome date of takeovers. Unsuccessful target firm shareholders suffer a large wealth loss after the outcome date, and evidence show that the entire abnormal returns gained from the announcement of takeover

proposals to the target firms that are not subsequently taken over within five years of an unsuccessful offer dissipate within two years of the initial unsuccessful bid.

Although the negative long-run post acquisition abnormal returns to the bidding firms gains a support from the majority, the issue is not unambiguous. Some studies do not find significant underperformance after the takeover, and even the studies carried out by examining the accounting performance after takeovers are divided. Fundamentally, the question is whether these acquisitions really led to significant negative abnormal returns, or whether these findings are the result of some type of specification error. In summary, acquiring firms' long-run post acquisition stock returns is still an unsettled question that demands further investigation.

2.9. Review of Methodologies

Franks, Harris and Titman (FHT) (1991) are viewed as a very important paper in the literature on long-run stock returns following takeovers. They alter this literature both by devoting their entire paper to post-acquisition shareholder returns and by using more sophisticated models (primarily the eight-portfolio model from Grinblatt and Titman (1988, 1989), this benchmark consists of four portfolios based on firm size, three based on dividend yield and one based on past returns). Thus, we review the methodologies in the Pre-FHT and Post-FHT periods, respectively.

2.9.1. Pre-FHT Period

2.9.1.1. Market Model

The Market Model (See Fama 1976, P63-132 for a discussion of this model) arises as an implication of the assumption of the two-parameter portfolio model that the joint distribution of returns on securities is multivariate normal. The market model is widely used in studies of the adjustment of securities prices to new information. Most of these studies are concerned with the reactions to company-specific information, such as a stock split or an announcement of takeovers. It specifies the following linear relationship between security *j* returns and returns on a market portfolio.

$$\widetilde{R}_{jt} = \alpha_j + \beta_j \widetilde{R}_{mt} + \widetilde{\varepsilon}_{jt} \qquad (1)$$

Where:

$\widetilde{R}_{jt}$ = rate of return on security *j* over period of *t*,

$\widetilde{R}_{mt}$ = rate of return on a value weighted (or equally weighted) market portfolio in time period *t*.

Since this model is based on the assumption that the joint distribution of returns on securities is multivariate normal, so that bivariate normality of $\widetilde{R}_{jt}$ and $\widetilde{R}_{mt}$ is implied.

$\alpha_j and \beta_j$ = security-specific parameters that vary from one security to another,

$$\alpha_j = E(\overline{R}_j) - \beta_j E(\overline{R}_m),$$

β_j = known as systematic risk, represents the risk of security *j* relative to the total risk of the market portfolio, and is proportional to the contribution of security *j* to the total risk of the market portfolio, i.e.,

$$Cov(\widetilde{R}_{jt}, \widetilde{R}_{mt}) / Var(\widetilde{R}_{mt}),$$

$\widetilde{\varepsilon}_{jt}$ = the random disturbance term of security *j* at period *t*, and $E(\widetilde{\varepsilon}_{jt}) = 0$. In the market model, the effects of company-specific information should show up in this disturbance.

Least squares has been used to estimate α_j and β_j. They are calculated by regressing monthly returns for security *j* on the monthly returns of the market index for a period (? month) prior to the bid.

Once we obtain the estimates $\hat{\alpha}_j$ and $\hat{\beta}_j$, we can compute the abnormal returns as follows:

$$\hat{\varepsilon}_{jt} = R_{jt} - \hat{\alpha}_j - \hat{\beta}_j R_{mt}, \qquad (2)$$

Where:

$\hat{\varepsilon}_{jt}$ = the residual or the abnormal performance of stock *j* at month *t*.

The Average Residual (AR) for each month, τ , relative to the event month is,

$$\bar{e}_\tau = AR_\tau = \frac{1}{N}\sum_{j=1}^{N}\hat{\varepsilon}_{jt} \qquad (3)$$

Where:

N = the number of firms which have residuals for month τ .

$\bar{e}_\tau$ = the average residual across firms for month τ .

These average residuals are summed over event time (from month –K to month T) to obtain the Cumulative Average Residual (CAR),

$$CAR_T = \sum_{\tau=-K}^{T} AR_\tau \qquad (4)$$

2.9.1.2. Other Models

Other models used in the Pre-FHT period to calculate the CARs are:

(1) CAPM: $\varepsilon_{jt} = R_{jt} - \left[R_{ft} + \beta_j (R_{mt} - R_{ft})\right]$ (5)

(2) Mean Adjusted Return Model: $e_{jt} = R_{jt} - \overline{R_j}$ (6)

(3) Market Adjusted Return Model: $e_{jt} = R_{jt} - R_{mt}$ (7)

2.9.2. Post-FHT Period

2.9.2.1. Fama-French three-factor Model

The Sharpe-Lintner (SL) model [Sharpe (1964), Lintner (1965)] implies that (a) expected returns on securities are a positive linear function of their market β, and (b) market β suffice to describe the cross-section of expected returns.

There are several empirical contradictions of the SL model. Empirical researches find that β seems not able to explain the cross-sectional variation in average returns, and size (ME), leverage, book-to-market equity (BE/ME), and earnings-price ratios (E/P) all help to explain the cross-section of expected return.

Fama and French (1992) argue "since E/P, ME, Leverage, and BE/ME are all scaled versions of price, it is reasonable to expect that some of them are redundant for describing average returns". They find that the combination of size (ME) and book-to-market equity (BE/ME) absorbs the roles of leverage and E/P in average stock returns.

Fama and French (1993) identify three common risk factors in the stock returns, an overall market factor and factors related to firm size (ME) and book-to-market equity (BE/ME). They argue these three factors do a good job in explaining the cross-section of average stock returns.

Based on the empirical findings of Fama and French (1992,1993), Fama and French (1993) write: "Many continue to use the one-factor Sharpe-Lintner model to evaluate portfolio performance and to estimate the cost of capital, despite the lack of evidence that it is relevant. At a minimum, the results here and in Fama and French (1992a) should help to break this common habit".

Fama and French (1996) argue that many of the CAPM average return anomalies are captured by the Fama and French (1993) three-factor model. However, this model cannot explain the continuation of short-term returns. The continuation of short-term returns is thus left unexplained by the model (Fama and French 1996). This model also has systematic problems explaining the average returns on categories of small stocks (Fama 1998).

Fama and French (1993) three-factor model is widely used in the Post-FHT period. [e.g. Gregory (1997), Mitchell and Stafford (2000)]. The Abnormal return based on this three-factor model is specified as follows:

$$\varepsilon_{jt} = R_{jt} - \left[R_{ft} + \beta_j\left(R_{mt} - R_{ft}\right) + \gamma_j\left(SMB_t\right) + \delta_j\left(HML_t\right)\right] \qquad (8)$$

Where:

R_{mt} = the monthly return on a value-weighted market portfolio.

SMB=the value-weighted return on small firms minus the value-weighted returns on large firms (Small minus Big).

HML=the value-weighted return on high book-to-market firms minus the value-weighted return on low book-to-market (High minus Low).

2.9.2.2. Size and book-to-market adjusted method (reference portfolio approach)

Some studies do not use any specific model at all, (but they follow the spirit of Fama and French 1992,1993,1996), [e.g. Anderson and Mandelker (1993), Loughran and Vijh (1997), Rau and Vermaelen (1998)]. Their method is to calculate Abnormal Returns for each firm relative to its size and book-to-market benchmark (i.e., the difference between

its monthly return and that of its reference portfolio). The method is described as follows: Firstly, they form, for instance, 10 size deciles at the end of every month on the basis of the market capitalization, then rank each firm into one of these 10 portfolios formed on the basis of these breakpoints. This decile breakpoint formation and ranking procedure is repeated every month between the investigation periods, for instance, 3 years. Secondly, These deciles are further sorted into, for instance, 5 quintiles using book-to-market ratios. Portfolio returns are then formed every month by averaging the monthly returns for these 50 portfolios. These returns are then used as benchmarks to calculate abnormal performance. Finally, Abnormal Returns are calculated for each firm relative to its size and book-to-market benchmark (as the difference between its monthly return and that of its reference portfolio) every month for 36 months after the merger completion date. CARs are calculated by averaging across all acquiring firms every month and then summing these averages over time.

2.9.2.3. Other Models

Other models used in the Post-FHT period to calculate the CARs are:

(1) DM (Dimson and Marsh 1986) risk and size adjusted model:

$$\varepsilon_{jt} = R_{jt} - \left[R_{st} + (\beta_j - \beta_s)(R_{mt} - R_{ft})\right] \qquad (9)$$

Where:

R_{st} is the return on a size control portfolio in month t.

β_s is the beta of the control sample.

(2) Simple size control portfolio Model (SS)

$$e_{jt} = R_{jt} - R_{st} \qquad (10)$$

2.10. Conclusion

This chapter provides a comprehensive review of previous studies on the financial performance of mergers and acquisitions, especially on the shareholders' wealth effects of corporate takeovers. We firstly review some key issues in the M & A literature, such as motives for takeovers, the impact of methods of payment to the shareholders returns, and the size effect to the long-run stock returns of corporate takeovers. Secondly, We turn to review a few key papers of the past three decades that contribute a lot to the development of the M & A literature. This provides us a clear time line regarding the evolution of studies in the corporate takeovers. Thirdly, we critically analyze the stock returns of both target and bidding firms in the entire acquisition process (i.e., from several years prior to the takeover to a few years after the completion of the takeover). Finally, we present a detailed review of the methodologies applied in these previous studies. In a word, this chapter provides readers a broad view of the studies in the mergers and acquisitions, and helps them to the further understanding of the following empirical chapters.

Chapter 3. Methodologies

3.1. Introduction

In event studies, both short and long term tests generally focus on a test statistic, i.e., the ratio of the sample mean CAR to its estimated standard deviation. Recent papers by Kothari and Warner (1997) and Barber and Lyon (1997) address biases in long-horizon event studies. Both document that for randomly chosen firms, the traditional t-test of abnormal performance is misspecified and indicates abnormal performance too frequently.

Kothari and Warner (1997) argue that it is very difficult to obtain an unbiased estimate of each component of this ratio in the long horizons. The null will be over-rejected if the measured average abnormal performance is systematically nonzero or the standard deviation used to calculate the test statistics is too small, or both. It is also possible that, if the mean and standard deviation are correlated.

Kothari and Warner (1997) examine a variety of abnormal return models, i.e., Market-Adjusted Model, Market Model, CAPM, and the Fama-French three-factor Model. They find that all four models are severely misspecified regardless the use of CARs or BHARs, (all four models significantly over-reject the null hypothesis), and the degree of misspecification is not highly sensitive to the models applied. Based on these findings, Kothari and Warner argue that parametric long-horizon tests will often indicate abnormal performance when none is present, thus the interpretation of long-

horizon tests requires extreme caution. However, they suggest that nonparametric procedures appear to have fewer potential problems, and conclusions based on these procedures seem less likely to be due to misspecification.

Barber and Lyon (1997) in an independent simulation study argue that many of the common methods used to calculate long-run abnormal stock returns are flawed and lead to biased test statistics. They evaluate three approaches for detecting the long-run abnormal stock returns, i.e., Reference Portfolio Approach, Control Firms Approach, and Fama-French three-factor Model. Barber and Lyon argue that using Reference Portfolio Approach (size portfolios, book-to-market portfolios, size/book-to-market portfolios, and equally-weighted market index) and the Fama-French three-factor model to calculate long-term abnormal returns yield misspecified test statistics (empirical rejection rates exceed theoretical rejection rates).

Barber and Lyon (1997) point out that misspecification arises from three possible biases: the new listing bias, the rebalancing bias, and the skewness bias. The *new listing* bias arises because sample firms usually have a long pre-event return record, whereas the benchmark portfolio includes firms that have only recently begun trading and are known to have abnormally low returns (Ritter (1991)). The *rebalancing* bias arises because the compounded return on the benchmark portfolio implicitly assumes periodic rebalancing of the portfolio weights, whereas the sample firm returns are compounded without rebalancing. The *skewness* bias refers to the fact that with a skewed-right distribution of abnormal returns, the student t-distribution is asymmetric with a mean smaller than the zero null. They advocate that a more appropriate approach would be a

comparison of buy-and-hold returns with an appropriate firm matched on size and book-to-market ratios.

Barber and Lyon (1997) find that the Control Firm Approach yields well-specified test statistics in virtually all-sampling situations they considered. They argue that this control firms approach yields well-specified test statistics because it alleviates the new listing bias (since both the sample firm and control firm must be listed in the identified event month), the rebalancing bias (since both the sample firm and control firm returns are calculated without rebalancing), and skewness biases (since the sample firm and control firm are equally likely to experience large positive returns). In a following up paper, Lyon, Barber, and Tsai (1999) find that using size/book-to-market control firms approach yields well-specified test statistic for the conventional t-statistic in all random samples.

In summary, control firms approach seems as a very promising way in the studies of testing long-run abnormal stock returns. Because it is not only avoid using the inappropriate asset pricing models, but also eliminates the new listing, the rebalancing, and skewness biases. Furthermore, Lyon, Barber, and Tsai (1999) find that in random samples the control firms approach yields well-specified test statistics either by using CARs or BHARs to calculate the long-run abnormal returns. Thus, it minimizes the chances that the test statistics are mis-specified.

Finally, previous researches in corporate takeovers have traditionally applied the CAR to calculate the long-run abnormal returns before 1997. However, since the study of

Loughran and Vijh (1997), people have started to apply the BHAR to examine the long-run abnormal returns in takeovers. Barber and Lyon (1997) favour the use of BHARs for two reasons. First, CARs are not able to reflect an investor's experience that holds a security for a long post-event period. Long-term investor experience is better captured by compounding short-term returns to obtain long-term buy-and-hold returns. Second, they find that CAR is a biased predictor of BHAR. However, Fama (1998) argue that theoretical and statistical consideration alike suggests that CARs rather than BHARs should be used. On balance, it seems that both CARs and BHARs have their own advantages and can be considered as complementary rather than competing approaches to calculating long-run abnormal stock returns. Thus, the best solution for us would be to use both and compare the results obtained from them.

3.2. Control Firms Approach

Control Firms Approach, i.e., matching sample firms to control firms of similar sizes and book-to-market ratios, advanced by Barber and Lyon (1997) has since been a very promising way to detect long-run abnormal stock returns. Its popularity arises from the inability of either the asset pricing model or the reference portfolio approach in detecting the long-run abnormal stock returns. The details of this method are as follows.

1. In **June** of year t, we find all the market value of equity (size) of all the LSE listed firms.

2. In **December** of year t-1, we calculate the book-to-market ratios of all these firms.

3. Sample firms are matched to a control firm on the basis of size and book-to-market ratio. (1) We identify all firms with a market value of equity (size) between 70% and 130% of the market value of equity (size) of the sample firm. (2) From this set of firms, we choose the firm with the book-to-market ratio closest to that of the sample firm. (3) We use the return on the control firm as the expected return for each sample firm; the same control firm is used throughout the horizon of analysis (three years).

The Calculation of Long-run Abnormal Stock Returns

The tradition in much of the research on abnormal returns has been to sum either daily or monthly abnormal returns over time. Define R_{it} as the month t simple return on a sample firm, R_{jt} is the return on the control firm matched on Size and Book-to-Market Ratio, we use it as the expected return for the sample firm throughout the horizon of analysis, i.e., $\mathrm{E}(R_{it}) = R_{jt}$. $AR_{it} = R_{it} - E(R_{it})$ As the abnormal return in month t. Cumulating across τ periods yields the cumulative abnormal return (CAR):

$$CAR_{i\tau} = \sum_{t=1}^{\tau} AR_{it} \qquad (1)$$

In contrast, the BHAR is the return on a buy-and-hold investment in the sample firm less the return on a buy-and-hold investment in the control firm, $\mathrm{E}(R_{it}) = R_{jt}$

$$BHAR_{i\tau} = \prod_{t=1}^{\tau}[1+R_{it}] - \prod_{t=1}^{\tau}[1+E(R_{it})] \qquad (2)$$

3.3. The Fama-French Three-Factor Model

In addition to the control firms approach, we also use the three-factor model developed by Fama and French (1993) as an alternative method, and compare the results obtained by these two approaches. The three-factor model is applied by regression the post-event monthly excess returns for firm *i* on a market factor, a size factor, and a book-to-market factor:

$$R_{it} - R_{ft} = \alpha_i + \beta_i \left(R_{mt} - R_{ft}\right) + s_i SMB_t + h_i HML_t + \varepsilon_{it} \qquad (3)$$

Where R_{it} is the simple return on the common stock of firm *i*, R_{ft} is the return on three-month treasury bills, R_{mt} is the return on a value-weighted market index, SMB_t is the return on a value-weighted portfolio of small stocks less the return on a value-weighted portfolio of big stocks, and HML_t is the return on a value-weighted portfolio of high book-to-market stocks less the return on a value-weighted portfolio of low book-to-market stocks. The regression yields parameter estimates of α_i, β_i S_i and h_i. The error term in the regression is denoted by ε_{it}. The parameter of interest in this regression is the intercept, α_i. A positive (negative) intercept indicates that after controlling for market, size, and book-to-market factors in returns, a sample firm has performed better (worse) than expected.

The *SMB* and *HML* in the model above are formed as follows according to Fama and French (1993,1996). At the end of June of each year t, LSE stocks are allocated to two

groups (Small or Big) based on whether their June size is below or above the median size for LSE stocks. LSE stocks (with book-to-market ratios) are allocated in an independent sort to three book-to-market ratio groups based on the breakpoints for the bottom 30% (Low), middle 40% (Medium), and top 30% (High) of the values of book-to-market ratios for LSE stocks. Value-weighted monthly returns on the portfolios are calculated from July to the following June. *SMB* is the difference, each month, between the average of the returns on the small-stock portfolio and the average of the returns on the big-stock portfolio. *HML* is the difference, each month, between the average of the returns on the high book-to-market portfolio and the average of the returns on the low book-to-market portfolios.

3.4. The Test Statistics

We will apply both the parametric and the non-parametric tests into our empirical studies. The details are as follows.

3.4.1. Conventional Parametric Student t-test

For the control firms approach, the test statistics of the null hypothesis that the mean CARs and BHARs are equal to zero for a sample of n firms are as follows:

$$t_{CAR} = \overline{CAR_{it}} \Big/ \left(\sigma \left(CAR_{it} \right) / \sqrt{n} \right) \tag{4}$$

or

$$t_{BHAR} = \overline{BHAR_{it}} \Big/ \left(\sigma \left(BHAR_{it} \right) / \sqrt{n} \right) \tag{5}$$

Where $\overline{CAR_{it}}$ and $\overline{BHAR_{it}}$ are the sample averages and $\sigma\left(CAR_{it}\right)$ and $\sigma\left(BHAR_{it}\right)$ are the cross-sectional sample standard deviations of abnormal returns for the sample of n firms.

For the Fama-French three-factor model, we follow the same application of Barber and Lyon (1997), the procedure is as follows: For a sample of *n* firms, we estimate *n* regressions, i.e., one for each sample firm. The intercept terms from these regressions (α s) are then averaged across the *n* sample firms. A parametric t-statistic is calculated by dividing the mean intercept term by the cross-sectional sample standard deviation of the intercept terms and multiplying by the square root of n. The mean intercept term is used to test the null hypothesis that the mean monthly abnormal return of sample firms is equal to zero. This application of the Fama-French three-factor model is conceptually equivalent to the tests based on cumulative abnormal returns (CARs).

3.4.2. Nonparametric Wilcoxon Signed-Rank test

Parametric tests are based on specific assumptions about the distribution of abnormal returns. Alternative nonparametric tests are available in order to examine the abnormal returns during the investigation period. In practice, they are used in conjunction with the parametric tests to check the robustness of the results. In our case, the Sign Test and the Wilcoxon Signed-Rank test are fit for our investigation.

The Sign Test computes the differences between the two variables for all cases and classifies the differences as either positive, negative, or tied. If the two variables are

similarly distributed, the number of positive and negative differences will not differ significantly. The Wilcoxon Signed-Rank Test considers information about both the sign of the differences and the magnitude of the differences between pairs. Because the Wilcoxon Signed-Rank Test incorporates more information about the data, it is more powerful than the sign test. Thus, we choose the Wilcoxon Signed-Rank Test as our nonparametric method to check the robustness of our parametric t-test.

3.5. Conclusion

In the present Chapter, we firstly discuss and analyze the misspecification problems associated with previous methodologies in detecting the long-run abnormal stock returns. We then introduce the Control Firms Approach advanced by Barber and Lyon (1997). Since the control firms approach minimizes the chances that the test statistics are misspecified, we will apply it as our main method to calculate both the CAR and the BHAR throughout the following empirical chapters. In addition to the control firms approach, the Fama-French three-factor model will also be used as an alternative to calculate the CAR. Finally, both the conventional parametric t-test and the nonparametric Wilcoxon Signed-Rand test will be applied as the test statistics throughout the following empirical chapters.

Chapter 4. Testing the Validity of the Control Firms Approach under Various Accounting Year Endings: the UK Evidence

4.1. Introduction

In *Chapter 3*, we have discussed that the control firms approach advanced by Barber and Lyon (1997) eliminates the new listing, the rebalancing, and skewness biases. Since it minimizes the chances that the test statistics are misspecified, it seems a very promising way in the studies of detecting the long-run abnormal stock returns.

However, the control firms approach designed by Barber and Lyon (1997) may not be without questions while applying to the out-of-sample studies. In their approach, Barber and Lyon use *June* of year *t* to find the market value (size), and *December* of year *t-1* to calculate the book-to-market ratio. The use of December to calculate the book-to-market ratio is because that US firms have the same fiscal year ending in December. Thus, it is reasonable and convenient to calculate the book-to-market ratio at the same accounting year ending, i.e., December. However, the accounting year endings of UK firms are different months across the whole year, if we introduce the same approach (calculating the book-to-market ratio at December) into UK, we are not able to calculate the book-to-market ratio at the firms' accounting year endings for most of the UK firms.

Due to UK firms accounting year endings vary from January to December, the control firms approach will not be exactly the same when we apply it in the UK. We may have two choices. **First**, we can still calculate the book-to-market ratio at December of year t-1 and find the size (market value) at June of year t by ignoring the difference of the

accounting year endings of all the UK firms. The advantage of this approach is that all the firms' sizes and book-to-market ratios are calculated at the same point in time, thus we can compare the sizes and the book-to-market ratios of different firms, and find the control firms for our sample firms. The shortcoming of this method is that the book-to-market ratios are not calculated according to firms accounting year endings as we usually do. However, Barber and Lyon (1997) and Lyon, Barber, and Tsai (1999) find that the control firms approach works well in random samples. Thus, if our sample firms are randomly chosen, and the accounting year endings of our sample firms are distributed randomly, we still can expect an unbiased test-statistic by using this matching method although more than half of book-to-market ratios are not calculated according to their accounting year endings. However, although it may not be biased, this matching issue may introduce noises to our empirical test.

Second, if we intend to calculate the book-to-market ratios at different months according to sample firms accounting year endings, we are still able to match them with a matching sample that contains all the firms that have the same accounting year ending with the sample firm. For instance, we can find all the sample firms that have an accounting year ending at March, we then collect all the LSE listed firms that also have an accounting year ending at March. We calculate the book-to-market ratios at March and find the sizes in six month after, i.e., September for all these sample and matching firms. The advantage of this approach is that we calculate the book-to-market ratio of our sample and matching firms not only at the same point in time but also at the firms accounting year ending. It is the same approach applied by Barber and Lyon (1997). The shortcoming of this method is that we have reduced our matching sample from all

the listed firms to the firms with only an accounting year ending at March. Thus, our matching sample will be very small, and the control firm matched on size and book-to-market ratio may not be the exact match to the sample firm. Thus we have limited our choice for the control firm.

In short, the two alternative ways ahead of us are both having advantages and shortcomings, we think the first approach will yield unbiased test statistics to our empirical test, but it may introduce noise at the same time. Although the second approach looks the same as what Barber and Lyon have used, it largely reduce the size of the matching sample and hence limit our choice for the control firm in a great deal. For convenience, we call the first way as the control firms approach under the December-June model, and name the second as the control firms approach under Various-Accounting-Year-Ending model. We will use both CAR and BHAR to calculate the long-run abnormal stock returns of our sample firms under both models, and test whether these long-run abnormal stock returns calculated under different approaches are significantly different.

4.2. Methodology

Corporate takeover is one of the most researched areas in finance, and is a typical event for the event study. Examining the long-run abnormal stock returns of corporate takeovers has been a popular topic for several decades. Thus, due to its typical status and its popularity, we choose corporate takeover as our event, and test the control firms approach under the specific event of corporate takeovers.

4.2.1. Control Firms Approach under December-June Model

By applying the control firms approach under the December-June model [Barber and Lyon (1997)'s approach, details are discussed in *Chapter 3*], we ignore the difference of firms accounting year endings, and calculate all the book-to-market ratios at December of year t-1, and find their sizes (market value of equity) at June of year t.

4.2.2. Control Firms Approach under Various-Year-Ending Model

To use the control firms approach under the Various-Year-Ending model, we regroup the sample firms and matching firms into different sub-samples according to firms accounting year endings. For example, we put all the sample firms that have an accounting year ending at January into sample January, and put all the matching firms whose accounting year also ends at January into matching-sample January. We then calculate their book-to-market ratios at January of year t, and find the market value of equity (size) at July of year t. When we obtain all the sizes and book-to-market ratios,

we can match a firm in sample January with a firm in matching-sample January to find out the control firm. The details of this approach are listed as follows.

1. In each calendar month of year t, we calculate the book-to-market ratios of all the LSE listed firms with an accounting year ending at this calendar month.

2. At the sixth month after the calendar month (i.e., with 6 months lag), we find all the market value of equity (size) of all these firms.

3. Sub-sample firms are matched to a control firm on the basis of size and book-to-market ratio of the sub-matching sample. (1) We identify all firms in the sub-matching sample with a market value of equity (size) between 70% and 130% of the market value of equity (size) of the sample firm. (2) From this set of firms, we choose the firm with the book-to-market ratio closest to that of the sample firm. (3) We use the return on the control firm as the expected return for each sample firm; the same control firm is used throughout the horizon of analysis.

For the methods of calculating the long-run abnormal stock returns (both CAR and BHAR) and their test statistics, please refer to *Chapter 3* for details.

4.3. Data and Sample Construction

Fama and French (1992) document a significant relation between stock returns, firm size, and book-to-market ratios for non-financial firms. Because Fama and French exclude the financial firms from their analysis, they leave a large holdout sample of financial firms on which to test the relation between security returns, size and book-to-market ratios. Barber and Lyon (1997) argue that there is no reason to expect that firm size and book-to-market ratios have different meanings for financial versus non-financial firms. By examining this holdout sample, Barber and Lyon find that both financial and non-financial firms exhibit a significant size and book-to-market premium. They document that the relation between stock return, firm size, and book-to-market ratios is similar for financial and non-financial firms. Based on these findings, we do not distinct the financial firms and non-financial firms from our sample firms. Thus our sample firms are mixed with both financial and non-financial firms.

In our empirical test, we will examine the three-year pre-announcement period shareholder returns of both target and bidding firms, and will also examine the successful bidding firms (merged firms) three–year returns after the takeover. We have initially collected all the UK public target and bidding firms from various issues of *Extel Financial* and *Acquisition Monthly* for the ten-year period of 1991-2000. We set our selection criteria as follows. (1) We omit the firms that we are not able to find a company Code for it from the Datastream. (2) For examining the three-year pre-announcement abnormal returns, all the target and bidding firms must have a takeover announcement date; we exclude the firms that the announcement date is not available.

For examining the three-year post-outcome abnormal returns, all the successful bidding firms must have an outcome date; we exclude the firms that the outcome date is not available. (3) Since we are examining target and bidding firms three-year pre-announcement stock returns and the successful bidding firms post-outcome three-year stock returns, all the selected firms must have whole three-year pre or post takeover stock price, we omit the firms that do not qualify for this requirement. (4) To apply the control firms approach to calculate the CARs and BHARs, all the sample firms selected after the above criteria must have both sizes (market value of equity) and book-to-market ratios at the event year t and year t-1, we exclude the firms that do not meet this requirement. (5) In line with Lyon et al (1999), we finally delete the selected sample firms with a negative book value and a zero size (market value of equity is equal to zero). Finally, 472 target firms and 208 bidding firms are qualified for the three-year pre-takeover studies, and 212 bidding firms are selected for the post-takeover investigation.

We choose all the firms that listed in the LSE in 1991-2000 as our matching firms, there are about 3,000 firms listed every year during this period. We try to find the size and book-to-market ratios for all of them. We find that most of the firms have the size (market value of equity) data, however, a difficulty encountered when trying to calculate the book-to-market ratios. There are nearly half of the firms that do not have a book value available on Datastream, thus we are not able to calculate the book-to-market ratios for them. Consequently, as shown in Table 4.1, there are less than 2,000

firms in each year with both size and book-to-market ratio[1]. The situation improves through time, but still less than 2000 matching firms available for each year under investigation. Furthermore, we delete the firms that have a size of zero. In line with Lyon et al (1999), firms with negative book value of equity, although this is relatively rare, are excluded from the analysis. The number of matching firms for each year is also shown in Table 4.1.

Table 4.1. Matching firms in 1991-2000

Matching firms are all the LSE listed firms with both sizes and book-to-market ratios (firms with negative book value and zero size are excluded).

Year	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Matching Firms	1445	1381	1334	1340	1427	1491	1612	1740	1702	1593

We have so far collected all the takeover sample firms and the matching firms for each year. To apply the control firms approach under December-June model, we can directly find the control firm by matching sample firm to the matching firms on the basis of size and book-to-market ratio. However, to use the control firms approach under the Various-Year-Ending model, we have to re-organize both the sample firms and matching firms of each year into 12 sub-samples on the basis of their year endings, and match the sub-sample firms with the relevant sub-matching samples. Thus, we need to construct 12 sub-samples and 12 sub-matching samples every year on the basis of firms accounting year endings.

---

[1] The book-to-market ratio is not available directly from the Datastream; however, the Datastream provides the market-to-book ratio (Datastream code MTBV). Thus, we calculate the book-to-market ratio by 1/MTBV for each firm that their market-to-book ratios (MTBV) are available.

We need firstly construct 12 sub-matching samples each year according to the firms accounting year endings. As Table 4.1 shows above, we have already obtained the matching samples for each year; our next job is to construct sub-matching samples for these years. For example, in 1991, we have 1445 matching firms; we find the accounting year endings of all these firms. If one firm's accounting year ends at January, we put it into matching sample January, if a firm's accounting year ending is August, we put it into matching sample August, and so on. Thus, we can build 12 sub-matching samples every year according to which calendar month the firm's accounting year ends at. We use this approach to construct the sub-matching samples for every year from 1991 to 2000. Table 4.2 shows the number of sub-matching samples for each calendar month (firms accounting year ending) from 1991 to 2000. As we can see that nearly half of firms have an accounting year ending at December, on average, 43.7% matching firms have an accounting year ending at December for this ten years period. The second largest month is March, there are on average 21.25% matching firms have an accounting year ending at March. The next significant months are September and June, they on average consist 8.19% and 7.53% matching firms respectively. Thus, sub-matching samples of December, March, September, and June consist on average 80.7% firms of the whole matching sample. All the other 8 sub-matching samples are relatively small with the largest percentage less than 4%.

Before we construct Table 4.2, we originally think that except December firms might be evenly distributed into sub-matching samples (i.e., the relevant calendar months) at each year. However, Table 4.2 tells us that are not the case. December shares nearly half of the firms, followed by March with more than 20%, June and September share around

8% respectively. Other sub-matching samples are quite small, all less than 4% and with the extreme case of November that shares only 0.93% of the total firms.

We originally plan to examine the difference of abnormal returns calculated under the December-June model and the Various-Year-Ending model. If the matching firms are evenly distributed into sub-matching samples as we initially think, there will be more than 100 firms in each sub-matching sample. Thus, although the sub-matching samples are relatively small, we still have more than 100 firms to be matched with a sample firm. For instance, one sample firm has the accounting year ending at February, thus we need to match it with the sub-matching sample February that consists all the firms with an accounting year ending at February in a given year. If the sub-matching sample of February consists more than 100 firms (though relatively small), we may still be able to find a close control firm for the sample firm with the choice of more than 100 firms. However, in fact, sub-matching sample February only on average consists 30 firms (2% firms of the whole matching sample), thus this sub-matching sample is too small for us to find a close match for the sample firm. Consequently, we are not going to examine the difference of abnormal returns calculated under the December-June model (i.e., a sample firm with an accounting year ending at February, we ignore its accounting year ending and calculate its book-to-market ratio at December and size at June, and then match it with the whole matching sample of around 1,500 firms on the basis of size and book-to-market ratio calculated at June and December respectively) and the Various-Year-Ending model (i.e., calculate the sample firm's book-to-market ratio at February according to the accounting year ending, and find the size with six-month lag at July, and then match it with the sub-matching sample February of around 30 firms on the

basis of book-to-market ratios and size calculated at February and July respectively). We think that the control firm (i.e., the expected return) that one chosen from 1,500 firms and the other chosen from 30 firms will make the expected return significantly different, and result in significant different abnormal returns.

Based on the discussion above, we will not examine the difference of abnormal returns calculated under December-June model and the Various-Year-Ending model with a sub-matching sample that on average has less than 100 matching firms in the ten-year period. Table 4.2 tells us that four calendar months (i.e., four sub-matching samples) in each year are qualified for the investigation; they are December (with on average 656 firms, 43.7%), March (319 firms, 21.25%), September (123 firms, 8.19%), and June (113 firms, 7.53%). Firms have the accounting year endings at December will have no problems to directly apply the December-June model, because the book-to-market ratios are just calculated according to their accounting year ending, i.e., December. And these firms nearly consist half of the matching sample, thus nearly half of LSE listed firms (with both sizes and book-to-market ratios) are fit for the December-June Model. Consequently, we will only examine the months of March, September, and June, we expect to find out whether the empirical results are significantly different by applying the control firms approach under the December-June model and the Various-Year-Ending model respectively.

Table 4.2. UK firms accounting year ending statistics: 1991-2000

We try to find out the accounting year ending of every firm of our matching samples (1991-2000) shown in **Table 4.1**. In every Year, we put the firms into 12 different sub-samples according to the calendar month that the firm's accounting year ends at. Thus, we obtain 120 sub-matching samples for this ten-year period according to the firms' accounting year endings. The number of firm for each calendar month in each year is shown below. We also calculate the average number of firms for each calendar month for the ten-year period, and the average percentages they share are also given below.

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1991	50	27	**306**	72	21	**95**	21	23	**117**	28	13	**597**	**1370**
1992	50	28	**299**	70	23	**92**	22	21	**110**	29	12	**569**	**1325**
1993	50	26	**290**	71	25	**94**	24	21	**112**	29	14	**575**	**1331**
1994	55	29	**306**	75	25	**100**	27	22	**123**	27	14	**612**	**1415**
1995	56	28	**319**	80	29	**100**	29	23	**119**	30	14	**648**	**1475**
1996	56	32	**330**	84	33	**116**	29	29	**133**	31	15	**709**	**1597**
1997	57	34	**357**	83	45	**131**	32	37	**137**	37	17	**758**	**1725**
1998	58	34	**349**	87	46	**136**	34	34	**135**	31	19	**725**	**1688**
1999	55	34	**331**	76	40	**134**	29	34	**120**	26	13	**688**	**1580**
2000	52	28	**312**	80	41	**136**	37	35	**125**	29	16	**686**	**1577**
AVER	53	30	**319**	77	32	**113**	28	27	**123**	29	14	**656**	**1508**
%	3.53	2	**21.25**	5.13	2.13	**7.53**	1.87	1.8	**8.19**	1.93	0.93	**43.7**	**100**

PAGE NUMBERING AS ORIGINAL

4.4. Empirical Results

Our purpose of this research is to examine whether there is statistically significant difference in the long-run abnormal returns calculated by using the control firms approach under the December-June model (advanced by Barber and Lyon (1997)) and the Various-Accounting-Year-Ending model, and hence to find out whether firms (such as firms in the UK) with different accounting year endings will significantly affect the validity of Barber and Lyon (1997) approach. In a word, we want to find out whether book-to-market ratios must be calculated and matched according to firms accounting year endings, i.e., whether firms accounting year endings will significantly affect our empirical results.

4.4.1. Target Firms' Three Years Pre-Acquisition Stock Returns

Table 4.3 reports the three-year pre-takeover average ARs (abnormal returns) and average CARs of the target firms that have an accounting year ending at March. ARs and CARs in column 2 and 3 are calculated by applying the December-June model (i.e., we ignore the accounting year ending of March for these firms, and calculate the book-to-market ratios at December of year t-1 and sizes at June of year t for these target firms). We match these sample firms with all the LSE listed firms (with both book-to-market ratios and sizes calculated at the same time as above, around 1,500 matching firms each year) to find the closest match, i.e., the control firms). ARs and CARs in Column 4 and 5 are calculated by applying the March-September model (i.e., according to the accounting year ending of March, we calculated the book-to-market ratios at

March of year t and sizes at September (with 6 months lag) of year t for these target firms. We match these sample firms with all the LSE listed firms that have an accounting year ending at March (their book-to-market ratios and sizes are calculated at the same time as above, around 300 firms each year) to find the closest match, i.e., the control firms. Column 6 and 7 are the first difference of the Abnormal Returns (FDAR) and the t-statistic of the FDAR. Figure 4.1 plots the 36 monthly FDARs.

Table 4.3. Target firms (with an accounting year ending at March) three-year pre-takeover abnormal returns and CARs

Sample target firms (accounting year ends at March, 63 firms) three-year pre-takeover abnormal returns are calculated by using the control firms approach under the December-June model and the March-September model respectively. The average AR (abnormal return) and CAR (cumulative abnormal return) for each month (from event months –36 to –1) are given below. We also calculate the FDAR (first difference of abnormal returns) and their t-statistics.

	December-June		March-September		Difference	
EM	**AR**	**CAR**	**AR**	**CAR**	**FDAR**	**T-Stat**
Month -36	0.0105	0.0105	0.0127	0.0127	-0.0022	0.15
Month -35	0.0126	0.0231	-0.0017	0.0111	0.0143	1.09
Month -34	0.0146	0.0377	0.0027	0.0138	0.0119	0.71
Month -33	-0.0052	0.0325	0.0133	0.0271	-0.0185	1.09
Month -32	0.0009	0.0334	0.0074	0.0345	-0.0065	0.39
Month -31	0.0034	0.0368	0.0012	0.0357	0.0022	0.13
Month -30	0.0044	0.0412	-0.0015	0.0341	0.0059	0.43
Month -29	-0.0148	0.0264	-0.0166	0.0175	0.0018	0.11
Month -28	0.0150	0.0414	0.0061	0.0237	0.0089	0.56
Month -27	0.0046	0.0461	0.0085	0.0322	-0.0039	0.27
Month -26	-0.0143	0.0318	-0.0036	0.0285	-0.0107	0.61
Month -25	-0.0098	0.0220	0.0086	0.0372	-0.0184	0.61
Month -24	0.0295	0.0515	0.0426	0.0797	-0.0131	0.47
Month -23	-0.0086	0.0429	-0.0069	0.0728	-0.0017	0.12
Month -22	0.0230	0.0659	0.0104	0.0832	0.0126	0.83
Month -21	-0.0048	0.0611	0.0006	0.0838	-0.0054	0.31
Month -20	-0.0007	0.0603	-0.0146	0.0693	0.0139	0.88
Month -19	**-0.0365***	0.0239	-0.0324	0.0368	-0.0041	0.22
Month -18	0.0050	0.0289	0.0032	0.0400	0.0018	0.11
Month -17	0.0215	0.0504	**0.0329***	0.0728	-0.0114	0.79
Month -16	-0.0038	0.0466	-0.0087	0.0641	0.0049	0.25
Month -15	0.0150	0.0616	0.0098	0.0739	0.0052	0.36
Month -14	-0.0136	0.0479	0.0019	0.0758	-0.0155	0.75
Month -13	**-0.0410***	0.0069	-0.0381	0.0377	-0.0029	0.18
Month -12	-0.0060	0.0009	-0.0007	0.0307	0.0010	0.05
Month -11	-0.0166	-0.0157	0	0.0308	-0.0166	0.82
Month -10	0.0013	-0.0144	-0.0375	-0.0067	0.0388	1.12

Month -9	-0.0109	-0.0253	-0.0405	-0.0472	0.0296	1.15
Month -8	-0.0087	-0.0340	-0.0002	-0.0474	-0.0085	0.33
Month -7	0.0119	-0.0221	-0.0056	-0.0530	0.0175	1.13
Month -6	0.0092	-0.0130	-0.0238	-0.0768	0.0330	1.76
Month -5	-0.0159	-0.0288	-0.0180	-0.0949	0.0021	0.12
Month -4	-0.0093	-0.0381	-0.0241	-0.1190	0.0148	0.64
Month -3	0.0086	-0.0295	0.0089	-0.1101	-0.0003	0.01
Month -2	0.0192	-0.0103	0.0288	-0.0813	-0.0096	0.63
Month -1	**0.0460***	0.0357	**0.0546***	-0.0268	-0.0086	0.50

* Indicate significant at 5%, two-sided test.

Figure 4.1. The first differences of target firms average abnormal returns (AR) between December-June model and March-September model

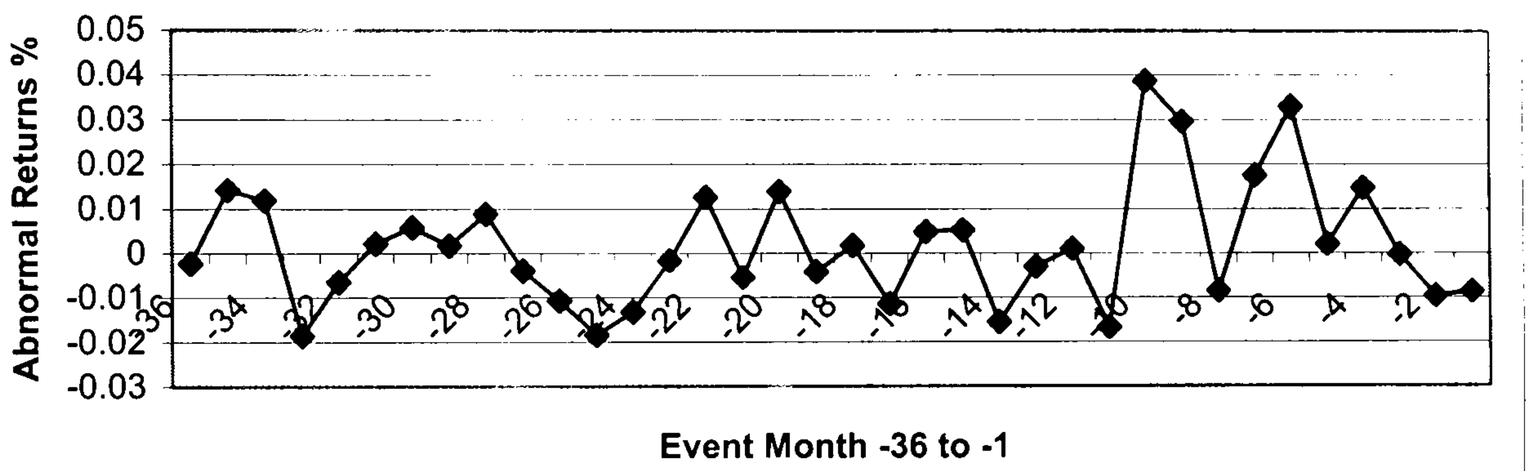


Table 4.4 shows, under the December-June model, target firms experience a small positive but insignificant abnormal return of 3.57% in three-year prior to the takeover announcement. However, under the March-September model, target firms suffer a small negative but insignificant abnormal return of –2.68% in three-year prior to the takeover announcement. The first difference of the two CARs is about 6%, but it is statistically insignificant different from zero.

Table 4.4. Target firms (with an accounting year ending at March) three-year pre-takeover CARs

Sample target firms (accounting year ends at March, 63 firms) three years pre-takeover average CARs are calculated by using the control firms approach under the December-June model and the March-September model respectively. Relevant t-statistics of the CARs and the corresponding P-values calculated by using the non-parametric Wilcoxon Signed-Rank test are also given in the table.

	CAR	T-Stat	P-Value
December-June	0.0357	0.291	0.406
March-September	-0.0268	-0.248	0.954
Difference	**0.0625**	**0.581**	**0.488**

Table 4.5 presents the three-year pre-takeover average BHARs of sample target firms that have an accounting year ending at March. BHAR in row 1 is calculated by applying the December-June model (i.e., we ignore the accounting year ending of March for these firms, and calculate the book-to-market ratios at December of year t-1 and sizes at June of year t for these target firms). We match these sample firms with all the LSE listed firms (with both book-to-market ratios and sizes calculated at the same time as above, around 1,500 firms each year) to find the closest match, i.e., the control firms). BHAR in row 2 is calculated by applying the March-September model (i.e., according to the accounting year ending of March, we calculated the book-to-market ratios at March of year t and sizes at September (with 6 months lag) of year t for these target firms). We match these sample firms with all the LSE listed firms that have an accounting year ending at March (their book-to-market ratios and sizes are calculated at the same time as above, around 300 firms each year) to find the closest match, i.e., the control firms.

As we can see from Table 4.5, under the December-June model, target firms experience a very small negative but insignificant abnormal return of -0.08% in three-year prior to the takeover announcement. Under the March-September model, target firms suffer a small negative but insignificant abnormal return of –4.28% in three-year prior to the takeover announcement. The first difference of the two BHARs is about 4%, but it is statistically insignificant different from zero.

Table 4.5.Target firms (with an accounting year ending at March) three-year pre-takeover BHARs

Sample target firms (accounting year ends at March, 63 firms) three years pre-takeover average BHARs (buy-and-hold abnormal returns) are calculated by using the control firms approach under the December-June model and the March-September model respectively. Relevant t-statistics of the BHARs and the corresponding P-values calculated by using the non-parametric Wilcoxon Signed-Rank test are also given in the table.

	BHAR	T-Stat	P-Value
December-June	-0.0008	-0.007	0.518
March-September	-0.0428	-0.406	0.937
Difference	**0.0420**	**0.370**	**0.474**

Table 4.6 reports the three-year pre-takeover average ARs (abnormal returns) and average CARs of the target firms that have an accounting year ending at June. ARs and CARs in column 2 and 3 are calculated by applying the December-June model (i.e., we ignore the accounting year ending of March for these firms, and calculate the book-to-market ratios at December of year t-1 and sizes at June of year t for these target firms. We match these sample firms with all the LSE listed firms (with both book-to-market ratios and sizes calculated at the same time as above, around 1,500 firms each year) to find the closest match, i.e., the control firms). ARs and CARs in Column 4 and 5 are calculated by applying the June-December model (i.e., according to the accounting year ending of June, we calculated the book-to-market ratios at June of year t and sizes at December (with 6 months lag) of year t for these target firms. We match these sample firms with all the LSE listed firms that have an accounting year ending at June (their book-to-market ratios and size are calculated at the same time as above, around 100 firms each year) to find the closest match, i.e., the control firms). Column 6 and 7 are the first difference of the Abnormal Returns (FDAR) and the t-statistic of the FDAR. Figure 4.2 plots the 36 monthly FDARs.

Table 4.6. Target firms (with an accounting year ending at June) three-year pre-takeover abnormal returns and CARs

Sample target firms (accounting year ends at June, 10 firms) three-year pre-takeover abnormal returns are calculated by using the control firms approach under the December-June model and the June-December model respectively. The average AR (abnormal return) and CAR (cumulative abnormal return) for each month (from event months –36 to –1) are given below. We also calculate the FDAR (first difference of abnormal returns) and their t-statistics.

	December-June		June-December		Difference	
EM	**AR**	**CAR**	**AR**	**CAR**	**FDAR**	**T-Stat**
Month -36	-0.0199	-0.0199	-0.0157	-0.0157	-0.0042	0.09
Month -35	-0.1149	-0.1348	-0.1093	-0.1249	-0.0056	0.29
Month -34	0.0612	-0.0736	0.0958	-0.0291	-0.0346	0.97
Month -33	-0.0043	-0.0779	-0.0675	-0.0965	0.0632	1.11
Month -32	0.0251	-0.0528	0.0249	-0.0716	0.0002	0.01
Month -31	0.0531	0.0003	0.0607	-0.0109	-0.0076	0.27
Month -30	-0.0255	-0.0252	-0.0289	-0.0398	0.0034	0.06
Month -29	0.0458	0.0205	0.0001	-0.0397	0.0457	1.36
Month -28	-0.0138	0.0067	-0.0275	-0.0672	0.0137	0.56
Month -27	-0.0110	-0.0043	0.0436	-0.0236	-0.0546	1.14
Month -26	0.0230	0.0187	0.0319	0.0083	-0.0089	0.13
Month -25	-0.0330	-0.0143	0.0115	0.0198	-0.0445	1.01
Month -24	-0.0707	-0.0850	-0.0558	-0.0360	-0.0149	0.28
Month -23	0.0338	-0.0511	0.0380	0.0020	-0.0042	0.13
Month -22	0.0518	0.0007	0.0300	0.0320	0.0218	0.42
Month -21	0.0337	0.0344	-0.0025	0.0295	0.0362	0.79
Month -20	-0.0600	-0.0255	**-0.1560***	-0.1265	0.0960	1.58
Month -19	0.0589	0.0334	0.0534	-0.0731	0.0055	0.04
Month -18	-0.0873	-0.0539	-0.0942	-0.1672	0.0069	0.17
Month -17	-0.1023	-0.1562	-0.0039	-0.1711	**-0.0984***	2.22
Month -16	-0.0377	-0.1939	-0.0223	-0.1934	-0.0154	0.41
Month -15	-0.0712	-0.2651	-0.0807	-0.2741	0.0095	0.21
Month -14	-0.0465	-0.3116	-0.0855	-0.3596	0.0390	1.13
Month -13	0.0749	-0.2368	0.1352	-0.2244	-0.0603	0.96
Month -12	0.0358	-0.2010	-0.0096	-0.2341	0.0454	0.75
Month -11	-0.0297	-0.2307	0.0060	-0.2281	-0.0357	1.32
Month -10	0.0203	-0.2104	-0.0460	-0.2742	0.0663	1.63
Month -9	0.0311	-0.1793	0.0603	-0.2139	-0.0292	0.62
Month -8	-0.0580	-0.2373	0.0827	-0.1312	-0.1407	1.91
Month -7	0.0758	-0.1615	0.0641	-0.0672	0.0117	0.36
Month -6	0.0310	-0.1305	-0.0460	-0.1132	**0.0770***	2.86
Month -5	0.0073	-0.1231	0.0537	-0.0594	-0.0464	1.27
Month -4	0.0096	-0.1135	0.0192	-0.0403	-0.0096	0.36
Month -3	0.0122	-0.1013	0.0135	-0.0268	-0.0013	0.05
Month -2	-0.0341	-0.1354	-0.0298	-0.0566	-0.0043	0.11
Month -1	-0.0079	-0.1433	0.0050	-0.0516	-0.0129	0.41

* Indicate significant at 5%, two-sided test.

Figure 4.2. The first differences of target firms average abnormal returns (AR) between December-June model and June-December model

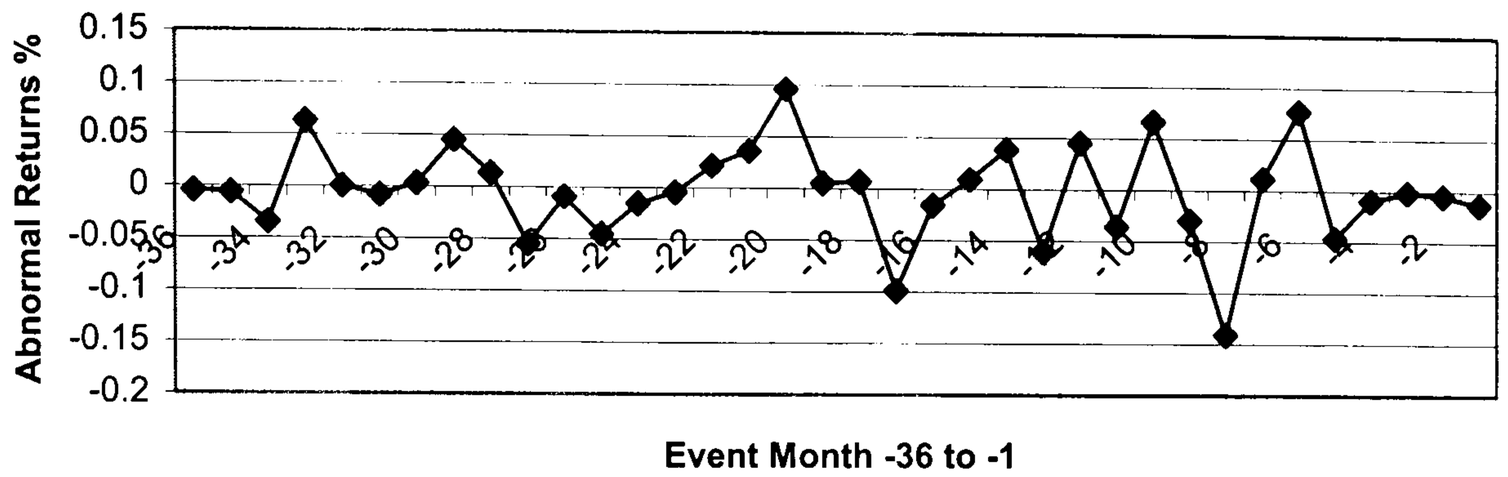


Table 4.7 shows, under the December-June model, target firms suffer a large negative but insignificant abnormal return of –14.33% in three-year prior to the takeover announcement. However, under the June-December model, target firms suffer a small negative but insignificant abnormal return of –5.16% in three-year prior to the takeover announcement. The first difference of the two CARs is about 9%, but it is statistically insignificant different from zero.

Table 4.7. Target firms (with an accounting year ending at June) three-year pre-takeover CARs

Sample target firms (accounting year ends at June, 10 firms) three years pre-takeover average CARs are calculated by using the control firms approach under the December-June model and the June-December model respectively. Relevant t-statistics of the CARs and the corresponding P-values calculated by using the non-parametric Wilcoxon Signed-Rank test are also given in the table.

	CAR	T-Stat	P-Value
December-June	-0.1433	-0.497	0.221
June-December	-0.0516	-0.243	0.683
Difference	**0.0917**	**0.373**	**0.721**

Table 4.8 presents the three-year pre-takeover average BHARs of the target firms that have an accounting year ending at June. BHAR in row 1 is calculated by applying the December-June model (i.e., we ignore the accounting year ending of March for these

firms, and calculate the book-to-market ratios at December of year t-1 and sizes at June of year t for these target firms. We match these sample firms with all the LSE listed firms (with both book-to-market ratios and sizes calculated at the same time as above, around 1,500 firms each year) to find the closest match, i.e., the control firms). BHAR in row 2 calculated by applying the June-December model [i.e., according to the accounting year ending of June, we calculated the book-to-market ratios at June of year t and sizes at December (with 6 months lag) of year t for these target firms. We match these sample firms with all the LSE listed firms that have an accounting year ending at June (their book-to-market ratios and sizes are calculated at the same time as above, around 100 firms each year) to find the closest match, i.e., the control firms].

As we can see from Table 4.8, under the December-June model, target firms experience a large negative but insignificant abnormal return of –15.93% in three-year prior to the takeover announcement. Under the June-December model, target firms also suffer a large negative but insignificant abnormal return of –18.65% in three-year prior to the takeover announcement. The first difference of the two BHARs is about 3%, but it is statistically insignificant different from zero.

Table 4.8. Target firms (with an accounting year ending at June) three-year pre-takeover BHARs

Sample target firms (accounting year ends at June, 10 firms) three years pre-takeover average BHARs (buy-and-hold abnormal returns) are calculated by using the control firms approach under the December-June model and the June-December model respectively. Relevant t-statistics of the BHARs and the corresponding P-values calculated by using the non-parametric Wilcoxon Signed-Rank test are also given in the table.

	BHAR	T-Stat	P-Value
December-June	-0.1593	-0.765	0.221
June-December	-0.1865	-0.921	0.610
Difference	**0.0272**	**0.106**	**0.878**

Table 4.9 reports the three-year pre-takeover average ARs (abnormal returns) and average CARs of the target firms that have an accounting year ending at September. ARs and CARs in column 2 and 3 are calculated by applying the December-June model (i.e., we ignore the accounting year ending of September for these firms, and calculate the book-to-market ratios at December of year t-1 and sizes at June of year t for these target firms. We match these sample firms with all the LSE listed firms (with both book-to-market ratios and sizes calculated at the same time as above, around 1,500 firms each year) to find the closest match, i.e., the control firms). ARs and CARs in Column 4 and 5 are calculated by applying the September-March model (i.e., according to the accounting year ending of September, we calculated the book-to-market ratios at September of year t and sizes at March (with 6 months lag) of year t+1 for these target firms. We match these sample firms with all the LSE listed firms that have an accounting year ending at September (their book-to-market ratios and sizes are calculated at the same time as above, around 100 firms for each year) to find the closest match, i.e., the control firms). Column 6 and 7 are the first difference of the Abnormal Returns (FDAR) and the t-statistic of the FDAR. Figure 4.3 plots the 36 monthly FDARs.

Table 4.9. Target firms (with an accounting year ending at September) three-year pre-takeover abnormal returns and CARs

Sample target firms (accounting year ends at September, 6 firms) three-year pre-takeover abnormal returns are calculated by using the control firms approach under the December-June model and the September-March model respectively. The average AR (abnormal return) and CAR (cumulative abnormal return) for each month (from event months –36 to –1) are given below. We also calculate the FDAR (first difference of abnormal returns) and their t-statistics.

	December-June		September-March		Difference	
EM	**AR**	**CAR**	**AR**	**CAR**	**FDAR**	**T-Stat**
Month -36	-0.0446	-0.0446	-0.0278	-0.0278	-0.0168	0.33
Month -35	-0.0087	-0.0534	0.0218	-0.0060	-0.0305	1.12
Month -34	-0.0459	-0.0993	-0.0357	-0.0418	-0.0102	0.19

Month -33	**-0.0405***	-0.1397	-0.0337	-0.0755	-0.0068	0.27
Month -32	-0.0115	-0.1512	0.0303	-0.0451	-0.0418	1.01
Month -31	-0.0428	-0.1940	0.0338	-0.0113	-0.0766	1.39
Month -30	-0.0207	-0.2147	-0.0251	-0.0365	0.0044	0.18
Month -29	-0.0043	-0.2190	0.0541	0.0176	-0.0584	2.27
Month -28	-0.0084	-0.2274	-0.0773	-0.0597	0.0689	1.30
Month -27	-0.0099	-0.2372	0.0398	-0.0199	-0.0497	1.63
Month -26	-0.0315	-0.2688	-0.0698	-0.0897	0.0383	0.44
Month -25	-0.0693	-0.3381	-0.0559	-0.1456	-0.0134	0.53
Month -24	0.0352	-0.3029	-0.0007	-0.1463	0.0359	1.04
Month -23	0.0731	-0.2298	0.0961	-0.0502	-0.0230	0.45
Month -22	-0.0109	-0.2407	-0.0273	-0.0775	0.0164	0.98
Month -21	0.0266	-0.2141	0.0629	-0.0146	-0.0363	1.34
Month -20	-0.0105	-0.2246	-0.0250	-0.0396	0.0145	0.24
Month -19	0.0513	-0.1733	0.0201	-0.0195	0.0312	0.83
Month -18	-0.0058	-0.1791	0.0196	0.0001	-0.0254	0.70
Month -17	-0.0494	-0.2286	**0.0652***	0.0653	-0.1146	1.83
Month -16	-0.0513	-0.2799	-0.0497	0.0156	-0.0016	0.02
Month -15	**0.0894***	-0.1905	**0.0384***	0.0540	0.0510	1.20
Month -14	-0.0306	-0.2211	-0.0341	0.0199	0.0035	0.06
Month -13	-0.1393	-0.3605	-0.0552	-0.0353	-0.0841	1.32
Month -12	0.0479	-0.3126	0.0174	-0.0178	0.0305	0.89
Month -11	**0.0663***	-0.2463	-0.0349	-0.0528	**0.1012***	3.83
Month -10	0.0183	-0.2280	-0.0007	-0.0535	0.0190	0.77
Month -9	-0.0048	-0.2328	**0.0945***	0.0411	-0.0993	2.00
Month -8	-0.1017	-0.3344	-0.1308	-0.0898	0.0291	0.69
Month -7	0.0007	-0.3337	**0.0585***	-0.0313	-0.0578	1.07
Month -6	-0.0720	-0.4057	**-0.0709***	-0.1022	-0.0011	0.04
Month -5	0.0164	-0.3893	-0.0579	-0.1601	0.0743	1.48
Month -4	**0.0269***	-0.3623	-0.0643	-0.2244	0.0912	1.53
Month -3	0.0361	-0.3262	0.0185	-0.2059	0.0176	0.27
Month -2	0.0650	-0.2612	0.0996	-0.1063	-0.0346	0.87
Month -1	0.0278	-0.2334	0.0668	-0.0396	-0.0390	0.97

* Indicate significant at 5%, two-sided test.

Figure 4.3. The first differences of target firms average abnormal returns (AR) between December-June model and September-March model

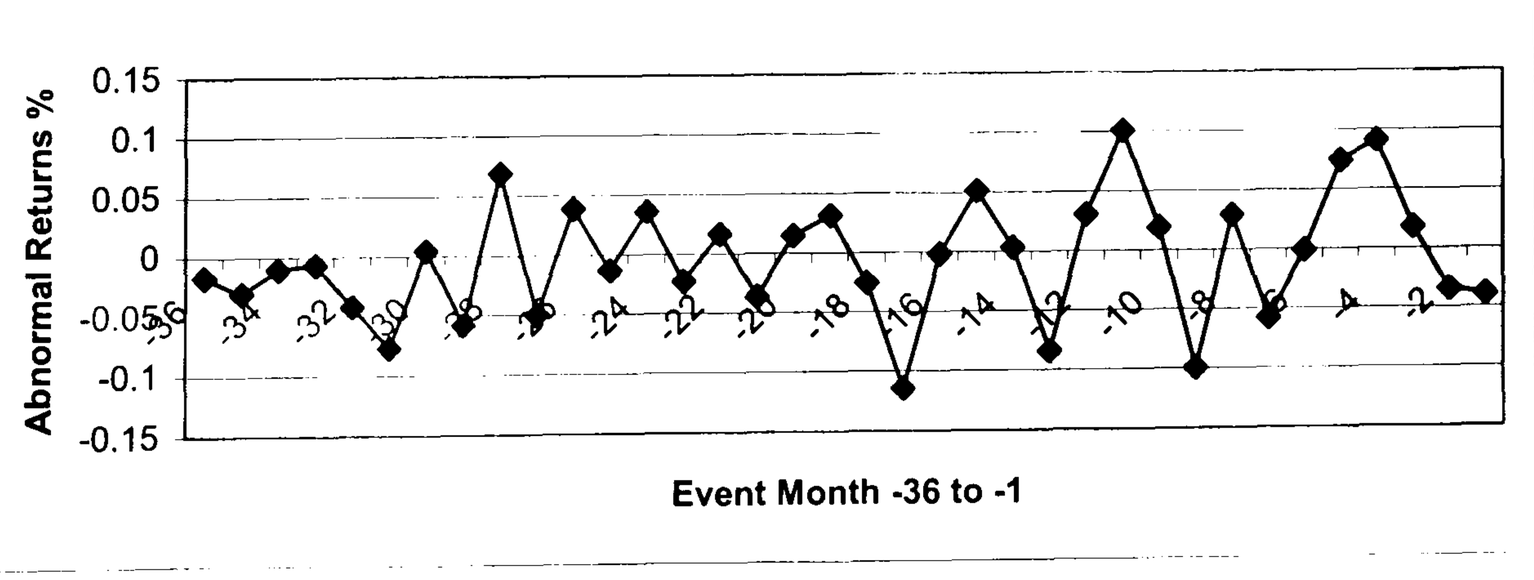


Table 4.10 shows, under the December-June model, target firms suffer a large negative but insignificant abnormal return of –23.34% in three-year prior to the takeover announcement. However, under the September-March model, target firms experience a small negative but insignificant abnormal return of –3.96% in three-year prior to the takeover announcement. The first difference of the two CARs is economically large about 20 %, but it is statistically insignificant different from zero.

Table 4.10. Target firms (with an accounting year ending at Sept) three-year pre-takeover CARs

Sample target firms (accounting year ends at September, 6 firms) three year pre-takeover average CARs are calculated by using the control firms approach under the December-June model and the September-March model respectively. Relevant t-statistics of the CARs and the corresponding P-values calculated by using the non-parametric Wilcoxon Signed-Rank test are also given in the table.

	CAR	T-Stat	P-Value
December-June	-0.2334	-1.075	0.529
September-March	-0.0396	-0.156	1.000
Difference	**-0.1938**	**-0.577**	**0.600**

Table 4.11 presents the three-year pre-takeover average BHARs of the target firms that have an accounting year ending at September. BHAR in row 1 is calculated by applying the December-June model (i.e., we ignore the accounting year ending of March for these firms, and calculate the book-to-market ratios at December of year t-1 and sizes at June of year t for these target firms. We match these sample firms with all the LSE listed firms (with both book-to-market ratios and size calculated at the same time as above, around 1,500 firms each year) to find the closest match, i.e., the control firms). BHAR in row 2 calculated by applying the September-March model (i.e., according to the accounting year ending of September, we calculated the book-to-market ratios at September of year t and sizes at March (with 6 months lag) of year t+1 for these target firms. We match these sample firms with all the LSE listed firms that have an

accounting year ending at September (their book-to-market ratios and sizes are calculated at the same time as above, around 100 firms each year) to find the closest match, i.e., the control firms).

Table 4.11. Target firms (with an accounting year ending at Sept) three-year pre-takeover BHARs

Sample target firms (accounting year ends at September, 6 firms) three years pre-takeover average BHARs (buy-and-hold abnormal returns) are calculated by using the control firms approach under the December-June model and the September-March model respectively. Relevant t-statistics of the BHARs and the corresponding P-values calculated by using the non-parametric Wilcoxon Signed-Rank test are also given in the table.

	BHAR	T-Stat	P-Value
December-June	-0.2585	-1.100	0.529
September-March	-0.2464	-0.896	0.295
Difference	**-0.0121**	**-0.032**	**0.753**

As we can see from Table 4.11, under the December-June model, target firms experience a large negative but insignificant abnormal return of –25.85% in three-year prior to the takeover announcement. Under the September-March model, target firms also suffer a large negative but insignificant abnormal return of –24.64% in three-year prior to the takeover announcement. The first difference of the two BHARs is about 1%, but it is statistically insignificant different from zero.

4.4.2 Bidding Firms' Three Years Pre-Acquisition Stock Returns

Table 4.12 reports the three-year pre-takeover average ARs (abnormal returns) and average CARs of the bidding firms that have an accounting year ending at March. ARs and CARs in column 2 and 3 are calculated by applying the December-June model (i.e., we ignore the accounting year ending of March for these firms, and calculate the book-to-market ratios at December of year t-1 and sizes at June of year t for these target

firms. We match these sample firms with all the LSE listed firms (with both book-to-market ratios and sizes calculated at the same time as above, around 1,500 matching firms each year) to find the closest match, i.e., the control firms). ARs and CARs in Column 4 and 5 are calculated by applying the March-September model (i.e., according to the accounting year ending of March, we calculated the book-to-market ratios at March of year t and sizes at September (with 6 months lag) of year t for these target firms. We match these sample firms with all the LSE listed firms that have an accounting year ending at March (their book-to-market ratios and sizes are calculated at the same time as above, around 300 firms each year) to find the closest match, i.e., the control firms). Column 6 and 7 are the first difference of the Abnormal Returns (FDAR) and the t-statistic of the FDAR. Figure 4.4 plots the 36 monthly FDARs.

Table 4.12. Bidding firms (with an accounting year ending at March) three-year pre-takeover abnormal returns and CARs

Sample bidding firms (accounting year ends at March, 31 firms) three-year pre-takeover abnormal returns are calculated by using the control firms approach under the December-June model and the March-September model respectively. The average AR (abnormal return) and CAR (cumulative abnormal return) for each month (from event months –36 to –1) are given below. We also calculate the FDAR (first difference of abnormal returns) and their t-statistics.

	December-June		March-September		Difference	
EM	**AR**	**CAR**	**AR**	**CAR**	**FDAR**	**T-Stat**
Month -36	0.0210	0.0210	**0.0417***	0.0417	-0.0207	1.35
Month -35	0.0196	0.0406	0.0008	0.0425	0.0188	1.32
Month -34	0.0153	0.0560	-0.0006	0.0419	0.0159	0.94
Month -33	-0.0208	0.0351	-0.0036	0.0383	-0.0172	1.21
Month -32	-0.0197	0.0154	-0.0078	0.0305	-0.0119	0.96
Month -31	0.0004	0.0158	-0.0035	0.0270	0.0039	0.23
Month -30	-0.0176	-0.0018	-0.0141	0.0129	-0.0035	0.26
Month -29	0.0021	0.0003	-0.0036	0.0093	0.0057	0.41
Month -28	0.0001	0.0004	-0.0341	-0.0248	0.0342	1.81
Month -27	**0.0401***	0.0405	**0.0429***	0.0181	-0.0028	0.20
Month -26	-0.0103	0.0302	-0.0236	-0.0055	0.0133	0.80
Month -25	0.0320	0.0622	0.0109	0.0054	0.0211	1.15
Month -24	0.0156	0.0779	-0.0062	-0.0008	0.0218	1.60
Month -23	0.0089	0.0868	-0.0071	-0.0079	0.0160	1.09
Month -22	0.0157	0.1025	0.0068	-0.0011	0.0089	0.73
Month -21	0.0128	0.1153	-0.0221	-0.0232	0.0349	1.94
Month -20	0.0133	0.1287	0.0020	-0.0212	0.0113	0.72

Month -19	0.0133	0.1420	-0.0059	-0.0270	0.0192	1.02
Month -18	-0.0149	0.1271	-0.0028	-0.0298	-0.0121	0.97
Month -17	0.0216	0.1487	0.0111	-0.0186	0.0105	0.59
Month -16	0.0053	0.1540	0.0077	-0.0109	-0.0024	0.14
Month -15	0.0173	0.1713	0.0178	0.0069	-0.0005	0.02
Month -14	-0.0273	0.1440	-0.0177	-0.0108	-0.0096	0.73
Month -13	-0.0275	0.1165	-0.0147	-0.0255	-0.0128	0.99
Month -12	0.0037	0.1202	-0.0052	-0.0307	0.0089	0.48
Month -11	0.0133	0.1335	0.0205	-0.0102	-0.0072	0.30
Month -10	0.0192	0.1527	-0.0076	-0.0178	0.0268	1.50
Month -9	-0.016	0.1368	-0.0106	-0.0284	-0.0054	0.27
Month -8	**0.0443***	0.1811	0.0285	0.0001	0.0158	0.99
Month -7	0.0087	0.1897	-0.0143	-0.0142	0.0230	1.16
Month -6	**0.0347***	0.2244	0.0212	0.0071	0.0135	1.03
Month -5	-0.0351	0.1894	-0.0108	-0.0038	-0.0243	0.86
Month -4	-0.009	0.1804	0.0224	0.0187	-0.0314	1.56
Month -3	-0.0042	0.1762	-0.0002	0.0184	-0.0040	0.21
Month -2	0.0092	0.1853	0.0090	0.0275	0.0002	0.01
Month -1	-0.0011	0.1842	-0.0123	0.0152	0.0112	0.66

* Indicate significant at 5%, two-sided test.

Figure 4.4. The first differences of bidding firms (pre-takeover) average abnormal returns (AR) between December-June model and March-September model

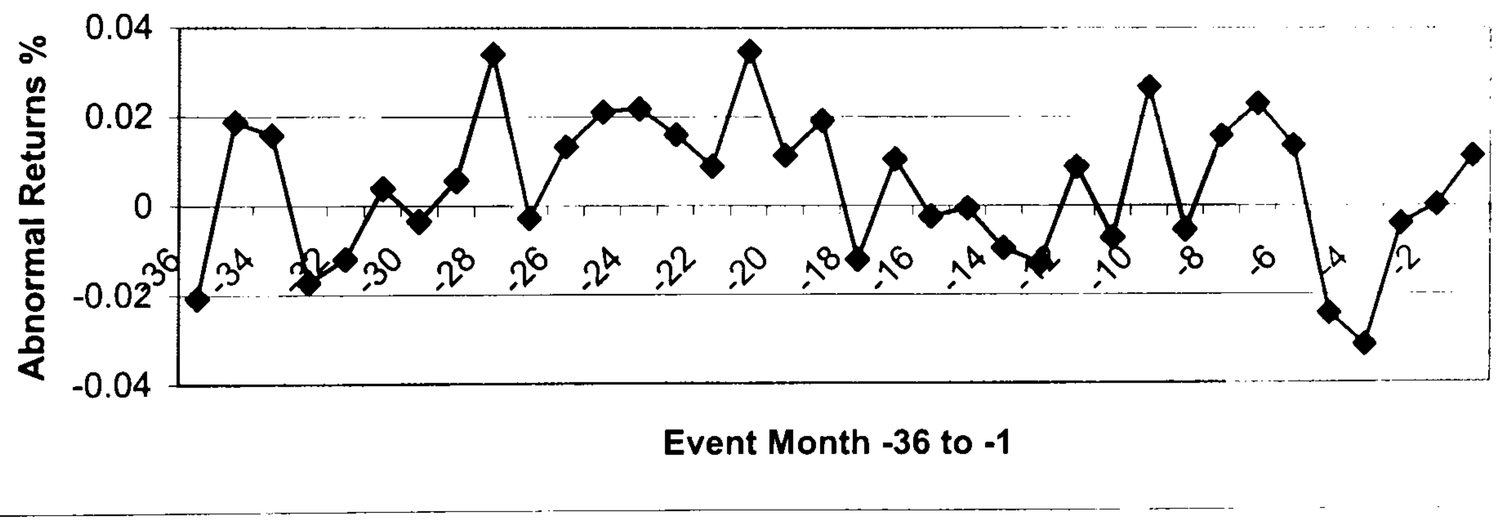


Table 4.13 shows, under the December-June model, bidding firms experience a large positive but insignificant abnormal return of 18.42% in three-year prior to the takeover announcement. However, under the March-September model, bidding firms have a small positive but insignificant abnormal return of 1.52% in three-year prior to the takeover announcement. The first difference of the two CARs is about 17%, but it is statistically insignificant different from zero.

Table 4.13. Bidding firms (with an accounting year ending at March) three-year pre-takeover CARs

Sample bidding firms (accounting year ends at March, 31 firms) three years pre-takeover average CARs are calculated by using the control firms approach under the December-June model and the March-September model respectively. Relevant t-statistics of the CARs and the corresponding P-values calculated by using the non-parametric Wilcoxon Signed-Rank test are also given in the table.

	CAR	T-Stat	P-Value
December-June	0.1842	1.517	0.244
March-September	0.0152	0.184	0.702
Difference	**0.1690**	**1.549**	**0.222**

Table 4.14 presents the three-year pre-takeover average BHARs of sample bidding firms that have an accounting year ending at March. BHAR in row 1 is calculated by applying the December-June model (i.e., we ignore the accounting year ending of March for these firms, and calculate the book-to-market ratios at December of year t-1 and sizes at June of year t for these target firms. We match these sample firms with all the LSE listed firms (with both book-to-market ratios and sizes calculated at the same time as above, around 1,500 firms each year) to find the closest match, i.e., the control firms). BHAR in row 2 is calculated by applying the March-September model (i.e., according to the accounting year ending of March, we calculated the book-to-market ratios at March of year t and sizes at September (with 6 months lag) of year t for these target firms. We match these sample firms with all the LSE listed firms that have an accounting year ending at March (their book-to-market ratios and sizes are calculated at the same time as above, around 300 firms each year) to find the closest match, i.e., the control firms).

As we can see from Table 4.14, under the December-June model, Bidding firms experience a large positive but insignificant abnormal return of 17.47% in three-year

prior to the takeover announcement. Under the March-September model, bidding firms gain a small positive but insignificant abnormal return of 3.28% in three-year prior to the takeover announcement. The first difference of the two BHARs is about 14%, but it is statistically insignificant different from zero.

Table 4.14. Bidding firms (with an accounting year ending at March) three-year pre-takeover BHARs

Sample Bidding firms (accounting year ends at March, 31 firms) three year pre-takeover average BHARs (buy-and-hold abnormal returns) are calculated by using the control firms approach under the December-June model and the March-September model respectively. Relevant t-statistics of the BHARs and the corresponding P-values calculated by using the non-parametric Wilcoxon Signed-Rank test are also given in the table.

	BHAR	T-Stat	P-Value
December-June	0.1747	1.241	0.286
March-September	0.0328	0.330	0.776
Difference	**0.1419**	**1.139**	**0.230**

Table 4.15 reports the three-year pre-takeover average ARs (abnormal returns) and average CARs of the bidding firms that have an accounting year ending at June. ARs and CARs in column 2 and 3 are calculated by applying the December-June model (i.e., we ignore the accounting year ending of March for these firms, and calculate the book-to-market ratios at December of year t-1 and sizes at June of year t for these target firms. We match these sample firms with all the LSE listed firms (with both book-to-market ratios and sizes calculated at the same time as above, around 1,500 firms each year) to find the closest match, i.e., the control firms). ARs and CARs in Column 4 and 5 are calculated by applying the June-December model (i.e., according to the accounting year ending of June, we calculated the book-to-market ratios at June of year t and sizes at December (with 6 months lag) of year t for these target firms. We match these sample firms with all the LSE listed firms that have an accounting year ending at June (their

book-to-market ratios and size are calculated at the same time as above, around 100 firms each year) to find the closest match, i.e., the control firms). Column 6 and 7 are the first difference of the Abnormal Returns (FDAR) and the t-statistic of the FDAR. Figure 4.5 plots the 36 monthly FDARs.

Table 4.15. Bidding firms (with an accounting year ending at June) three-year pre-takeover abnormal returns and CARs

Sample bidding firms (accounting year ends at June, 10 firms) three-year pre-takeover abnormal returns are calculated by using the control firms approach under the December-June model and the June-December model respectively. The average AR (abnormal return) and CAR (cumulative abnormal return) for each month (from event months –36 to –1) are given below. We also calculate the FDAR (first difference of abnormal returns) and their t-statistics.

	December-June		June-December		Difference	
EM	AR	CAR	AR	CAR	FDAR	T-Stat
Month -36	-0.0179	-0.0179	0.0015	0.0015	-0.0194	0.47
Month -35	-0.0078	-0.0256	0.0138	0.0153	-0.0216	1.20
Month -34	-0.0907	-0.1163	-0.1321	-0.1168	0.0414	0.62
Month -33	0.0266	-0.0897	0.0333	-0.0834	-0.0067	0.30
Month -32	0.0205	-0.0693	0.0156	-0.0678	0.0049	0.08
Month -31	-0.0500	-0.1193	0.0162	-0.0516	-0.0662	1.68
Month -30	-0.0795	-0.1988	-0.0237	-0.0753	-0.0558	1.72
Month -29	-0.0765	-0.2753	-0.0435	-0.1189	-0.0330	0.93
Month -28	-0.0156	-0.2909	-0.0178	-0.1366	0.0022	0.05
Month -27	-0.0494	-0.3403	-0.0850	-0.2216	0.0356	0.39
Month -26	-0.0046	-0.3449	0.0200	-0.2016	-0.0246	1.13
Month -25	-0.0291	-0.3739	-0.0175	-0.2191	-0.0116	0.44
Month -24	0.0167	-0.3572	-0.0021	-0.2212	0.0188	0.44
Month -23	0.0593	-0.2979	0.0619	-0.1593	-0.0026	0.10
Month -22	-0.0117	-0.3096	-0.0123	-0.1716	0.0006	0.02
Month -21	**0.0920***	-0.2176	0.0427	-0.1289	0.0493	0.87
Month -20	-0.0301	-0.2477	0.0270	-0.1019	-0.0571	0.92
Month -19	0.0185	-0.2291	-0.0224	-0.1243	0.0409	0.75
Month -18	**-0.0955***	-0.3246	-0.0376	-0.1619	**-0.0579***	3.36
Month -17	0.0300	-0.2947	**0.1203***	-0.0417	-0.0903	1.13
Month -16	0.0461	-0.2486	0.0716	0.0300	-0.0255	0.90
Month -15	0.0159	-0.2327	-0.0345	-0.0045	0.0504	1.42
Month -14	0.0717	-0.1611	0.0330	0.0285	0.0387	0.98
Month -13	0.0518	-0.1092	0.0452	0.0737	0.0066	0.16
Month -12	-0.0040	-0.1132	-0.0178	0.0560	0.0138	0.30
Month -11	0.0323	-0.0809	0.0384	0.0944	-0.0061	0.21
Month -10	0.0178	-0.0631	-0.0084	0.0860	0.0262	0.92
Month -9	-0.0203	-0.0835	0.0574	0.1434	-0.0777	1.95
Month -8	**-0.0561***	-0.1396	-0.0352	0.1082	-0.0209	0.63
Month -7	0.0322	-0.1074	0.0211	0.1293	0.0111	0.27
Month -6	0.0219	-0.0854	0.0808	0.2102	-0.0589	1.80
Month -5	**0.0901***	0.0046	0.0479	0.2580	0.0422	0.81

Month -4	-0.0105	-0.0058	0.0614	0.3195	-0.0719	0.85
Month -3	0.0489	0.0431	0.0800	0.3994	-0.0311	0.56
Month -2	**0.1159***	0.1590	0.0581	0.4575	0.0578	1.70
Month -1	0.0591	0.2181	0.0734	0.5310	-0.0143	0.25

* Indicate significant at 5%, two-sided test.

Figure 4.5. The first differences of bidding firms (pre-takeover) average abnormal returns (AR) between December-June model and June-December model

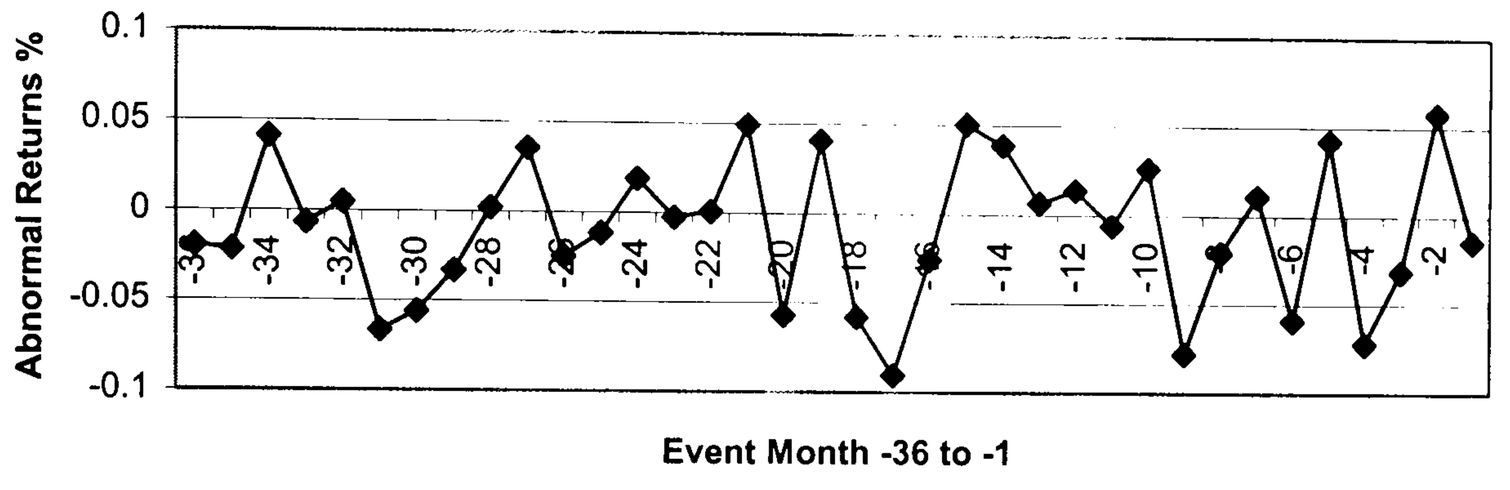


Table 4.16 shows, under the December-June model, bidding firms experience a large positive but insignificant abnormal return of 21.81% in three-year prior to the takeover announcement. Under the June-December model, biding firms gain a very large positive but insignificant abnormal return of 53.1% in three-year prior to the takeover announcement. The first difference of the two CARs is about 31%, but it is statistically insignificant different from zero.

Table 4.16. Bidding firms (with an accounting year ending at June) three-year pre-takeover CARs

Sample bidding firms (accounting year ends at June, 10 firms) three years pre-takeover average CARs are calculated by using the control firms approach under the December-June model and the June-December model respectively. Relevant t-statistics of the CARs and the corresponding P-values calculated by using the non-parametric Wilcoxon Signed-Rank test are also given in the table.

	CAR	T-Stat	P-Value
December-June	0.2181	1.199	0.308
June-December	0.5310	2.177	0.083
Difference	**-0.3129**	**-1.071**	**0.441**

Table 4.17 presents the three-year pre-takeover average BHARs of the bidding firms that have an accounting year ending at June. BHAR in row 1 is calculated by applying the December-June model (i.e., we ignore the accounting year ending of March for these firms, and calculate the book-to-market ratios at December of year t-1 and sizes at June of year t for these target firms. We match these sample firms with all the LSE listed firms (with both book-to-market ratios and sizes calculated at the same time as above, around 1,500 firms each year) to find the closest match, i.e., the control firms). BHAR in row 2 calculated by applying the June-December model (i.e., according to the accounting year ending of June, we calculated the book-to-market ratios at June of year t and sizes at December (with 6 months lag) of year t for these target firms. We match these sample firms with all the LSE listed firms that have an accounting year ending at June (their book-to-market ratios and sizes are calculated at the same time as above, around 100 firms each year) to find the closest match, i.e., the control firms).

As we can see from Table 4.17, under the December-June model, target firms experience a large positive but insignificant abnormal return of 33.38% in three-year prior to the takeover announcement. Under the June-December model, target firms gain a large positive but insignificant abnormal return of 45.49% in three-year prior to the takeover announcement. The first difference of the two BHARs is about 12%, but it is statistically insignificant different from zero.

Table 4.17. Bidding firms (with an accounting year ending at June) three-year pre-takeover BHARs

Sample bidding firms (accounting year ends at June, 10 firms) three years pre-takeover average BHARs (buy-and-hold abnormal returns) are calculated by using the control firms approach under the December-June model and the June-December model respectively. Relevant t-statistics of the BHARs and the corresponding P-values calculated by using the non-parametric Wilcoxon Signed-Rank test are also given in the table.

	BHAR	T-Stat	P-Value
December-June	0.3338	1.060	0.610
June-December	0.4549	1.818	0.103
Difference	**-0.1211**	**-0.542**	**0.594**

Table 4.18 reports the three-year pre-takeover average ARs (abnormal returns) and average CARs of the bidding firms that have an accounting year ending at September. ARs and CARs in column 2 and 3 are calculated by applying the December-June model (i.e., we ignore the accounting year ending of September for these firms, and calculate the book-to-market ratios at December of year t-1 and sizes at June of year t for these target firms. We match these sample firms with all the LSE listed firms (with both book-to-market ratios and sizes calculated at the same time as above, around 1,500 firms each year) to find the closest match, i.e., the control firms). ARs and CARs in Column 4 and 5 are calculated by applying the September-March model (i.e., according to the accounting year ending of September, we calculated the book-to-market ratios at September of year t and sizes at March (with 6 months lag) of year t+1 for these target firms. We match these sample firms with all the LSE listed firms that have an accounting year ending at September (their book-to-market ratios and sizes are calculated at the same time as above, around 100 firms for each year) to find the closest match, i.e., the control firms). Column 6 and 7 are the first difference of the Abnormal Returns (FDAR) and the t-statistic of the FDAR. Figure 4.6 plots the 36 monthly FDARs.

Table 4.18. Bidding firms (with an accounting year ending at September) three-year pre-takeover abnormal returns and CARs

Sample bidding firms (accounting year ends at September, 20 firms) three-year pre-takeover abnormal returns are calculated by using the control firms approach under the December-June model and the September-March model respectively. The average AR (abnormal return) and CAR (cumulative abnormal

return) for each month (from event months –36 to –1) are given below. We also calculate the FDAR (first difference of abnormal returns) and their t-statistics.

	December-June		September-March		Difference	
EM	**AR**	**CAR**	**AR**	**CAR**	**FDAR**	**T-Stat**
Month -36	-0.0130	-0.0130	-0.0039	-0.0039	-0.0091	0.59
Month -35	0.0264	0.0134	0.0335	0.0295	-0.0071	0.54
Month -34	0.0186	0.0319	0.0182	0.0477	0.0004	0.02
Month -33	-0.0052	0.0267	-0.0306	0.0171	0.0254	1.31
Month -32	0.0027	0.0294	-0.0256	-0.0084	0.0283	1.67
Month -31	-0.0068	0.0226	-0.0056	-0.0140	-0.0012	0.04
Month -30	-0.0277	-0.0051	-0.0008	-0.0148	-0.0269	1.57
Month -29	0.0239	0.0189	0.0281	0.0133	-0.0042	0.13
Month -28	0.0021	0.0209	0.0087	0.0221	-0.0066	0.51
Month -27	-0.0210	-0.0001	0.0222	0.0443	-0.0432	1.27
Month -26	-0.0038	-0.0039	**0.0324***	0.0766	**-0.0362***	2.17
Month -25	-0.0007	-0.0047	-0.0073	0.0694	0.0066	0.42
Month -24	**-0.0416***	-0.0462	-0.0248	0.0446	-0.0168	0.73
Month -23	-0.0227	-0.0689	-0.0331	0.0115	0.0104	0.78
Month -22	-0.0091	-0.0780	0.0114	0.0229	-0.0205	0.94
Month -21	0.0271	-0.0509	0.0223	0.0452	0.0048	0.24
Month -20	0.0140	-0.0369	-0.0132	0.0321	0.0272	1.18
Month -19	-0.0271	-0.0640	-0.0226	0.0095	-0.0045	0.18
Month -18	-0.0199	-0.0839	-0.0285	-0.019	0.0086	0.47
Month -17	-0.0148	-0.0986	-0.0131	-0.0320	-0.0017	0.07
Month -16	0.0206	-0.0781	0.0056	-0.0265	0.0150	0.79
Month -15	-0.0194	-0.0974	-0.0089	-0.0353	-0.0105	0.54
Month -14	-0.0019	-0.0994	-0.0020	-0.0373	0.0001	0.002
Month -13	**0.0475***	-0.0518	-0.0127	-0.0500	0.0602	1.75
Month -12	0.0148	-0.0370	0.0101	-0.0399	0.0047	0.24
Month -11	0.0260	-0.0110	0.0058	-0.0341	0.0202	1.07
Month -10	0.0393	0.0283	0.0284	-0.0058	0.0109	0.68
Month -9	0.0410	0.0693	0.0007	-0.0050	0.0403	1.66
Month -8	-0.0467	0.0226	-0.0092	-0.0142	-0.0375	1.02
Month -7	-0.0326	-0.0100	-0.0350	-0.0492	0.0024	0.08
Month -6	-0.0223	-0.0323	**-0.0316***	-0.0808	0.0093	0.60
Month -5	0.0090	-0.0233	0.0298	-0.0509	-0.0208	1.09
Month -4	0.0243	0.0010	0.0054	-0.0456	0.0189	0.74
Month -3	0.0012	0.0023	-0.0068	-0.0524	0.0080	0.33
Month -2	0.0387	0.0409	-0.0091	-0.0615	0.0478	1.13
Month -1	0.0671	0.1081	0.0548	-0.0067	0.0123	0.46

* Indicate significant at 5%, two-sided test.

Figure 4.6. The first differences of biding firms (pre-takeover) average abnormal returns (AR) between December-June model and September-March model

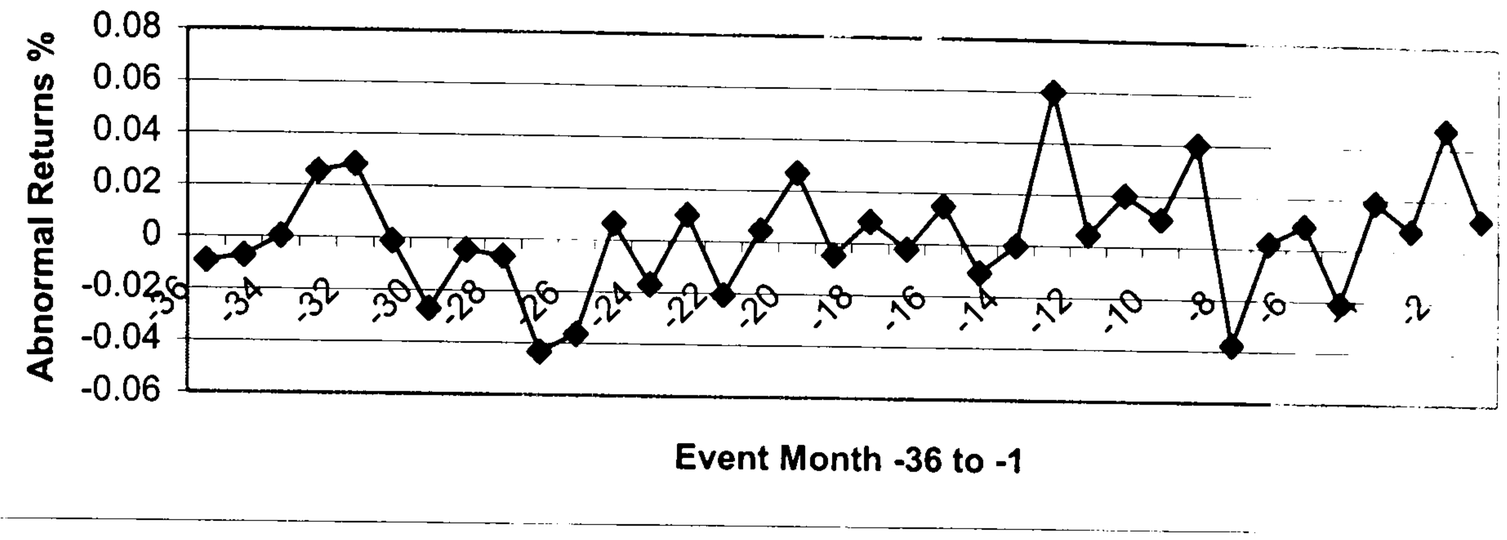


Table 4.19 shows, under the December-June model, bidding firms earn a positive but insignificant abnormal return of 10.81% in three-year prior to the takeover announcement. However, under the September-March model, bidding firms experience a small negative but insignificant abnormal return of –0.67% in three-year prior to the takeover announcement. The first difference of these two CARs is about 11 %, but it is statistically insignificant different from zero.

Table 4.19. Bidding firms (with an accounting year ending at Sept) three-year pre-takeover CARs

Sample Bidding firms (accounting year ends at September, 20 firms) three year pre-takeover average CARs are calculated by using the control firms approach under the December-June model and the September-March model respectively. Relevant t-statistics of the CARs and the corresponding P-values calculated by using the non-parametric Wilcoxon Signed-Rank test are also given in the table.

	CAR	T-Stat	P-Value
December-June	0.1081	0.742	0.588
September-March	-0.0067	-0.041	0.779
Difference	**0.1148**	**0.863**	**0.554**

Table 4.20 presents the three-year pre-takeover average BHARs of the bidding firms that have an accounting year ending at September. BHAR in row 1 is calculated by applying the December-June model (i.e., we ignore the accounting year ending of

March for these firms, and calculate the book-to-market ratios at December of year t-1 and sizes at June of year t for these target firms. We match these sample firms with all the LSE listed firms (with both book-to-market ratios and size calculated at the same time as above, around 1,500 firms each year) to find the closest match, i.e., the control firms). BHAR in row 2 calculated by applying the September-March model (i.e., according to the accounting year ending of September, we calculated the book-to-market ratios at September of year t and sizes at March (with 6 months lag) of year t+1 for these target firms. We match these sample firms with all the LSE listed firms that have an accounting year ending at September (their book-to-market ratios and sizes are calculated at the same time as above, around 100 firms each year) to find the closest match, i.e., the control firms.

Table 4.20. Bidding firms (with an accounting year ending at Sept) three-year pre-takeover BHARs

Sample bidding firms (accounting year ends at September, 20 firms) three years pre-takeover average BHARs (buy-and-hold abnormal returns) are calculated by using the control firms approach under the December-June model and the September-March model respectively. Relevant t-statistics of the BHARs and the corresponding P-values calculated by using the non-parametric Wilcoxon Signed-Rank test are also given in the table.

	BHAR	T-Stat	P-Value
December-June	0.2521	1.107	0.695
September-March	0.1016	0.367	0.896
Difference	**0.1505**	**0.705**	**0.554**

As we can see from Table 4.20, under the December-June model, bidding firms experience a large positive but insignificant abnormal return of 25.21% in three-year prior to the takeover announcement. Under the September-March model, biding firms also earn a positive but insignificant abnormal return of 10.16% in three-year prior to

the takeover announcement. The first difference of the two BHARs is about 15%, but it is statistically insignificant different from zero.

4.4.3. Bidding Firms' Three Years Post Acquisition Stock Returns

Table 4.21 reports the three-year post-takeover average ARs (abnormal returns) and average CARs of the bidding firms that have an accounting year ending at March. ARs and CARs in column 2 and 3 are calculated by applying the December-June model (i.e., we ignore the accounting year ending of March for these firms, and calculate the book-to-market ratios at December of year t-1 and sizes at June of year t for these target firms. We match these sample firms with all the LSE listed firms (with both book-to-market ratios and sizes calculated at the same time as above, around 1,500 matching firms each year) to find the closest match, i.e., the control firms). ARs and CARs in Column 4 and 5 are calculated by applying the March-September model (i.e., according to the accounting year ending of March, we calculated the book-to-market ratios at March of year t and sizes at September (with 6 months lag) of year t for these target firms. We match these sample firms with all the LSE listed firms that have an accounting year ending at March (their book-to-market ratios and sizes are calculated at the same time as above, around 300 firms each year) to find the closest match, i.e., the control firms). Column 6 and 7 are the first difference of the Abnormal Returns (FDAR) and the t-statistic of the FDAR. Figure 4.7 plots the 36 monthly FDARs.

Table 4.21. Bidding firms (with an accounting year ending at March) three-year post-takeover abnormal returns and CARs

Sample bidding firms (accounting year ends at March, 33 firms) three-year post-takeover abnormal returns are calculated by using the control firms approach under the December-June model and the March-September model respectively. The average AR (abnormal return) and CAR (cumulative abnormal

return) for each month (from event months 1 to 36) are given below. We also calculate the FDAR (first difference of abnormal returns) and their t-statistics.

	December-June		March-September		Difference	
EM	**AR**	**CAR**	**AR**	**CAR**	**FDAR**	**T-Stat**
Month 1	0.0008	0.0080	0.0071	0.0071	0.0009	0.05
Month 2	-0.0071	0.0009	-0.0135	-0.0064	0.0064	0.33
Month 3	-0.0265	-0.0256	**-0.0365***	-0.0429	0.0100	0.65
Month 4	-0.0112	-0.0369	0.0028	-0.0401	-0.0140	1.00
Month 5	0.0194	-0.0174	0.0151	-0.0251	0.0043	0.31
Month 6	-0.0180	-0.0354	-0.0091	-0.0341	-0.0089	0.60
Month 7	-0.0014	-0.0368	-0.0107	-0.0449	0.0093	0.73
Month 8	0.0133	-0.0234	-0.0235	-0.0684	**0.0368***	2.21
Month 9	0	-0.0235	0.0334	-0.0349	-0.0334	1.74
Month 10	-0.0183	-0.0418	-0.0216	-0.0565	0.0033	0.19
Month 11	0.0066	-0.0351	0.0079	-0.0486	-0.0013	0.09
Month 12	-0.0247	-0.0599	-0.0097	-0.0583	-0.0150	0.85
Month 13	-0.0247	-0.0845	-0.0041	-0.0624	-0.0206	1.30
Month 14	0.0148	-0.0698	0.0444	-0.0180	-0.0296	1.45
Month 15	-0.0100	-0.0798	-0.0018	-0.0198	-0.0082	0.42
Month 16	0.0028	-0.0770	0.0221	0.0023	-0.0193	0.87
Month 17	0.0271	-0.0499	0.0143	0.0166	0.0128	0.69
Month 18	-0.0023	-0.0522	0.0220	0.0386	-0.0243	1.49
Month 19	0.0055	-0.0467	0.0018	0.0404	0.0037	0.19
Month 20	**0.0635***	0.0167	0.0239	0.0643	0.0396	1.69
Month 21	-0.0175	-0.0008	-0.0013	0.0630	-0.0162	0.56
Month 22	-0.0483	-0.0491	-0.0381	0.0249	-0.0102	0.43
Month 23	-0.0140	-0.0631	-0.0269	-0.0020	0.0129	0.62
Month 24	-0.0326	-0.0958	-0.0374	-0.0394	0.0048	0.25
Month 25	**0.0582***	-0.0376	0.0371	-0.0023	0.0211	1.08
Month 26	0.0072	-0.0304	0.0144	0.0121	-0.0072	0.29
Month 27	0.0147	-0.0157	-0.0138	-0.0017	0.0285	1.42
Month 28	-0.0069	-0.0226	-0.0068	-0.0085	-0.0001	0.01
Month 29	0.0377	0.0151	-0.0178	-0.0263	**0.0555***	2.09
Month 30	0.0361	0.0512	0.0040	-0.0223	0.0321	1.55
Month 31	0.0098	0.0610	-0.0131	-0.0354	0.0229	0.97
Month 32	0.0178	0.0788	0.0299	-0.0055	-0.0121	0.53
Month 33	0.0476	0.1264	**0.0675***	0.0620	-0.0199	0.53
Month 34	0.0133	0.1397	0.0328	0.0948	-0.0195	1.09
Month 35	-0.0227	0.1170	-0.0244	0.0705	0.0017	0.06
Month 36	-0.0210	0.0960	**-0.0549***	0.0156	0.0339	1.25

* Indicate significant at 5%, two-sided test.

Figure 4.7. The first differences of bidding firms (post-takeover) average abnormal returns (AR) between December-June model and March-September model

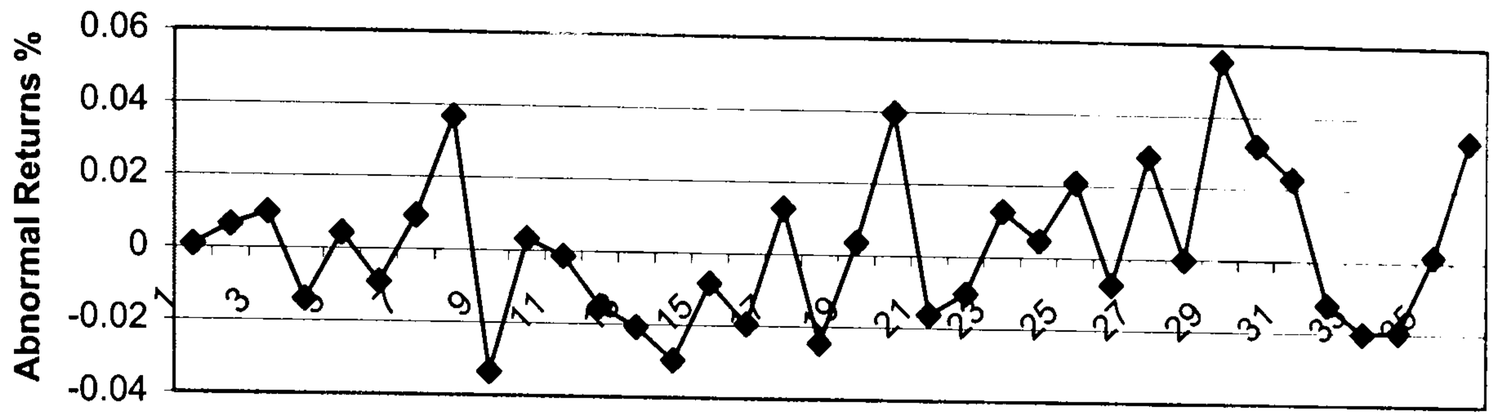


Table 4.22 shows, under the December-June model, bidding firms experience a positive but insignificant abnormal return of 9.6% in three-year after the takeover. However, under the March-September model, bidding firms have a small positive but insignificant abnormal return of 1.56% in three-year after the takeover. The first difference of the two CARs is about 8%, but it is statistically insignificant.

Table 4.22. Bidding firms (with an accounting year ending at March) three-year post-takeover CARs

Sample bidding firms (accounting year ends at March, 33 firms) three year post-takeover average CARs are calculated by using the control firms approach under the December-June model and the March-September model respectively. Relevant t-statistics of the CARs and the corresponding P-values calculated by using the non-parametric Wilcoxon Signed-Rank test are also given in the table.

	CAR	T-Stat	P-Value
December-June	0.0960	0.724	0.532
March-September	0.0156	0.115	0.555
Difference	**0.0804**	**0.713**	**0.969**

Table 4.23 presents the three-year post-takeover average BHARs of sample bidding firms that have an accounting year ending at March. BHAR in row 1 is calculated by applying the December-June model (i.e., we ignore the accounting year ending of March for these firms, and calculate the book-to-market ratios at December of year t-1

and sizes at June of year t for these target firms. We match these sample firms with all the LSE listed firms (with both book-to-market ratios and sizes calculated at the same time as above, around 1,500 firms each year) to find the closest match, i.e., the control firms). BHAR in row 2 is calculated by applying the March-September model (i.e., according to the accounting year ending of March, we calculated the book-to-market ratios at March of year t and sizes at September (with 6 months lag) of year t for these target firms. We match these sample firms with all the LSE listed firms that have an accounting year ending at March (their book-to-market ratios and sizes are calculated at the same time as above, around 300 firms each year) to find the closest match, i.e., the control firms).

Table 4.23. Bidding firms (with an accounting year ending at March) three-year post-takeover BHARs

Sample Bidding firms (accounting year ends at March, 33 firms) three years post-takeover average BHARs (buy-and-hold abnormal returns) are calculated by using the control firms approach under the December-June model and the March-September model respectively. Relevant t-statistics of the BHARs and the corresponding P-values calculated by using the non-parametric Wilcoxon Signed-Rank test are also given in the table.

	BHAR	T-Stat	P-Value
December-June	0.0757	0.606	0.421
March-September	-0.0129	-0.098	0.642
Difference	**0.0886**	**0.731**	**0.829**

As we can see from Table 4.23, under the December-June model, bidding firms experience a positive but insignificant abnormal return of 7.57% in three-year after the takeover. Under the March-September model, bidding firms experience a small negative but insignificant abnormal return of –1.29% in three-year after the takeover. The first difference of the two BHARs is about 9%, but it is statistically insignificant different from zero.

Table 4.24 reports the three-year post-takeover average ARs (abnormal returns) and average CARs of the bidding firms that have an accounting year ending at June. ARs and CARs in column 2 and 3 are calculated by applying the December-June model (i.e., we ignore the accounting year ending of March for these firms, and calculate the book-to-market ratios at December of year t-1 and sizes at June of year t for these target firms. We match these sample firms with all the LSE listed firms (with both book-to-market ratios and sizes calculated at the same time as above, around 1,500 firms each year) to find the closest match, i.e., the control firms). ARs and CARs in Column 4 and 5 are calculated by applying the June-December model (i.e., according to the accounting year ending of June, we calculated the book-to-market ratios at June of year t and sizes at December (with 6 months lag) of year t for these target firms. We match these sample firms with all the LSE listed firms that have an accounting year ending at June (their book-to-market ratios and size are calculated at the same time as above, around 100 firms each year) to find the closest match, i.e., the control firms). Column 6 and 7 are the first difference of the Abnormal Returns (FDAR) and the t-statistic of the FDAR. Figure 4.8 plots the 36 monthly FDARs.

Table 4.24. Bidding firms (with an accounting year ending at June) three-year post-takeover abnormal returns and CARs

Sample bidding firms (accounting year ends at June, 12 firms) three-year post-takeover abnormal returns are calculated by using the control firms approach under the December-June model and the June-December model respectively. The average AR (abnormal return) and CAR (cumulative abnormal return) for each month (from event months 1 to 36) are given below. We also calculate the FDAR (first difference of abnormal returns) and their t-statistics.

	December-June		June-December		Difference	
EM	**AR**	**CAR**	**AR**	**CAR**	**FDAR**	**T-Stat**
Month 1	-0.0051	-0.0051	0.0332	0.0332	-0.0383	1.04
Month 2	-0.0203	-0.0254	-0.0031	0.0301	-0.0172	0.53
Month 3	-0.0070	-0.0323	-0.0488	-0.0186	0.0418	0.78
Month 4	-0.0142	-0.0465	-0.0313	-0.0499	0.0171	0.26
Month 5	-0.0443	-0.0908	**-0.0992***	-0.1491	0.0549	1.31

Month 6	-0.0566	-0.1475	-0.0645	-0.2136	0.0079	0.21
Month 7	0.0134	-0.1341	-0.1180	-0.3317	**0.1314***	2.18
Month 8	-0.0265	-0.1606	-0.0504	-0.3821	0.0239	0.61
Month 9	0.0678	-0.0928	0.0561	-0.3260	0.0117	0.27
Month 10	0.0357	-0.0571	0.0662	-0.2598	-0.0305	0.86
Month 11	0.0288	-0.0283	-0.0487	-0.3085	**0.0775***	2.39
Month 12	0.0179	-0.0104	-0.0255	-0.3340	0.0434	0.92
Month 13	0.0570	0.0466	0.0382	-0.2958	0.0188	0.57
Month 14	-0.0315	0.0151	-0.0425	-0.3382	0.0110	0.24
Month 15	0.0274	0.0425	-0.0213	-0.3596	0.0487	1.17
Month 16	-0.0287	0.0138	0.0228	-0.3367	-0.0515	1.12
Month 17	0.0210	0.0349	0.0328	-0.3040	-0.0118	0.34
Month 18	-0.0067	0.0282	-0.0446	-0.3486	0.0379	1.17
Month 19	0.0263	0.0545	**-0.0849***	-0.4334	**0.1112***	2.45
Month 20	0.0286	0.0831	0.0193	-0.4142	0.0093	0.24
Month 21	0.0408	0.1238	0.0148	-0.3994	0.0260	0.32
Month 22	0.0525	0.1763	0.0210	-0.3784	0.0315	0.88
Month 23	-0.0477	0.1286	0.0049	-0.3736	-0.0526	0.57
Month 24	-0.0407	0.0879	-0.0379	-0.4115	-0.0028	0.07
Month 25	-0.0387	0.0492	-0.0458	-0.4573	0.0071	0.24
Month 26	-0.0033	0.0459	-0.0497	-0.5070	0.0464	0.76
Month 27	-0.0066	0.0393	0.0973	-0.4097	-0.1039	1.56
Month 28	0.0170	0.0563	-0.0025	-0.4123	0.0195	0.50
Month 29	-0.0679	-0.0116	-0.1024	-0.5147	0.0345	0.64
Month 30	-0.0092	-0.0208	0.0185	-0.4961	-0.0277	0.74
Month 31	-0.0739	-0.0947	-0.0314	-0.5275	-0.0425	1.44
Month 32	0.0656	-0.0291	0.0447	-0.4828	0.0209	0.64
Month 33	0.0381	0.0090	0.0553	-0.4274	-0.0172	0.37
Month 34	0.0019	0.0108	-0.0158	-0.4432	0.0177	0.33
Month 35	**-0.1377***	-0.1269	-0.1277	-0.5709	-0.0100	0.25
Month 36	0.0350	-0.0919	0.0590	-0.5119	-0.0240	0.42

* Indicate significant at 5%, two-sided test.

Figure 4.8. The first differences of bidding firms (post-takeover) average abnormal returns (AR) between December-June model and June-December model

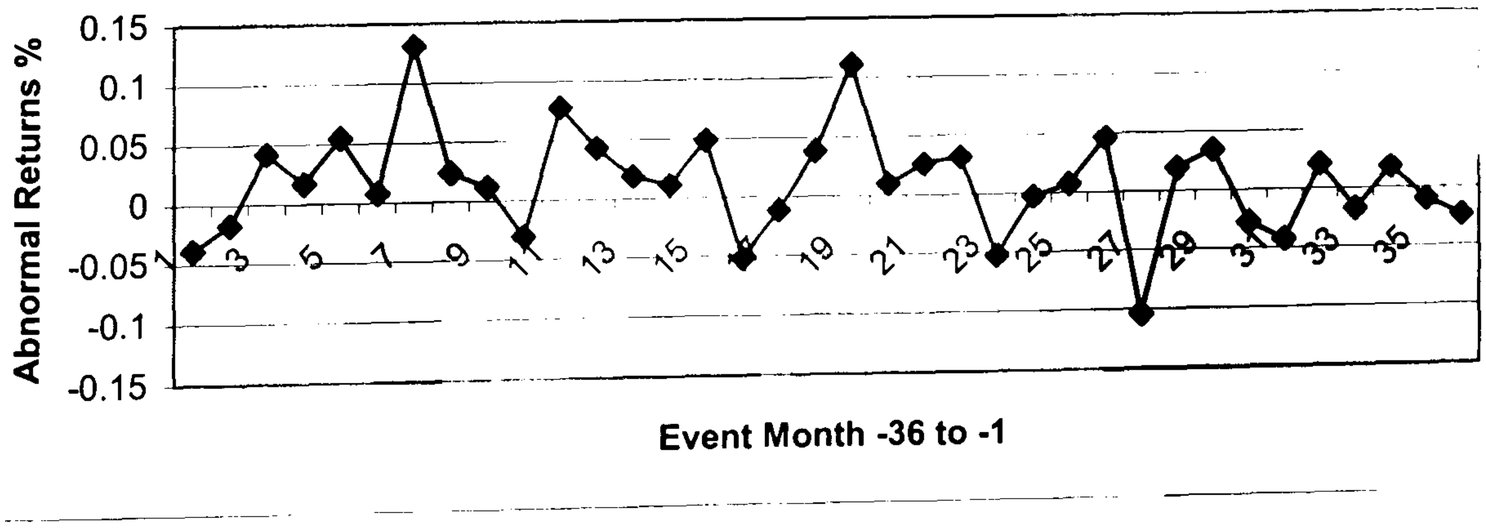


Table 4.25 shows, under the December-June model, bidding firms experience a negative but insignificant abnormal return of –9.19% in three-year after the takeover. Under the June-December model, biding firms suffer a very large negative but insignificant abnormal return of 51.19% in three-year after the takeover. The first difference of the two CARs is about 42%, but it is statistically insignificant different from zero.

Table 4.25. Bidding firms (with an accounting year ending at June) three-year post-takeover CARs

Sample bidding firms (accounting year ends at June, 12 firms) three years post-takeover average CARs are calculated by using the control firms approach under the December-June model and the June-December model respectively. Relevant t-statistics of the CARs and the corresponding P-values calculated by using the non-parametric Wilcoxon Signed-Rank test are also given in the table.

	CAR	T-Stat	P-Value
December-June	-0.0919	-0.283	0.784
June-December	-0.5119	-1.539	0.126
Difference	**0.4200**	**1.268**	**0.182**

Table 4.26 presents the three-year post-takeover average BHARs of the bidding firms that have an accounting year ending at June. BHAR in row 1 is calculated by applying the December-June model (i.e., we ignore the accounting year ending of March for these firms, and calculate the book-to-market ratios at December of year t-1 and sizes at June of year t for these target firms. We match these sample firms with all the LSE listed firms (with both book-to-market ratios and sizes calculated at the same time as above, around 1,500 firms each year) to find the closest match, i.e., the control firms). BHAR in row 2 calculated by applying the June-December model (i.e., according to the accounting year ending of June, we calculated the book-to-market ratios at June of year t and sizes at December (with 6 months lag) of year t for these target firms. We match these sample firms with all the LSE listed firms that have an accounting year ending at

June (their book-to-market ratios and sizes are calculated at the same time as above, around 100 firms each year) to find the closest match, i.e., the control firms).

As we can see from Table 4.26, under the December-June model, bidding firms suffer a large negative but insignificant abnormal return of -27.39% in three-year after the takeover. Under the June-December model, bidding firms also suffer a large negative but insignificant abnormal return of –53.79% in three-year after the takeover. The first difference of the two BHARs is about 26%, but it is statistically insignificant different from zero.

Table 4.26. Bidding firms (with an accounting year ending at June) three-year post-takeover BHARs

Sample bidding firms (accounting year ends at June, 12 firms) three years post-takeover average BHARs (buy-and-hold abnormal returns) are calculated by using the control firms approach under the December-June model and the June-December model respectively. Relevant t-statistics of the BHARs and the corresponding P-values calculated by using the non-parametric Wilcoxon Signed-Rank test are also given in the table.

	BHAR	T-Stat	P-Value
December-June	-0.2739	-1.218	0.556
June-December	-0.5379	-1.883	0.078
Difference	**0.2640**	**0.955**	**0.328**

Table 4.27 reports the three-year post-takeover average ARs (abnormal returns) and average CARs of the bidding firms that have an accounting year ending at September. ARs and CARs in column 2 and 3 are calculated by applying the December-June model (i.e., we ignore the accounting year ending of September for these firms, and calculate the book-to-market ratios at December of year t-1 and sizes at June of year t for these target firms. We match these sample firms with all the LSE listed firms (with both book-to-market ratios and sizes calculated at the same time as above, around 1,500

firms each year) to find the closest match, i.e., the control firms). ARs and CARs in Column 4 and 5 are calculated by applying the September-March model (i.e., according to the accounting year ending of September, we calculated the book-to-market ratios at September of year t and sizes at March (with 6 months lag) of year t+1 for these target firms. We match these sample firms with all the LSE listed firms that have an accounting year ending at September (their book-to-market ratios and sizes are calculated at the same time as above, around 100 firms for each year) to find the closest match, i.e., the control firms). Column 6 and 7 are the first difference of the Abnormal Returns (FDAR) and the t-statistic of the FDAR. Figure 4.9 plots the 36 monthly FDARs.

Table 4.27. Bidding firms (with an accounting year ending at September) three-year post-takeover abnormal returns and CARs

Sample bidding firms (accounting year ends at September, 17 firms) three-year post-takeover abnormal returns are calculated by using the control firms approach under the December-June model and the September-March model respectively. The average AR (abnormal return) and CAR (cumulative abnormal return) for each month (from event months 1 to 36) are given below. We also calculate the FDAR (first difference of abnormal returns) and their t-statistics.

	December-June		September-March		Difference	
EM	**AR**	**CAR**	**AR**	**CAR**	**FDAR**	**T-Stat**
Month 1	0.0025	0.0025	-0.0205	-0.0205	0.0230	0.76
Month 2	**-0.0455***	-0.0430	-0.0201	-0.0406	-0.0254	1.21
Month 3	0.0307	-0.0123	0.0023	-0.0383	0.0284	1.20
Month 4	0.0113	-0.0010	-0.0099	-0.0483	0.0212	0.99
Month 5	-0.0165	-0.0175	-0.0058	-0.0541	-0.0107	0.35
Month 6	-0.0475	-0.0650	0.0230	-0.0311	-0.0705	1.24
Month 7	0.0094	-0.0557	-0.0012	-0.0323	0.0106	0.38
Month 8	0.0324	-0.0232	0.0036	-0.0287	0.0288	0.89
Month 9	-0.0134	-0.0366	-0.0200	-0.0487	0.0066	0.19
Month 10	0.0201	-0.0165	0.0034	-0.0453	0.0167	0.61
Month 11	0.0275	0.0110	0.0161	-0.0292	0.0114	0.63
Month 12	0.0137	0.0247	-0.0473	-0.0765	0.0610	1.98
Month 13	0.0046	0.0293	0.0328	-0.0437	-0.0282	1.14
Month 14	0.0372	0.0665	0.0244	-0.0193	0.0128	0.48
Month 15	0.0407	0.1073	-0.0222	-0.0415	**0.0629***	2.36
Month 16	0.0068	0.1141	0.0138	-0.0278	-0.0070	0.17
Month 17	0.0387	0.1528	0.0050	-0.0227	0.0337	0.60
Month 18	-0.0031	0.1497	0.0062	-0.0165	-0.0093	0.28
Month 19	0.0211	0.1707	0.0492	0.0327	-0.0281	0.54

Month 20	-0.0078	0.1629	**0.0882***	0.1209	**-0.0960***	3.42
Month 21	-0.0110	0.1519	0.0256	0.1465	-0.0366	1.07
Month 22	-0.0283	0.1236	-0.0388	0.1077	0.0105	0.20
Month 23	0.0034	0.1270	-0.0029	0.1049	0.0063	0.15
Month 24	0.0156	0.1426	-0.0058	0.0990	0.0214	0.80
Month 25	-0.0024	0.1401	0.0100	0.1091	-0.0124	0.44
Month 26	-0.0800	0.0601	-0.0083	0.1007	-0.0717	0.96
Month 27	**0.0477***	0.1078	-0.0028	0.0980	0.0505	1.27
Month 28	-0.0056	0.1023	-0.0503	0.0476	0.0447	1.28
Month 29	0.0327	0.1349	0.0331	0.0807	-0.0004	0.01
Month 30	-0.0352	0.0998	-0.0314	0.0493	-0.0038	0.08
Month 31	0.0485	0.1482	-0.0250	0.0243	0.0735	1.89
Month 32	-0.0070	0.1412	0.0341	0.0584	-0.0411	2.00
Month 33	0.0193	0.1605	0.0291	0.0875	-0.0098	0.47
Month 34	0.0123	0.1728	0.0438	0.1313	-0.0315	0.97
Month 35	0.0058	0.1786	0.0394	0.1707	-0.0336	1.23
Month 36	-0.0160	0.1626	-0.0320	0.1387	0.0160	0.46

* Indicate significant at 5%, two-sided test.

Figure 4.9. The first differences of bidding firms (post-takeover) average abnormal returns (AR) between December-June model and September-March model

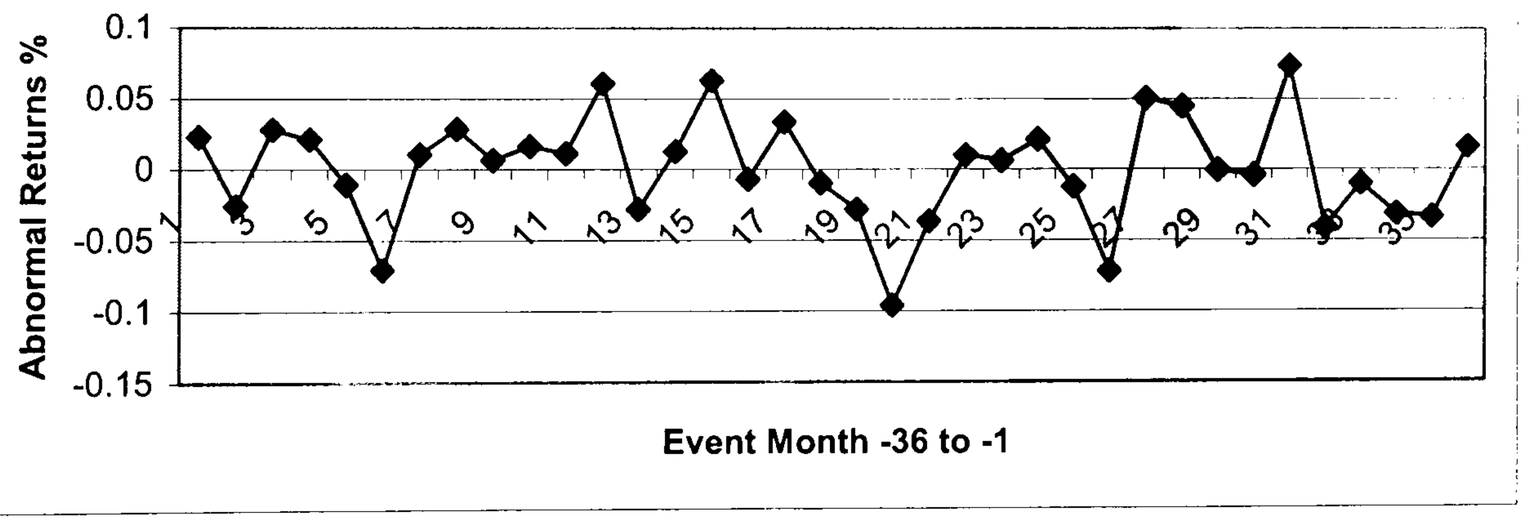


Table 4.28 shows, under the December-June model, bidding firms earn a positive but insignificant abnormal return of 16.26% in three-year after the takeover. Under the September-March model, bidding firms experience a positive but insignificant abnormal return of 13.87% in three-year after the takeover. The first difference of these two CARs is about 2%, but it is statistically insignificant different from zero.

Table 4.28. Bidding firms (with an accounting year ending at Sept) three-year post-takeover CARs

Sample Bidding firms (accounting year ends at September, 17 firms) three year post-takeover average CARs are calculated by using the control firms approach under the December-June model and the September-March model respectively. Relevant t-statistics of the CARs and the corresponding P-values calculated by using the non-parametric Wilcoxon Signed-Rank test are also given in the table.

	CAR	T-Stat	P-Value
December-June	0.1626	0.686	0.421
September-March	0.1387	0.716	0.570
Difference	**0.0239**	**0.097**	**0.865**

Table 4.29 presents the three-year post-takeover average BHARs of the bidding firms that have an accounting year ending at September. BHAR in row 1 is calculated by applying the December-June model (i.e., we ignore the accounting year ending of March for these firms, and calculate the book-to-market ratios at December of year t-1 and sizes at June of year t for these target firms. We match these sample firms with all the LSE listed firms (with both book-to-market ratios and size calculated at the same time as above, around 1,500 firms each year) to find the closest match, i.e., the control firms). BHAR in row 2 calculated by applying the September-March model (i.e., according to the accounting year ending of September, we calculated the book-to-market ratios at September of year t and sizes at March (with 6 months lag) of year t+1 for these target firms. We match these sample firms with all the LSE listed firms that have an accounting year ending at September (their book-to-market ratios and sizes are calculated at the same time as above, around 100 firms each year) to find the closest match, i.e., the control firms).

As we can see from Table 4.29, under the December-June model, bidding firms experience a small positive but insignificant abnormal return of 1.06% in three years after the takeover. Under the September-March model, biding firms earn a positive but

insignificant abnormal return of 13.61% in three-year after the takeover. The first difference of the two BHARs is about 13%, but it is statistically insignificant different from zero.

Table 4.29. Bidding firms (with an accounting year ending at Sept) three-year post-takeover BHARs

Sample bidding firms (accounting year ends at September, 17 firms) three year post-takeover average BHARs (buy-and-hold abnormal returns) are calculated by using the control firms approach under the December-June model and the September-March model respectively. Relevant t-statistics of the BHARs and the corresponding P-values calculated by using the non-parametric Wilcoxon Signed-Rank test are also given in the table.

	BHAR	T-Stat	P-Value
December-June	0.0106	0.035	0.538
September-March	0.1361	0.490	0.344
Difference	**-0.1255**	**-0.402**	**0.865**

Finally, we will take a look at how close the sample firms are matched with the control firms on the basis of the book-to-market ratios (because we match the size in a fixed range, i.e., 70% to 130%, and we choose the closest book-to-market ratio from this range. Thus we will only look at the book-to-market ratios here). Table 4.30 tells us that the December-June model gets the closest book-to-market ratios in every case examined. It is because sample firms are matched with on average 1,500 firms to get the closest control firms (i.e., the expected return) under the December-June model. However, sample firms are only matched with on average 300 or 100 firms under other models examined. Thus, we get the closest control firms, i.e., the exact expected returns, from applying the December-June model.

Table 4.30. The Mean and Standard Deviation of the first differences of the B/M ratios between sample firms and control firms under different two models

We calculate the absolute value of the first differences of the book-to-market ratios between all the sample firms and the control firms under each model examined. The mean of these differences and their standard deviations are given below.

Table 4.30.1 Target Firms (pre-takeover)

	Mean	Standard Deviation
December-June	0.02	0.008
March-September	0.07	0.02
December-June	0.02	0.01
June-December	0.12	0.04
December-June	0.005	0.002
September-March	0.31	0.17

Table 4.30.2 Bidding Firms (pre-takeover)

	Mean	Standard Deviation
December-June	0.02	0.005
March-September	0.07	0.014
December-June	0.006	0.003
June-December	0.08	0.03
December-June	0.01	0.004
September-March	0.21	0.05

Table 4.30.3 Bidding Firms (post-takeover)

	Mean	Standard Deviation
December-June	0.02	0.005
March-September	0.06	0.01
December-June	0.008	0.003
June-December	0.08	0.03
December-June	0.02	0.005
September-March	0.17	0.05

Finally, we have not tested the rest of 20% firms that have an accounting year ending at other eight months, because we have no need to test them. The matching samples for these eight months are too small (around 30 firms for each month), we believe that a sample firm matched with 1,500 matching firms under the December-June model will have no doubt to find a closer control firm, i.e., the expected return, than the same firm matched with a matching sample of 30 firms.

Altogether, the tests results in Table 4.3-4.30 indicate that there is no statistically significant difference of the long-term abnormal returns calculated under the December-June model and the corresponding models of the control firms approach. And because of the close matching of the former, we think that following the December-June model of Barber and Lyon (1997) may lead to a better result.

4.5. Conclusion

This chapter tests the validity of the control firms approach advanced by Barber and Lyon (1997) in the countries such as UK where the listed firms have various accounting year endings. Firstly, we find that UK firms' accounting year endings are concentrated in four months. In the ten-year period of 1991-2000, there are on average 43.7% firms having an accounting year ending at December, 21.25% firms having an accounting year ending at March, 8.19% firms having an accounting year ending at September, and finally 7.53% firms accounting year ends at June. Thus, these four months share 80.7% of all the LSE listed firms. The accounting year endings of the rest 20% firms are fall into other eight months, with the highest shares 3.35% and lowest shares only 0.93%.

Because 43.7% firms with an accounting year ending at December, it means that nearly half of the firms in the UK will have no problems for us to directly apply Barber and Lyon's control firms approach. However, how are the other firms especially the firms with an accounting year endings at March, June, and September (these three months share 37% of UK listed firms). Is the Barber and Lyon's control firms approach also fit for these firms? To find out, we test the differences of long-run abnormal stock returns calculated under Barber and Lyon's December-June model and other models according to firms accounting year endings (there are March-September model, June-December model, and September-March model).

We firstly calculate the target firms' three years pre-acquisition abnormal stock returns (both CARs and BHARs) by using Barber and Lyon's December-June model and other

corresponding models according to target firms accounting year endings. We then calculate and test the first difference between each paired models. We do not find any statistically significant difference from either the three-year pre-takeover CARs or the three-year pre-takeover BHARs calculated under the December-June model and other corresponding models.

After examining the target firms, we apply the same methods to calculate the bidding firms three years pre-acquisition and three years post acquisition abnormal stock returns and test the differences of CARs and BHARs calculated under each paired models. We once again fail to find any statistically significant differences from either the CARs or the BHARs calculated under the December-June model and other corresponding models in both three-year pre-takeover and three-year post-takeover periods.

Put them together, we conclude that, at least in our case, there is no statistically significant difference of the long-run abnormal returns calculated under Barber and Lyon's approach and the approaches that according to firms accounting year endings. In a word, we find that the difference of accounting year endings in the UK will not significantly affect the validity of Barber and Lyon's control firms approach.

Chapter Five: Long-run Post Acquisition Stock Returns: the Impact of Overlapping Returns, Takeover Premiums, and Methods of Payment

5.1. Introduction

Mergers and acquisitions is one of the most researched areas in finance. It first became a topic of public policy debate during the greater merger waves in the U.K. and the U.S. at the end of the 19th century. To date, most research on the financial performance of mergers and acquisitions has focused on stock returns surrounding the takeover announcement and outcome dates. Virtually all researchers have reported large positive average abnormal returns to target firm shareholders, a result that is not surprising given the significant premiums paid in the takeovers. Most researchers also find that the bidding firm shareholders break even around the time of the takeovers.

Parallel to the research on the announcement and outcome period stock returns, a small body of work has investigated the long-run post acquisition stock returns. The reason why researchers have paid relevant less attention to the post acquisition long-run stock returns might be the strong belief in market efficiency indicated what the results should be. However, a majority of studies, both in the UK and elsewhere, have documented a pattern of long-run negative post acquisition returns to the shareholders of the bidding firms. Why merged firms on average suffer a significant wealth loss is an anomaly to us. As Jensen and Ruback (1983, P.20) writes: "These post-outcome negative abnormal returns are unsettling because they are inconsistent with market efficiency and suggest that changes in stock prices overestimate the future efficiency gains from mergers."

5.1.1 Previous Evidence

Firstly, we shall have a brief look of the studies conducted in the UK. Firth (1979) shows the CAR (cumulative abnormal returns) of acquiring firms choosing cash offer decreases by 2.6%, and the CAR of acquiring firms offering equity decreases by 7.8% at the end of 24 months after the takeover announcement. Barnes (1984), Dodds and Quek (1985) report a CAR of –6.3% and –6.8% over the 60 months following the takeover announcement, respectively. Franks and Harris (1989) examine a nearly exhaustive sample of 1,800 UK takeovers in the period 1955-1985, they find that successful bidding firms suffer significant wealth loss in the two years period after the completion of takeovers, the CAR by using the market model is –12.6% by 24 months after the merger. Limmack (1991) uses three benchmarks to compute the post-acquisition abnormal returns. All the benchmarks produce significant negative CARs by 24 months following the completion of takeovers, and on average, the CAR is –9%. Kennedy and Limmack (1996) take into account of the size effect, they show that overall size adjusted returns are negative with bidder abnormal returns being a significant –4.92% for the period 12 to 24 months post bid. Gregory (1997) examines the post-merger performance of UK bidding companies by using six benchmarks. He finds the two years CARs between –11.8% to –18% under these six different models, all of which are statistically significant.

The evidence of long-term significantly negative abnormal returns of the merged firms following takeovers is echoed in the US. Langetieg (1978) reports significant CARs between –2.23% and –2.62% over 70 months using four different statistical methods.

Asquith (1983) reports that the CAR decreases by 7.2% for the merged firms in the 240 days following the merger completion date. Malatesta (1983) finds statistically significant CARs of –7.6% for the year after the first public announcement of the merger proposal. Jensen and Ruback (1983) survey seven previous studies of bidding firms' post-takeover performance and report an average CAR of –5.5% in 12 months after the takeover. Magenheim and Mueller (1988) find a significantly negative CAR of 2.4% over three years after the merger announcement. Lahey and Conn (1990) apply two benchmarks and report a CAR of –10.2% and –38.57% respectively by three years after the merger approval. Agrawal, Jaffe and Mandelker (1992) provide a thorough analysis of the post-merger share performance of acquiring firms by using a nearly exhaustive sample of US mergers over 30 years. They find that shareholders of bidding firms suffer a statistically significant wealth loss of about -10% over five years after the merger. Anderson and Mandelker (1993) report significant five-year CARs of –9.6% and –9.3% under a size and a size & book-to-market adjustment model, respectively. Loughran and Vijh (1997) find a statistically significant BHAR (buy-and-hold abnormal return) relative to a size and book-to-market control of –15.9%. Rau and Vermaelen (1998) use the size and book-to-market adjustment method and report a statistical significant three-year CAR of –4%. Most recently, Agrawal and Jaffe (2000) review 22 different papers of both UK and US examining the long-term post-acquisition stock returns, and conclude that merged firms' long-run performance is significantly negative following mergers.

However, although the above evidence both in the UK and the US reports a significant negative long-run abnormal stock returns after the takeover, the findings are not all one

sided. Mandelker (1974) finds that shareholders of bidding firms suffer a wealth loss in the 40 months after the merger, the CAR decreases by 1.4%. However, it is economically small and no t-statistics are provided for this entire 40 months post-acquisition period, t-statistics for both a 10-month and a 20-month period are insignificant. Malatesta (1983) finds statistically significant abnormal returns for the year after the takeover announcement but insignificant results for the year after the management approval. Using the same data but different methodologies, Magenheim and Mueller (1988) and Bradley and Jarrell (1988) reach opposite conclusion. MM find significant CAR over three years, while BJ find insignificant results over the same time period.

Lahey and Conn (1990) find a negative CAR of –10.20% in three years after the acquisition but it is statistically insignificant. Franks, Harris and Titman (1991) investigate the post-merger share price performance of acquiring firms by using two single-factor benchmarks (the equally-weighted index and the value-weighted index) and two multi-factor benchmarks (the eight-portfolio benchmark and ten-factor benchmark). They find negative post-merger abnormal returns to the bidding firm shareholders by using an equal-weighted index. However, the value-weighted benchmark yields positive post-merger performance. In contrast, the result generated by using multi-factor benchmarks especially the eight-portfolio benchmark reveal no statistically significant abnormal performance for the overall sample of bidding firms during post-merger period. Loderer and Martin (1992) find a negative five-year abnormal returns but it is not statistically different from zero.

Healy, Palepu and Ruback (1992) examine the post-acquisition share performance for the 50 largest U.S. mergers between 1979 and 1984. In order to avoid the inability of stock price performance studies to determine whether takeovers create real economic gains and to identify the sources of such gains. They examine the post-merger cash flow performance of successful bidding firms. Their findings indicate that merged firms have a significant improvement in operating cash flow returns after the merger, resulting from increases in asset productivity relative to their industries. Based on the similar method, Manson, Stark and Thomas (1994) in the UK find that operational cash flow gains after the takeovers. However, the evidence is not one-sided, Ravenscraft and Scherer (1987) and Herman and Lowenstein (1988) report poor accounting performance after takeovers.

As we can see from all the evidence above, although the negative long-run abnormal returns after the acquisition gains a support from the majority, the issue is not unambiguous. Some studies do not find significant underperformance after the takeover, and even the studies carried out by examining the accounting performance after takeovers are divided. Fundamentally, the question is whether these acquisitions really led to significant negative abnormal returns, or whether these results are the result of some type of specification error. In summary, acquiring firms long-run post acquisition stock returns is still an unsettled question that demands further investigation.

5.1.2. The Overpricing Interpretation

One possible interpretation to the long-run negative post acquisition stock returns is that it represents a delayed market reaction to overpriced takeovers. That is bidding firms might have overvalued and paid too much premiums to the targets that leads to a delayed correction in their post acquisition period. There are two common reasons about it. One is that bidding companies might overestimate the value of the targets and have paid a higher price than their true values. The other is that managers of bidding companies might be too optimistic to think that they could improve the performance of the acquired firms sufficiently to recoup the higher premiums they paid for them. This is consistent with the *performance extrapolation hypothesis* advanced by Rau and Vermaelen (1998). Recent data shows that the average one-month premium of UK public takeovers is 40.6% between the years 1991-2000. (*Acquisition Monthly2001*)

There are a few papers have studied some questions on takeover premiums. Jarrell et al (1988) find that target firm shareholders receive average premiums of 30% and peak value excess 100% for the sale of their shares in takeovers during the 1970s and 1980s. Alberts and Varaiya (1989) argue that the acquiring firms have on average failed to improve the financial performance of their acquirees sufficiently to recapture the high premiums paid to them. Hayward and Hambrick (1995) report that takeover premiums are positively correlated with proxies for past managerial performance such as recent organizational success and media praise for the CEO.

Although these studies have conducted some research in takeover premiums, there are no previous studies have fully investigated the impact of premiums to the bidding firms post-acquisition stock returns. In recognizing the importance of takeover premiums to the merged firms' post-acquisition performance, we shall thoroughly investigate the following questions: Firstly, what is on average the best premium region for bidding firms to takeover the targets? Or to ask the question another way, for the purpose of achieving the best post-takeover performance, how much premiums should the acquiring company offer? Secondly, is it the higher the premiums offered by bidding companies, the worse of their post-takeover performance? Thirdly, do the takeover premiums on average overestimate the targets' value, and whether this overestimation leads to their post-takeover underperformance?

5.1.3. The Methodological Errors Interpretation

Apart from the overpricing interpretation discussed above, an alternative explanation is that the phenomena are caused by methodological errors in calculating and interpreting the long-run stock returns. These errors may arise through choice of inappropriate control models and also the use of inappropriate test statistics. Indeed, the application of test statistics that reflect the non-normal properties of distributions of long-run returns do reduce the significance of results based on parametric tests.

Attempts to provide what are deemed to be more appropriate models have been made in recent papers by Franks, Harris and Titman (1991), Agrawal, Jaffe and Mandelker (1992), and Rau and Vermaelen (1998) by using US data; and Gregory (1997) by using

UK data. In addition to potential errors arising from the inappropriate choice of control models, a number of researchers have most recently pointed out that the process used in the calculation of long-run returns is itself biased.

Recent papers by Kothari and Warner (1997) and Barber and Lyon (1997) address biases in long-horizon event studies. Both document that for randomly chosen firms, the traditional t-test of abnormal performance is misspecified and indicates abnormal performance too frequently. Barber and Lyon (1997) find that the control firm approach yields well-specified test statistics in virtually all-sampling situations they considered. And in a following up paper, Lyon, Barber, and Tsai (1999) report that using size/book-to-market control firms approach yields well-specified test statistic for the conventional t-statistic in all random samples. [Please refer to *Chapter 3* for a detailed discussion of above issues]

Since the control firms approach minimizes the chances that the test statistics are mis-specified, we will introduce the control firms approach into our empirical studies, and expect to find out whether the previous evidence of significant negative long-run abnormal returns is due to the methodology errors, i.e., the mis-specification of test statistics.

5.1.4. Methods of Payment

Furthermore, previous studies have consistently found that bidding firms shareholder returns are method of payment dependent. Almost all these papers have reported that

cash financed bidding firms consistently outperform the equity financed bidding firms[2]. However, these studies have only concentrated on the cash offer and stock offer, few papers have investigated the other two alternative ways: alternative offer and combined offer. Alternative offer means that bidding firms deliver a choice to the targets, target firm shareholders can either choose a full cash offer or a full equity offer, this all depends on the preference of target firms shareholders. Combined offer means that the payment terms are neither pure stock nor pure cash; both stock and cash are jointly used. For instance, 2.7 WB ordinary shares plus 1,472p cash for every 10 JM ordinary shares. Since the alternative offer and combined offer are very common in these days and cannot be ignored, we will examine all these four kinds of payment and expect to find out whether cash offer outperforms the other three.

5.1.5. The Effect of Overlapping Returns

Based on the work of Barber and Lyon (1997) and Kothari and Warner (1997), Lyon, Barber, and Tsai (1999) conclude that misspecification of test statistics can be traced to (1) the new listing bias, (2) the rebalancing bias, (3) the skewness bias, (4) cross-sectional dependence, and (5) a bad model of asset pricing.

We choosing to use the Control Firms Approach advanced by Barber and Lyon (1997) can not only avoid using a bad asset price model, but also eliminates the new listing, the rebalancing, and skewness biases. Thus the only problem left to the control firms approach is the cross-sectional dependence in sample observations. Cross-sectional

---

[2] See, for example, Travlos (1987), Huang and Walking (1987), Amihud, Lev, and Travlos (1990), Loughran and Vijh (1997), Gregory (1997), Draper and Paudyal (1999), Baker and Limmack (2001). This list is by no means exhaustive.

dependence inflates test statistics because the number of sample firms overstates the number of independent observations. Two extreme sample situations of the problem of cross-sectional dependence are:

Calendar clustering. It is reasonable to assume that the contemporaneous returns of firms are more likely to be cross-sectionally related than returns from different periods. If true, the problem of cross-sectional dependence will be most severe when all sample firms share the same event date. Lyon, Barber, and Tsai (1999) find that the control firms approach control well for calendar clustering of event dates.

Overlapping return calculation. A common problem in event studies that analyse long-run abnormal returns is overlapping periods of return calculation for the same firm. Because these returns share several months of overlapping returns, this is the most severe form of cross-sectional dependence in the event study of long-run abnormal returns. Lyon, Barber, and Tsai (1999) find that the lack of independence generated by overlapping returns yields misspecified test statistics, and suggest the only solution to this problem is to remove the sample of observations of overlapping returns.

So far, it is only one possible source of bias left to us: the cross-sectional dependence. To reduce the problem caused by the cross-sectional dependence in sample observations. Firstly, we point out that in the takeover event, bidding firms in our sample have different takeover event date, they of course do not share the same event date, this makes the *calendar clustering* problem have little problem for our sample observations. Secondly, and the most severe problem is to eliminate the overlapping

return calculations. To do so, we will not only examine the whole sample, but also remove the overlapping bidding firms from our sample, i.e., we choose the bidding firms that only involved in one takeover event and do not have any other takeover activities during the entire post-takeover period (say, three years). Thus, we will have an independent sample of bidding firms that are free of overlapping return problem. We can also compare the results and the inferences between the whole sample (the sample contains overlapping firms) and the non-overlapping sample, and evaluate the impact of the overlapping returns.

5.1.6. Summary

In summary, our study differs from previous studies in five important ways. First, we apply the most up-to-date and reliable method (the control firms approach) into the investigation of long-run post acquisition stock returns; it minimizes the chances that our results are mis-specified. Second, we pioneer the investigation of the impact of takeover premiums to the long-run post takeover stock returns, and that can also be used to test the hypothesis of the delayed market reaction to overpriced takeovers. Third, to examine the impact of overlapping returns and to remove the possible bias caused by the cross-sectional dependence in sample observations, we examine all our empirical questions by using not only the whole sample but a corresponding sample that removes all the overlapping bidding firms. By doing so, we can test the impact of overlapping returns to the long-run post-acquisition returns, to the takeover premiums, and to the methods of payment. Fourth, we examine four kinds of payment instead of just two (cash and stock offer). As previous studies have consistently found that the cash

financing bidding firms outperform the stock financing firms, we examine whether cash financing also outperforms the other two (alternative and combined offer). Finally, we are among the first to use both the CAR and the BHAR to examine the long-run post-acquisition stock returns.

5.2. Methodology

We have mentioned above that we will adopt Barber and Lyon's control firms approach in our study. However, we must acknowledge that this approach may not be without questions while applying it in the UK. In their approach, Barber and Lyon use *June* of year *t* to find the market value (size), and *December* of year *t-1* to calculate the book-to-market ratio. The use of December to calculate the book-to-market ratio is because that US firms have the same fiscal year ending in December. Thus, it is reasonable and convenient to calculate the book-to-market ratio at the same accounting year ending, i.e., December. However, the accounting year endings of UK firms are different months across the whole year, if we introduce the same approach into UK, we are not able to calculate the book-to-market ratio at the accounting year ending for most of the firms. This may lead to a biased result of our empirical study.

In *Chapter 4*, we have tested the validity of the control firms approach under various accounting year endings through UK corporate takeovers. We find that there is no statistically significant difference of the long-run abnormal stock returns calculated under the Barber and Lyon (1997) approach and the approaches according to firms' accounting year endings, and we suggest that following the December-June model of

Barber and Lyon (1997) may lead to a better result. Based on these findings, we will use the same control firms approach applied by Barber and Lyon (1997).

In addition to the control firms approach, we also use the three-factor model developed by Fama and French (1993) as an alternative method. According to Kothari and Warner (1997) and Barber and Lyon (1997), we would expect to see that the three-factor model leads to the mis-specification of test statistics by often indicating abnormal performance when none is present.

For the methods of calculating the long-run abnormal stock returns (both CAR and BHAR) and their test statistics, please refer to *Chapter 3* for details.

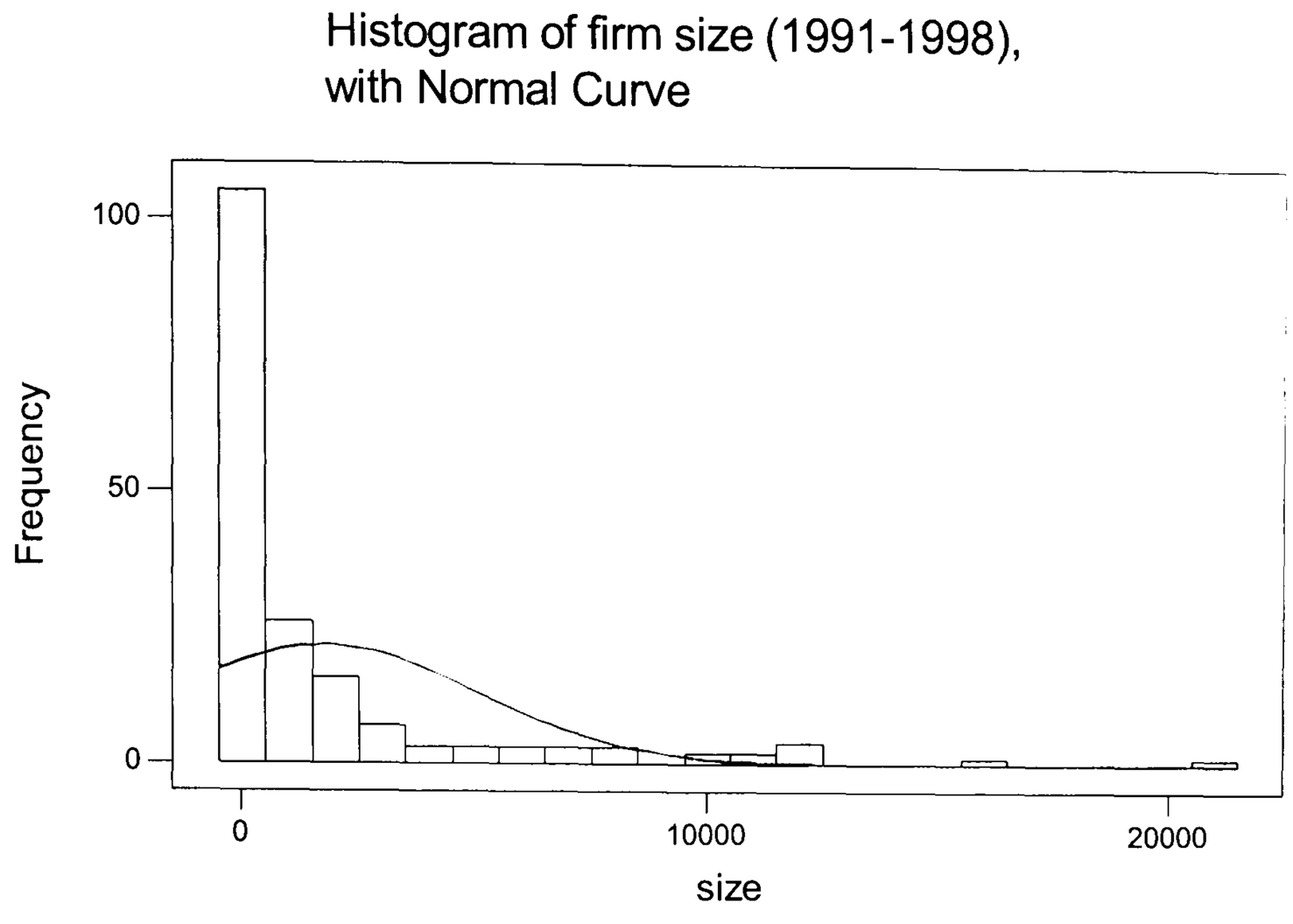
5.3. Data and Sample Construction

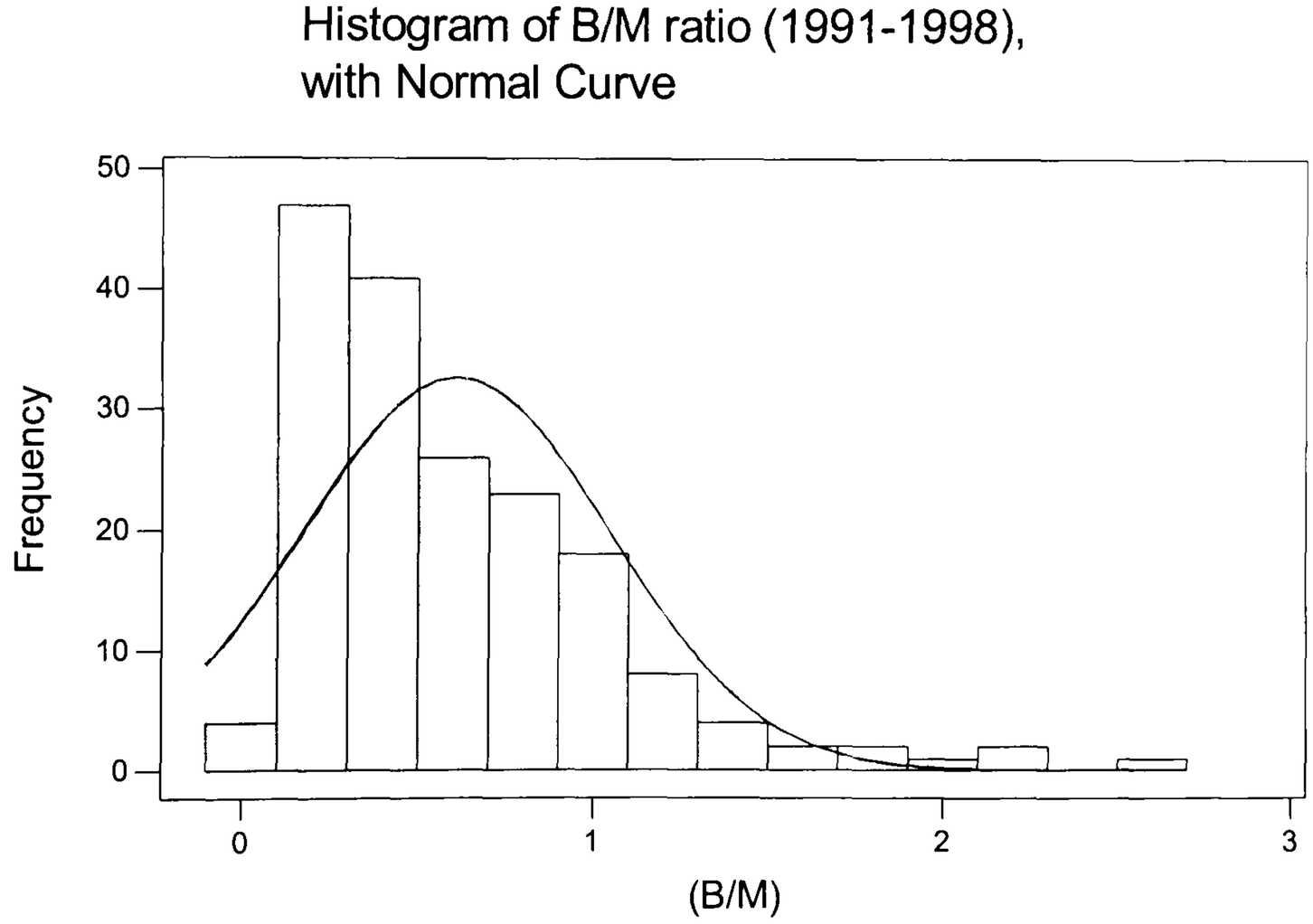
In our empirical test, we will examine the successful bidding firms three-year post acquisition stock returns. To reflect the up-to-date developments of acquisitions, all the data used in our study are in the 1990s. We have initially collected all the successful UK public bidding firms from various issues of *Extel Financial* and *Acquisition Monthly* for the eight-year period of 1991-1998. We apply the similar sample selection criteria as mentioned in Chapter 4, and finally, 179 successful bidding firms are qualified for the investigation in 1991-1998 periods.

The descriptive statistics for the sample size and B/M ratio are presented in the following table and histograms. As we can see from the table, the mean size value is much higher than the median size and is very close to the size of the 3rd quartile. It shows that 3 quarters of bidding firms have a size smaller than the mean, and 1 quarter bidding firms have a far large size than others. The histogram confirms the data and shows that the distribution of the sample size is positive skewed. The B/M ratio presents a similar pattern that more than 3 quarters of bidding firms have a B/M ratio smaller than one, with less than 1quarter firms have a higher book value to their market capitalization. The histogram of B/M ratio also shows a positive skewed distribution.

Descriptive statistics of sample size and B/M ratio

Size (1991-1998) £million		**B/M Ratio (1991-1998)**	
Mean	1748.36	Mean	0.61
Standard Deviation	3283.17	Standard Deviation	0.44
Minimum	4.28	Minimum	0.05
1st Quartile	90.4	1st Quartile	0.28
Median	332.9	Median	0.47
3rd Quartile	1755.9	3rd Quartile	0.82
Maximum	20824.3	Maximum	2.67
Count	179	Count	179





In summary, the descriptive statistics shows that most of the sample firms are smaller than their mean size, and most of them have a smaller book value to their market value. For this unevenly distributed sample, equal-weighted return is more appropriate to be

applied in the empirical study. Thus, the small proportion of large size and B/M sample firms will not significantly affect the general results.

People may argue that one of the selection criteria might cause the survivorship bias. Our sample selection criteria do potentially introduce some bias by imposing a period (say, three years) of survival post-acquisition. However, in fact, if we do not select the bidding firms with full three-year stock returns, the problem may be even worse. First, for instance, we have 10 sample firms: 8 survive for three years, 2 survive 15 months. We calculate the CARs of all these 10 firms, thus, if we do not exclude the 2 firms that have not survived for three years, the average CAR of these ten firms will not reflect the average 36-month cumulative abnormal return, because two of them are 15-month CARs. Second, if these 2 non-survived firms are taken over by other firms after 15 months, thus the CARs of these two firms will not be the abnormal returns caused by the single takeover event like other 8 firms, thus, the average CARs of these 10 firms will not be the single event cumulative abnormal returns. Fortunately, the consequences of our selection criteria are not serious for our analysis as few bidding firms (less than 10 firms) are removed from the whole sample.

Table 5.1. Matching firms in 1991-1998

Matching firms are all the LSE listed firms with both sizes and book-to-market ratios (firms with negative book value and zero size are excluded).

Year	1991	1992	1993	1994	1995	1996	1997	1998
Matching Firms	1445	1381	1334	1340	1427	1491	1612	1740

Table 5.1 shows the matching firms in 1991-1998 period, thus we have so far selected the whole sample of bidding firms and constructed the matching samples of each year from 1991 to 1998. Our next job is to construct the sub-samples based on the methods of payment and the takeover premiums.

In referring to the methods of payment, we put all the bidding firms that choose a full cash offer into the Cash Offer sub-sample and a full stock offer into the Stock Offer sub-sample. Bidding firms that offer a full choice between cash and stock to the target firms are put into Alternative Offer sub-sample. Combined Offer sub-sample is the firms that contain the bidding firms that combine cash and stock together as the payment method, for instance, 2.7 WB ordinary shares plus 1,472p cash for every 10 JM ordinary shares.

In referring to the takeover premiums, we use the one-month takeover premiums[3]. It is the differences of the price per share offered by the bidder (i.e. offer price) to the trading price of the target stock one month before the offer. The one-month premium data are available from *Acquisition Monthly* since 1995, thus our sample period for the takeover premiums is from 1995 to 1998, 109 bidding firms have the one-month premium data for this four years period. Bidding firms that offer a negative or zero premiums to the targets are put into sub-sample P1. P2 contains the firms that offer a premium bigger

---

[3] Evidence shows that target firm share prices are largely and significantly changed only during the takeover announcement date and the day before. Our use of target prices one month before the announcement date can reflect the normal prices of target firms before the offer. See, for example, Dodd (1980), Asquith (1983), Dennis and McConnell (1986), Huang and Walkling (1987), Bradley et al (1988), Sudarsanam et al (1996), Draper and Paudyal (1999). This list is by no means exhaustive.

than zero and less or equal to 30%. P3 contains the firms that offer a premium bigger than 30% but less or equal to 50%. All bidding firm that offer a premium bigger than 50% are put into P4.

5.4. Empirical Results

5.4.1. Long-run Post Acquisition Stock Returns and the Impact of Overlapping Returns

We firstly examine the bidding firms three-year post acquisition abnormal stock returns for the whole sample from 1991 to 1998, this sample contains 179 bidding firms that involved in the acquisition at this period.

Table 5.2 reports the three-year post-takeover average ARs (abnormal returns), average CARs, and their t-statistics of the 179 UK bidding firms from 1991 to 1998. As we can see that only 5 out of 36 average monthly ARs are significant at 5% two-sided test, most of the monthly average ARs are statistically insignificant different from zero. 11 out of 14 CARs in the first 14 months are statistically significant different from zero. It shows that UK bidding firms suffer a significant negative abnormal returns in the first year after the takeover. The CARs are statistically insignificant from month 15 to month 36. Finally, the three-year CAR is economically small and statistically insignificant.

Table 5.2. Bidding firms (1991-1998) three years post acquisition average ARs and CARs

There are 179 UK bidding firms involved in the acquisitions during 1991-1998 periods. AR is the monthly average abnormal return of all the bidding firms. CAR is the cumulative average abnormal return of all the bidding firms. T-statistics of the monthly ARs and CARs are also given in the table.

EM	AR	T-Stat	CAR	T-Stat
Month 1	-0.0089	-1.134	-0.0089	-1.134
Month 2	-0.0105	-1.381	-0.0194	-1.724
Month 3	**-0.0255***	-2.866	**-0.0450***	-3.283
Month 4	0.0091	0.866	**-0.0359***	-2.062
Month 5	-0.0106	-1.202	**-0.0465***	-2.269
Month 6	-0.0057	-0.733	**-0.0521***	-2.246
Month 7	-0.0068	-0.828	**-0.0590***	-2.235
Month 8	-0.0002	-0.025	**-0.0592***	-2.041
Month 9	-0.0105	-1.046	**-0.0697***	-2.138

Month 10	0.0045	0.535	-0.0652	-1.879
Month 11	-0.0163	-1.504	**-0.0815***	-2.272
Month 12	0.0048	0.643	**-0.0767***	-2.055
Month 13	-0.0033	-0.313	**-0.0800***	-2.100
Month 14	-0.0053	-0.542	**-0.0854***	-2.070
Month 15	**0.0172***	1.981	-0.0682	-1.631
Month 16	0.0060	0.632	-0.0621	-1.437
Month 17	-0.0077	-0.628	-0.0699	-1.513
Month 18	**0.0242***	2.423	-0.0457	-0.942
Month 19	-0.0024	-0.285	-0.0481	-1.003
Month 20	-0.0084	-0.785	-0.0564	-1.092
Month 21	0.0031	0.282	-0.0534	-1.002
Month 22	-0.0006	-0.052	-0.0539	-1.023
Month 23	-0.0042	-0.355	-0.0581	-1.083
Month 24	-0.0062	-0.630	-0.0643	-1.214
Month 25	-0.0048	-0.477	-0.0691	-1.266
Month 26	**0.0234***	2.296	-0.0457	-0.832
Month 27	0.0113	0.943	-0.0344	-0.621
Month 28	**0.0266***	2.514	-0.0077	-0.138
Month 29	0.0088	0.793	0.0011	0.018
Month 30	0.0128	1.081	0.0139	0.237
Month 31	0.0080	0.738	0.0219	0.369
Month 32	0.0178	1.577	0.0396	0.662
Month 33	-0.0006	-0.048	0.0391	0.636
Month 34	0.0056	0.477	0.0447	0.721
Month 35	0.0184	1.563	0.0631	1.016
Month 36	-0.0145	-1.105	0.0486	0.750

* Indicate significant at 5%, two-sided t-test.

Figure 5.1 shows the 36 months CARs, as we can see that CARs are continually fallen from the event month to the month 14, and then start to go up and down until month 25. CARs are climbing up consistently from month 26 and become positive after month 29. From Table 5.2, we know that 11 out of 14 CARs in the first 14 months are statistically significant different from zero, and the CARs are statistically insignificant after the month 15.

Figure 5.1. Bidding firms (91-98) three-year post acquisition average CARs

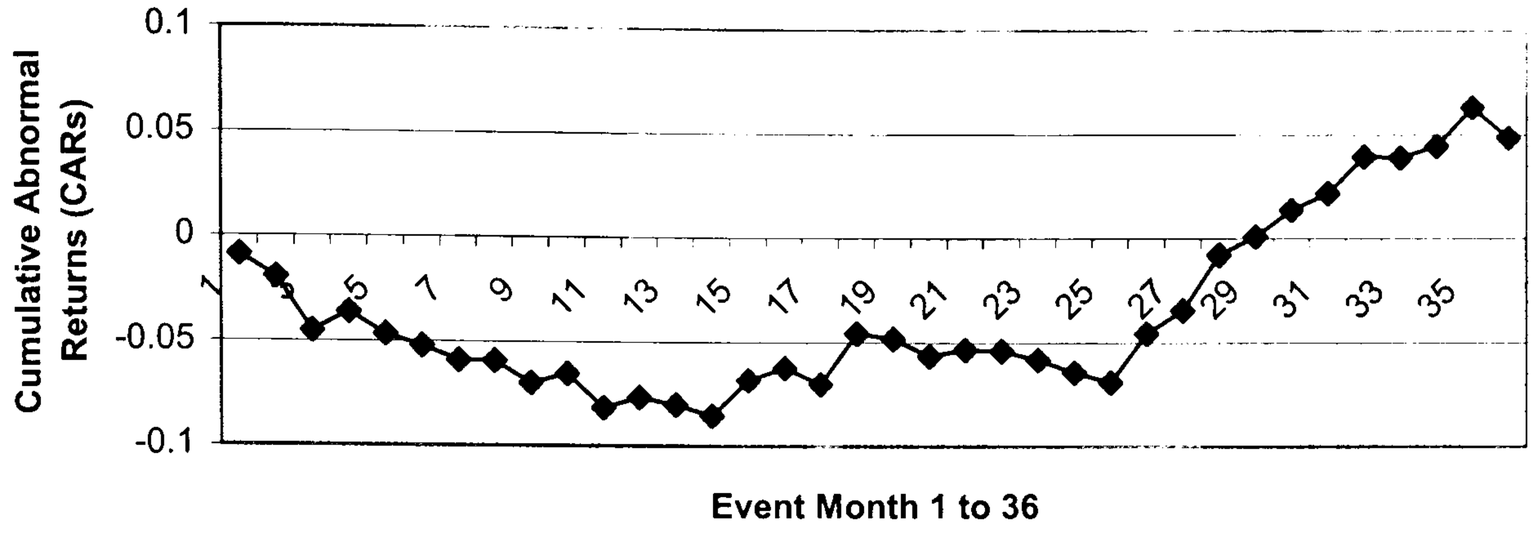


Table 5.3.1 reports bidding firms three years post acquisition CARs and BHARs, their t-statistics and P-values. According to the t-value of CARs, UK bidding firms experience a statistically significant negative abnormal returns in the first year after the takeover. On the other hand, bidding firms suffer a significant negative abnormal returns in two years after the completion of the takeover according to the t-values of BHARs. However, their corresponding P-values calculated by the nonparametric test show that neither the CARs nor the BHARs are statistically significant at the 5% significance level. Finally, Both three-year abnormal returns (three-year CAR and three-year BHAR) are positive and statistically insignificant different from zero. These contradict with the findings of most previous studies that report a significant negative long-run abnormal return. However, according to the results shown in Table 5.3.2, all the three intercept terms are statistically significant different from zero, with the implied CARs[4] far more striking than the CARs reported in Table 5.3.1.

[4] Gregory (1997) applies six benchmarks including the Fama-French three-factor model to examine the long-run post acquisition performance of UK bidding firms over the sample period 1984-1992. He reports a one-year post acquisition CAR of –10.63% and a two-year CAR of –18.01% by using the three-factor model, both are significant at 1% significance level in two-sided t-test. By comparing the results obtained from all the six benchmarks, the abnormal returns are particularly striking under the Fama-French three-factor model.

Table 5.3. Bidding firms (1991-1998) three years post acquisition average CARs and BHARs

There are 179 UK bidding firms involved in the acquisitions during 1991-1998 periods. Table 5.3.1 reports the result calculated by using the control firms approach. Table 5.3.2 presents the result calculated by using the Fama-French three-factor model. CAR is the average cumulative abnormal return of all the bidding firms. BHAR is the average buy-and-hold abnormal return of all the bidding firms. α is the mean intercept term of Fama-French three-factor model. Implied CAR is the mean α multiplying by 12, 24, and 36. T-statistics of the CARs and the BHARs as well as the corresponding P-values calculated by using the non-parametric Wilcoxon Signed-Rank test are given in the table.

Table 5.3.1

EM	CAR	T-Stat	P-Value
1 to 12	**-0.0767***	-2.055	0.127
1 to 24	-0.0643	-1.214	0.167
1 to 36	0.0486	0.750	0.390

EM	BHAR	T-Stat	P-Value
1 to 12	**-0.0916***	-2.510	0.056
1 to 24	**-0.1077***	-2.026	0.120
1 to 36	0.070	0.968	0.242

Table 5.3.2

EM	α	T-Stat	P-Value	Implied CAR
1 to 12	**-0.0081***	-3.182	0.014	-0.0972
1 to 24	**-0.0088***	-5.172	0.000	-0.2112
1 to 36	**-0.0079***	-5.429	0.000	-0.2844

* Indicate significant at 5%, two-sided t-test.

As we know, from the statistic point of view, the mean of a group of sample observations will normally be significantly different from zero if most of these observations are larger or smaller than zero. If all the observations are evenly or near evenly randomly distributed up and down the zero line, it shows that these observations do not follow an obvious positive or negative trend (i.e., a systematic pattern), and the signs of these observations are unable to predict. Thus, the mean of these observations is statistically insignificant different from zero.

As discussed above, Figure 5.2 and 5.3 show the 179 three-year CAR observations and the 179 three-year BHAR observations, respectively. (The whole sample contains 179

UK bidding firms; every firm has a CAR and a BHAR) As we can see that the CARs and BHARs are randomly hover around the zero line. No obvious return pattern can be found from these observations. That is the reason why the average three-year CAR of 4.86% and the average three-year BHAR of 7% are statistically insignificant different from zero.

Figure 5.2. 179 three-year CAR obsevations 1991-1998

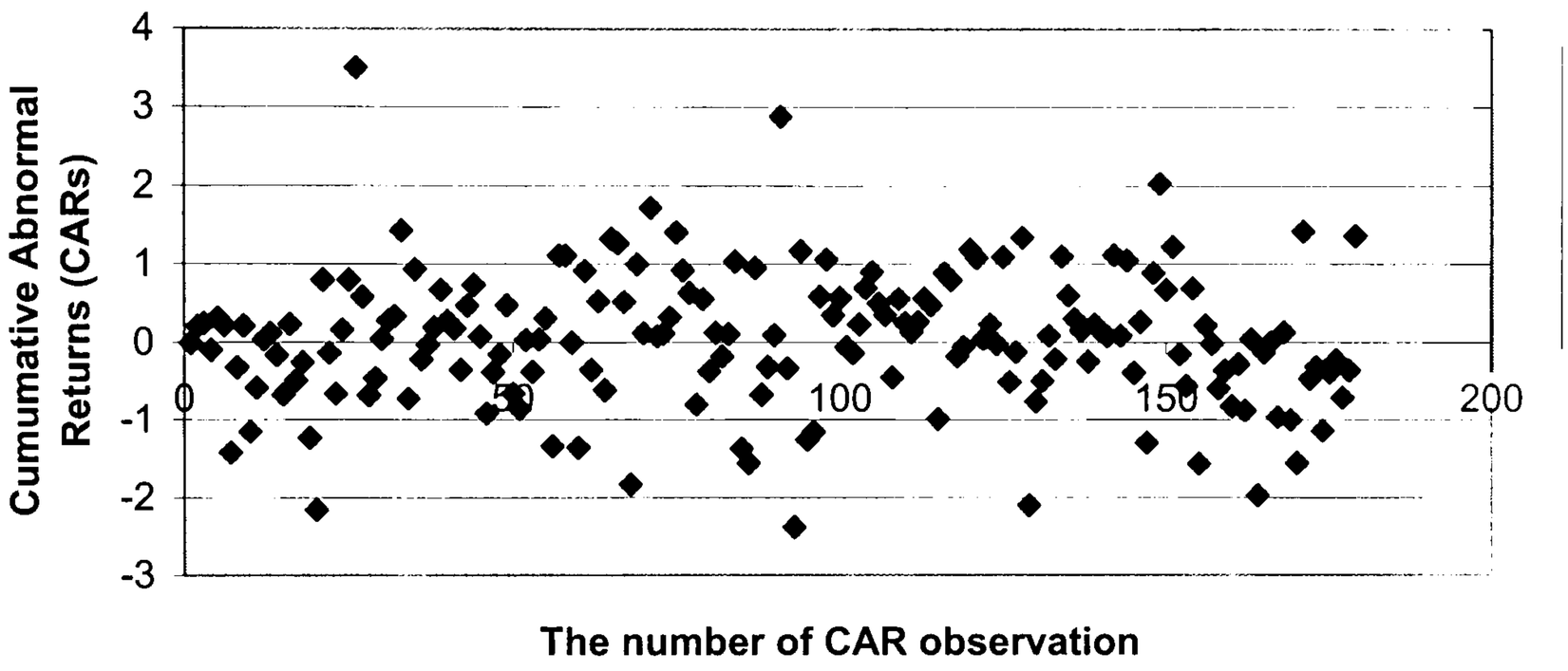
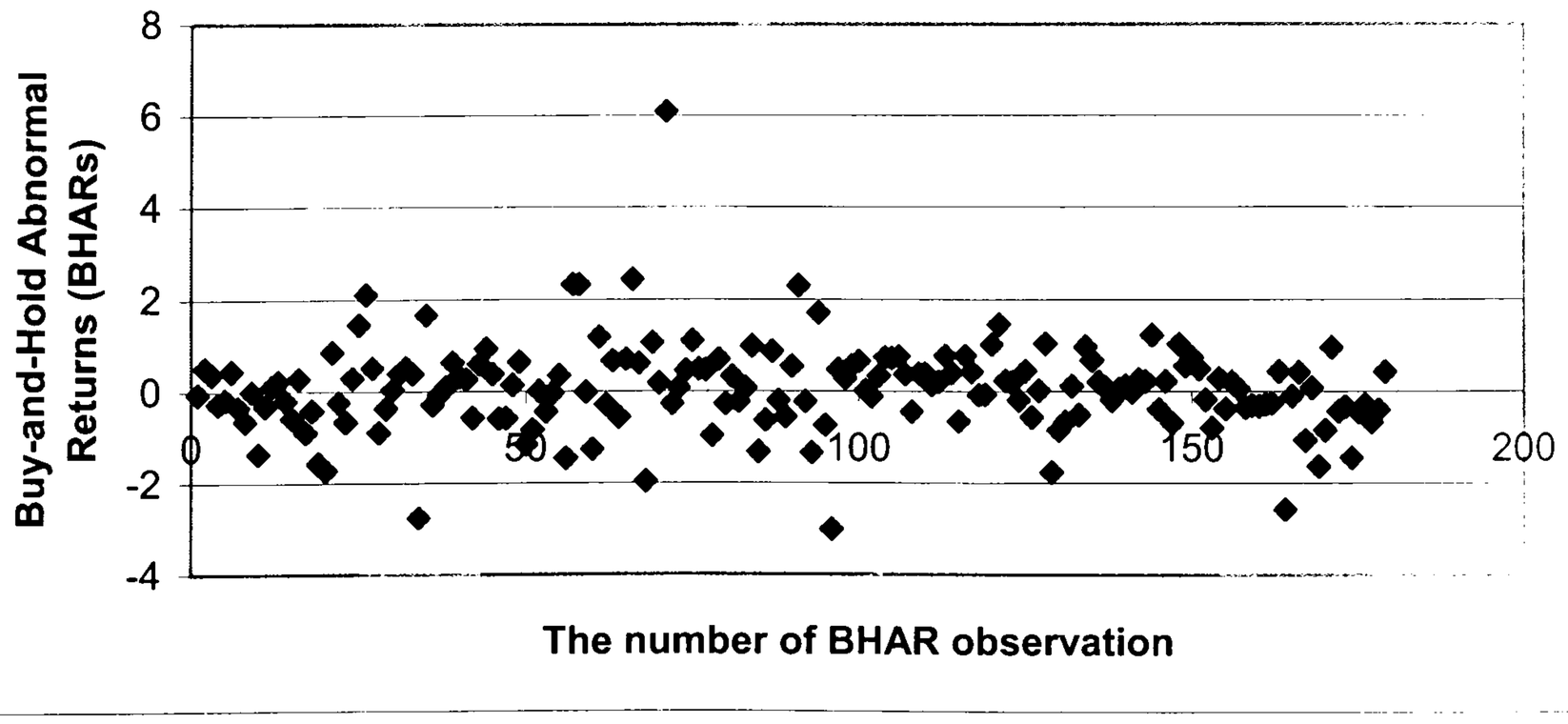


Figure 5.3. 179 three-year BHAR observations 1991-1998



We have so far examined the bidding firms (1991-1998) three years post acquisition

abnormal returns. In contrast with most previous studies, we report a positive three-year CAR of 4.86%, and a positive three-year BHAR of 7%, they are both economically small and statistically insignificant different from zero. Thus, we have so far found a small positive but statistically insignificant three-year post acquisition abnormal returns.

However, we must acknowledge that the sample (1991-1998) contains a proportion of overlapping firms, and the positive three-year abnormal returns found above might be due to these overlapping returns. Furthermore, as Lyon et al (1999) argue, the overlapping returns might also mis-specify the test statistics. Thus, we remove the potential bias of overlapping returns by excluding the overlapping bidding firms from the whole sample, and reexamine the non-overlapping bidding firms three years post acquisition abnormal returns.

Table 5.4. Non-overlapping bidding firms (1991-1998) three years post acquisition average ARs and CARs

There are 133 UK non-overlapping bidding firms involved in the acquisitions during 1991-1998 periods. AR is the monthly average abnormal return of all the bidding firms. CAR is the cumulative average abnormal return of all the bidding firms. T-statistics of the monthly ARs and CARs are also given in the table.

EM	AR	T-Stat	CAR	T-Stat
Month 1	-0.0060	-0.618	-0.0060	-0.618
Month 2	-0.0154	-1.716	-0.0214	-1.573
Month 3	**-0.0367***	-3.325	**-0.0580***	-3.440
Month 4	0.0073	0.548	**-0.0507***	-2.358
Month 5	-0.0194	-1.755	**-0.0701***	-2.802
Month 6	-0.0019	-0.195	**-0.0720***	-2.517
Month 7	-0.0044	-0.431	**-0.0765***	-2.293
Month 8	0.0076	0.633	-0.0689	-1.921
Month 9	-0.0166	-1.301	**-0.0855***	-2.082
Month 10	-0.0028	-0.279	**-0.0883***	-1.992
Month 11	-0.0213	-1.538	**-0.1096***	-2.411
Month 12	0.0009	0.097	**-0.1087***	-2.303
Month 13	-0.0068	-0.499	**-0.1155***	-2.414
Month 14	-0.0117	-0.922	**-0.1272***	-2.439
Month 15	**0.0258***	2.328	-0.1014	-1.911
Month 16	0.0027	0.225	-0.0987	-1.800
Month 17	-0.0112	-0.721	-0.1099	-1.891

Month 18	**0.0274***	2.185	-0.0825	-1.347
Month 19	-0.0031	-0.304	-0.0856	-1.429
Month 20	-0.0195	-1.428	-0.1051	-1.620
Month 21	0.0057	0.461	-0.0994	-1.487
Month 22	0.0084	0.607	-0.0911	-1.363
Month 23	-0.0042	-0.310	-0.0953	-1.401
Month 24	-0.0163	-1.399	-0.1115	-1.667
Month 25	-0.0058	-0.476	-0.1174	-1.708
Month 26	**0.0268***	2.164	-0.0906	-1.306
Month 27	0.0151	1.052	-0.0755	-1.084
Month 28	**0.0302***	2.302	-0.0453	-0.645
Month 29	0.0081	0.607	-0.0371	-0.516
Month 30	0.0048	0.322	-0.0323	-0.441
Month 31	0.0225	1.730	-0.0098	-0.131
Month 32	0.0173	1.281	0.0075	0.101
Month 33	-0.0043	-0.306	0.0032	0.041
Month 34	0.0056	0.381	0.0088	0.114
Month 35	0.0169	1.144	0.0257	0.334
Month 36	-0.0134	-0.811	0.0123	0.154

* Indicate significant at 5%, two-sided t-test.

Table 5.4 presents the non-overlapping bidding firms three years post acquisition ARs and CARs. Five monthly average ARs are statistically significant at 5% two-sided t-test, 11 out of 14 monthly average CARs are statistically significant at 5% two-sided test in the first 14 months, and no CARs are significant from month 15 to month 36. This is remarkably consistent with the results reported in Table 5.2 even when we have removed the overlapping bidding firms.

Figure 5.4 shows the three years post acquisition average CARs of the non-overlapping bidding firms. It follows a similar return pattern with the results of the whole sample as Figure 5.1 shows. The CARs are consistently negative until month 32, while the CARs become positive at month 29 for the whole sample shown in Figure 5.1. 11 out of 14 CARs are significant at 5% two-sided test in the first 14 months; CARs of the rest months are statistically insignificant. Comparing Figure 5.4 and Figure 5.1, we find that non-overlapping firms have a lower average CARs than that of the whole sample no

matter these CARs are significant or not. It might suggest that the overlapping returns have inflated the monthly average CARs of the whole sample.

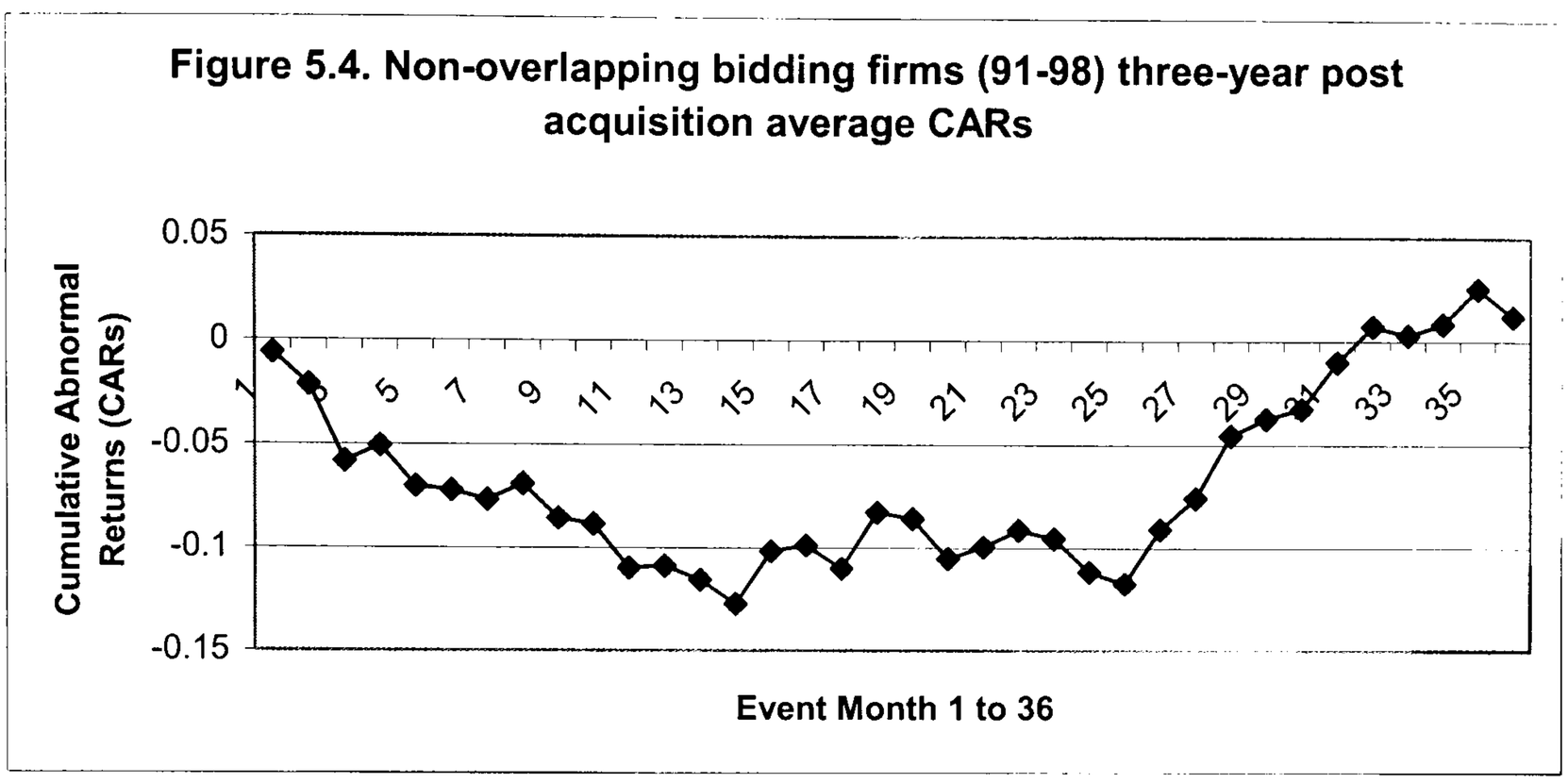


Table 5.5.1 shows that UK bidding firms, according to both t-value and p-value of CARs, suffer a statistically significant negative abnormal return in one year after the takeover. However, according to the t-values and p-values of BHARs, UK bidding firms experience a statistically significant negative abnormal return in two years after the takeover. Both the average three-year CAR and the average three-year BHAR are statistically insignificant different from zero at 5% significance level evaluated by either the parametric or the nonparametric tests. In Contrast, Table 5.5.2 presents three significant negative intercept terms with large implied negative CARs.

Table 5.5. Non-overlapping bidding firms (1991-1998) three years post acquisition average CARs and BHARs

There are 133 UK non-overlapping bidding firms involved in the acquisitions during 1991-1998 periods. Table 5.5.1 reports the result calculated by using the control firms approach. Table 5.5.2 presents the result calculated by using the Fama-French three-factor model. CAR is the average cumulative abnormal return of all the bidding firms. BHAR is the average buy-and-hold abnormal return of all the bidding firms. α is the mean intercept term of Fama-French three-factor model. Implied CAR is the mean α multiplying by 12, 24, and 36. T-statistics of the CARs and the BHARs as well as the corresponding P-values calculated by using the non-parametric Wilcoxon Signed-Rank test are given in the table.

Table 5.5.1

EM	CAR	T-Stat	P-Value
1 to 12	**-0.1087***	-2.303	0.047
1 to 24	-0.1115	-1.667	0.036
1 to 36	0.0123	0.154	0.942

EM	BHAR	T-Stat	P-Value
1 to 12	**-0.1298***	-2.849	0.014
1 to 24	**-0.1760***	-2.768	0.009
1 to 36	0.0209	0.259	0.942

Table 5.5.2

EM	α	T-Stat	P-Value	Implied CAR
1 to 12	**-0.0111***	-3.434	0.004	-0.1332
1 to 24	**-0.0120***	-5.865	0.000	-0.2880
1 to 36	**-0.0112***	-6.339	0.000	-0.4032

* Indicate significant at 5%, two-sided t-test.

By comparing Table 5.3 and Table 5.5, we can see that all the CARs, implied CARs, and BHARs in Table 5.3 are larger than their counterparts in Table 5.5. The higher average abnormal returns in Table 5.3 might be inflated by the overlapping returns. If we take a close look at their t-values and p-values, we find that the results are inconsistent in Table 5.3.1. The one-year CAR and the one- and two-year BHARs are statistically significant at 5% significance level based on their t-statistics, however, their p-values tell us they are not significant at the 5% significance level. On the contrary, after removing the overlapping returns, Table 5.5.1 presents a consistent story. Lyon et al (1999) argue that cross-sectional dependence inflates test statistics because the number of sample firms overstates the number of independence observations. Our evidence shows that overlapping returns might have inflated the parametric t-values in Table 5.3.1 by inflating the mean of abnormal returns.

To explore the impact of overlapping returns, we turn to examine the three years post acquisition abnormal returns of a sample that contains all the overlapping bidding firms. The long-run abnormal returns of overlapping bidding firms are essential for us to find out the overlapping returns effect. Table 5.6 reports the three years post acquisition average ARs and CARs of the overlapping UK bidding firms. Only two monthly average ARs are significant at 5% two-sided test. The average monthly CARs show a strong pattern of performance of overlapping firms, 29 out of 36 monthly average CARs are positive. However, all the CARs of the overlapping bidding firms are statistically insignificant different from zero.

Table 5.6. Overlapping bidding firms (1991-1998) three years post acquisition average ARs and CARs

There are 46 UK overlapping bidding firms involved in the acquisitions during 1991-1998 periods. AR is the monthly average abnormal return of all the bidding firms. CAR is the cumulative average abnormal return of all the bidding firms. T-statistics of the monthly ARs and CARs are also given in the table.

EM	AR	T-Stat	CAR	T-Stat
Month 1	-0.0176	-1.362	-0.0176	-1.362
Month 2	0.0036	0.256	-0.0139	-0.701
Month 3	0.0066	0.519	-0.0073	-0.351
Month 4	0.0142	1.047	0.0069	0.264
Month 5	0.0150	1.304	0.0219	0.691
Month 6	-0.0166	-1.619	0.0053	0.150
Month 7	-0.0137	-1.127	-0.0084	-0.243
Month 8	-0.0229	-1.276	-0.0313	-0.695
Month 9	0.0073	0.601	-0.0240	-0.538
Month 10	0.0256	1.662	0.0016	0.038
Month 11	-0.0018	-0.137	-0.0002	-0.005
Month 12	0.0161	1.415	0.0159	0.333
Month 13	0.0066	0.490	0.0225	0.439
Month 14	0.0130	1.195	0.0355	0.687
Month 15	-0.0076	-0.753	0.0279	0.536
Month 16	0.0155	1.257	0.0435	0.798
Month 17	0.0024	0.152	0.0459	0.747
Month 18	0.0147	1.063	0.0606	0.953
Month 19	-0.0002	-0.015	0.0604	0.894
Month 20	**0.0239***	2.093	0.0843	1.217
Month 21	-0.0045	-0.196	0.0798	1.104
Month 22	-0.0264	-1.489	0.0534	0.787
Month 23	-0.0042	-0.172	0.0492	0.709
Month 24	0.0231	1.319	0.0722	1.060
Month 25	-0.0017	-0.105	0.0705	0.980

Month 26	0.0135	0.790	0.0840	1.172
Month 27	0.0006	0.027	0.0846	1.139
Month 28	0.0161	1.004	0.1007	1.301
Month 29	0.0108	0.554	0.1115	1.413
Month 30	**0.0359***	2.304	0.1474	1.824
Month 31	-0.0339	-1.884	0.1134	1.396
Month 32	0.0191	0.949	0.1325	1.476
Month 33	0.0104	0.534	0.1429	1.680
Month 34	0.0055	0.337	0.1484	1.639
Month 35	0.0227	1.362	0.1711	1.832
Month 36	-0.0178	-0.957	0.1533	1.578

* Indicate significant at 5%, two-sided t-test.

Figure 5.5 shows the overlapping bidding firms three-year post acquisition CARs. The monthly average CARs rise consistently after the event month, and the vast majority of them (29 out of 36) are positive. Thus, though they are statistically insignificant, we can tell that the higher returns shown in Figure 5.1 comparing to Figure 5.4 are solely driven by the overlapping returns.

Figure 5.5. Overlapping bidding firms (91-98) three-year post acquisition average CARs

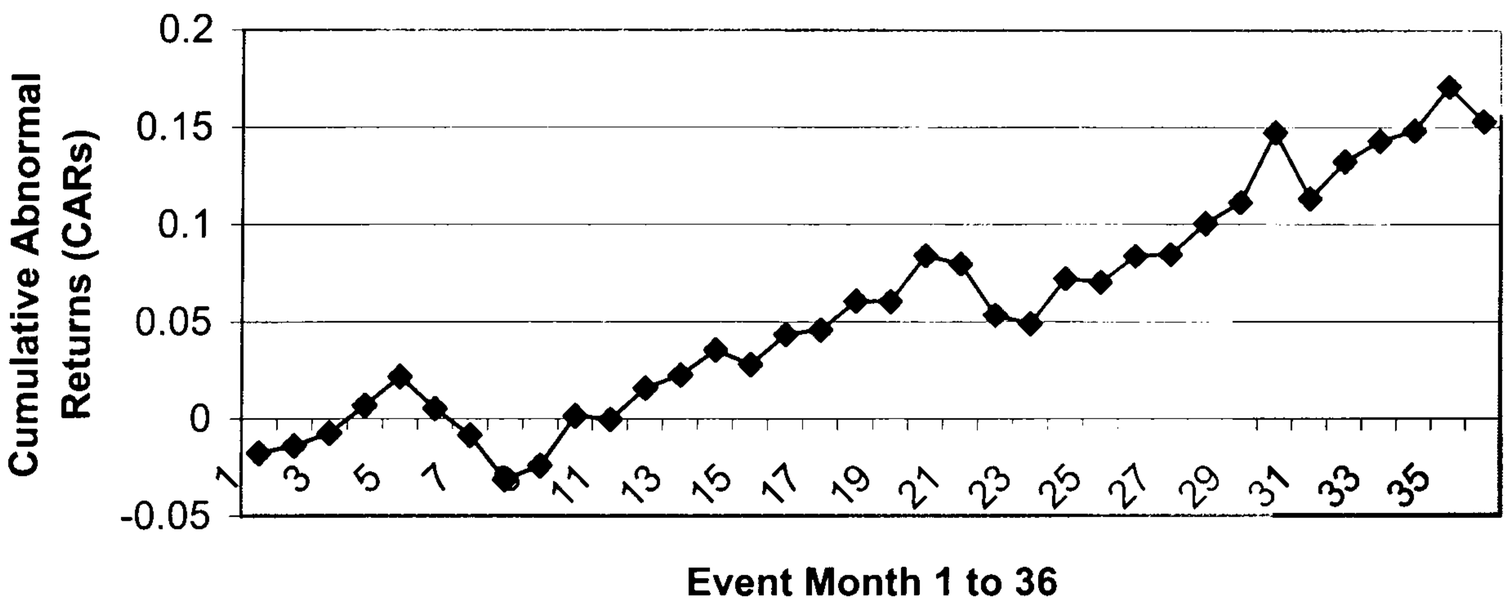


Table 5.7.1 presents the overlapping bidding firms three years post acquisition average CARs and BHARs. Although they are statistically insignificant different from zero at 5% significance level based on either the t-values or the p-values, we can tell that the

longer the period, the higher the CARs and the BHARs. Table 5.7.2 reports similar results, all three intercept terms are positive and insignificant different from zero at 5% significance level. This presents a strong pattern of performance of the overlapping bidding firms in three years after the takeover. Thus, we are able to confirm that the higher average three-years CARs and BHARs of the whole sample (overlapping plus non-overlapping bidding firms) comparing to that of the non-overlapping sample are inflated by the high positive average abnormal returns of the overlapping firms.

Table 5.7. Overlapping bidding firms (1991-1998) three years post acquisition average CARs and BHARs

There are 46 UK overlapping bidding firms involved in the acquisitions during 1991-1998 periods. Table 5.7.1 reports the result calculated by using the control firms approach. Table 5.7.2 presents the result calculated by using the Fama-French three-factor model. CAR is the average cumulative abnormal return of all the bidding firms. BHAR is the average buy-and-hold abnormal return of all the bidding firms. α is the mean intercept term of Fama-French three-factor model. Implied CAR is the mean α multiplying by 12, 24, and 36. T-statistics of the CARs and the BHARs as well as the corresponding P-values calculated by using the non-parametric Wilcoxon Signed-Rank test are given in the table.

Table 5.7.1

EM	CAR	T-Stat	P-Value
1 to 12	0.0159	0.333	0.474
1 to 24	0.0722	1.060	0.207
1 to 36	0.1533	1.578	0.071

EM	BHAR	T-Stat	P-Value
1 to 12	0.0189	0.375	0.481
1 to 24	0.0895	0.994	0.117
1 to 36	0.2118	1.359	0.039

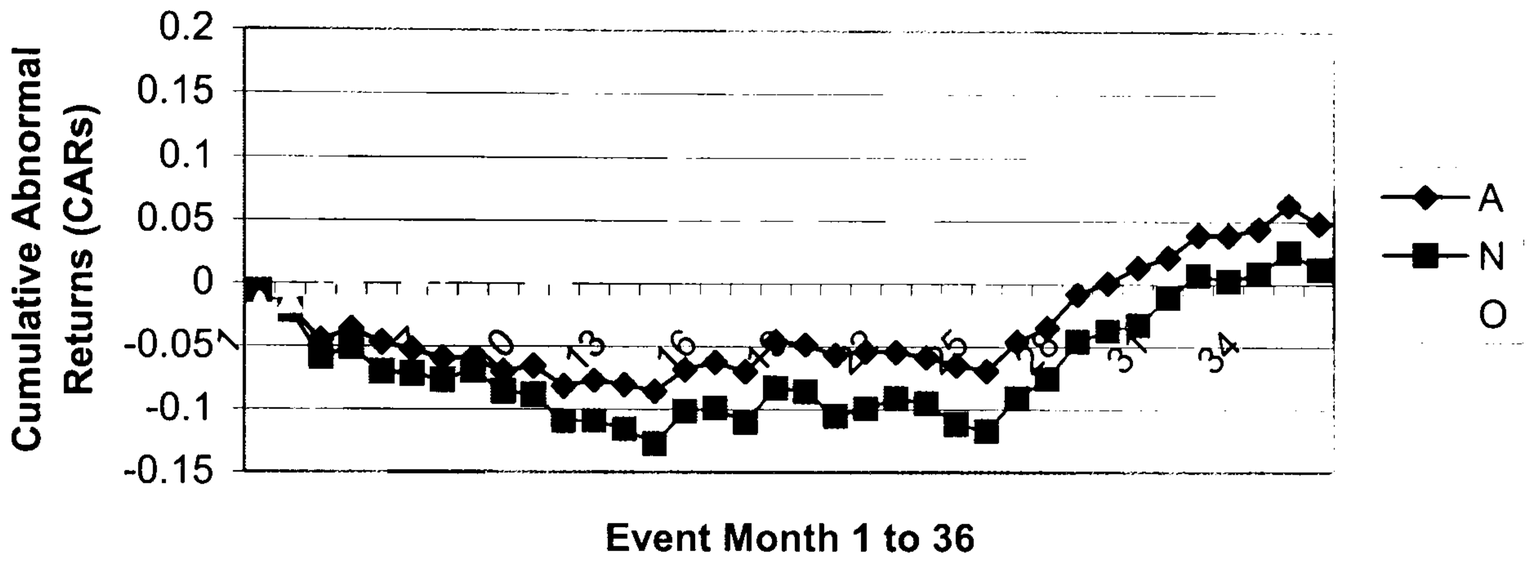
Table 5.7.2

EM	α	T-Stat	P-Value	Implied CAR
1 to 12	0.0004	0.119	0.686	0.0048
1 to 24	0.0006	0.244	0.785	0.0144
1 to 36	0.0016	0.893	0.299	0.0576

Figure 5.6 puts Figure 5.1, 5.4, and 5.5 together and compares their long-run post acquisition stock returns. Overlapping bidding firms outperform the other two, and non-

overlapping bidding firms underperform the whole sample. It clearly shows that overlapping returns have inflated the average returns of the whole sample, and that may well inflate the test-statistics of the whole sample and leads to an over-rejection of the null hypothesis.

Figure 5.6. Three years post acquisition average CARs of All, Overlapping and Non-overlapping bidding firms 1991-1998



A: all samples, non-overlapping and overlapping bidding firms.
N: non-overlapping bidding firms.
O: overlapping bidding firms.

We have so far examined the three-year post acquisition abnormal returns of a whole sample, a non-overlapping sample, and an overlapping sample of the UK bidding firms that involved in the acquisitions in 1991-1998 periods. To check the robustness of our results, i.e., to check our results are not acquired by chance, we use a sub-sample period to re-examine the UK bidding firms three-year post acquisition stock returns. We choose the period of 1995-1998 as our sub-sample period because: First, 1995-1998 period contains more bidding firms than 1991-1994 period (112 vs. 67 firms). Second, we will later examine the impact of one-month takeover premiums to the bidding firms long-run post acquisition stock returns, and the one-month takeover premium data for

bidding firms is only available from 1995. Thus, we are going to investigate the impact of one-month takeover premiums for the period of 1995-1998. However, before we move to examine the premium effect, we would be better to firstly take a look at the three-year post acquisition stock returns of all the bidding firms in 1995-1998 period. This will provide us a general picture of the long-run stock returns of the bidding firms involved in a takeover in this four years period, and help us to find out later how these results are affected by the one-month takeover premiums.

Because the investigation of the sub-sample period (1995-1998) follows the same procedures as we have done for the whole sample period, to avoid replicating the tables and the figures and to save space, we put the detailed results and discussions for 1995-1998 sub-sample periods into *Appendix 1*, and only report the main finding here.

By examining the three years post acquisition stock returns of the whole sample, the non-overlapping sample and the overlapping sample of the UK bidding firms in 1995-1998 sub-sample periods, we find almost identical results with that reported in the whole sample period (1991-1998). Thus, our findings for the whole sample period are reinforced by the evidence of the sub-sample.

We have so far investigated the three years post takeover stock returns of UK bidding firms in both 1991-1998 and 1995-1998 sample periods, and our findings in both sample periods are remarkably consistent. Firstly, by comparing the results derived from the two different approaches, we do find a lot of evidence that Fama-French three-factor model over-rejects the null hypothesis of no abnormal return. This is consistent

with the study of Barber and Lyon (1997) and Kothari and Warner (1997). Due to the severe mis-specification problem of the three-factor model, we only use the results calculated by the control firms approach as our inference throughout the paper, and the three-factor model only serves the purpose of comparing the results calculated under these two different methods.

Lyon et al (1999) argue that overlapping returns inflate test statistics. Our results based on the control firms approach demonstrate that overlapping returns do inflate the test statistics through inflating the average long-run post acquisition stock returns. To alleviate the overlapping effect, we rely on the results obtained from the non-overlapping sample as our inference. By examining the non-overlapping bidding firms (1991-1998 and 1995-1998 sample periods) three years post acquisition abnormal stock returns (CARs and BHARs), we find that it seems safe to say that UK bidding firms do suffer a significant wealth loss in the first year after their completion of the acquisition. However, we do not find any significant abnormal returns for the bidding firms in three years after the takeover, because both the three-year average CAR and three-year average BHAR are economically and statistically insignificant different from zero.

We conclude that UK bidding firms do not experience any significant three-year post acquisition abnormal returns in the 1990s. Our results are consistent with several recent studies[5] in resolving the previously reported anomalies, and give support to the efficient market hypothesis (EMH).

---

[5] A few researchers have recently retested the anomalies that were previously reported in the event studies. See, for example, Mitchell and Stafford (2000) does not find any statistically significant long-run anomalies in corporate takeovers; share repurchases, and seasoned equity offerings (SEOs). Brav et al (2000) have resolved the long-run anomalies associated with SEOs and IPO. Eckbo et al (2000) and

5.4.2.The Impact of Takeover Premiums to the Long-run Post Acquisition Stock Returns

Table 5.8 reports bidding firms (1995-1998) three years post acquisition average monthly CARs based on the one-month takeover premiums that they have offered to the targets. As the table shows that bidding firms that belonging to the premium region of P2 (0<P2<=30%) outperform the bidding firms in the other three premium regions, 30 out of 36 monthly average CARs are positive, and the CARs are statistically significant different from zero at 5% significance level from month 28 to month 36.

Table 5.8. Bidding firms (1995-1998) three-year post acquisition average CARs, according to the one-month takeover premiums

There are 112 UK bidding firms involved in the acquisition during 1995-1998 periods. According to the one-month premiums that they offered to the targets, bidding firms are grouped into four sub-samples based on four different premium regions. The premium regions are: P1<=0 (i.e., offering zero or negative premium); 0<P2<=30%; 30%<P3<=50%; P4>50% (i.e., the offer price is 50% higher than the target firm's stock price one-month before the takeover announcement). P1 contains 12 bidding firms, P2 contains 41 bidding firms, P3 contains 33 bidding firms, and P4 contains 23 bidding firms. T-statistics of the CARs are also given in the table.

	Cumulative Abnormal Returns (CARs)							
EM	**P1**	**T-Stat**	**P2**	**T-Stat**	**P3**	**T-Stat**	**P4**	**T-Stat**
1	**-0.1046***	-2.692	0.0042	0.314	-0.0096	-0.517	0.0005	0.023
2	**-0.1509***	-2.510	0.0026	0.142	-0.0332	-1.258	-0.0226	-0.854
3	-0.1626	-2.114	-0.0269	-0.936	-0.0617	-1.709	-0.0372	-1.244
4	-0.1857	-1.703	-0.0399	-1.241	-0.0493	-1.143	0.0137	0.304
5	-0.1862	-1.595	-0.0258	-0.687	-0.0513	-0.942	-0.0113	-0.204
6	-0.2389	-1.643	-0.0167	-0.407	-0.0524	-0.895	-0.0275	-0.424
7	-0.3090	-1.703	0.0005	0.011	-0.0690	-1.049	-0.0679	-1.014
8	-0.3535	-1.876	0.0070	0.133	-0.0694	-0.877	-0.0572	-0.741
9	-0.3940	-1.977	-0.0173	-0.296	-0.0765	-0.888	-0.0377	-0.410
10	-0.3908	-1.805	-0.0132	-0.207	-0.0713	-0.781	-0.0759	-0.768
11	-0.3646	-1.896	0.0193	0.296	-0.0924	-0.906	-0.1406	-1.181
12	-0.3526	-1.970	0.0108	0.169	-0.0795	-0.696	-0.1434	-1.185
13	-0.3223	-1.707	0.0222	0.327	-0.0840	-0.758	-0.1447	-1.129
14	-0.3119	-1.446	0.0182	0.252	-0.0729	-0.613	-0.1695	-1.198
15	-0.3258	-1.604	0.0558	0.718	-0.0572	-0.508	-0.1235	-0.807
16	-0.3264	-1.693	0.0726	0.897	-0.0547	-0.454	-0.0547	-0.357
17	-0.3050	-1.611	0.1010	1.230	-0.1415	-1.106	-0.0625	-0.378
18	-0.2831	-1.385	0.1407	1.616	-0.1444	-1.118	0.0349	0.185
19	-0.3405	-1.614	0.1442	1.667	-0.1415	-1.162	0.0455	0.243

Eckbo and Norli (2000) have resolved the long-run anomalies associated with SEOs and IPO respectively. Gompers and Lerner (2001) have resolved the long-run anomalies associated with IPO. Boehme and Sorescu (2002) have resolved the anomalies following dividend initiations and resumptions.

20	-0.3651	-1.630	0.1521	1.752	-0.1812	-1.332	0.0099	0.053
21	-0.3351	-1.448	0.1660	1.749	-0.2092	-1.540	0.0107	0.056
22	-0.3887	-1.556	0.1588	1.687	-0.2070	-1.446	0.0426	0.227
23	-0.4103	-1.706	0.1896	1.982	-0.2328	-1.550	-0.0274	-0.147
24	-0.3460	-1.389	0.1603	1.624	-0.1986	-1.433	-0.0017	-0.009
25	-0.3085	-1.255	0.1696	1.673	-0.2281	-1.596	-0.0637	-0.326
26	-0.2988	-1.349	0.1915	1.902	-0.2222	-1.486	-0.0136	-0.067
27	-0.2508	-1.050	0.1910	1.922	-0.1693	-1.070	-0.0560	-0.302
28	-0.2981	-1.180	**0.2157***	2.095	-0.1016	-0.688	-0.0220	-0.115
29	-0.2328	-0.886	**0.2441***	2.441	-0.1242	-0.838	-0.0149	-0.071
30	-0.2107	-0.804	**0.2467***	2.525	-0.0928	-0.587	-0.0117	-0.054
31	-0.2649	-1.033	**0.2378***	2.387	-0.0574	-0.359	0.0115	0.051
32	-0.2141	-0.928	**0.2677***	2.480	-0.0327	-0.218	-0.0264	-0.115
33	-0.2321	-0.983	**0.2913***	2.782	-0.0379	-0.250	-0.0552	-0.251
34	-0.2208	-0.915	**0.3401***	3.199	-0.0338	-0.225	-0.0804	-0.366
35	-0.1076	-0.443	**0.3461***	3.145	-0.0360	-0.247	-0.0696	-0.305
36	-0.1153	-0.453	**0.3524***	3.093	-0.0594	-0.420	-0.1687	-0.677

* Indicate significant at 5%, two-sided t-test.

Figure 5.7 shows UK bidding firms three years post acquisition average CARs based on four one-month premium regions. Sub-sample P2 (0<P2<=30%) consistently outperform the other three. Sub-sample P4 (P4>50%) outperforms sub-sample P3 (30<P3<=50%) in 27 out of 36 months. Bidding firms offering a negative premium (Sub-sample P1) experience the worst post acquisition returns.

Figure 5.7. Bidding firms (95-98) three-year post acquisition average CARs, according to the one-month takeover Premiums

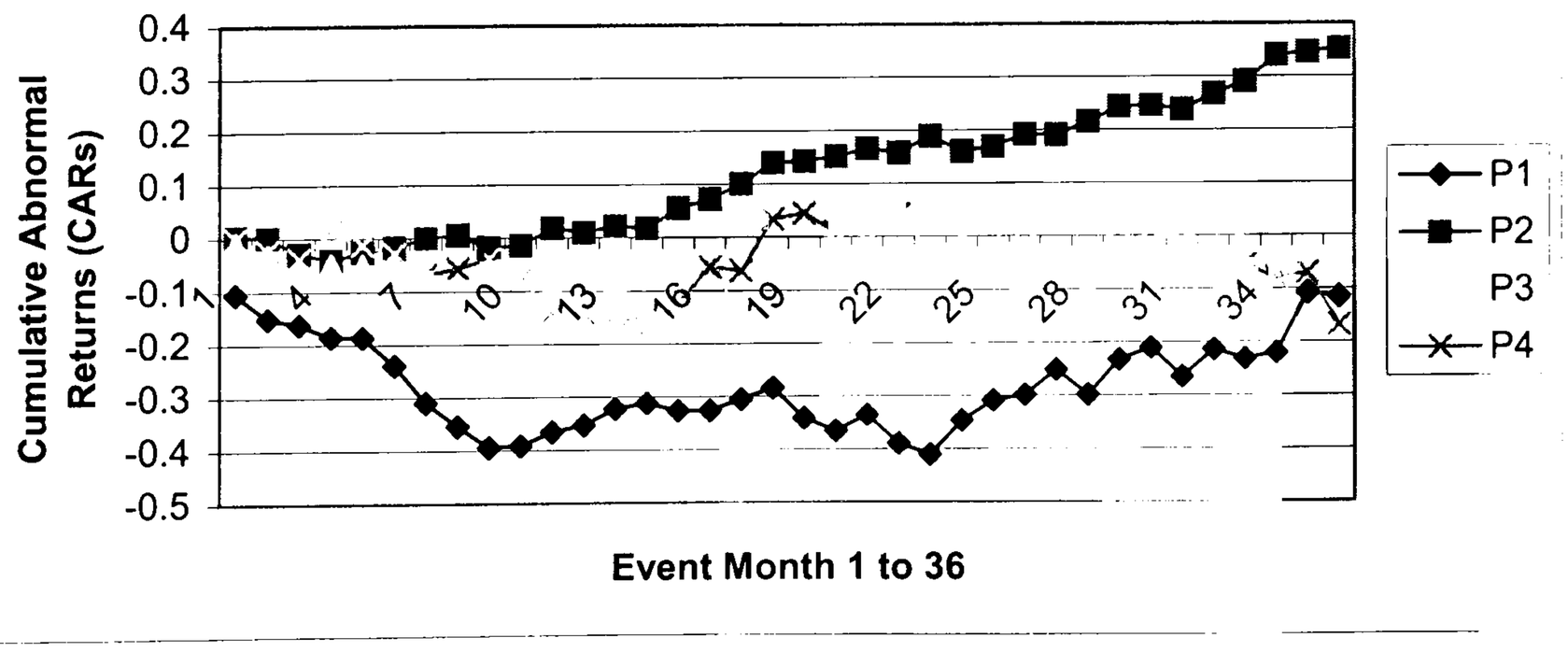


Table 5.9.1 reports that all the bidding firms except the bidding firms of sub-sample P2 experience negative one to three years post acquisition abnormal returns. Based on the t-statistics, the first year CAR and BHAR of the sub-sample P1 are statistically significant at 10% significance level, however the corresponding p-values tell us they are not significant at 10%. It is consistent with our previous findings regarding the impact of overlapping returns to the t-statistics. On the other hand, bidding firms of the sub-sample P2 gain large and statistically significant three-year post acquisition abnormal returns, the CAR is 35.24% and the BHAR is 45.28%, both are statistically significant different from zero at 5% significance level. Table 5.9.2 shows that all the four sub-samples experience negative one to three years post acquisition negative abnormal returns. This result is consistent with Table 5.9.1 except for sub-sample P2, bidding firms of sub-sample P2 suffer negative one to three years abnormal returns by using the three-factor model. However, consistent with Table 5.9.1, the three-year intercept term and its implied CAR of sub-sample P2 outperform the other three sub-samples. Thus, Table 5.9.1 and 5.9.2 tell us that sub-sample P2 outperform the other three sub-samples by either using the control firms approach or the Fama-French three-factor model to calculate the long-run abnormal stock returns.

Table 5.9. Bidding firms (1995-1998) three-year post acquisition average CARs and BHARs, according to the one-month takeover premiums

There are 112 UK bidding firms involved in the acquisition during 1995-1998 periods. According to the one-month premiums that they offered to the targets, bidding firms are grouped into four sub-samples based on four different premium regions. The premium regions are: P1<=0 (i.e., offering zero or negative premium); 0<P2<=30%; 30%<P3<=50%; P4>50% (i.e., the offer price is 50% higher than the target firm's stock price one-month before the takeover announcement). P1 contains 12 bidding firms, P2 contains 41 bidding firms, P3 contains 33 bidding firms, and P4 contains 23 bidding firms. Table 5.9.1 reports the result calculated by using the control firms approach. Table 5.9.2 presents the result calculated by using the Fama-French three-factor model. CAR is the average cumulative abnormal return of all the bidding firms. α -P1, α -P2, α -P3, α -P4 are the mean intercept terms of Fama-French three-factor model of corresponding premium sub-samples. Implied CAR is the mean α multiplying by 12, 24, and 36. T-statistics of relevant CARs

and BHARs as well as the corresponding P-values calculated by using the nonparametric Wilcoxon Signed-Rank test are also given in the table.

Table 5.9.1

Cumulative Abnormal Returns (CARs)

EM	P1	T-Stat	P2	T-Stat	P3	T-Stat	P4	T-Stat
1 to 12	**-0.3526****	-1.970	0.0108	0.169	-0.0795	-0.696	-0.1434	-1.185
	(0.158)		*(0.464)*		*(0.879)*		*(0.248)*	
1 to 24	-0.3460	-1.389	0.1603	1.624	-0.1986	-1.433	-0.0017	-0.009
	(0.480)		*(0.156)*		*(0.131)*		*(0.605)*	
1 to 36	-0.1153	-0.453	**0.3524***	3.093	-0.0594	-0.420	-0.1687	-0.677
	(0.638)		*(0.006)*		*(0.574)*		*(0.412)*	

Buy-and-Hold Abnormal Returns (BHARs)

EM	P1	T-Stat	P2	T-Stat	P3	T-Stat	P4	T-Stat
1 to 12	**-0.2911****	-1.906	-0.0326	-0.386	-0.0736	-0.776	-0.1451	-1.255
	(0.158)		*(0.521)*		*(0.728)*		*(0.301)*	
1 to 24	-0.4409	-1.462	0.0657	0.669	-0.1723	-1.399	-0.0275	-0.175
	(0.433)		*(0.231)*		*(0.214)*		*(0.503)*	
1 to 36	-0.1917	-0.643	**0.4528***	2.702	-0.0694	-0.677	-0.2056	-0.861
	(0.875)		*(0.002)*		*(0.662)*		*(0.362)*	

Table 5.9.2

EM	α-P1	T-Stat	P-Value	Implied CAR
1 to 12	-0.0171	-1.740	0.170	-0.2052
1 to 24	-0.0044	-0.849	0.556	-0.1056
1 to 36	**-0.0082***	-2.389	0.031	-0.2952

EM	α-P2	T-Stat	P-Value	Implied CAR
1 to 12	-0.0013	-0.278	0.786	-0.0156
1 to 24	**-0.0071***	-2.427	0.043	-0.1704
1 to 36	**-0.0062***	-2.214	0.105	-0.2232

EM	α-P3	T-Stat	P-Value	Implied CAR
1 to 12	**-0.0216***	-2.879	0.012	-0.2592
1 to 24	**-0.0155***	-3.632	0.001	-0.3720
1 to 36	**-0.0111***	-3.334	0.002	-0.3996

EM	α-P4	T-Stat	P-Value	Implied CAR
1 to 12	-0.0126	-1.762	0.104	-0.1512
1 to 24	**-0.0158***	-2.936	0.009	-0.3792
1 to 36	**-0.0122***	-2.743	0.013	-0.4392

* Indicate significant at 5%, two-sided t-test.

** Indicate significant at 10%, two-sided t-test.

a. P-values calculated by using the nonparametric Wilcoxon Signed-Rank test are given in the parenthesis.

As our previous findings show that overlapping returns inflate both the long-run stock returns and the t-statistics, we re-examine the premium issue by removing the overlapping firms to eliminate the bias caused by the overlapping returns. Table 5.10 reports the non-overlapping UK bidding firms three years post acquisition monthly average CARs based on four different premium regions. The results are consistent with that reported in Table 5.8, bidding firms of sub-sample P2 outperform all the other three sub-samples in three-year after the acquisition.

Table 5.10. Non-overlapping bidding firms (1995-1998) three-year post acquisition average CARs, according to the one-month takeover premiums

There are 89 UK non-overlapping bidding firms involved in the acquisition during 1995-1998 periods. According to the one-month premiums that they offered to the targets, bidding firms are grouped into four sub-samples based on four different premium regions. The premium regions are: P1<=0 (i.e., offering zero or negative premium); 0<P2<=30%; 30%<P3<=50%; P4>50% (i.e., the offer price is 50% higher than the target firm's stock price one-month before the takeover announcement). P1 contains 11 bidding firms, P2 contains 33 bidding firms, P3 contains 25 bidding firms, and P4 contains 18 bidding firms. T-statistics of the CARs are also given in the table.

Cumulative Abnormal Returns (CARs)								
EM	**P1**	**T-Stat**	**P2**	**T-Stat**	**P3**	**T-Stat**	**P4**	**T-Stat**
1	**-0.1037***	-2.436	0.0050	0.331	-0.0038	-0.190	0.0060	0.236
2	**-0.1632***	-2.532	0.0014	0.068	-0.0369	-1.223	-0.0164	-0.499
3	**-0.1874***	-2.349	-0.0472	-1.378	-0.0671	-1.541	-0.0352	-0.935
4	-0.2322	-2.149	-0.0545	-1.417	-0.0629	-1.292	0.0122	0.212
5	-0.2318	-1.969	-0.0497	-1.143	-0.0884	-1.444	-0.0179	-0.255
6	-0.2853	-1.889	-0.0348	-0.738	-0.0752	-1.131	-0.0412	-0.503
7	-0.3643	-1.925	-0.0054	-0.099	-0.0893	-1.164	-0.0915	-1.094
8	-0.3953	-1.964	-0.0045	-0.073	-0.0526	-0.629	-0.0837	-0.879
9	-0.4435	-2.097	-0.0413	-0.589	-0.0704	-0.759	-0.0563	-0.492
10	-0.4447	-1.936	-0.0527	-0.695	-0.0768	-0.698	-0.0871	-0.711
11	-0.4071	-1.981	-0.0292	-0.384	-0.1180	-0.964	-0.1560	-1.043
12	-0.4063	-2.172	-0.0406	-0.545	-0.1232	-0.899	-0.1454	-0.960
13	-0.3725	-1.869	-0.0224	-0.282	-0.1210	-0.937	-0.1472	-0.917
14	-0.3568	-1.543	-0.0385	-0.458	-0.1126	-0.787	-0.1758	-0.988
15	-0.3598	-1.640	0.0036	0.040	-0.0777	-0.570	-0.1174	-0.610
16	-0.3673	-1.780	0.0152	0.162	-0.0942	-0.640	-0.0314	-0.165
17	-0.3449	-1.701	0.0336	0.360	-0.1923	-1.248	-0.0322	-0.155
18	-0.3349	-1.546	0.0804	0.788	-0.2089	-1.353	0.1181	0.509
19	-0.4028	-1.824	0.0833	0.835	-0.1976	-1.364	0.1493	0.660
20	-0.4293	-1.827	0.0898	0.910	-0.2515	-1.520	0.0986	0.434
21	-0.3784	-1.519	0.1349	1.248	-0.2974	-1.789	0.1002	0.435
22	-0.4268	-1.578	0.1256	1.127	-0.2721	-1.532	0.1469	0.651
23	-0.4445	-1.705	0.1492	1.343	-0.2926	-1.544	0.0695	0.308
24	-0.4007	-1.505	0.1134	0.989	-0.2891	-1.665	0.0960	0.422

25	-0.3588	-1.362	0.1275	1.080	-0.3095	-1.723	0.0411	0.172
26	-0.3175	-1.314	0.1688	1.409	-0.3169	-1.706	0.0977	0.395
27	-0.2831	-1.092	0.1819	1.531	-0.2579	-1.293	0.0462	0.210
28	-0.3405	-1.248	0.2072	1.723	-0.1847	-1.003	0.0957	0.420
29	-0.2671	-0.936	0.2129	1.800	-0.2078	-1.117	0.1192	0.481
30	-0.2402	-0.842	0.1938	1.670	-0.1777	-0.893	0.1192	0.457
31	-0.3115	-1.128	0.2117	1.778	-0.1173	-0.578	0.1568	0.598
32	-0.2648	-1.074	0.2393	1.885	-0.1010	-0.532	0.1325	0.507
33	-0.2874	-1.143	**0.2569***	2.038	-0.1030	-0.540	0.0691	0.270
34	-0.2752	-1.069	**0.3025***	2.432	-0.0919	-0.482	0.0432	0.169
35	-0.1471	-0.560	**0.3066***	2.358	-0.1160	-0.631	0.0654	0.253
36	-0.1462	-0.528	**0.3259***	2.450	-0.1300	-0.726	-0.0488	-0.167

* Indicate significant at 5%, two-sided t-test.

Figure 5.8 shows that although we have removed the overlapping bidding firms, the results virtually remain the same as that presented in Figure 5.7. The same return pattern shown in Figure 5.8 might be due to that all the four sub-samples are equally likely to be affected by the overlapping returns.

Figure 5.8. Non-overlapping bidding firms (95-98) three-year post acquistion average CARs, according to the one-month takeover Premiums

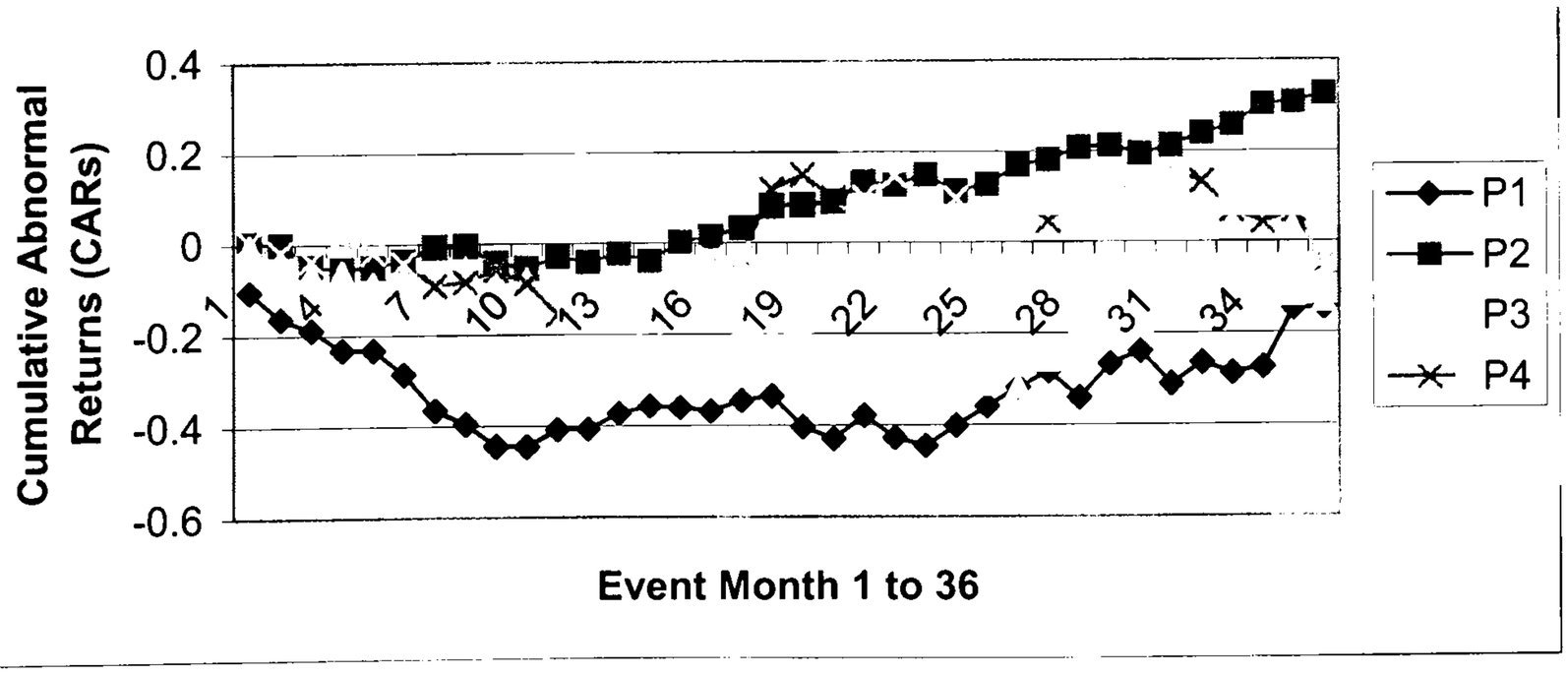


Table 5.11.1 shows that the results of non-overlapping sample remain virtually the same as presented in Table 5.9.1. After removing the overlapping returns, the first year negative CAR and BHAR of sub-sample P1 are statistically significant different from

zero at 10% significance level, it shows that sub-sample P1 significantly underperform other three sub-samples at least in the first year after the acquisition. Consistent with the results presented in Table 5.9.1, only the three-year positive CAR and BHAR of sub-sample P2 are statistically significant different from zero at 5% significance level. It once again confirms that bidding firms of sub-sample P2 outperforms other three sub-samples in three-year after the takeover. Finally the two-year negative BHAR of sub-sample P3 are statistically significant different from zero at 10% significance level, it provides evidence that sub-sample P4 outperform sub-sample P3 at least in two-year time after the acquisition. Consistent with Table 5.9.2, Table 5.11.2 reports one to three years' negative post acquisition abnormal returns for all the four sub-samples. This is inconsistent with the results presented in Table 5.11.1. However, Table 5.11.2 once again shows that the three-year intercept term and its implied CAR of sub-sample P2 outperform the other three sub-samples. Thus, we are able to conclude that bidding firms of sub-sample P2 experience best post acquisition stock returns in three years after the completion of the takeover bids.

Table 5.11. Non-overlapping bidding firms (1995-1998) three-year post acquisition average CARs and BHARs, according to the one-month takeover premiums

There are 89 UK non-overlapping bidding firms involved in the acquisition during 1995-1998 periods. According to the one-month premiums that they offered to the targets, bidding firms are grouped into four sub-samples based on four different premium regions. The premium regions are: P1<=0 (i.e., offering zero or negative premium); 0<P2<=30%; 30%<P3<=50%; P4>50% (i.e., the offer price is 50% higher than the target firm's stock price one-month before the takeover announcement). P1 contains 11 bidding firms, P2 contains 33 bidding firms, P3 contains 25 bidding firms, and P4 contains 18 bidding firms. Table 5.11.1 reports the result calculated by using the control firms approach. Table 5.11.2 presents the result calculated by using the Fama-French three-factor model. CAR is the average cumulative abnormal return of all the bidding firms. BHAR is the average buy-and-hold abnormal return of all the bidding firms. α -P1, α -P2, α -P3, α -P4 are the mean intercept terms of Fama-French three-factor model of corresponding premium sub-samples. Implied CAR is the mean α multiplying by 12, 24, and 36. T-statistics of relevant CARs and BHARs as well as the corresponding P-values calculated by using the nonparametric Wilcoxon Signed-Rank test are also given in the table.

Table 5.11.1

Cumulative Abnormal Returns (CARs)

EM	P1	T-Stat	P2	T-Stat	P3	T-Stat	P4	T-Stat
1 to 12	**-0.4063****	-2.172	-0.0406	-0.545	-0.1232	-0.899	-0.1454	-0.960
	(0.075)		*(0.950)*		*(0.476)*		*(0.327)*	
1 to 24	-0.4007	-1.505	0.1134	0.989	-0.2891	-1.665	0.0960	0.422
	(0.328)		*(0.480)*		*(0.069)*		*(0.948)*	
1 to 36	-0.1462	-0.528	**0.3259***	2.450	-0.130	-0.726	-0.0488	-0.167
	(0.790)		*(0.030)*		*(0.382)*		*(0.811)*	

Buy-and-Hold Abnormal Returns (BHARs)

EM	P1	T-Stat	P2	T-Stat	P3	T-Stat	P4	T-Stat
1 to 12	**-0.3429****	-2.178	-0.0966	-0.972	-0.138	-1.238	-0.1462	-1.017
	(0.075)		*(0.879)*		*(0.300)*		*(0.396)*	
1 to 24	-0.5005	-1.545	0.0032	0.028	**-0.292****	-1.979	0.0775	0.423
	(0.328)		*(0.728)*		*(0.051)*		*(0.983)*	
1 to 36	-0.2284	-0.705	**0.4216***	2.075	-0.1739	-1.461	-0.0163	-0.068
	(1.000)		*(0.017)*		*(0.211)*		*(0.679)*	

Table 5.11.2

EM	α-P1	T-Stat	P-Value	Implied CAR
1 to 12	-0.0177	-1.643	0.230	-0.2124
1 to 24	-0.0041	-0.737	0.689	-0.0984
1 to 36	**-0.0085***	-2.265	0.045	-0.3060
EM	**α-P2**	**T-Stat**	**P-Value**	**Implied CAR**
1 to 12	-0.0013	-0.234	0.971	-0.0156
1 to 24	**-0.0080***	-2.271	0.056	-0.1920
1 to 36	**-0.0078***	-2.355	0.063	-0.2808
EM	**α-P3**	**T-Stat**	**P-Value**	**Implied CAR**
1 to 12	**-0.0255***	-2.725	0.017	-0.3060
1 to 24	**-0.0180***	-3.345	0.002	-0.4320
1 to 36	**-0.0132***	-3.187	0.002	-0.4752
EM	**α-P4**	**T-Stat**	**P-Value**	**Implied CAR**
1 to 12	-0.0110	-1.258	0.258	-0.1320
1 to 24	**-0.0164***	-2.485	0.024	-0.3936
1 to 36	**-0.0152***	-2.778	0.017	-0.5472

* Indicate significant at 5%, two-sided t-test.

** Indicate significant at 10%, two-sided t-test.

a. P-values calculated by using the nonparametric Wilcoxon Signed-Rank test are given in the parenthesis.

As we have mentioned before, due to the mis-specification problem of the Fama-French three-factor model, we give our inference only based on the control firms approach and

the three-factor model only serve the purpose for comparing the results acquired from these two different approaches. Because the results reported in Table 5.11.1 and Figure 5.8 has removed the overlapping returns effect, we rely on the results reported in them as our inference. According to both three-year average CARs and BHARs, sub-sample P2 (0<P2<=30%) gain a very large and statistically significant positive abnormal return in three years after the completion of the acquisition. The three-year CARs and BHARs are all negative and statistically insignificant different from zero for the rest of three sub-samples, by comparing the three-year CARs and BHARs, we find that sub-sample P4 (P4>50%) outperforms sub-sample P3 (30%<P3<=50%), and sub-sample P1 (P1<=0) experience the worst returns.

Thus, we are able to answer the three questions raised in the introduction section regarding the impact of takeover premiums to the bidding firms long-run post acquisition stock returns. First, to achieve the best long run post acquisition performance, we find that the best or optimal one-month premium region for the bidding firms to takeover the targets is between 0 and 30%. Second, as the evidence shows, it is not the higher the premiums offered by the bidding firms the worse of their performance. Bidding firms offering a negative one-month takeover premium experience the worst returns, while the returns to the bidding firms that offering the highest premiums are not bad. Third, we reject the explanation that the previous evidence of long-run negative post acquisition abnormal returns are due to a delayed market reaction to overpriced takeovers[6]. We do not find any evidence that the negative long-run abnormal returns are related with overpricing.

---

[6] Agrawal and Jaffe (2000) also reject the same explanation in their recent review of 22 previous studies regarding bidding firms long-run post acquisition stock returns.

5.4.3. The Impact of the Method of Payment to the Long-run Post Acquisition Stock Returns

Table 5.12 presents the bidding firms three-year post acquisition monthly average CARs based on four kinds of method of payment. As we can see from this table, though they are statistically insignificant different from zero, bidding firms that offering combined payment (stock plus cash) experience the best post takeover stock returns, 29 out of 36 monthly average CARs are positive.

Table 5.12. Bidding firms (1991-1998) three-year post acquisition average CARs, according to the method of payment

There are 179 UK bidding firms involved in the acquisitions during 1991-1998 periods. According to the method of payment that bidding firms have chosen to pay the target firms shareholders, bidding firms are grouped into four sub-samples based on their financing methods. The monthly average CARs of these four sub-samples are listed in the table. Cash offer contains 58 bidding firms, stock offer contains 50 bidding firms, alternative offer contains 37 bidding firms, and combined offer contains 25 bidding firms. T-statistics of the CARs are also given in the table.

Cumulative Abnormal Returns (CARs)								
EM	**CASH**	**T-Stat**	**STOCK**	**T-Stat**	**ALTER**	**T-Stat**	**COMB**	**T-Stat**
1	-0.0109	-0.867	-0.0287	-1.726	0.0011	0.066	-0.0103	-0.636
2	-0.0184	-1.018	**-0.0519***	-2.195	-0.0168	-0.712	0.0030	0.127
3	-0.0426	-1.933	**-0.0877***	-2.629	-0.0369	-1.374	-0.0105	-0.419
4	-0.0144	-0.552	-0.0796	-1.972	-0.0655	-1.647	0.0065	0.176
5	-0.0209	-0.651	**-0.1114***	-2.376	-0.0758	-1.658	0.0396	0.998
6	-0.0119	-0.331	**-0.1327***	-2.460	**-0.1105***	-2.227	0.0425	1.162
7	-0.0286	-0.734	**-0.1485***	-2.328	**-0.1193***	-2.227	0.0695	1.697
8	-0.0443	-1.034	-0.1386	-1.964	-0.1170	-1.992	0.0926	1.870
9	-0.0631	-1.337	-0.1473	-1.889	-0.1121	-1.681	0.0640	1.081
10	-0.0449	-0.947	-0.1422	-1.685	-0.1091	-1.496	0.0258	0.386
11	-0.0750	-1.317	-0.1563	-1.961	-0.1336	-1.617	0.0714	1.018
12	-0.0638	-1.048	**-0.1708***	-2.110	-0.1013	-1.185	0.0582	0.750
13	-0.0679	-1.040	**-0.1620***	-2.067	-0.1045	-1.133	0.0310	0.393
14	-0.0791	-1.138	-0.1640	-1.960	-0.1204	-1.193	0.0291	0.332
15	-0.0599	-0.892	-0.1250	-1.385	-0.1278	-1.272	0.0347	0.389
16	-0.0376	-0.571	-0.1648	-1.747	-0.1121	-1.072	0.0561	0.597
17	-0.0650	-0.846	-0.1655	-1.723	-0.1268	-1.232	0.0589	0.570
18	-0.0424	-0.538	-0.1362	-1.232	-0.0986	-0.994	0.0649	0.602
19	-0.0470	-0.624	-0.1273	-1.114	-0.0908	-0.933	0.0560	0.534
20	-0.0552	-0.656	-0.1515	-1.279	-0.0974	-0.894	0.0456	0.436
21	-0.0649	-0.770	-0.1228	-0.984	-0.1022	-0.880	0.0393	0.391
22	-0.0786	-0.976	-0.1367	-1.116	-0.0677	-0.571	0.0230	0.229
23	-0.0799	-0.950	-0.1344	-1.121	-0.0629	-0.497	-0.0374	-0.380

24	-0.0705	-0.865	-0.1631	-1.317	-0.0663	-0.568	-0.0163	-0.160
25	-0.0712	-0.828	-0.1673	-1.342	-0.0955	-0.793	-0.0162	-0.157
26	-0.0684	-0.798	-0.1326	-1.072	-0.0238	-0.188	-0.0329	-0.300
27	-0.0349	-0.432	-0.1647	-1.428	0.0149	0.104	-0.0345	-0.283
28	-0.0204	-0.251	-0.1601	-1.342	0.0306	0.215	0.0629	0.576
29	-0.0225	-0.269	-0.1179	-0.967	0.0094	0.064	0.0747	0.650
30	-0.0080	-0.092	-0.1114	-0.937	0.0142	0.091	0.1048	0.928
31	-0.0185	-0.223	-0.0876	-0.691	0.0323	0.210	0.0947	0.796
32	0.0158	0.189	-0.0718	-0.562	0.0162	0.112	0.1228	0.896
33	0.0057	0.066	-0.0526	-0.408	-0.0058	-0.041	0.0934	0.716
34	0.0028	0.033	-0.0232	-0.177	0.0149	0.102	0.0662	0.509
35	0.0268	0.314	0.0044	0.033	0.0090	0.063	0.0936	0.673
36	0.0280	0.314	0.0027	0.019	-0.0605	-0.408	0.0800	0.515

* Indicate significant at 5%, two-sided t-test.

Figure 5.9 presents a clear picture of the three-year post acquisition average CARs based on four methods of payment. Sub-sample of combined offer outperforms the other three. Cash offer outperforms stock offer that is consistent with almost all the previous studies. Generally, alternative offer are ranked in the middle between cash offer and stock offer. However, most of the points shown in Figure 5.9 are statistically insignificant different from zero at 5% significance level.

Figure 5.9. Bidding firms (91-98) three-year post acquisition average CARs, according to the method of payment

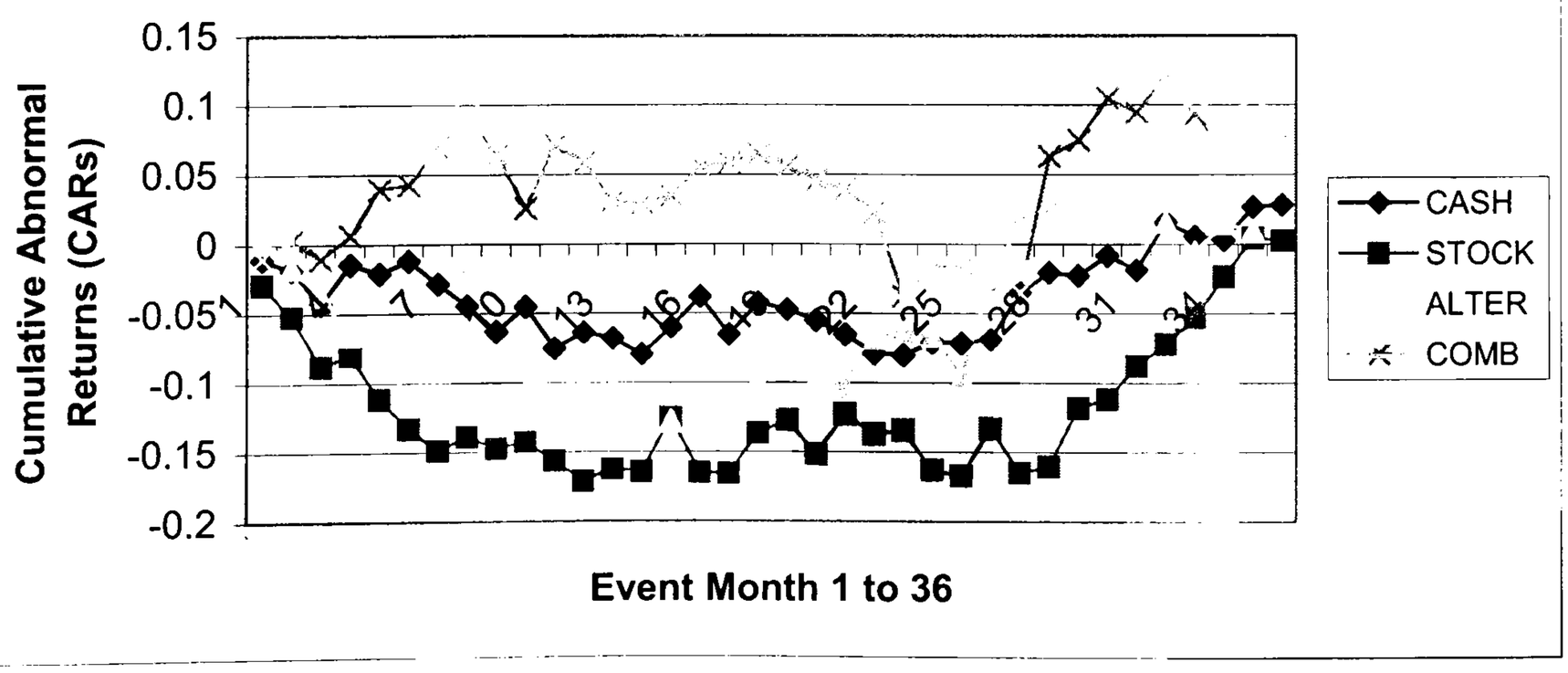


Table 5.13.1 reports bidding firms three-year post acquisition average CAR and BHAR based on four methods of payment. Because the t-statistics and the p-values are inconsistent for the first year CAR and BHAR of stock offer bidding firms, it once again confirms our findings of the effects of overlapping returns to the t-statistics. It shows none of the three-year CARs and BHARs are statistically significant different from zero at either 5% or 10% significance level. However, we can see that stock offer suffer the worst return at least in two years after the acquisition. In contrast with Table 5.13.1, Table 5.13.2 reports that all the three-year intercept terms and their implied CARs are negative and statistically significant different from zero. By comparing them, we also find that combined offer outperforms the other three, and cash offer outperforms the stock offer.

Table 5.13. Bidding firms (1991-1998) three-year post acquisition average CARs and BHARs, according to the method of payment

There are 179 UK bidding firms involved in the acquisition during 1991-1998 periods. According to the method of payment that bidding firms have chosen to pay the target firms shareholders, bidding firms are grouped into four sub-samples based on their financing methods. Cash offer contains 58 bidding firms, stock offer contains 50 bidding firms, alternative offer contains 37 bidding firms, and combined offer contains 25 bidding firms. Table 5.13.1 reports the result calculated by using the control firms approach. Table 5.13.2 presents the result calculated by using the Fama-French three-factor model. CAR is the average cumulative abnormal return of all the bidding firms. BHAR is the average buy-and-hold abnormal return of all the bidding firms. α -Cash, α -Stock, α -Alter, α -Comb is the mean intercept terms of Fama-French three-factor model of corresponding sub-samples. Implied CAR is the mean α multiplying by 12, 24, and 36. T-statistics of relevant CARs and BHARs as well as the corresponding P-values calculated by using the nonparametric Wilcoxon Signed-Rank test are also given in the table.

Table 5.13.1

Cumulative Abnormal Returns (CARs)

EM	CASH	T-Stat	STOCK	T-Stat	ALTER	T-Stat	COMB	T-Stat
1 to 12	-0.0638	-1.048	**-0.1708***	-2.110	-0.1013	-1.185	0.0582	0.750
	(0.612)		*(0.069)*		*(0.118)*		*(0.326)*	
1 to 24	-0.0705	-0.865	-0.1631	-1.317	-0.0663	-0.568	-0.0163	-0.160
	(0.702)		*(0.087)*		*(0.361)*		*(0.946)*	
1 to 36	0.0280	0.314	0.0027	0.019	-0.0605	-0.408	0.080	0.515
	(0.564)		*(0.942)*		*(0.678)*		*(0.313)*	

Buy-and-Hold Abnormal Returns (BHARs)

EM	CASH	T-Stat	STOCK	T-Stat	ALTER	T-Stat	COMB	T-Stat
1 to 12	-0.0611	-1.056	**-0.1672***	-2.184	**-0.135****	-1.818	-0.0021	-0.020
	(0.543)		*(0.054)*		*(0.053)*		*(0.382)*	

1 to 24	-0.0903	-1.084	**-0.2363****	-1.983	-0.1168	-0.968	-0.0784	-0.747
	(0.628)		*(0.088)*		*(0.309)*		*(0.563)*	
1 to 36	0.0511	0.617	0.0736	0.552	-0.2359	-1.421	0.2646	0.985
	(0.380)		*(0.579)*		*(0.301)*		*(0.264)*	

Table 5.13.2

EM	**α-Cash**	**T-Stat**	**P-Value**	**Implied CAR**
1 to 12	**-0.0082***	-2.143	0.139	-0.0984
1 to 24	**-0.0074***	-2.755	0.014	-0.1776
1 to 36	**-0.0072***	-3.174	0.005	-0.2592
EM	**α-Stock**	**T-Stat**	**P-Value**	**Implied CAR**
1 to 12	-0.0107	-1.822	0.210	-0.1284
1 to 24	**-0.0128***	-3.830	0.003	-0.3072
1 to 36	**-0.0113***	-3.758	0.002	-0.4068
EM	**α-Alter**	**T-Stat**	**P-Value**	**Implied CAR**
1 to 12	**-0.0130***	-2.304	0.026	-0.1560
1 to 24	**-0.0117***	-2.645	0.024	-0.2808
1 to 36	**-0.0098***	-2.710	0.020	-0.3528
EM	**α-Comb**	**T-Stat**	**P-Value**	**Implied CAR**
1 to 12	-0.0031	-0.507	0.600	-0.0372
1 to 24	-0.0061	-1.931	0.050	-0.1464
1 to 36	**-0.0063***	-2.197	0.010	-0.2268

* Indicate significant at 5%, two-sided t-test.

** Indicate significant at 10%, two-sided t-test.

a. P-values calculated by using the nonparametric Wilcoxon Signed-Rank test are given in the parenthesis.

In order to alleviate the impact of overlapping returns, Table 5.14 reports the non-overlapping bidding firms three-year post acquisition monthly average CARs based on four methods of payment. Although we have removed the overlapping bidding firms, the results, as we can see, virtually remain the same.

Table 5.14. Non-overlapping bidding firms (1991-1998) three-year post acquisition average CARs, according to the method of payment

There are 133 UK non-overlapping bidding firms involved in the acquisitions during 1991-1998 periods. According to the method of payment that bidding firms have chosen to pay the target firms shareholders, bidding firms are grouped into four sub-samples based on their financing methods. The monthly average CARs of these four sub-samples are listed in the table. Cash offer contains 39 bidding firms, stock offer

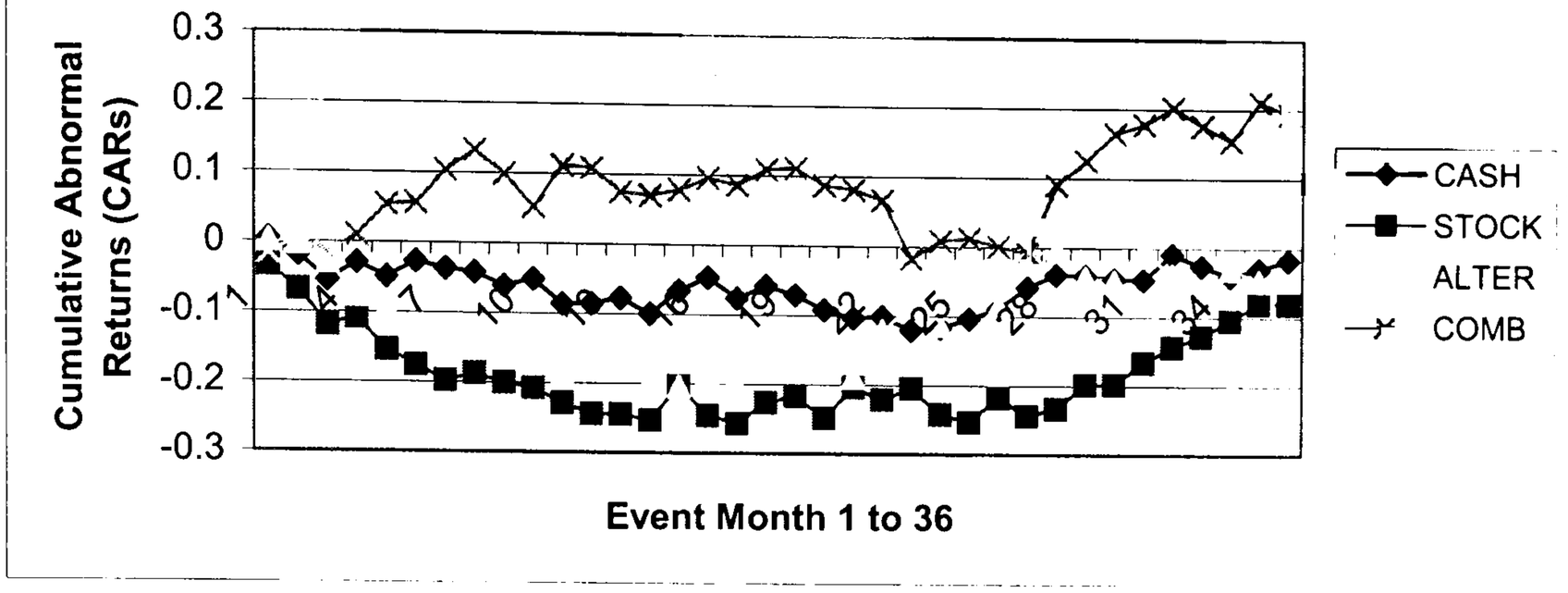
contains 42 bidding firms, alternative offer contains 25 bidding firms, and combined offer contains 20 bidding firms. T-statistics of the CARs are also given in the table.

Cumulative Abnormal Returns (CARs)								
EM	**CASH**	**T-Stat**	**STOCK**	**T-Stat**	**ALTER**	**T-Stat**	**COMB**	**T-Stat**
1	0.0058	0.368	-0.0333	-1.789	0.0034	0.160	-0.0157	-0.817
2	-0.0186	-0.792	**-0.0677***	-2.666	-0.0022	-0.084	0.0042	0.144
3	-0.0542	-1.884	**-0.1179***	-3.142	-0.0286	-0.925	-0.0153	-0.500
4	-0.0286	-0.925	**-0.1078***	-2.326	-0.0754	-1.431	0.0109	0.236
5	-0.0483	-1.221	**-0.1527***	-2.911	-0.0934	-1.603	0.0541	1.103
6	-0.0270	-0.599	**-0.1746***	-2.872	**-0.1326***	-2.091	0.0573	1.308
7	-0.0366	-0.727	**-0.1974***	-2.722	**-0.1485***	-2.097	**0.1041***	2.171
8	-0.0416	-0.860	**-0.1866***	-2.319	-0.1329	-1.676	**0.1329***	2.358
9	-0.0606	-1.107	**-0.2002***	-2.220	-0.1479	-1.583	0.0994	1.450
10	-0.0506	-0.822	**-0.2072***	-2.147	-0.1441	-1.406	0.0531	0.692
11	-0.0861	-1.138	**-0.2282***	-2.556	-0.1867	-1.597	0.1119	1.427
12	-0.0853	-1.062	**-0.2435***	-2.684	-0.1577	-1.302	0.1093	1.250
13	-0.0767	-0.897	**-0.2442***	-2.832	-0.1722	-1.322	0.0752	0.801
14	-0.0991	-1.069	**-0.2522***	-2.740	-0.1957	-1.366	0.0701	0.665
15	-0.0657	-0.735	-0.2029	-2.001	-0.2041	-1.432	0.0789	0.743
16	-0.0464	-0.539	**-0.2452***	-2.303	-0.1856	-1.256	0.0968	0.878
17	-0.0762	-0.745	**-0.2564***	-2.416	-0.2018	-1.404	0.0869	0.720
18	-0.0579	-0.550	-0.2261	-1.812	-0.1594	-1.142	0.1094	0.906
19	-0.0705	-0.719	-0.2165	-1.676	-0.1427	-1.044	0.1112	0.997
20	-0.0914	-0.813	-0.2479	-1.859	-0.1690	-1.098	0.0874	0.810
21	-0.1031	-0.903	-0.2030	-1.454	-0.1886	-1.153	0.0816	0.784
22	-0.1010	-0.930	-0.2203	-1.575	-0.1203	-0.710	0.0671	0.651
23	-0.1196	-1.038	-0.2044	-1.475	-0.0865	-0.486	-0.0166	-0.173
24	-0.1162	-1.038	-0.2416	-1.696	-0.1137	-0.702	0.0091	0.090
25	-0.1029	-0.872	-0.2524	-1.763	-0.1565	-0.941	0.0127	0.123
26	-0.0883	-0.741	-0.2166	-1.521	-0.0845	-0.482	0.0012	0.010
27	-0.0572	-0.510	-0.2427	-1.844	-0.0111	-0.055	-0.0080	-0.064
28	-0.0389	-0.346	-0.2330	-1.717	-0.0020	-0.010	0.0910	0.872
29	-0.0401	-0.347	-0.1981	-1.428	-0.0425	-0.206	0.1254	1.141
30	-0.0453	-0.380	-0.1972	-1.459	-0.0469	-0.216	0.1647	1.483
31	-0.0460	-0.396	-0.1655	-1.144	-0.0053	-0.025	0.1783	1.527
32	-0.0087	-0.075	-0.1428	-0.982	-0.0378	-0.192	0.2029	1.623
33	-0.0252	-0.208	-0.1273	-0.860	-0.0810	-0.419	0.1769	1.433
34	-0.0403	-0.338	-0.1039	-0.701	-0.0303	-0.152	0.1546	1.264
35	-0.0293	-0.250	-0.0797	-0.527	-0.0462	-0.236	0.2104	1.693
36	-0.0166	-0.135	-0.0802	-0.517	-0.1211	-0.595	0.1946	1.268

* Indicate significant at 5%, two-sided t-test.

Figure 5.10 shows that even we have removed the overlapping bidding firms from our investigation, the returns pattern of all the four methods of payment remain the same as shown in Figure 5.9. The same return pattern shown in Figure 5.9 might be due to that all the four sub-samples are equally likely to be affected by the overlapping returns, thus, the results are virtually remained the same when we remove the overlapping firms.

Figure 5.10. Non-overlapping bidding firms (91-98) three-year post acquistion average CARs, according to the method of payment



After removing the overlapping firms, Table 5.15.1 shows that except the combined offer, all the other three methods of payment lead to a negative post acquisition abnormal return. The one and two years negative CARs and BHARs of stock offer are statistically significant at 5% or 10% significance level. It marks the stock offer as the worst performer in at least two years after the acquisition. Table 5.15.2 reports that all the three-year intercept terms and their implied CARs are negative and statistically significant different from zero. By comparing them, we can see that combined offer outperform the other three, and cash offer outperform the stock offer.

Table 5.15. Non-overlapping bidding firm (1991-1998) three-year post acquisition average CARs and BHARs, according to the method of payment

There are 133 UK non-overlapping bidding firms involved in the acquisition during 1991-1998 periods. According to the method of payment that bidding firms have chosen to pay the target firms shareholders, bidding firms are grouped into four sub-samples based on their financing methods. Cash offer contains 39 bidding firms, stock offer contains 42 bidding firms, alternative offer contains 25 bidding firms, and combined offer contains 20 bidding firms. Table 5.15.1 reports the result calculated by using the control firms approach. Table 5.15.2 presents the result calculated by using the Fama-French three-factor model. CAR is the average cumulative abnormal return of all the bidding firms. BHAR is the average buy-and-hold abnormal return of all the bidding firms. α -Cash, α -Stock, α -Alter, α -Comb is the mean intercept terms of Fama-French three-factor model of corresponding sub-samples. Implied CAR is the mean α multiplying by 12, 24, and 36. T-statistics of relevant CARs and BHARs as well as the corresponding P-values calculated by using the nonparametric Wilcoxon Signed-Rank test are also given in the table.

Table 5.15.1

Cumulative Abnormal Returns (CARs)

EM	CASH	T-Stat	STOCK	T-Stat	ALTER	T-Stat	COMB	T-Stat
1 to 12	-0.0853	-1.062	**-0.2435***	-2.684	-0.1577	-1.302	0.1093	1.250
	(0.512)		*(0.015)*		*(0.065)*		*(0.117)*	
1 to 24	-0.1162	-1.038	**-0.2416****	-1.696	-0.1137	-0.702	0.0091	0.090
	(0.645)		*(0.025)*		*(0.211)*		*(0.970)*	
1 to 36	-0.0166	-0.135	-0.0802	-0.517	-0.1211	-0.595	0.1946	1.268
	(0.944)		*(0.604)*		*(0.545)*		*(0.135)*	

Buy-and-Hold Abnormal Returns (BHARs)

EM	CASH	T-Stat	STOCK	T-Stat	ALTER	T-Stat	COMB	T-Stat
1 to 12	-0.092	-1.181	**-0.2439***	-2.891	**-0.1943****	-2.015	0.0388	0.306
	(0.379)		*(0.009)*		*(0.026)*		*(0.135)*	
1 to 24	-0.1359	-1.174	**-0.3547***	-2.688	-0.1590	-1.135	-0.0668	-0.637
	(0.548)		*(0.010)*		*(0.109)*		*(0.654)*	
1 to 36	-0.0045	-0.043	-0.0486	-0.347	-0.2578	-1.533	0.4104	1.303
	(0.834)		*(0.750)*		*(0.122)*		*(0.100)*	

Table 5.15.2

EM	α-Cash	T-Stat	P-Value	Implied CAR
1 to 12	-0.0094	-1.772	0.273	-0.1128
1 to 24	**-0.0085***	-2.268	0.042	-0.2040
1 to 36	**-0.0095***	-3.076	0.004	-0.3420
EM	**α-Stock**	**T-Stat**	**P-Value**	**Implied CAR**
1 to 12	**-0.0142***	-2.136	0.118	-0.1704
1 to 24	**-0.0160***	-4.491	0.001	-0.3840
1 to 36	**-0.0138***	-4.196	0.001	-0.4968
EM	**α-Alter**	**T-Stat**	**P-Value**	**Implied CAR**
1 to 12	**-0.0216***	-2.922	0.005	-0.2592
1 to 24	**-0.0184***	-3.078	0.004	-0.4416
1 to 36	**-0.0162***	-3.376	0.003	-0.5832
EM	**α-Comb**	**T-Stat**	**P-Value**	**Implied CAR**
1 to 12	-0.0026	-0.346	0.681	-0.0312
1 to 24	-0.0065	-1.803	0.042	-0.1560
1 to 36	**-0.0078***	-2.239	0.011	-0.2808

* Indicate significant at 5%, two-sided t-test.

** Indicate significant at 10%, two-sided t-test.

a. P-values calculated by using the nonparametric Wilcoxon Signed-Rank test are given in the parenthesis.

Finally, we use Table 5.15.1 as our inference (because it applies the control firms approach and removes the overlapping returns effect) to interpret the bidding firms

long-run post acquisition stock returns based on four kinds of method of payment. We find that the sub-sample of stock offer underperforms the other three sub-samples (Cash offer, Combined offer, and Alternative offer) in two years after the takeover. However, we do not find any statistically significant three-year post-acquisition abnormal stock returns for all the four sub-samples, and hence no statistically significant three-year post takeover under- or out-performance among the four sub-samples (sub-samples of four kinds of method of payment) has been detected.

5.5. Conclusion

This chapter primarily applies the control firms approach (advanced by Barber and Lyon 1997) and uses the Fama-French three-factor model as an alternative to examine the impact of overlapping returns, takeover premiums, and methods of payment to the long-run post acquisition stock returns. To reflect the up-to-date development of corporate takeovers, we choose 1990s as our sample period. By comparing the results obtained from the control firms approach and from the Fama-French three-factor model, we do find a lot of evidence that the three-factor model is severely mis-specified by indicating abnormal performance too frequently. Thus, we give our inference only based on the control firms approach throughout this chapter, and the three-factor model only serve its purpose for comparing the results obtained from these two different approaches.

Our main findings are as follows: Firstly, in contrast to most previous studies, we do not find any statistically significant three-year post acquisition abnormal stock returns for the UK bidding firms in the 1990s; our results are consistent with a few recent studies in resolving the previously reported anomalies, and give support to the efficient market hypothesis (EMH). Secondly, we find that overlapping returns do inflate the test statistics as argued by Lyon et al (1999) through inflating the long-run post acquisition average stock returns. Thus, the overlapping returns will cause a serious mis-specification problem to the t-statistics if included in the investigation sample. Thirdly, after a full scale of investigation of takeover premiums, we find an optimal premium region for the bidding firms to takeover the targets; and because we do not find any

evidence that bidding firms long-run post acquisition negative abnormal returns are related to the overpricing, we reject the explanation that the previous evidence of long-run post acquisition negative abnormal returns is due to a delayed market reaction to overpriced takeovers. Fourthly, we find that stock offer underperforms the other three offers (cash offer, combined offer, and alternative offer) in two years after the takeover, however no statistically significant three-year under- or out-performance among these four kinds of method of payment has been detected. Finally, we conclude that previous findings of significant long-run post acquisition abnormal stock returns are more likely due to the five biases argued by Lyon et al (1999), and that leads to the mis-specification of the test statistics.

Chapter Six: Examining the Monitoring Role of Institutional Funds through Long-run Stock Returns of Corporate Takeovers: the UK Evidence

6.1. Introduction

Institutional funds have become increasingly prominent in the UK over the past two decades. In 1999, institutions held Pounds 2,477bn of funds, nearly three times the 1990 total, and accounted for over 85% of total identified funds under management. Insurance and pension schemes account for the bulk of UK institutional funds, although unit trusts and money market funds are also a growing market (IFSL 2001). Fund managers invest funds on behalf of institutions. Their primary task is to invest the flow of cash from pension contributions, insurance premiums and personal savers in a portfolio of financial assets that will best meet clients' needs. In the UK, a substantial proportion of institutional funds are invested in equity. As a result, institutional investors account for a large proportion of shares in the UK than in most industrialized countries, nearly 60% in 1999 (IFSL 2001). UK institutional funds have traditionally favoured investment in equity since the 1960s, given the generally good long-term returns reflecting the higher growth of equity markets relative to other asset classes. In 2000, an average of 49% of pension funds was allocated into UK equities with a further 22% invested in overseas equity. This is higher than in most other industrial countries. Bonds and government securities accounted for around 20% of UK pension funds' investments. The remainder was held in cash and property. (IFSL 2001).

This far larger weighting in investing in higher volatility equities is due to the special

characteristics of UK pension funds. Comparing to the continental Europe and US, the UK pension funds face the smallest set of externally imposed restrictions and regulations on their investment behavior of any group of institutional investors anywhere in the world. Recently, the Pension Act 1995 has removed restrictions on what assets trustees can invest their pension fund resources in. This makes UK pension funds free to invest in almost any securities.

6.1.1. Active Monitoring Hypothesis and the Evidence

Being the largest shareholder in the UK, institutional funds are expected to play a significant role in the corporate governance and that may well enhance corporate efficiency. However, the issue of involvement of institutional funds in the running of companies is controversial. There are two main hypotheses regarding this issue. One is the "*active monitoring hypothesis*". Institutional funds hold substantial stakes in individual companies. The size of these stakes renders them particularly sensitive to the performance of firms in their portfolios, and provides them powerful incentives to monitor firm management, ensuring that managers choose investment strategies to maximize long-run value rather than to meet short-term earnings goals. This vigilant institutional monitoring enhances managerial efficiency and the quality of corporate decision-making. Such institutional monitoring may involve holding discussion with management on corporate plans and performance, supporting (opposing) the management's wealth enhancing (reducing) policies and decisions, and active participating in board elections and other voting issues.

Demsetz (1983), Shleifer and Vishny (1986), and Agrawal and Mandelker (1990) argue that owners of large blocks of shares have greater incentives to monitor managers. Jarrell et al (1985) and Bushee (1998) find a positive correlation between R&D expenditures and institutional ownership and, therefore, support the monitoring role. Nesbitt (1994) shows that companies targeted by large pension funds increase significantly their performance. Smith (1996) finds that pension funds are actively involved in the monitoring role, and their involvement is largely successful in changing governance structure and increasing shareholder wealth. Carleton et al (1998) report that pension fund is generally able to reach agreements with the firms it contacts, and most of that firms have generally followed up on the agreements by enacting changes requested by pension fund. They argue that pension fund has been very successful in inducing firms to adopt the changes it requests. Rajgopal et al (1998, 1999) find evidence that is consistent with institutional investors providing a monitoring function. Del Guercio and Hawkins (1999) find that shareholder (e.g., pension fund) proposals are followed by significant additional corporate governance activities and broad corporate change, such as asset sales and restructurings. More recently, Gompers and Metrick (2001) find that share returns are higher in companies with greater institutional ownership, and argue that greater institutional ownership implies more effective monitoring. Wahal and McConnell (2000) reports that expenditures for PP&E and R&D are higher in firms with a larger fraction of shares held by institutional investors, and these institutional investors play a significant monitoring role by allowing firms to invest more in projects with long-term returns.

6.1.2. Passive Voting Hypothesis and the Evidence

However, on the other hand, it is well argued that institutional funds are incapable to monitor corporations due to their passivity, myopic goals, legal constraints and conflict of interests.

Some argue that institutional funds are passive investors who are more likely to sell their holdings in poorly performing firms than to expand their resources in monitoring and improving their performance. It is further argued that institutional funds are short-termists, because fund managers are under considerable pressures from their clients to perform. For instance, nearly all of the pension schemes set target for their fund managers, it is commonly to beat one specific benchmark by one or two percent. A recent study conducted by the department of applied economics of Cambridge University shows that 21 out of 39 defined benefit pension schemes they investigated have changed fund managers within the past five years. The reason for many of these changes is dissatisfaction with the performance of existing fund managers. Accompanying with the replacement of fund managers, their assets under management have shrunk as well. For instance, Britain's 20 biggest fund management firms have lost 14% of institutional assets under management in the past year (Pensions Week 2001). In such circumstances, fund managers have to take a myopic view of their investments, guided solely by the short-term goal of outperforming some benchmark in the current quarter. According to this, they will frequently "churn" their portfolios for short-term financial gains. Consequently, they create managerial incentives to cut R&D spending to avoid reporting a decline in earnings. In addition, given their tax-exempt status, UK

pension funds are criticized for making companies pay high cash dividends that could be used to finance growth opportunities.

Moreover, many funds are also concerned that they might incur some legal liability if they take on active roles. There is also free-rider problem associated with institutional funds activism or monitoring. This problem arises because small and passive shareholders realize the benefits of monitoring done by large institutions but they incur none of the costs. Thus monitoring will be possible only when the monitoring is sufficient to cover all the associated monitoring costs. In addition to that, institutional funds themselves may be subject to agency problems, because the vast majority of funds are externally managed by fund managers (in 2000, self-managed pension funds accounted for around only 2% of total identified UK funds under management, IFSL 2001), there are possible conflicts of interests between the private and institutional clients and the fund managers. Thus they either always vote with management or sell their shares to avoid voting. This is referred to as the "*passive voting hypothesis*".

Bergin (1988) shows that institutional investors were generally passive and routinely voted their proxies with management. Murphy and Van Nuys (1994) maintain that public pension funds are run by individual fund managers who do not have the proper incentives to maximize fund value. Romano (1994) and Admati et al (1994) argue that pension funds are not effective monitors because of the agency problem within the funds themselves. Wahal (1996) finds no evidence of significant long-term improvement in either stock price or accounting measures of corporate performance in the post-targeting period by pension funds, and casts doubt on the efficiency of pension

fund activism in improving firm performance. Karpoff et al (1996) obtain little evidence that firm values and operating performance of companies that are the targets of pension funds proposals improves. Duggal and Millar (1999) find no evidence that institutional investors as a group enhance efficiency in the market for corporate control, and question the monitoring abilities of institutional investors. More recently, Gillan and Starks (2000) find that shareholder proposals sponsored by public pension funds receive significantly more votes but appear to have small negative impact on stock prices. Faccio and Lasfer (2000) report that pension funds do not add value to the companies in which they hold large stakes and cast doubt on the monitoring role of pension funds.

In sum, previous studies have provided us contradictory evidence on the monitoring issue. These mixed results make us difficult to judge the monitoring role of institutional funds. If we can find a new approach to examine these hypotheses, it will create and add fresh evidence on the existing findings. Thus, we believe that the testing of these hypotheses under a different framework is called for. In our study, we test the *active monitoring* and *passive voting* hypotheses through the corporate takeover markets by examining the bidding firms' (largely held or not held by institutional funds, say ≥3%) long-run stock returns[7]. It is long argued that institutional funds are finance professionals with expertise in the area of investment management, if they are indeed monitoring corporations, then takeovers undertaken by bidding firms with high level of institutional funds ownership may be expected to be more wealth enhancing (higher stock returns) than those with low or without institutional funds ownership.

---

[7] The Companies Act (1985) (sections 198 and 199) requires that if a holding reaches or exceed 3% of the company's capital it must be declared. We posit that the holding of 3% or above is significant to warrant monitoring and to allow us to test directly the monitoring role.

6.1.3. Summary

In summary, our study differs from previous studies in five important ways. First, we investigate the monitoring role of institutional funds through a brand new framework – by examining and comparing the takeover bidding firms long-run stock returns. Second, we apply the most up-to-date and reliable method (the control firms approach) into the investigation of long-run post acquisition stock returns; it minimizes the chances that our results are mis-specified. Third, to remove the possible bias caused by the cross-sectional dependence in sample observations, we examine all our samples by using not only the whole sample but also a corresponding sub-sample that removes all the overlapping bidding firms. Finally, we are among the first to use both the CAR and the BHAR to examine the long-run pre- and post-acquisition stock returns, and apply the nonparametric test to double check our inferences.

6.2. Methodology

In *Chapter 4*, we have tested the validity of the control firms approach under various accounting year endings through UK corporate takeovers. We find that there is no statistically significant difference of the long-run abnormal stock returns calculated under the Barber and Lyon (1997) approach and the approaches according to firms' accounting year endings, and we suggest that following the December-June model of Barber and Lyon (1997) may lead to a better result. Based on these findings, we will apply the same control firms approach applied by Barber and Lyon (1997).

In addition to the control firms approach, we also use the three-factor model developed by Fama and French (1993) as an alternative method, and compare the results obtained by these two approaches.

For the methods of calculating the long-run abnormal stock returns (both CAR and BHAR) and their test statistics, please refer to *Chapter 3* for details.

6.3. Data and Sample Construction

In our empirical test, we will examine the bidding firms three-year pre- and post-acquisition stock returns. To investigate the monitoring role of institutional funds, we have to collect the shareholding details of all the bidding firms. Fortunately, this shareholding details can be acquired from *Hemscott,* we are able to see all the shareholders and their holdings details for each bidding firms from this data source. However, the shareholding details from *Hemscott* only start from year 1994, there is no holding information pre-1994. And the database only contain the shareholding details of firms alive, there is no holding information for the dead firms. Thus, we are not able to examine the dead bidding firms and have to start our sample period from year 1994.

Our mission is to investigate the monitoring role of institutional funds through the framework of corporate takeovers by comparing the long-run stock returns of bidding firms that are largely and consistently held by institutional funds and bidding firms that are not largely or/and consistently held by institutional funds. To say largely, we mean that bidding firms are held by at least one institutional fund for equal to or bigger than 3%; to say consistently, we mean that bidding firms are held at least by one institutional fund in each year from the takeover completion year to three years prior to it (for the investigation of three-year pre-acquisition stock returns) or to three years after it (for the investigation of three-year post-acquisition stock returns). Thus, by saying largely and consistently, we mean that bidding firms are held 3% or more by at least one institutional fund for every year of the whole four-year period under investigation.

Because we need to know the shareholding details for four years (the acquisition completion year and three years before or after it), and we only have shareholding details from 1994, thus we only can start our sample period from year 1997 for the investigation of bidding firms three-year pre-acquisition stock returns, and from year 1994 for the investigation of bidding firms three-year post-acquisition stock returns. Thus we choose 1997-2001 as our sample period for examining three-year pre-acquisition stock returns, and 1994-1998 as the sample period for the investigation of post-acquisition stock returns. We collect all the successful UK public bidding firms for the above periods from various issues of *Extel Financial* and *Acquisition Monthly.*

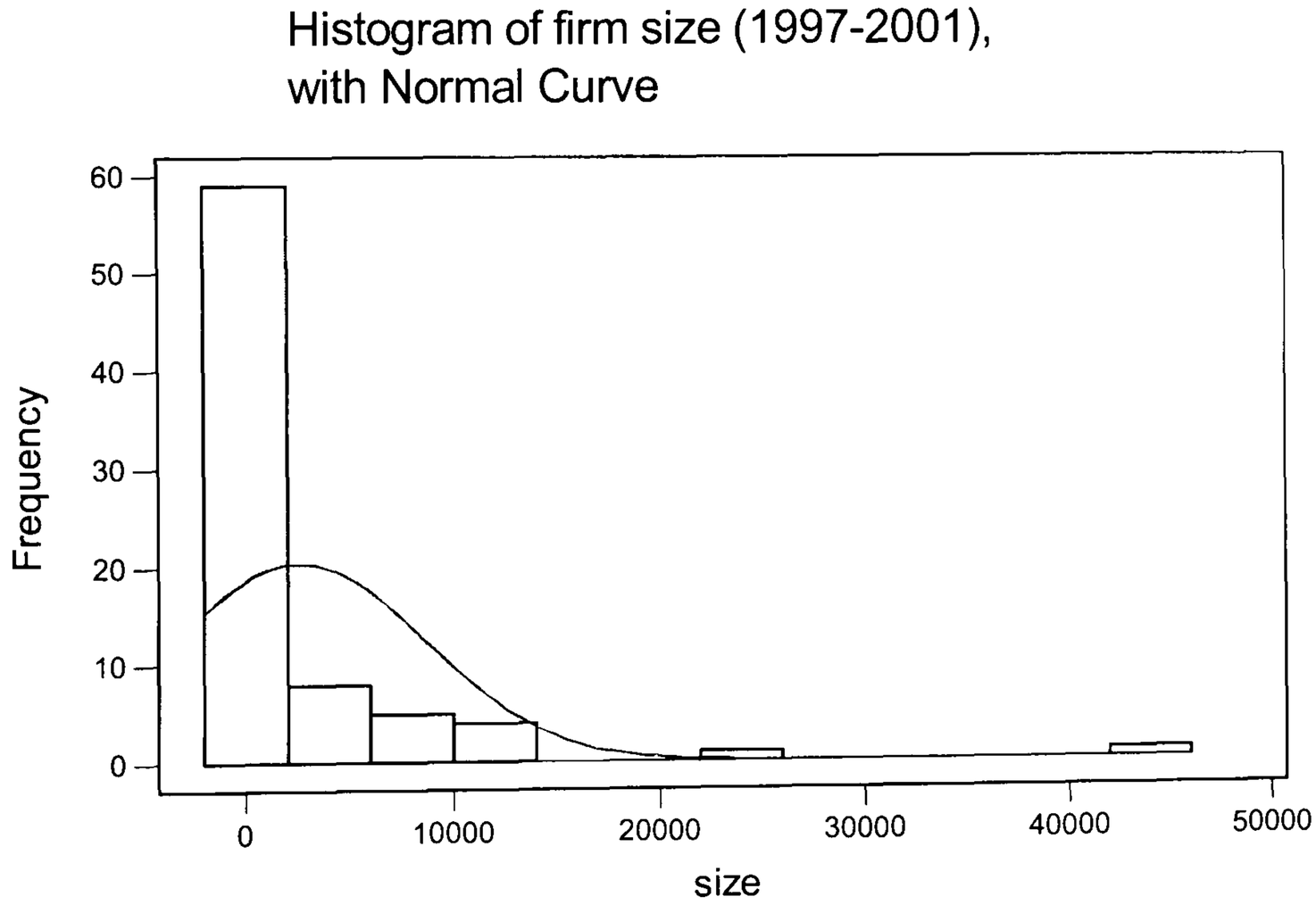
Because the shareholding details are not available for dead companies at the time of the investigation, we have to omit the dead bidding firms. We apply the similar sample selection criteria as used in both chapter 4 and 5. Finally, 78 bidding firms are qualified for the investigation of 1997-2001 sample period, and 99 bidding firms are qualified for the investigation of 1994-1998 sample period.

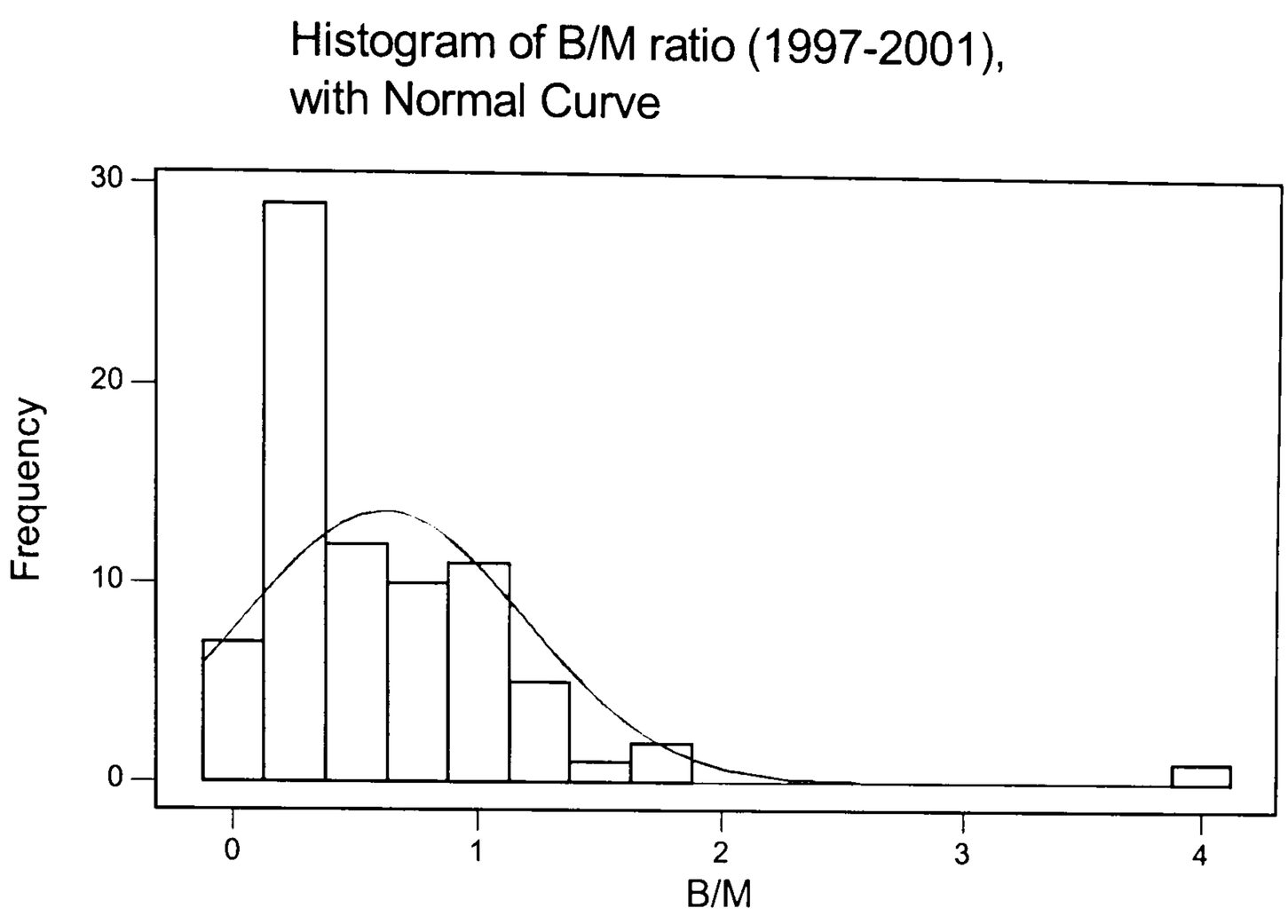
The descriptive statistics for the sample size and B/M ratio for both sample periods are presented in the following tables and histograms. We can tell from the tables and histograms of both pre- and post-acquisition sample periods, the distributions of size and B/M ratio are positively skewed (with the size far right skewed for both sample periods). This is quite similar to the descriptive statistics reported in Chapter 5. Thus, most of the sample firms are smaller than their mean size, and most of them have a smaller book value to market value. For this unevenly distributed sample, equal-weighted return is more appropriate to be applied in the empirical study. Because by

using equal-weighted return, the general results will not be significantly affected by the small proportion of very large size and B/M sample firms.

Descriptive statistics of sample size and B/M ratio

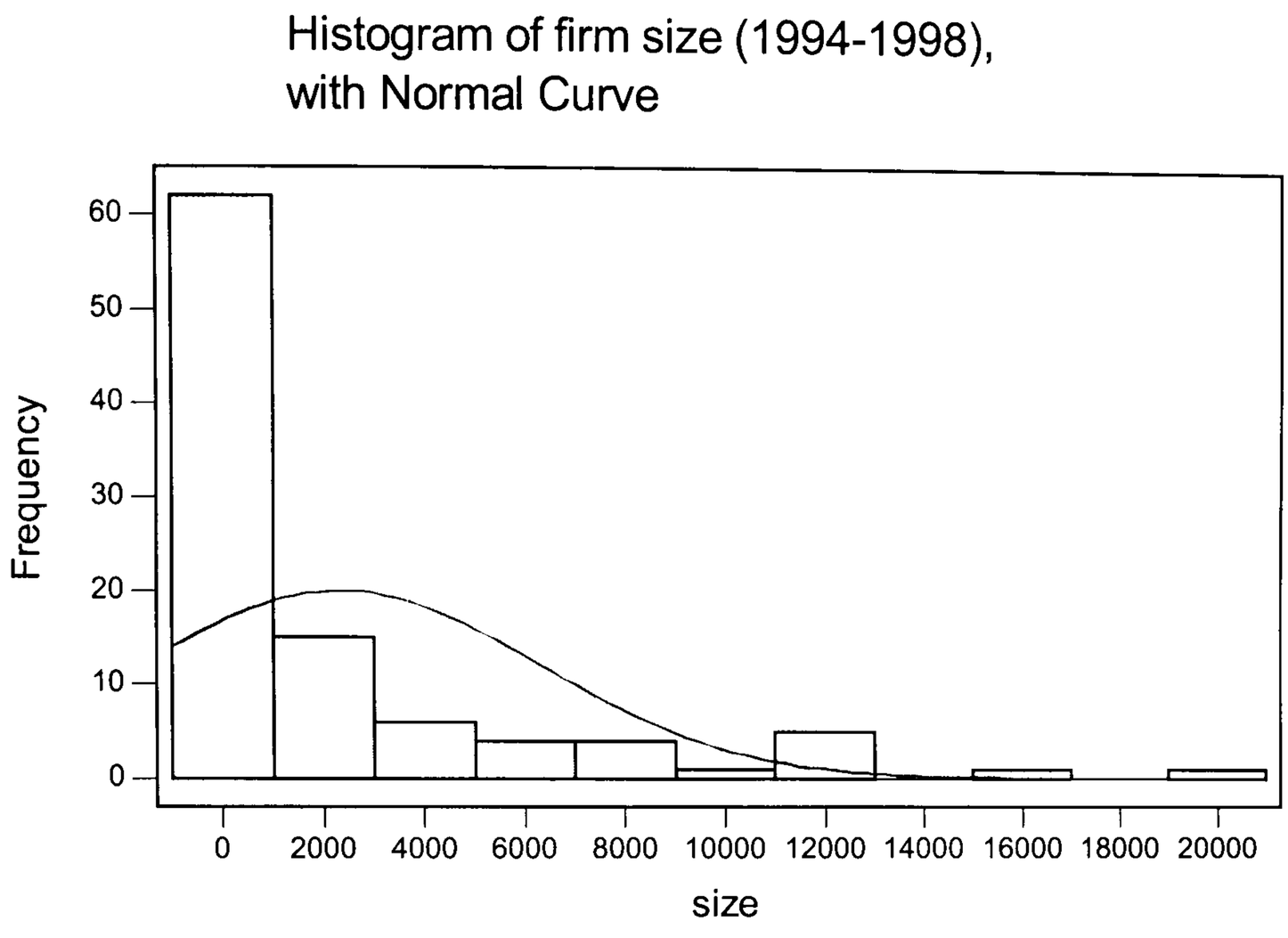
Size (1997-2001) £million		**B/M Ratio (1997-2001)**	
Mean	2604.40	Mean	0.61
Standard Deviation	6119.57	Standard Deviation	0.57
Minimum	6.1	Minimum	0.04
1st Quartile	113.6	1st Quartile	0.25
Median	435.6	Median	0.46
3rd Quartile	1903.4	3rd Quartile	0.89
Maximum	43169.3	Maximum	4.03
Count	78	Count	78





Descriptive statistics of sample size and B/M ratio

Size (1994-1998) £million		**B/M Ratio (1994-1998)**	
Mean	2343.42	Mean	0.52
Standard Deviation	3953.07	Standard Deviation	0.33
Minimum	9.4	Minimum	0.07
1st Quartile	140.3	1st Quartile	0.25
Median	450.0	Median	0.43
3rd Quartile	2643.8	3rd Quartile	0.80
Maximum	20824.3	Maximum	1.62
Count	99	Count	99


Histogram of firm size (1994-1998),
with Normal Curve
Frequency
60
50
40
30
20
10
0
0
2000
4000
6000
8000
10000
12000
14000
16000
18000
20000
size

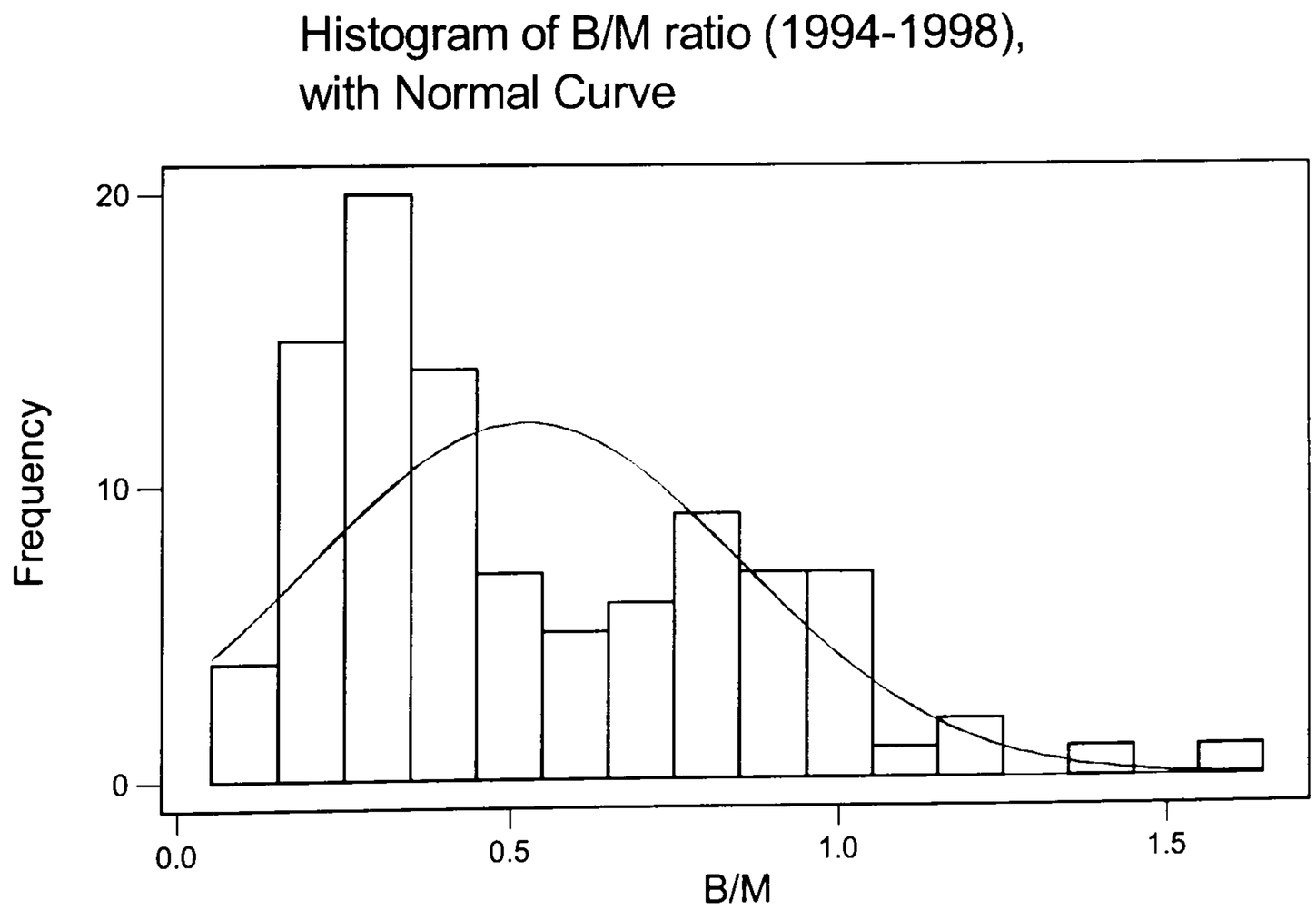

Histogram of B/M ratio (1994-1998),
with Normal Curve
Frequency
20
10
0
0.0
0.5
1.0
1.5
B/M

Table 6.1. Matching firms in 1994-2001

Matching firms are all the LSE listed firms with both sizes and book-to-market ratios (firms with negative book value and zero size are excluded).

Year	1994	1995	1996	1997	1998	1999	2000	2001
Matching Firms	1340	1427	1491	1612	1740	1702	1593	1415

Table 6.1 shows the matching firms in 1994-2001 period, thus we have so far selected the whole samples of bidding firms and constructed the matching samples of each year for the two sample periods of 1997-2001 and 1994-1998. The next step is to construct the sub-samples based on the shareholding details.

To identify which shareholders are the institutional funds for each bidding firm, we use a name list of institutional funds provided by *UK Fund Managers Association* to define the holdings of institutional funds.

For investigating the monitoring role of institutional funds in 1997-2001 sample period (i.e., pre-acquisition investigation), we identify two sub-samples. One sub-sample contains 36 bidding firms that are largely and consistently held by institutional funds. The other sub-sample contains 42 bidding firms that are not largely or/and consistently held by institutional funds.

For examining the monitoring role of institutional funds in 1994-1998 sample period (i.e., post-acquisition investigation), we also identify two sub-samples. One sub-sample contains 43 bidding firms that are largely and consistently held by institutional funds.

The other sub-sample contains 56 bidding firms that are not largely or/and consistently held by institutional funds.

6.4. Empirical Results

To investigate the monitoring role of institutional funds, we firstly examine bidding firms long-run stock returns in the pre-acquisition period. The findings will tell us whether institutional funds are actively involved in the corporate governance in the pre-acquisition stage. We then turn to examine bidding firms long-run stock returns in the post-acquisition period. The results will not only tell us whether the institutional funds are actively monitoring the firms in the post-acquisition period, but also tell us whether they are playing a consistent role in both pre- and post-acquisition period.

6.4.1. Do Institutional Funds Monitor Firms in the Pre-Acquisition Period?

6.4.1.1. Bidding Firms' Long-Run Pre-Acquisition Stock Returns

We hereby examine the three-year pre-acquisition stock returns of UK bidding firms that are either consistently held 3% or above by at least one institutional fund or held less than 3% by any institutional funds in the investigation period. Before we move to examine these two sub-samples, we firstly examine the bidding firms three-year pre-acquisition stock returns for the whole sample from 1997 to 2001, it will provide us a general story of the UK bidding firms pre-takeover stock returns, and help us to explain the results acquired from the two sub-samples subsequently.

To take into account the overlapping returns problem argued in *Chapter 5*, we not only examine the three-year pre-acquisition stock returns of the whole sample, but a non-

overlapping sample and an overlapping sample. Because this investigation provides an overall view of returns and useful background material and does not test the monitoring role of institutional funds, we put the detailed results and discussions into *Appendix 2*, and only conclude the findings here.

We find that there are no statistically significant three-year pre-takeover abnormal stock returns, and this finding is in contrast to the majority of previous studies[8] on bidding firms' long-run pre-acquisition stock returns. Previous studies have reported that bidding firms shareholders earn a small but significant positive abnormal returns from five to two years prior to the takeover announcement. We argue that previously reported significant long-run pre-acquisition positive abnormal returns might suffer the problems of misspecification of test statistics. We also find that after controlling the new listing, the rebalance, and the skewness biases overlapping returns deflate the average CARs of the whole sample, and that may cause the under rejection of the null hypothesis (empirical rejection rate less than the theoretical rejection rate), and hence leads to a biased test statistics.

To serve our purpose of examining the monitoring role of institutional funds, we now have a general understanding of the bidding firms (1997-2001) three years pre-acquisition stock returns. Thus, it is the time to move onto our primary investigation.

---

[8] See, for example, Ellert (1976), Dodd & Ruback (1977), Asquith (1983), Schipper and Thompson (1983), etc.,

6.4.1.2. Long-Run Pre-Acquisition Stock Returns of Bidding Firms with Large Level of Institutional Ownership vs. Bidding Firms with Low or without Institutional Ownership

We are going to examine two groups of UK bidding firms, one group is largely (>=3%) and consistently (four years) held by institutional funds, the other group is not largely or/and consistently held by institutional funds. We want to explore the difference of the stock returns between these two groups, and test the monitoring role of institutional funds by comparing the performance of these two groups.

We firstly examine the three years pre-acquisition stock returns of UK bidding firms that are largely and consistently held by the institutional funds. Table 6.2 shows the three years average ARs and CARs of these bidding firms. There are two ARs significant at 5% two-sided t-test, and none of the CARs are statistically significant different from zero.

Table 6.2. Bidding firms (1997-2001, held>=3% by institutional funds) three years pre-acquisition average ARs and CARs

There are 36 UK bidding firms that are largely and consistently held by institutional funds involved in the acquisition during 1997-2001 periods. AR is the monthly average abnormal return of all the bidding firms. CAR is the cumulative average abnormal return of all the bidding firms. T-statistics of the monthly ARs and CARs are also given in the table.

EM	AR	T-Stat	CAR	T-Stat
Month -36	-0.0026	-0.127	-0.0026	-0.127
Month -35	0.0092	0.606	0.0066	0.278
Month -34	-0.0255	-1.075	-0.0189	-0.542
Month -33	0.0250	1.451	0.0061	0.139
Month -32	-0.0289	-1.770	-0.0228	-0.439
Month -31	0.0002	0.011	-0.0226	-0.376
Month -30	-0.0322	-1.476	-0.0548	-0.844
Month -29	-0.0236	-1.385	-0.0783	-1.109
Month -28	-0.0177	-0.928	-0.0960	-1.183
Month -27	-0.0061	-0.224	-0.1021	-1.120
Month -26	**-0.0426***	-2.174	-0.1447	-1.425

Month -25	-0.0156	-0.583	-0.1603	-1.619
Month -24	-0.0001	-0.006	-0.1604	-1.677
Month -23	0.0344	1.047	-0.1260	-1.433
Month -22	-0.0148	-0.864	-0.1409	-1.498
Month -21	-0.0054	-0.262	-0.1463	-1.535
Month -20	0.0378	1.679	-0.1085	-1.113
Month -19	-0.0246	-0.997	-0.1330	-1.418
Month -18	0.0175	0.700	-0.1156	-1.169
Month -17	-0.0049	-0.200	-0.1205	-1.198
Month -16	0.0294	1.326	-0.0911	-0.905
Month -15	-0.0104	-0.341	-0.1015	-0.910
Month -14	0.0138	0.662	-0.0877	-0.773
Month -13	**0.0567***	2.410	-0.0311	-0.255
Month -12	0.0438	1.661	0.0127	0.096
Month -11	0.0071	0.200	0.0198	0.140
Month -10	-0.0016	-0.053	0.0182	0.133
Month -9	0.0332	1.341	0.0515	0.369
Month -8	-0.0271	-1.070	0.0244	0.169
Month -7	-0.0156	-0.727	0.0088	0.060
Month -6	0.0041	0.250	0.0129	0.091
Month -5	-0.0005	-0.025	0.0124	0.083
Month -4	0.0105	0.417	0.0229	0.144
Month -3	-0.0050	-0.230	0.0180	0.110
Month -2	0.0303	1.179	0.0483	0.287
Month -1	-0.0175	-0.613	0.0308	0.178

* Indicate significant at 5%, two-sided t-test.

Figure 6.1 shows that CARs fall consistently in the third year before the takeover announcement, and then rise consistently two years before the announcement. However, none of these monthly CARs are statistically significant different from zero at 5% significance level.

Figure 6.1. Bidding firms (97-01, held >=3% by institutional funds) three-year pre-acquisition averge CARs

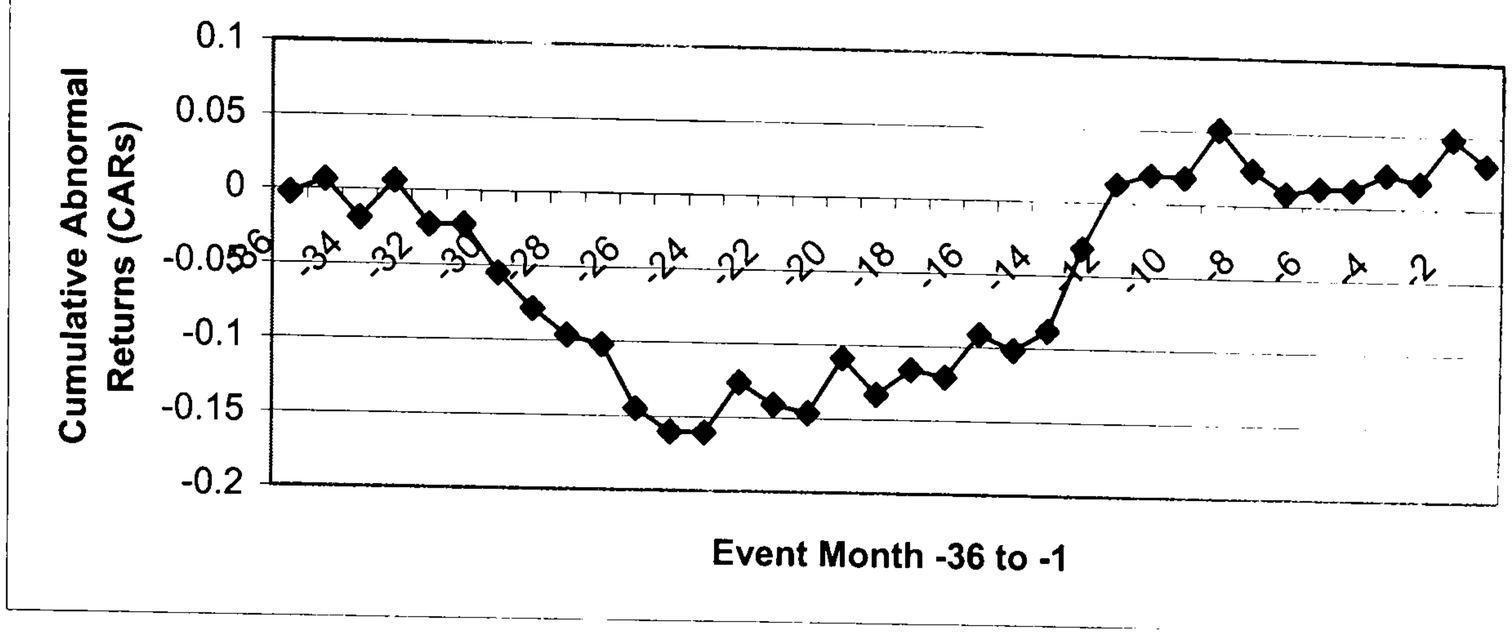


Table 6.3.1 and Table 6.3.2 reports the one-, two- and three-year pre-acquisition CARs and BHARs of institutional holding bidding firms. Neither the CARs nor the BHARs are statistically significant at 5% significant level in two-sided t-test. All the parametric t-statistics are consistent with the non-parametric P-values. According to this, there are no long-run significant abnormal returns for the UK bidding firms that are largely and consistently held by institutional funds.

Table 6.3. Bidding firms (1997-2001, held>=3% by institutional funds) three years pre-acquisition average CARs and BHARs

There are 36 UK bidding firms that are largely and consistently held by institutional funds involved in the acquisition during 1997-2001 periods. Table 6.3.1 reports the result calculated by using the control firms approach. Table 6.3.2 presents the result calculated by using the Fama-French three-factor model. CAR is the average cumulative abnormal return of all the bidding firms. BHAR is the average buy-and-hold abnormal return of all the bidding firms. α is the mean intercept term of Fama-French three-factor model. Implied CAR is the mean α multiplying by 12, 24, and 36. T-statistics of the CARs and the BHARs as well as the corresponding P-values calculated by using the non-parametric Wilcoxon Signed-Rank test are given in the table.

Table 6.3.1

EM	CAR	T-Stat	P-Value
-12 to -1	0.0618	0.613	0.519
-24 to -1	0.1911	1.188	0.059
-36 to -1	0.0308	0.178	0.540

EM	BHAR	T-Stat	P-Value
-12 to -1	0.1089	0.850	0.480

-24 to -1	0.0134	0.027	0.099
-36 to -1	-0.2388	-0.409	0.489

Table 6.3.2

EM	α	T-Stat	P-Value	Implied CAR
-12 to -1	0.0037	0.523	0.919	0.0444
-24 to -1	0.0057	1.258	0.350	0.1368
-36 to -1	-0.0023	-0.750	0.242	-0.0828

We then turn to examine the three years pre-acquisition stock returns of UK bidding firms that are not largely or/and consistently held by institutional funds. Table 6.4 shows the three years pre-acquisition average ARs and CARs, and FDCARs of UK bidding firms that are not largely or/and consistently held by institutional funds. Consistent with Table 6.2, there only three average ARs are significant at 5% significance level, and no monthly CARs are statistically significant, all the FDCARs are statistically insignificant different from zero. However, in contrast with Table 6.2, most of the CARs in Table 6.4 are positive.

Table 6.4. Bidding firms (1997-2001, held<3% by institutional funds) three years pre-acquisition average ARs and CARs

There are 42 UK bidding firms that are not largely or/and consistently held by institutional funds involved in the acquisition during 1997-2001 periods. AR is the monthly average abnormal return of all the bidding firms. CAR is the cumulative average abnormal return of all the bidding firms. FDCAR is the first difference of CARs between non-institutional holding bidding firms and institutional holding bidding firms. T-statistics of the monthly ARs, CARs, and FDCARs are also given in the table.

EM	AR	T-Stat	CAR	T-Stat	FDCAR	T-Stat
Month -36	0.0091	0.963	0.0091	0.963	0.0117	0.52
Month -35	0.0035	0.297	0.0127	0.760	0.0061	0.21
Month -34	-0.0072	-0.633	0.0054	0.320	0.0243	0.63
Month -33	0.0099	0.653	0.0153	0.614	0.0092	0.18
Month -32	0.0083	0.660	0.0236	0.828	0.0464	0.78
Month -31	-0.0186	-1.466	0.0050	0.156	0.0276	0.41
Month -30	-0.0090	-0.617	-0.0040	-0.111	0.0508	0.68
Month -29	0.0055	0.358	0.0015	0.043	0.0798	1.02
Month -28	0.0050	0.333	0.0065	0.169	0.1025	1.14
Month -27	0.0022	0.170	0.0087	0.204	0.1108	1.10
Month -26	-0.0030	-0.187	0.0057	0.134	0.1504	1.37
Month -25	**-0.0339***	-2.206	-0.0283	-0.622	0.1320	1.21

Month -24	0.0189	1.433	-0.0094	-0.209	0.1510	1.43
Month -23	0.0239	1.797	0.0145	0.295	0.1405	1.39
Month -22	-0.0016	-0.090	0.0129	0.238	0.1538	1.42
Month -21	0.0158	0.992	0.0288	0.531	0.1751	1.60
Month -20	-0.0037	-0.189	0.0251	0.424	0.1336	1.17
Month -19	-0.0008	-0.056	0.0242	0.399	0.1572	1.41
Month -18	0.0188	1.520	0.0431	0.720	0.1587	1.37
Month -17	0.0213	1.249	0.0644	1.015	0.1849	1.55
Month -16	-0.0042	-0.246	0.0601	0.921	0.1512	1.26
Month -15	-0.0110	-0.609	0.0491	0.709	0.1506	1.15
Month -14	-0.0022	-0.123	0.0469	0.616	0.1346	0.99
Month -13	-0.0283	-1.499	0.0186	0.235	0.0497	0.34
Month -12	-0.0015	-0.105	0.0171	0.215	0.0044	0.03
Month -11	0.0204	0.890	0.0375	0.479	0.0177	0.11
Month -10	-0.0076	-0.462	0.0299	0.365	0.0117	0.07
Month -9	-0.0014	-0.075	0.0285	0.322	-0.0230	-0.14
Month -8	**-0.0379***	-2.156	-0.0095	-0.106	-0.0339	-0.20
Month -7	0.0030	0.214	-0.0064	-0.069	-0.0152	-0.09
Month -6	0.0194	1.323	0.0129	0.138	0.0000	0.00
Month -5	0.0260	1.512	0.0389	0.412	0.0265	0.15
Month -4	0.0151	0.670	0.0541	0.603	0.0312	0.17
Month -3	-0.0394	-1.925	0.0147	0.154	-0.0033	-0.02
Month -2	**0.0563***	2.037	0.0710	0.773	0.0227	0.12
Month -1	0.0566	1.338	0.1276	1.297	0.0968	0.49

* Indicate significant at 5%, two-sided t-test.

Figure 6.2 shows the 36 monthly CARs of UK bidding firms that are not largely or/and consistently held by institutional funds. The return pattern is somewhat different with previous figure. 31 out of 36 monthly CARs are positive. There is no obvious loss in the third year prior to the takeover announcement, and the CARs experience both rise and drop in two years before the announcement. However, none of them are statistically significant at 5% significant level of two-sided t-test.

Figure 6.2. Bidding firms (97-01, held <3% by institutional funds) three-year pre-acquisition average CARs

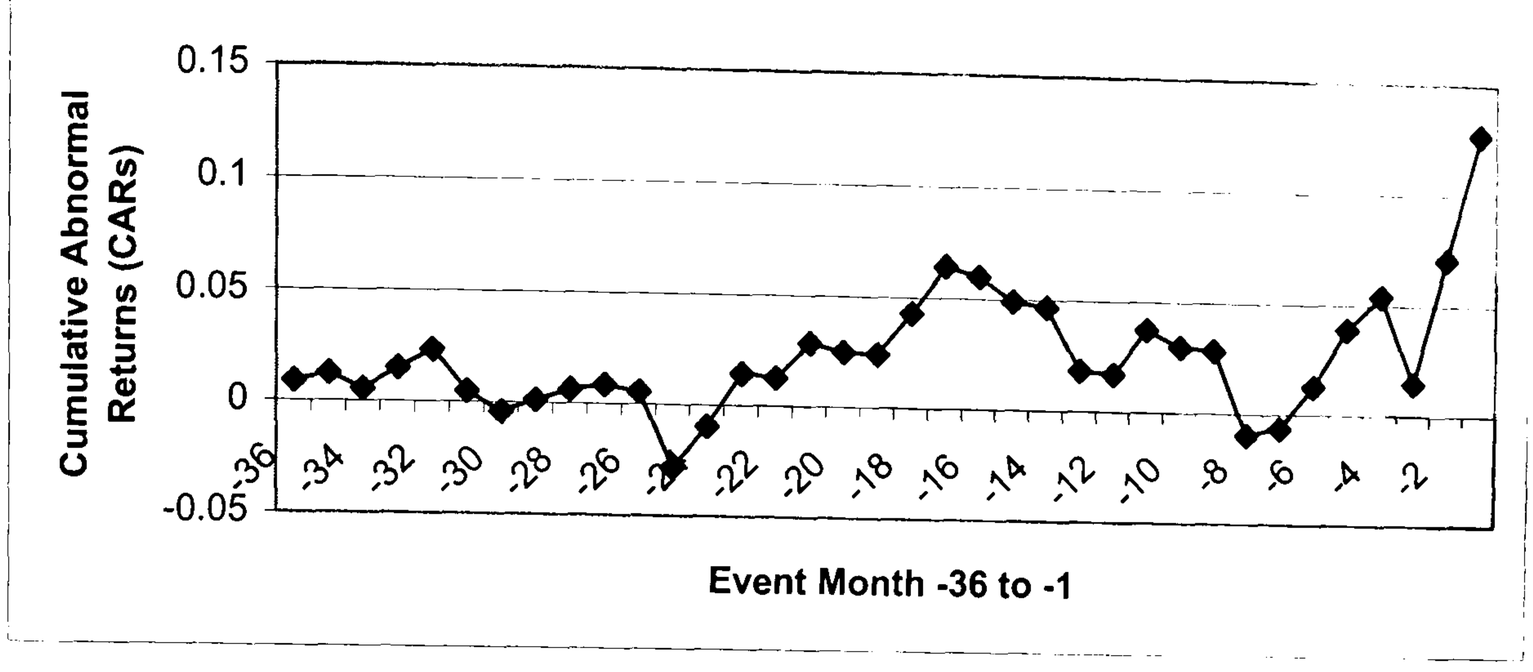


Table 6.5.1 and Table 6.5.2 reports the one-, two- and three-year pre-acquisition CARs and BHARs of UK bidding firms that are not largely or/and consistently held by institutional funds. All the CARs and BHARs are positive, but none of them are statistically significant at 5% significance level, this is consistent with the results reported in Table 6.3.

Table 6.5. Bidding firms (1997-2001, held<3% by institutional funds) three years pre-acquisition average CARs and BHARs

There are 42 UK bidding firms that are not largely or/and consistently held by institutional funds involved in the acquisition during 1997-2001 periods. Table 6.5.1 reports the result calculated by using the control firms approach. Table 6.5.2 presents the result calculated by using the Fama-French three-factor model. CAR is the average cumulative abnormal return of all the bidding firms. BHAR is the average buy-and-hold abnormal return of all the bidding firms. α is the mean intercept term of Fama-French three-factor model. Implied CAR is the mean α multiplying by 12, 24, and 36. T-statistics of the CARs and the BHARs as well as the corresponding P-values calculated by using the non-parametric Wilcoxon Signed-Rank test are given in the table.

Table 6.5.1

EM	CAR	T-Stat	P-Value
-12 to -1	0.1090	1.393	0.358
-24 to -1	0.1558	1.733	0.263
-36 to -1	0.1276	1.297	0.712

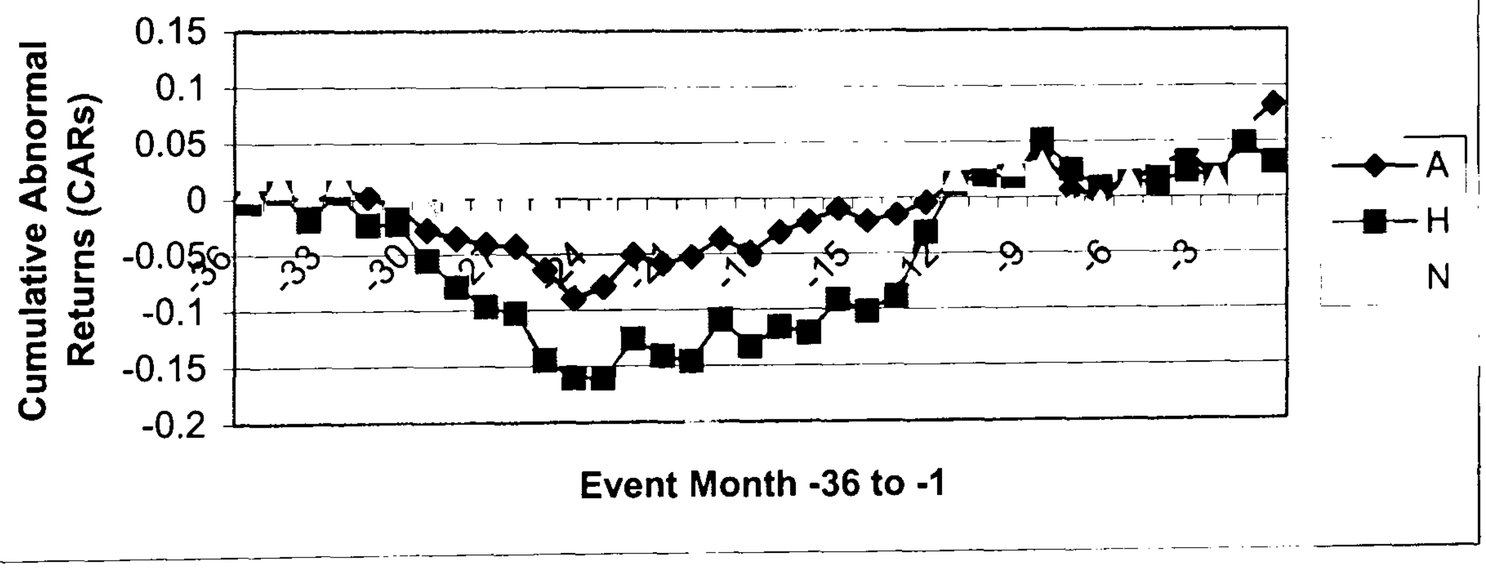
EM	BHAR	T-Stat	P-Value
-12 to -1	0.2074	1.629	0.204
-24 to -1	0.1908	1.894	0.108
-36 to -1	0.1523	1.256	0.553

Table 6.5.2

EM	α	T-Stat	P-Value	Implied CAR
-12 to -1	0.0104	1.701	0.299	0.1248
-24 to -1	0.0018	0.669	0.764	0.0432
-36 to -1	0.0000	0.019	0.812	0.0014

Figure 6.3 shows that non-institutional holding firms outperform the institutional holding firms in most of the months during three years prior to the takeover announcement. However, all the CARs shown in Figure 6.3 are statistically insignificant different from zero. Thus, we do not find any evidence so far that institutional funds monitor the firms that they hold large stakes and this monitoring leads to a better performance.

Figure 6.3. Three years pre-acquisition average CARs of all, institutional holding and non-institutional holding bidding firms 1997-2001



A: All the bidding firms.
H: Bidding firms largely and consistently held by institutional funds.
N: Bidding firms not largely or/and consistently held by institutional funds.

However, the findings presented above might be affected by the overlapping returns, and the inference might also be misleading with the presence of overlapping firms.

Thus, we re-examine it by removing the overlapping bidding firms from each of the above two samples. Table 6.6 reports the three years pre-acquisition average ARs and CARs of the institutional holding non-overlapping bidding firms. There is only one monthly average ARs significant at 5% significance level, and no CARs are significant different from zero, this is consistent with the results reported in Table 6.2 for the whole institution holding sample. However, in contrast with Table 6.2, most of CARs in Table 6.6 are positive.

Table 6.6. Non-overlapping bidding firms (1997-2001, held>=3% by institutional funds) three years pre-acquisition average ARs and CARs

There are 24 UK non-overlapping bidding firms that are largely and consistently held by institutional funds involved in the acquisition during 1997-2001 periods. AR is the monthly average abnormal return of all the bidding firms. CAR is the cumulative average abnormal return of all the bidding firms. T-statistics of the monthly ARs and CARs are also given in the table.

EM	AR	T-Stat	CAR	T-Stat
Month -36	0.0048	0.170	0.0048	0.170
Month -35	0.0245	1.518	0.0293	1.005
Month -34	-0.0034	-0.106	0.0259	0.578
Month -33	0.0336	1.555	0.0595	1.050
Month -32	**-0.0339***	-2.362	0.0255	0.410
Month -31	-0.0152	-0.570	0.0103	0.136
Month -30	-0.0119	-0.431	-0.0015	-0.019
Month -29	-0.0064	-0.308	-0.008	-0.090
Month -28	-0.0126	-0.506	-0.0206	-0.199
Month -27	0.0270	1.245	0.0064	0.063
Month -26	-0.0266	-1.095	-0.0202	-0.171
Month -25	-0.0014	-0.039	-0.0216	-0.206
Month -24	0.0052	0.244	-0.0164	-0.166
Month -23	0.0435	0.990	0.0271	0.295
Month -22	-0.0251	-1.149	0.0021	0.020
Month -21	-0.0041	-0.151	-0.0021	-0.020
Month -20	0.0436	1.544	0.0416	0.366
Month -19	-0.0415	-1.538	0.0001	0.001
Month -18	0.0444	1.466	0.0445	0.374
Month -17	-0.0244	-0.801	0.0201	0.156
Month -16	0.0052	0.228	0.0252	0.193
Month -15	-0.0341	-0.818	-0.0088	-0.059
Month -14	0.0124	0.424	0.0036	0.023
Month -13	0.0502	1.674	0.0537	0.322
Month -12	0.0435	1.316	0.0972	0.534
Month -11	0.0245	0.475	0.1218	0.622
Month -10	-0.0361	-0.909	0.0857	0.448
Month -9	0.0190	0.555	0.1047	0.543

Month -8	-0.0098	-0.329	0.0950	0.469
Month -7	-0.0207	-0.801	0.0742	0.359
Month -6	0.0047	0.216	0.0789	0.395
Month -5	0.0072	0.326	0.0861	0.418
Month -4	-0.0066	-0.201	0.0794	0.359
Month -3	-0.0162	-0.547	0.0632	0.278
Month -2	0.0363	1.507	0.0995	0.434
Month -1	-0.0267	-0.641	0.0728	0.303

* Indicate significant at 5%, two-sided t-test.

Figure 6.4 shows the institutional holding non-overlapping bidding firms three-year pre-acquisition average CARs. In contrast with Figure 6.1, most of the monthly CARs are positive, and the CARs do not experience consistent rise or fall. All the monthly CARs in Figure 6.4 outperform their corresponding one in Figure 6.1, however, they are statistically insignificant different from zero.

Figure 6.4. Non-overlapping bidding firms (97-01, held >=3% by institutional funds) three-year pre-acquisition average CARs

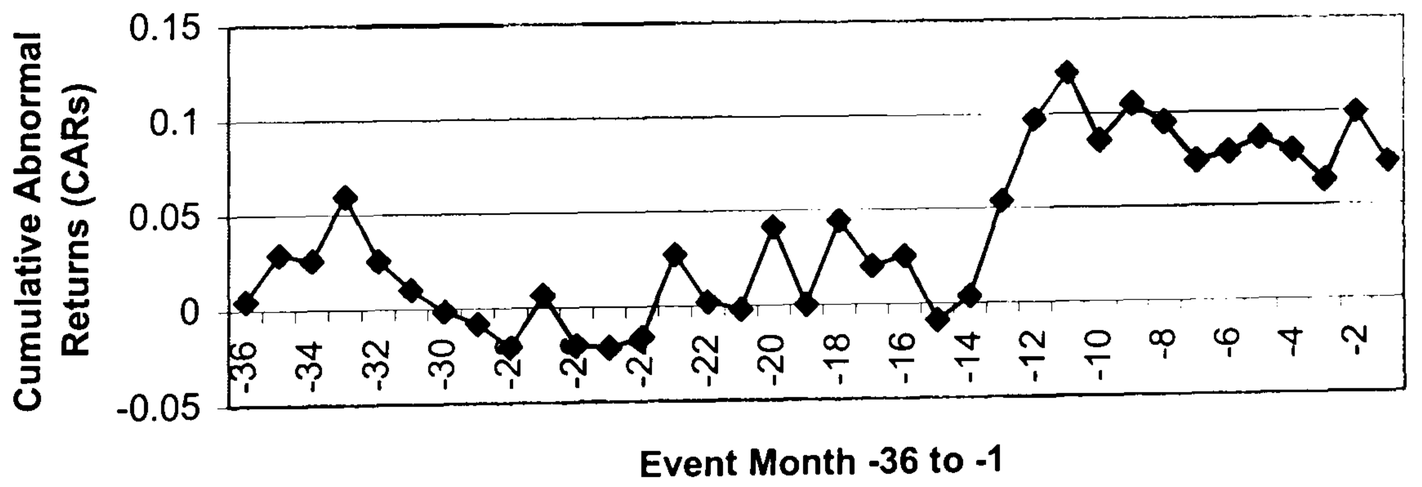


Table 6.7.1 and Table 6.7.2 report that all the CARs and the BHARs either positive or negative are statistically insignificant different from zero. The t-statistics and the non-parametric P-values are consistent with each other.

Table 6.7. Non-overlapping bidding firms (1997-2001, held>=3% by institutional funds) three years pre-acquisition average CARs and BHARs

There are 24 UK non-overlapping bidding firms that are largely and consistently held by institutional funds involved in the acquisition during 1997-2001 periods. Table 6.7.1 reports the result calculated by using the control firms approach. Table 6.7.2 presents the result calculated by using the Fama-French three-factor model. CAR is the average cumulative abnormal return of all the bidding firms. BHAR is the average buy-and-hold abnormal return of all the bidding firms. α is the mean intercept term of Fama-French three-factor model. Implied CAR is the mean α multiplying by 12, 24, and 36. T-statistics of the CARs and the BHARs as well as the corresponding P-values calculated by using the non-parametric Wilcoxon Signed-Rank test are given in the table.

Table 6.7.1

EM	CAR	T-Stat	P-Value
-12 to -1	0.0190	0.147	0.710
-24 to -1	0.0944	0.435	0.209
-36 to -1	0.0728	0.303	0.361

EM	BHAR	T-Stat	P-Value
-12 to -1	0.0634	0.373	0.732
-24 to -1	-0.2372	-0.321	0.376
-36 to -1	-0.3131	-0.361	0.331

Table 6.7.2

EM	α	T-Stat	P-Value	Implied CAR
-12 to -1	0.0037	0.394	0.558	0.0444
-24 to -1	0.0053	0.918	0.637	0.1272
-36 to -1	-0.0003	-0.068	0.597	-0.0108

Consistent with the finding of the whole sample of institutional holding biding firms, we do not find any statistical significant long-run abnormal stock returns for the non-overlapping institutional holding bidding firms. We now turn to examine the non-overlapping bidding firms that are not largely or/and consistently held by institutional funds. Table 6.8 presents the three years average ARs, CARs, and FDCARs of these non-overlapping bidding firms. Consistent with the results reported in Table 6.6, there are only two monthly ARs are statistically significant and none of the CARs are

statistically significant. All the FDCARs are statistically insignificant different from zero.

Table 6.8. Non-overlapping bidding firms (1997-2001, held<3% by institutional funds) three years pre-acquisition average ARs and CARs

There are 32 UK independent bidding firms that are not largely or/and consistently held by institutional funds involved in the acquisition during 1997-2001 periods. AR is the monthly average abnormal return of all the bidding firms. CAR is the cumulative average abnormal return of all the bidding firms. FDCAR is the first difference of CARs between non-institutional holding non-overlapping bidding firms and institutional holding non-overlapping bidding firms. T-statistics of the monthly ARs, CARs, and FDCARs are also given in the table.

EM	AR	T-Stat	CAR	T-Stat	FDCAR	T-Stat
Month -36	0.0086	0.764	0.0086	0.764	0.0038	0.13
Month -35	-0.0012	-0.082	0.0074	0.355	-0.0219	-0.61
Month -34	0.0101	0.887	0.0175	0.861	-0.0084	-0.17
Month -33	0.0090	0.493	0.0266	0.905	-0.0329	-0.52
Month -32	0.0195	1.319	0.0461	1.379	0.0206	0.29
Month -31	**-0.0336***	-2.523	0.0125	0.314	0.0022	0.03
Month -30	-0.0109	-0.626	0.0016	0.036	0.0031	0.03
Month -29	-0.0014	-0.073	0.0002	0.004	0.0082	0.08
Month -28	-0.0001	-0.006	0	0.001	0.0206	0.18
Month -27	0.0026	0.159	0.0027	0.051	-0.0037	-0.03
Month -26	0.0072	0.347	0.0098	0.190	0.0300	0.23
Month -25	-0.0348	-1.808	-0.0250	-0.449	-0.0034	-0.03
Month -24	0.0197	1.210	-0.0053	-0.098	0.0111	0.10
Month -23	0.0216	1.465	0.0163	0.264	-0.0108	-0.10
Month -22	-0.0071	-0.324	0.0092	0.134	0.0071	0.06
Month -21	0.0160	0.800	0.0252	0.372	0.0273	0.22
Month -20	0.0024	0.109	0.0277	0.382	-0.0139	-0.10
Month -19	-0.0015	-0.085	0.0262	0.346	0.0261	0.19
Month -18	0.0075	0.723	0.0337	0.444	-0.0108	-0.08
Month -17	0.0182	0.867	0.0520	0.645	0.0319	0.21
Month -16	-0.0060	-0.387	0.0459	0.576	0.0207	0.14
Month -15	-0.0148	-0.670	0.0312	0.362	0.0400	0.23
Month -14	0.0038	0.185	0.0350	0.375	0.0314	0.17
Month -13	-0.0299	-1.397	0.0050	0.050	-0.0487	-0.25
Month -12	0.0034	0.184	0.0084	0.084	-0.0888	-0.43
Month -11	0.0211	0.750	0.0295	0.299	-0.0923	-0.42
Month -10	-0.0276	-1.455	0.0019	0.018	-0.0838	-0.39
Month -9	0.0068	0.294	0.0086	0.078	-0.0961	-0.43
Month -8	-0.0429	-1.939	-0.0342	-0.306	-0.1292	-0.56
Month -7	-0.0118	-0.763	-0.0461	-0.396	-0.1203	-0.51
Month -6	0.0291	1.609	-0.0170	-0.145	-0.0959	-0.41
Month -5	0.0329	1.524	0.0159	0.134	-0.0702	-0.30
Month -4	0.0317	1.134	0.0476	0.425	-0.0318	-0.13
Month -3	-0.0479	-1.900	-0.0003	-0.002	-0.0635	-0.25
Month -2	**0.0759***	2.189	0.0756	0.665	-0.0239	-0.09
Month -1	0.0754	1.399	0.1510	1.240	0.0782	0.29

* Indicate significant at 5%, two-sided t-test.

Figure 6.5. Non-overlapping bidding firms (97-01, held <3% by institutional funds) three-year pre-acquisition average CARs

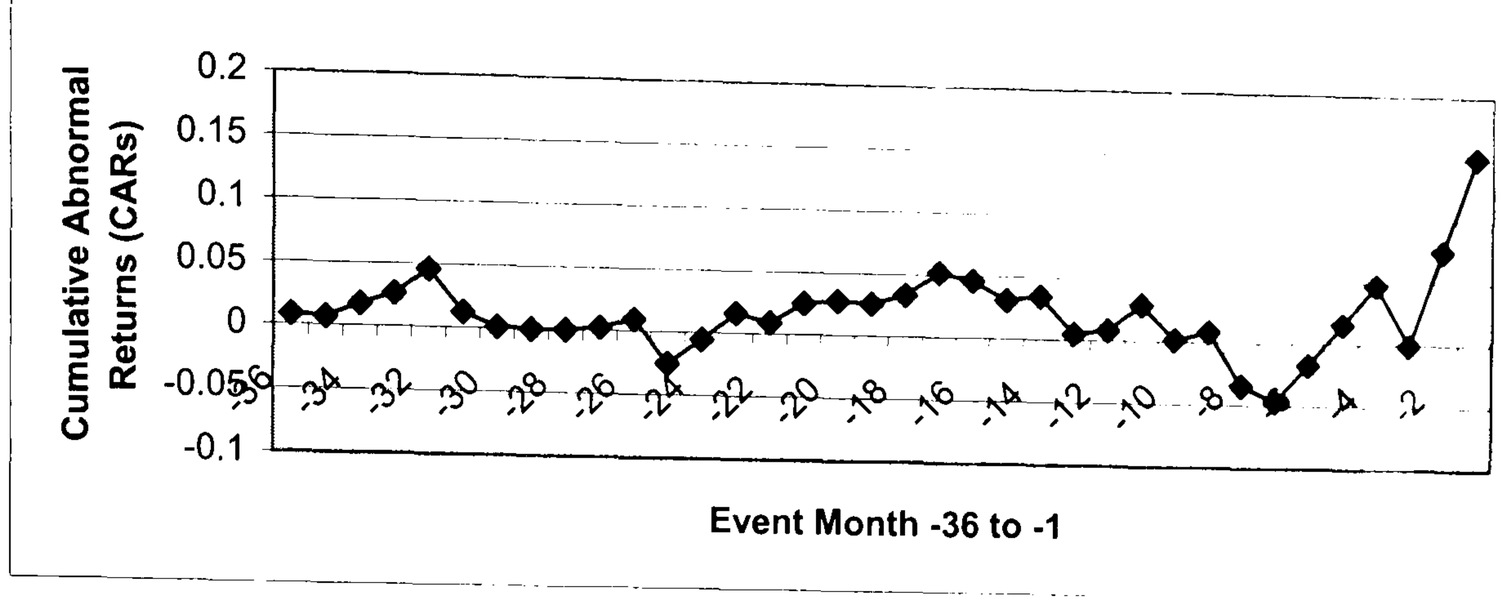


Figure 6.5 shows the three years pre-acquisition monthly CARs of the non-overlapping bidding firms that are not largely or/and consistently held by institutional funds. As the figure shows that these bidding firms experience a long-run small and positive abnormal returns in most months. However, all the CARs are statistically insignificant different from zero.

Table 6.9.1 and Table 6.9.2 show the one-, two- and three-year pre-acquisition CARs and BHARs of non-overlapping bidding firms that are not largely or/and consistently held by institutional funds. Consistent with Table 6.7, all the CARs and BHARs are statistically insignificant different from zero. Thus, we find that there is no statistically significant difference of the stock returns between the two groups of non-overlapping bidding firms. Hence, no monitoring roles have been observed so far.

Table 6.9. Non-overlapping bidding firms (1997-2001, held<3% by institutional funds) three years pre-acquisition average CARs and BHARs

There are 32 UK non-overlapping bidding firms that are not largely or/and consistently held by institutional funds involved in the acquisition during 1997-2001 periods. Table 6.9.1 reports the result calculated by using the control firms approach. Table 6.9.2 presents the result calculated by using the Fama-French three-factor model. CAR is the average cumulative abnormal return of all the bidding firms.

BHAR is the average buy-and-hold abnormal return of all the bidding firms. α is the mean intercept term of Fama-French three-factor model. Implied CAR is the mean α multiplying by 12, 24, and 36. T-statistics of the CARs and the BHARs as well as the corresponding P-values calculated by using the non-parametric Wilcoxon Signed-Rank test are given in the table.

Table 6.9.1

EM	CAR	T-Stat	P-Value
-12 to -1	0.1460	1.502	0.239
-24 to -1	0.1760	1.567	0.331
-36 to -1	0.1510	1.240	0.588

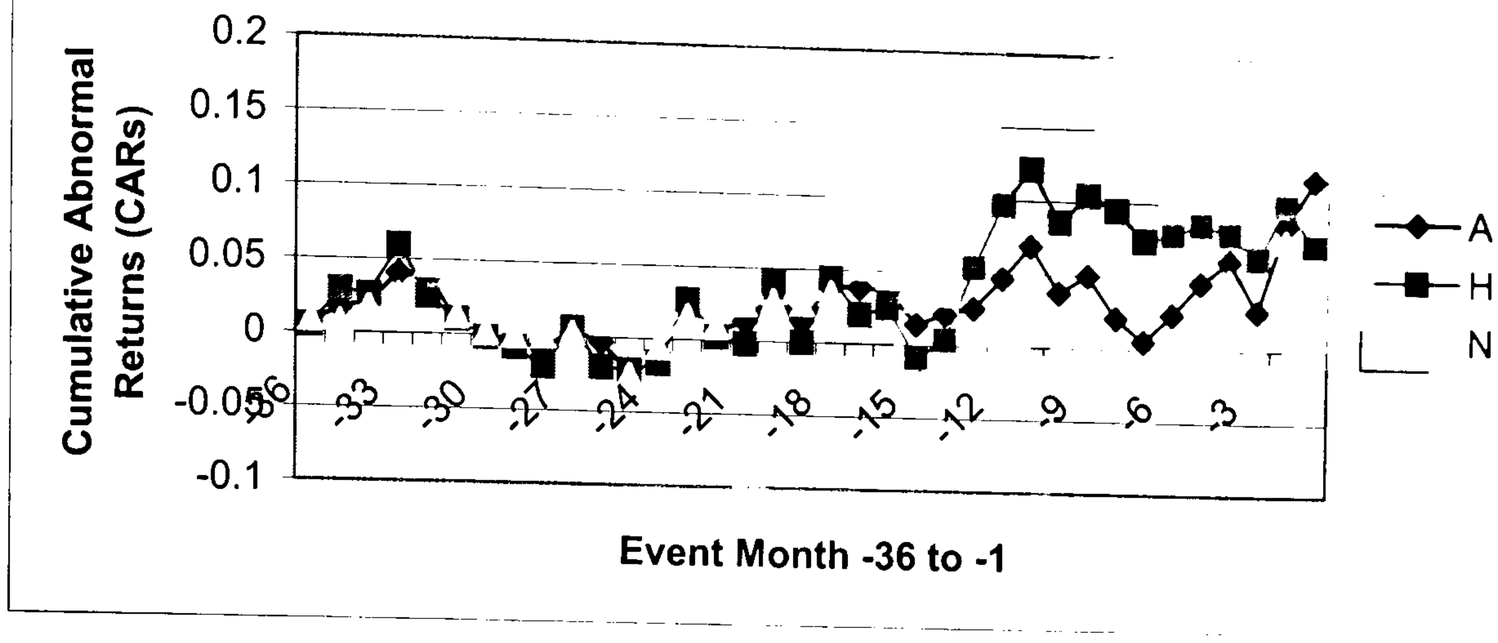
EM	BHAR	T-Stat	P-Value
-12 to -1	0.2687	1.658	0.121
-24 to -1	0.2025	1.592	0.210
-36 to -1	0.1570	1.026	0.681

Table 6.9.2

EM	α	T-Stat	P-Value	Implied CAR
-12 to -1	0.0124	1.604	0.405	0.1488
-24 to -1	0.0018	0.553	0.933	0.0432
-36 to -1	-0.0001	-0.054	0.701	-0.0036

Figure 6.6 shows that non-overlapping firms of institutional holding and non-institutional holding experience similar returns in the third and second year prior to the takeover announcement, and institutional holding firms outperform the non-institutional holding firms in the one year prior to the announcement. However, as we have noticed before that none of the CARs shown in Figure 6.6 are statistically significant different from zero.

Figure 6.6. Three years pre-acquisition average CARs of all, institutional holding, non-institutional holding non-overlapping bidding firms 97-01



A: all the non-overlapping bidding firms.
H: Non-overlapping bidding firms largely and consistently held by institutional funds.
N: Non-overlapping bidding firms not largely or/and consistently held by institutional funds.

We have so far examined the three years pre-acquisition stock returns of two sub-samples (held >=3% and held <3%) of the whole bidding firms and the two sub-samples (held >=3% and held <3%) of the non-overlapping bidding firms. We do not find any statistical significant long-run abnormal returns for all these sub-samples, and thus no statistically significant difference of the stock returns between the paired samples. Thus, there is no obvious monitoring role of institutional funds has been detected so far. However, how are the overlapping bidding firms, will they show a significant different between the pair samples? We turn to examine the two sub-samples of overlapping bidding firms.

Table 6.10 reports the three years pre-acquisition average ARs and CARs of overlapping bidding firms that are largely and consistently held by institutional funds. In contrast with previous sub-samples, all the CARs are negative and 11 of them are

statistically significant different from zero from month –26 to month -16. It means that institutional holding overlapping bidding firms suffer a large and significant loss during the second year prior to the takeover announcement.

Table 6.10. Overlapping bidding firms (1997-2001, held>=3% by institutional funds) three years pre-acquisition average ARs and CARs

There are 12 UK overlapping bidding firms that are largely and consistently held by institutional funds involved in the acquisition during 1997-2001 periods. AR is the monthly average abnormal return of all the bidding firms. CAR is the cumulative average abnormal return of all the bidding firms. T-statistics of the monthly ARs and CARs are also given in the table.

EM	AR	T-Stat	CAR	T-Stat
Month -36	-0.0174	-0.676	-0.0174	-0.676
Month -35	-0.0214	-0.685	-0.0388	-0.998
Month -34	**-0.0697***	-2.459	**-0.1085***	-2.327
Month -33	0.0078	0.269	-0.1007	-1.736
Month -32	-0.0189	-0.462	-0.1196	-1.315
Month -31	0.0311	1.301	-0.0884	-0.888
Month -30	-0.0728	-2.151	-0.1612	-1.580
Month -29	-0.0578	-2.073	-0.2190	-1.978
Month -28	-0.0278	-0.949	-0.2468	-2.006
Month -27	-0.0723	-1.082	-0.3191	-1.851
Month -26	**-0.0746***	-2.297	**-0.3938***	-2.202
Month -25	-0.0441	-1.106	**-0.4379***	-2.274
Month -24	-0.0106	-0.410	**-0.4485***	-2.386
Month -23	0.0162	0.347	**-0.4323***	-2.704
Month -22	0.0056	0.203	**-0.4267***	-2.484
Month -21	-0.0079	-0.263	**-0.4346***	-2.505
Month -20	0.0260	0.679	**-0.4086***	-2.605
Month -19	0.0093	0.182	**-0.3993***	-2.921
Month -18	-0.0364	-0.884	**-0.4357***	-3.076
Month -17	0.0340	0.817	**-0.4017***	-3.111
Month -16	0.0780	1.651	**-0.3237***	-2.390
Month -15	0.0368	0.994	-0.2869	-2.048
Month -14	0.0165	0.702	-0.2704	-2.017
Month -13	0.0697	1.801	-0.2007	-1.388
Month -12	0.0444	0.976	-0.1563	-0.997
Month -11	-0.0278	-1.034	-0.1840	-1.125
Month -10	0.0674	1.789	-0.1167	-0.763
Month -9	0.0616	2.138	-0.0551	-0.328
Month -8	-0.0617	-1.302	-0.1168	-0.758
Month -7	-0.0052	-0.132	-0.1220	-0.796
Month -6	0.0031	0.119	-0.1189	-0.755
Month -5	-0.0160	-0.342	-0.1349	-0.762
Month -4	0.0449	1.210	-0.0901	-0.479
Month -3	0.0176	0.675	-0.0725	-0.374
Month -2	0.0182	0.294	-0.0542	-0.247
Month -1	0.0009	0.042	-0.0533	-0.255

* Indicate significant at 5%, two-sided t-test.

Figure 6.7 shows that institutional holding overlapping bidding firms suffer a big loss in the third year prior to the announcement of takeover bids, and start to gain some ground after month –24. Most of the CARs in the second year prior to the takeover announcement are statistically significant different from zero.

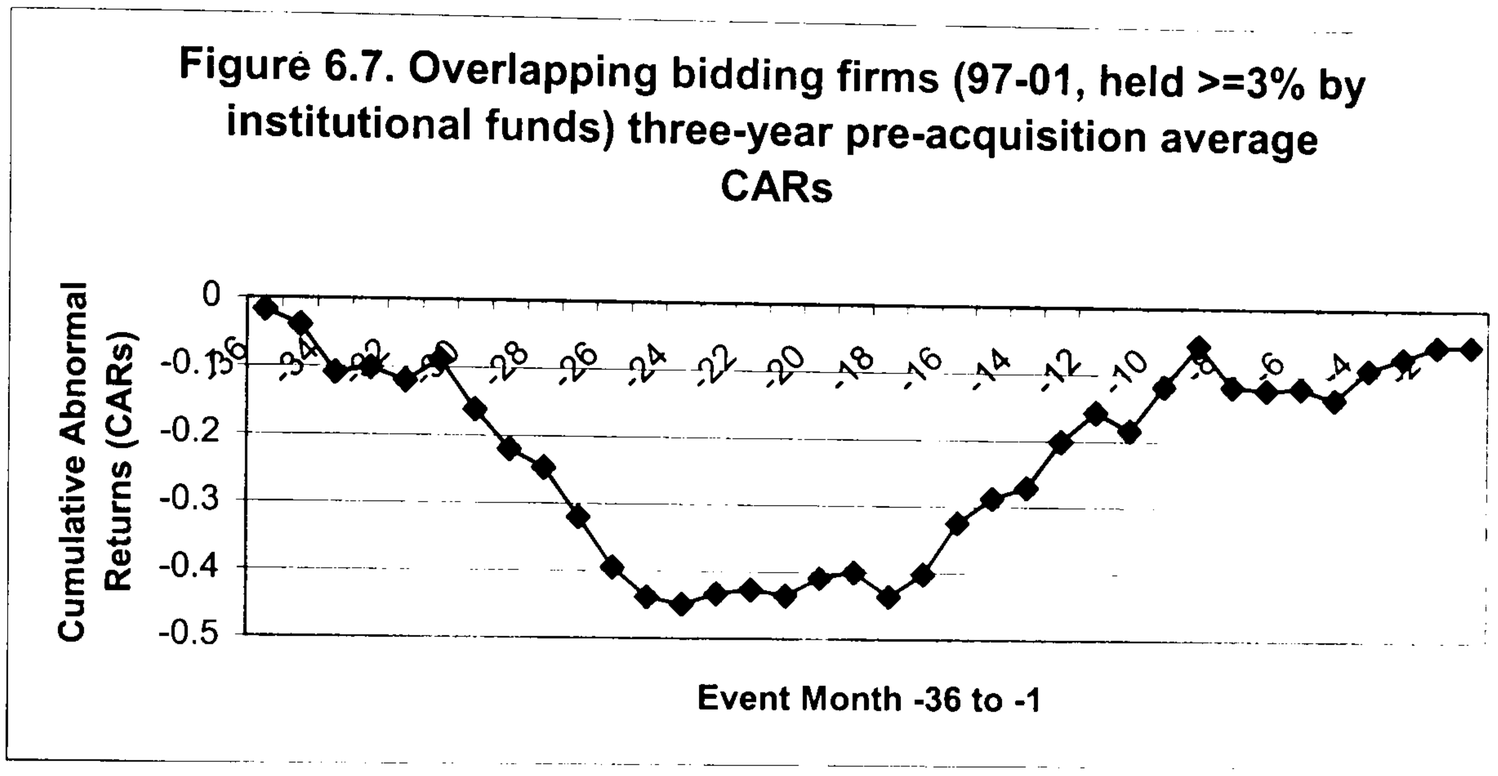


Table 6.11.1 and Table 6.11.2 report the one-, two- and three-year pre-acquisition CARs and BHARs of institutional holding overlapping bidding firms. All the CARs and BHARs either positive or negative are statistically insignificant different from zero. The t-statistics and the P-values are consistent with each other.

Table 6.11. Overlapping bidding firms (1997-2001, held>=3% by institutional funds) three years pre-acquisition average CARs and BHARs

There are 12 UK overlapping bidding firms that are largely and consistently held by institutional funds involved in the acquisition during 1997-2001 periods. Table 6.11.1 reports the result calculated by using the control firms approach. Table 6.11.2 presents the result calculated by using the Fama-French three-factor model. CAR is the average cumulative abnormal return of all the bidding firms. BHAR is the average buy-and-hold abnormal return of all the bidding firms. α is the mean intercept term of Fama-French three-factor model. Implied CAR is the mean α multiplying by 12, 24, and 36. T-statistics of the CARs and the BHARs as well as the corresponding P-values calculated by using the non-parametric Wilcoxon Signed-Rank test are given in the table.

Table 6.11.1

EM	CAR	T-Stat	P-Value
-12 to -1	0.1474	0.919	0.638
-24 to -1	0.3846	1.817	0.158
-36 to -1	-0.0533	-0.255	0.638

EM	BHAR	T-Stat	P-Value
-12 to -1	0.1999	1.068	0.480
-24 to -1	0.5146	1.978	0.117
-36 to -1	-0.0904	-0.298	0.814

Table 6.11.2

EM	α	T-Stat	P-Value	Implied CAR
-12 to -1	0.0039	0.348	0.556	0.0468
-24 to -1	0.0067	0.858	0.456	0.1608
-36 to -1	-0.0065	-1.464	0.196	-0.2340

Table 6.12 reports the three years pre-acquisition average ARs, CARs, and FDCARs of overlapping bidding firms that are not largely or/and consistently held by institutional funds. Unlike Table 6.10, the results in Table 6.12 are consistent with previous findings that no CARs are statistically significant different from zero at 5% significance level. However, 9 out of 36 FDCARs are statistically significant different from zero at 5% significance level. It shows that non-institutional holding overlapping firms outperform their institutional holding counterparts in these 9 months.

Table 6.12. Overlapping bidding firms (1997-2001, held<3% by institutional funds) three years pre-acquisition average ARs and CARs

There are 10 UK overlapping bidding firms that are not largely or/and consistently held by institutional funds involved in the acquisition during 1997-2001 periods. AR is the monthly average abnormal return of all the bidding firms. CAR is the cumulative average abnormal return of all the bidding firms. FDCAR is the first difference of CARs between non-institutional holding overlapping bidding firms and institutional holding overlapping bidding firms. T-statistics of the monthly ARs, CARs, and FDCARs are also given in the table.

EM	AR	T-Stat	CAR	T-Stat	FDCAR	T-Stat
Month -36	0.0107	0.605	0.0107	0.605	0.0281	0.90
Month -35	0.0187	0.980	0.0294	1.374	0.0682	1.54
Month -34	**-0.0628***	-2.551	-0.0333	-1.262	0.0752	1.40
Month -33	0.0126	0.485	-0.0208	-0.441	0.0799	1.07
Month -32	-0.0276	-1.352	-0.0484	-0.970	0.0712	0.69

Month -31	0.0296	1.062	-0.0188	-0.387	0.0696	0.63
Month -30	-0.0030	-0.110	-0.0218	-0.344	0.1394	1.16
Month -29	0.0274	1.749	0.0056	0.082	0.2246	1.73
Month -28	0.0213	0.740	0.0270	0.384	0.2738	1.93
Month -27	0.0010	0.057	0.0280	0.404	0.3471	1.87
Month -26	**-0.0356***	-2.808	-0.0076	-0.114	0.3862	2.02
Month -25	-0.0312	-1.486	-0.0388	-0.532	0.3991	1.94
Month -24	0.0164	0.807	-0.0224	-0.295	0.4261	2.10
Month -23	0.0311	0.999	0.0088	0.134	**0.4411***	2.55
Month -22	0.0162	0.792	0.0250	0.368	**0.4517***	2.44
Month -21	0.0151	0.725	0.0401	0.547	**0.4747***	2.52
Month -20	-0.0234	-0.557	0.0167	0.175	**0.4253***	2.32
Month -19	0.0012	0.041	0.0179	0.206	**0.4172***	2.57
Month -18	0.0551	1.395	0.0730	1.050	**0.5087***	3.22
Month -17	0.0310	1.210	0.1040	1.459	**0.5057***	3.43
Month -16	0.0016	0.030	0.1056	0.992	**0.4293***	2.49
Month -15	0.0010	0.035	0.1066	1.092	**0.3935***	2.30
Month -14	-0.0215	-0.545	0.0851	0.692	0.3555	1.95
Month -13	-0.0231	-0.551	0.0620	0.608	0.2627	1.48
Month -12	-0.0172	-1.220	0.0448	0.457	0.2011	1.09
Month -11	0.0183	0.493	0.0631	0.626	0.2471	1.29
Month -10	**0.0565***	2.267	0.1196	1.173	0.2363	1.29
Month -9	-0.0277	-0.934	0.0919	0.819	0.1470	0.73
Month -8	-0.0222	-0.990	0.0697	0.573	0.1865	0.95
Month -7	0.0506	1.729	0.1203	0.987	0.2423	1.24
Month -6	-0.0118	-0.630	0.1086	0.886	0.2275	1.14
Month -5	0.0041	0.190	0.1127	0.891	0.2476	1.14
Month -4	-0.0378	-1.370	0.0749	0.596	0.1650	0.73
Month -3	-0.0124	-0.410	0.0625	0.482	0.1350	0.58
Month -2	-0.0064	-0.226	0.0561	0.407	0.1103	0.43
Month -1	-0.0037	-0.093	0.0524	0.363	0.1057	0.42

* Indicate significant at 5%, two-sided t-test.

Figure 6.8 shows the three years pre-acquisition performance of overlapping bidding firms that are not largely or/and consistently held by institutional funds. All the monthly CARs are positive in two years prior to the takeover announcement. However, all the CARs are statistically insignificant different from zero at 5% significance level.

Figure 6.8. Overlapping bidding firms (97-01, held <3% by institutional funds) three-year pre-acquisition average CARs

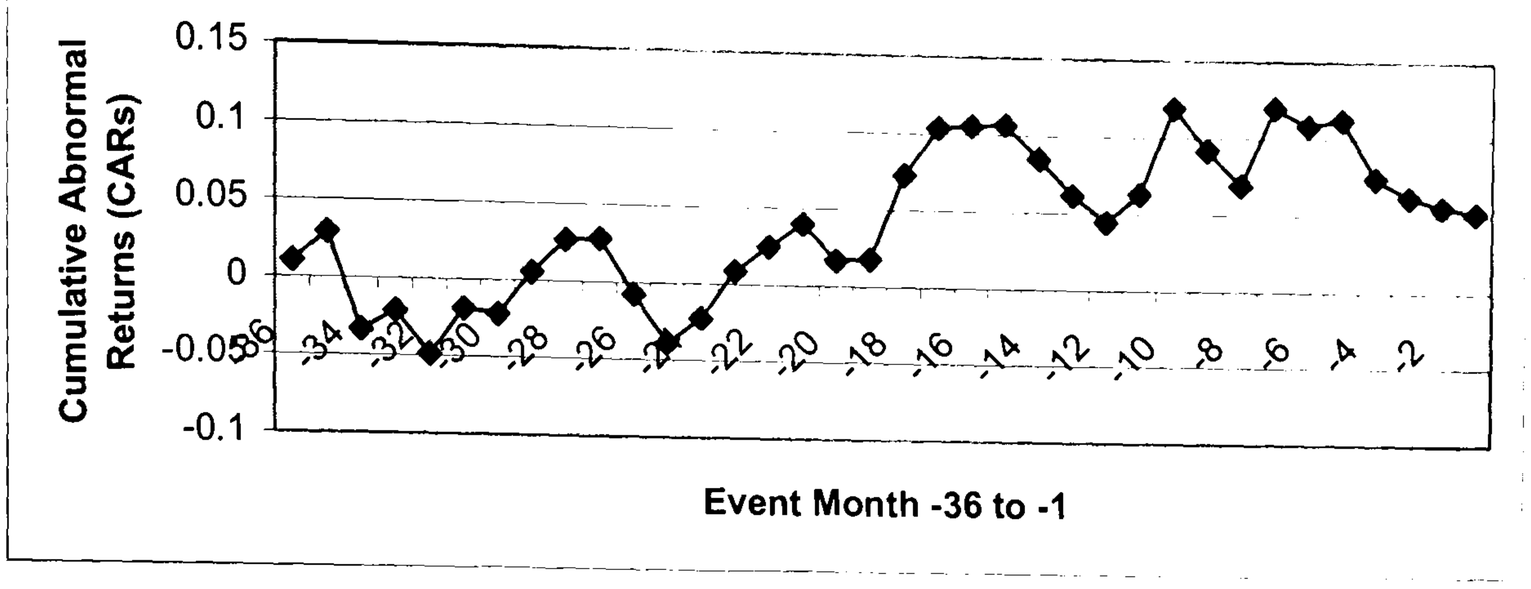


Table 6.13.1 and Table 6.13.2 reports the one-, two- and three-year pre-acquisition CARs and BHARs of overlapping bidding firms that are not largely or/and consistently held by institutional funds. Consistent with Table 6.11, all the CARs and BHARs are insignificant different from zero.

Table 6.13. Overlapping bidding firms (1997-2001, held<3% by institutional funds) three years pre-acquisition average CARs and BHARs

There are 10 UK bidding firms that are not largely or/and consistently held by institutional funds involved in the acquisition during 1997-2001 periods. Table 6.13.1 reports the result calculated by using the control firms approach. Table 6.13.2 presents the result calculated by using the Fama-French three-factor model. CAR is the average cumulative abnormal return of all the bidding firms. BHAR is the average buy-and-hold abnormal return of all the bidding firms. α is the mean intercept term of Fama-French three-factor model. Implied CAR is the mean α multiplying by 12, 24, and 36. T-statistics of the CARs and the BHARs as well as the corresponding P-values calculated by using the non-parametric Wilcoxon Signed-Rank test are given in the table.

Table 6.13.1

EM	CAR	T-Stat	P-Value
-12 to -1	-0.0096	-0.092	0.959
-24 to -1	0.0912	0.745	0.646
-36 to -1	0.0524	0.363	0.799

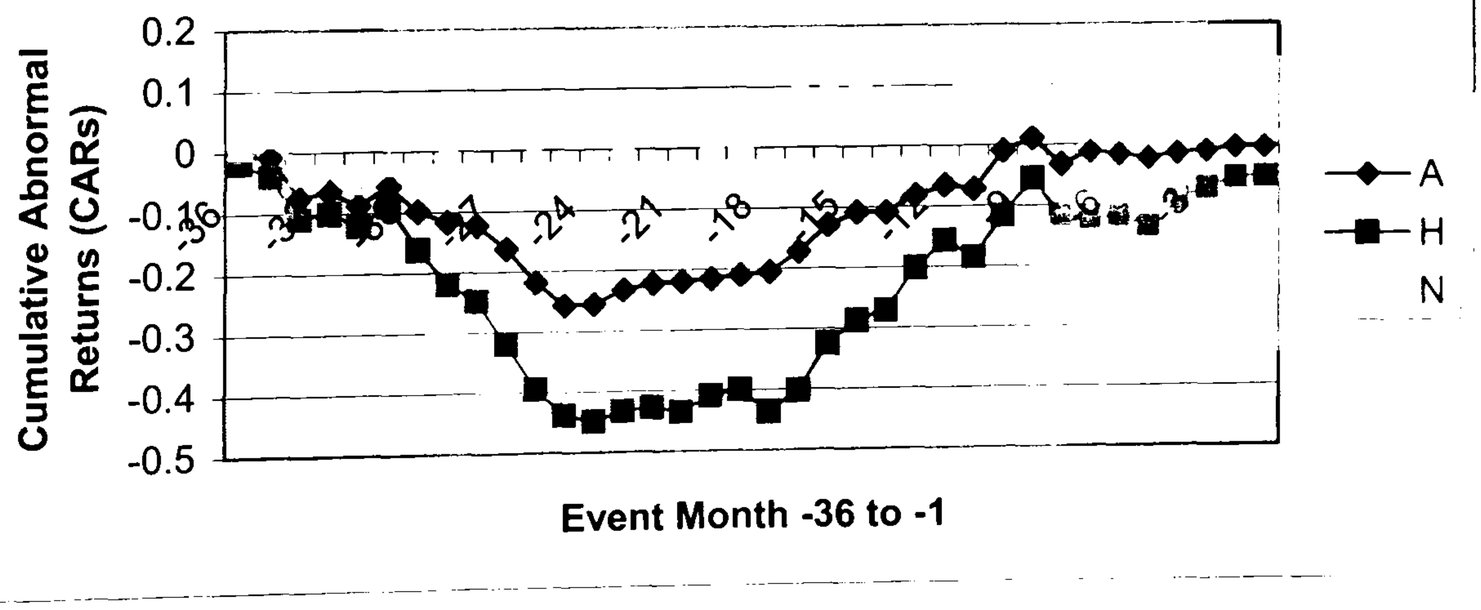
EM	BHAR	T-Stat	P-Value
-12 to -1	0.0112	0.093	0.959
-24 to -1	0.1533	1.231	0.241
-36 to -1	0.1370	0.906	0.575

Table 6.13.2

EM	α	T-Stat	P-Value	Implied CAR
-12 to -1	0.0042	0.553	0.838	0.0504
-24 to -1	0.0017	0.402	0.683	0.0408
-36 to -1	0.0002	0.084	0.838	0.0072

Figure 6.9 shows that non-institutional holding overlapping bidding firms outperform the institutional holding overlapping bidding firms. All the monthly CARs of non-institutional holding overlapping bidding firms are statistically insignificant, however, most of the CARs of the institutional holding firms are significantly negative in the second year prior to the takeover announcement. Thus, the non-institutional holding overlapping bidding firms outperforms their counterparts at least in the second year prior to the takeover period, and this against the monitoring role of institutional funds.

Figure 6.9. Three years pre-acquisition average CARs of all, institutional holding, non-institutional holding overlapping bidding firms 97-01



A: all the overlapping bidding firms.
H: overlapping bidding firms largely and consistently held by institutional funds.
N: overlapping bidding firms not largely or/and consistently held by institutional funds.

In sum, after examining and comparing the three years pre-acquisition stock returns of three pairs of sub-samples (institutional holding bidding firms *vs.* non-institutional holding bidding firms; institutional holding non-overlapping bidding firms *vs.* non-institutional holding non-overlapping bidding firms; institutional holding overlapping bidding firms *vs.* non-institutional holding overlapping bidding firms), we do not find any evidence that institutional funds actively monitoring the firms that they hold large stakes and this monitoring leads to a better performance of these firms. We thus conclude that there is no obvious or significant monitoring role of institutional funds in three years pre-acquisition period.

6.4.2. Do Institutional Funds Monitor Firms in the Post Acquisition Period?

6.4.2.1. Bidding Firms' Long-Run Post Acquisition Stock Returns

There is so far no monitoring role of institutional funds has been observed in the three years pre-acquisition period. Will this finding be held in the three years post-acquisition period? We turn to explore it.

Once again, we will firstly examine all the bidding firms in 1994-1998 as a whole before we move to investigate the sub-samples divided by the institutional funds holdings. It will provide us a general story before exploring the differences of the sub-samples. Again this investigation is not a test of the monitoring role of institutional funds, but provides useful context and information. For this reason, we once again put the detailed results and discussions into *Appendix 3*, and only conclude the results here.

After examining the bidding firms (1994-1998 sample period) three years post-takeover abnormal stock returns, we do not find any statistically significant three-years abnormal returns. This is consistent with the results reported in Chapter 5. Thus, we now have a general understanding of the bidding firms three years post acquisition stock return in 1994-1998 periods, it is time to move onto our primary investigation.

6.4.2.2. Long-Run Post Acquisition Stock Returns of Bidding Firms with Large Level of Institutional Ownership vs. Bidding Firms with Low or without Institutional Ownership

Table 6.14 reports the three years post acquisition monthly average ARs and CARs of bidding firms that are largely and consistently held by institutional funds. Two monthly ARs are significant at 5% significant level. All the CARs are negative and only two of them are statistically significant different from zero at 5% significance level.

Table 6.14. Bidding firms (1994-1998, held>=3% by institutional funds) three years post acquisition average ARs and CARs

There are 43 UK bidding firms that are largely and consistently held by institutional funds involved in the acquisitions during 1994-1998 periods. AR is the monthly average abnormal return of all the bidding firms. CAR is the cumulative average abnormal return of all the bidding firms. T-statistics of the monthly ARs and CARs are also given in the table.

EM	AR	T-Stat	CAR	T-Stat
Month 1	-0.0102	-0.671	-0.0102	-0.671
Month 2	-0.0316	-1.888	**-0.0418***	-2.072
Month 3	**-0.0390***	-2.039	**-0.0807***	-2.704
Month 4	0.0021	0.075	-0.0786	-1.973
Month 5	-0.0106	-0.562	-0.0892	-1.894
Month 6	-0.0161	-0.798	-0.1053	-1.838
Month 7	-0.0343	-1.403	-0.1396	-2.006
Month 8	0.0133	0.578	-0.1263	-1.712
Month 9	-0.0003	-0.012	-0.1266	-1.474
Month 10	-0.0013	-0.079	-0.1280	-1.355
Month 11	-0.0211	-0.739	-0.1491	-1.581
Month 12	0.0251	1.511	-0.1240	-1.317
Month 13	0.0036	0.152	-0.1204	-1.349
Month 14	-0.0160	-0.771	-0.1364	-1.400
Month 15	0.0134	0.759	-0.1230	-1.245
Month 16	0.0055	0.224	-0.1174	-1.167
Month 17	-0.0362	-1.322	-0.1537	-1.463
Month 18	0.0333	1.308	-0.1204	-1.082
Month 19	0.0082	0.404	-0.1121	-1.030
Month 20	-0.0308	-1.332	-0.1430	-1.275
Month 21	-0.0069	-0.252	-0.1499	-1.250
Month 22	-0.0275	-1.164	-0.1774	-1.529
Month 23	-0.0500	-1.697	-0.2275	-1.951
Month 24	0.0244	1.015	-0.2030	-1.815
Month 25	-0.0048	-0.226	-0.2079	-1.790
Month 26	0.0287	1.246	-0.1792	-1.588
Month 27	0.0255	1.501	-0.1537	-1.340
Month 28	0.0057	0.246	-0.1480	-1.211
Month 29	-0.0029	-0.113	-0.1508	-1.213

Month 30	0.0343	1.204	-0.1165	-0.886
Month 31	0.0066	0.234	-0.1099	-0.853
Month 32	0.0286	1.003	-0.0813	-0.631
Month 33	**-0.0642***	-2.347	-0.1455	-1.125
Month 34	0.0102	0.342	-0.1353	-1.053
Month 35	-0.0159	-0.614	-0.1512	-1.199
Month 36	-0.0723	-1.999	-0.2235	-1.748

* Indicate significant at 5%, two-sided t-test.

Figure 6.10 shows the three years post acquisition monthly CARs of bidding firms that are largely and consistently held by institutional funds. As we can see that institutional holding bidding firms suffer a loss immediately after completion of the takeover, and the CARs remain negative throughout the three years period. However, only the CARs of monthly 2 and 3 are significant, 34 out of 36 CARs are statistically insignificant different from zero.

Figure 6.10. Bidding firms (94-98, held >=3% by institutional funds) three years post acquisition average CARs

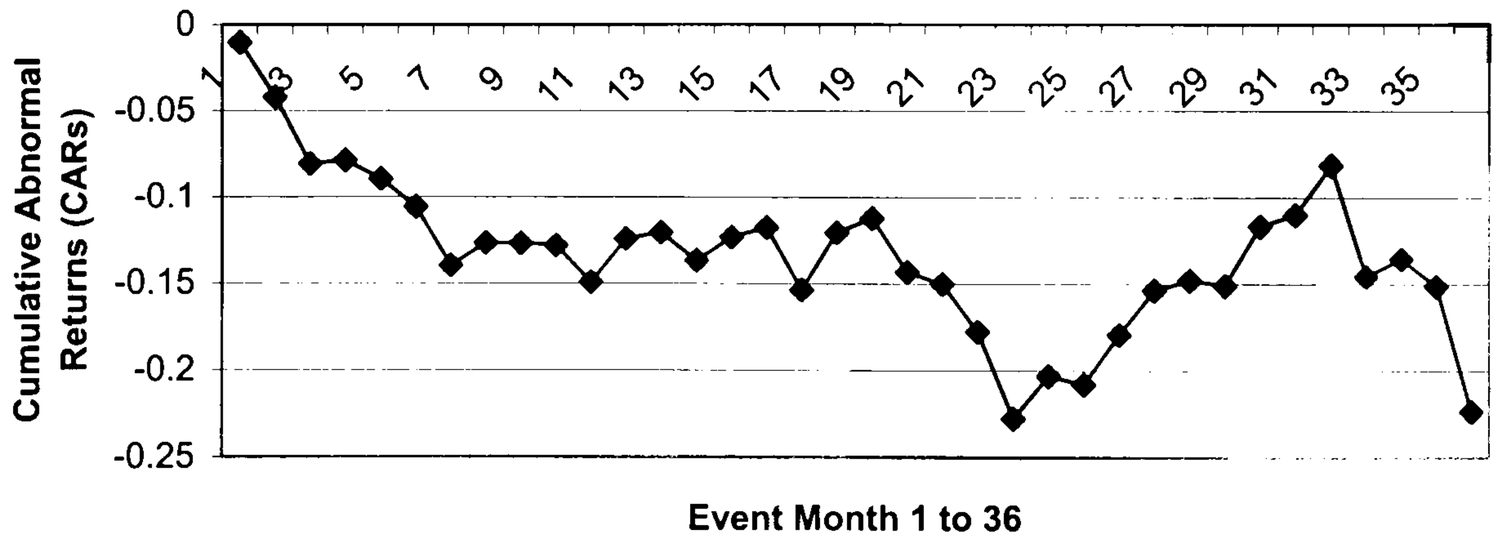


Table 6.15.1 reports the one, two, and three years post acquisition CARs and BHARs of bidding firms that are largely and consistently held by institutional funds. All the CARs and BHARs are negative and statistically insignificant different from zero, all the t-

values and P-values are consistent with each other. Table 6.15.2 presents three negative and significant intercept terms, the t-values and P-values of two and three years α are consistent with each other. Thus, institutional holding bidding firms experience a significant negative abnormal returns in two or three years after the takeover based on the Fama-French three factor model.

Table 6.15. Bidding firms (1994-1998, held>=3% by institutional funds) three years post acquisition average CARs and BHARs

There are 43 UK bidding firms that are largely and consistently held by institutional funds involved in the acquisition during 1994-1998 periods. Table 6.15.1 reports the result by using the control firms approach. Table 6.15.2 presents the result by using the Fama-French three-factor model. CAR is the average cumulative abnormal return of all the bidding firms. BHAR is the average buy-and-hold abnormal return of all the bidding firms. α is the mean intercept term of Fama-French three-factor model. Implied CAR is the mean α multiplying by 12, 24, and 36. T-statistics of the CARs and the BHARs as well as the corresponding P-values calculated by using the non-parametric Wilcoxon Signed-Rank test are given in the table.

Table 6.15.1

EM	CAR	T-Stat	P-Value
1 to 12	-0.1240	-1.317	0.612
1 to 24	-0.2030	-1.815	0.080
1 to 36	-0.2235	-1.748	0.169

EM	BHAR	T-Stat	P-Value
1 to 12	-0.1004	-1.172	0.546
1 to 24	-0.2332	-1.933	0.084
1 to 36	-0.2159	-1.560	0.328

Table 6.15.2

EM	α	T-Stat	P-Value	Implied CAR
1 to 12	**-0.0103***	-2.101	0.264	-0.1236
1 to 24	**-0.0134***	-4.044	0.001	-0.3216
1 to 36	**-0.0125***	-4.612	0.000	-0.4500

* Indicate significant at 5%, two-sided t-test.

Table 6.16 reports the three years post acquisition average ARs, CARs, and FDCARs of bidding firms that are not largely or/and consistently held by institutional funds. Four monthly average ARs are significant. Two CARs of month 35 and 36 are positive and statistically significant. 3 out of 36 FDCARs are statistically significant different from

zero at 5% significance level. It shows that non-institutional holding firms outperform their institutional holding counterparts at least in 3 months time.

Table 6.16. Bidding firms (1994-1998, held <3% by institutional funds) three years post acquisition average ARs and CARs

There are 56 UK bidding firms that are not largely or/and consistently held by institutional funds involved in the acquisitions during 1994-1998 periods. AR is the monthly average abnormal return of all the bidding firms. CAR is the cumulative average abnormal return of all the bidding firms. FDCAR is the first difference of CARs between non-institutional holding bidding firms and institutional holding bidding firms. T-statistics of the monthly ARs, CARs, and FDCARs are also given in the table.

EM	AR	T-Stat	CAR	T-Stat	FDCAR	T-Stat
Month 1	-0.0128	-0.984	-0.0128	-0.984	-0.0026	-0.13
Month 2	-0.0077	-0.786	-0.0205	-1.377	0.0213	0.85
Month 3	0.0002	0.013	-0.0203	-1.080	0.0604	1.71
Month 4	0.0154	1.249	-0.0049	-0.221	0.0737	1.61
Month 5	0.0109	0.890	0.0059	0.223	0.0951	1.76
Month 6	0.0006	0.067	0.0065	0.236	0.1118	1.76
Month 7	-0.0149	-1.274	-0.0084	-0.286	0.1312	1.74
Month 8	**-0.0256***	-2.251	-0.0339	-1.021	0.0924	1.14
Month 9	-0.0311	-1.875	-0.0651	-1.777	0.0615	0.66
Month 10	0.0067	0.528	-0.0583	-1.525	0.0697	0.68
Month 11	0.0238	1.751	-0.0345	-0.893	0.1146	1.12
Month 12	0.0050	0.398	-0.0295	-0.672	0.0945	0.91
Month 13	**0.0309***	2.189	0.0015	0.031	0.1219	1.21
Month 14	-0.0159	-1.124	-0.0144	-0.277	0.1220	1.10
Month 15	0.0247	1.799	0.0103	0.198	0.1333	1.19
Month 16	0.0159	1.055	0.0263	0.472	0.1437	1.25
Month 17	0.0102	0.642	0.0365	0.617	0.1902	1.58
Month 18	0.0201	1.625	0.0566	0.916	0.1770	1.39
Month 19	-0.0092	-0.638	0.0473	0.748	0.1594	1.27
Month 20	-0.0271	-1.912	0.0202	0.307	0.1632	1.26
Month 21	0.0121	0.638	0.0323	0.481	0.1822	1.33
Month 22	-0.0019	-0.140	0.0304	0.469	0.2078	1.56
Month 23	0.0169	0.972	0.0473	0.712	**0.2748***	2.05
Month 24	0.0065	0.474	0.0538	0.785	0.2568	1.96
Month 25	0.0041	0.285	0.0580	0.819	0.2659	1.95
Month 26	0.0040	0.236	0.0620	0.858	0.2412	1.80
Month 27	0.0077	0.495	0.0697	0.913	0.2234	1.62
Month 28	**0.0304***	2.200	0.1000	1.329	0.2480	1.73
Month 29	-0.0003	-0.016	0.0998	1.308	0.2506	1.72
Month 30	-0.0004	-0.022	0.0994	1.292	0.2159	1.42
Month 31	0.0194	1.060	0.1188	1.518	0.2287	1.52
Month 32	0.0197	1.240	0.1385	1.704	0.2198	1.44
Month 33	0.0144	0.931	0.1528	1.900	0.2983	1.96
Month 34	0.0132	0.767	0.1660	1.978	0.3013	1.96
Month 35	**0.0595***	2.810	**0.2255***	2.543	**0.3767***	2.44
Month 36	0.0201	1.132	**0.2456***	2.634	**0.4691***	2.96

* Indicate significant at 5%, two-sided t-test.

Figure 6.11 shows the three years post acquisition CARs of bidding firms that are not largely or/and consistently held by institutional funds. As the figure shows that CARs consistently rise after the completion of the takeover, and finally reach 25% at the end of the three years period. 34 out of 36 CARs are statistically insignificant different from zero. However, the CARs of month 35 and 36 are statistically significant different from zero at 5% significance level in a two-sided t-test.

Figure 6.11. Bidding firms (94-98, held<3% by institutional funds) three years post acquisition average CARs

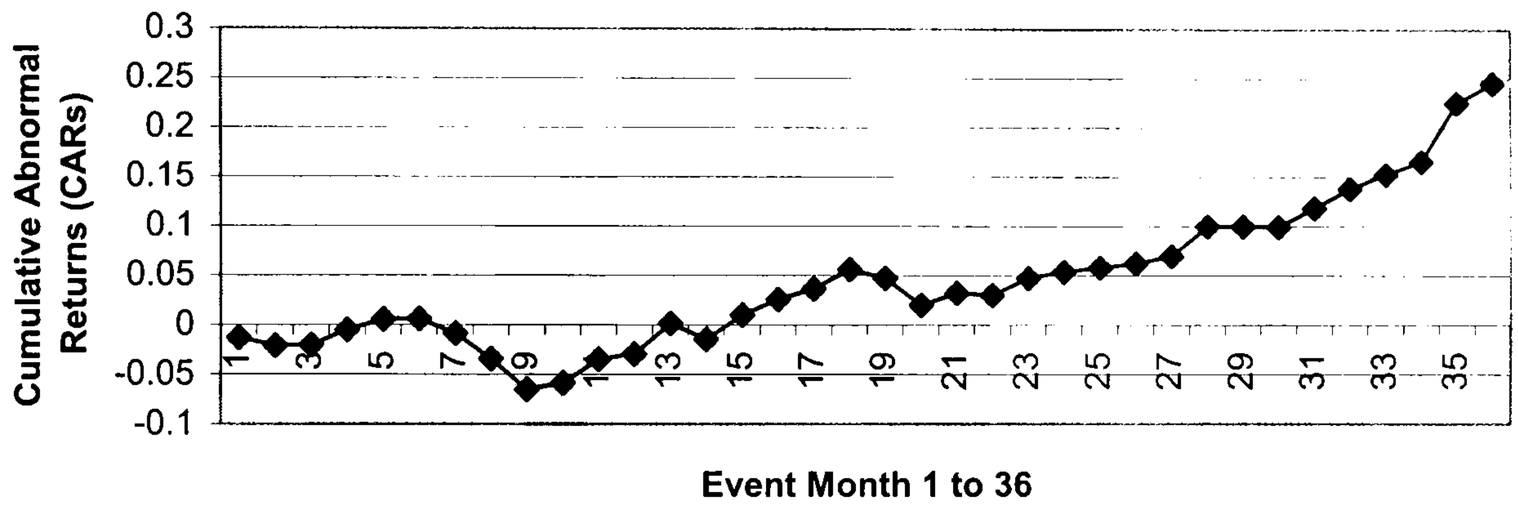


Table 6.17.1 reports the one, two, and three years CARs and BHARs of bidding firms that are not largely or/and consistently held by institutional funds. Both the one and two years post acquisition CARs and BHARs are insignificant. However, both the three years CAR and BHAR are positive and statistically significant different from zero. Their t- and P-values are consistent with each other. Table 6.17.2 reports three small and negative intercept terms, they are statistically insignificant different from zero. Thus, comparing to Table 6.15, Table 6.17 presents some evidence that non-institutional holding bidding firms outperform the institutional holding bidding firms based either on the control firms approach or the Fama-French three factor model.

Table 6.17. Bidding firms (1994-1998, held<3% by institutional funds) three years post acquisition average CARs and BHARs

There are 56 UK bidding firms that are not largely or/and consistently held by institutional funds involved in the acquisition during 1994-1998 periods. Table 6.17.1 reports the result calculated by using the control firms approach. Table 6.17.2 presents the result calculated by using the Fama-French three-factor model. CAR is the average cumulative abnormal return of all the bidding firms. BHAR is the average buy-and-hold abnormal return of all the bidding firms. α is the mean intercept term of Fama-French three-factor model. Implied CAR is the mean α multiplying by 12, 24, and 36. T-statistics of the CARs and the BHARs as well as the corresponding P-values calculated by using the non-parametric Wilcoxon Signed-Rank test are given in the table.

Table 6.17.1

EM	CAR	T-Stat	P-Value
1 to 12	-0.0295	-0.672	0.648
1 to 24	0.0538	0.785	0.378
1 to 36	**0.2456***	2.634	0.013

EM	BHAR	T-Stat	P-Value
1 to 12	-0.0470	-0.846	0.596
1 to 24	0.0651	0.850	0.458
1 to 36	**0.3950***	2.653	0.007

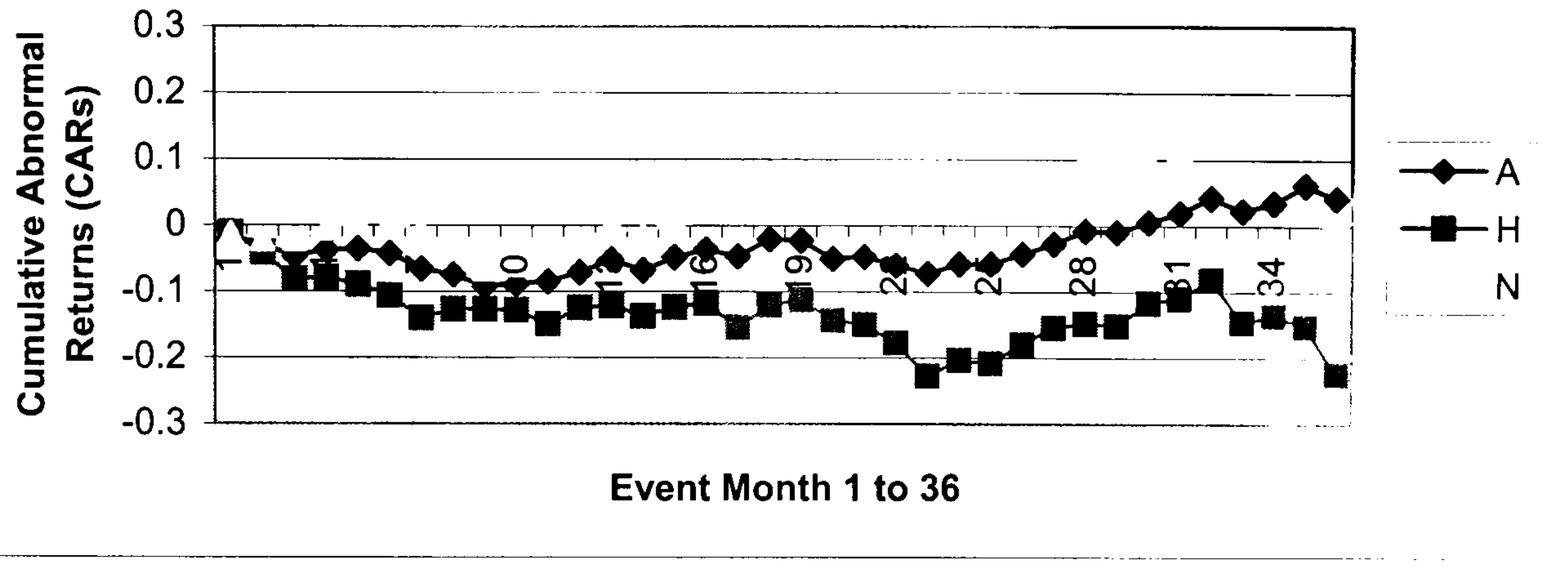
Table 6.17.2

EM	α	T-Stat	P-Value	Implied CAR
1 to 12	-0.0031	-0.806	0.342	-0.0372
1 to 24	-0.0018	-0.670	0.355	-0.0432
1 to 36	-0.0006	-0.310	0.636	-0.0216

* Indicate significant at 5%, two-sided t-test.

Figure 6.12 shows that non-institutional funds holding bidding firms outperform the institutional holding bidding firms throughout the three years post acquisition period though most of the CARs are statistically insignificant different from zero. Thus, we have so far not found any evidence regarding the monitoring of institutional funds and the wealth enhance performance of their holding firms, on the contrary, we find some evidence that institutional holding firms underform non-institutional holding firms in three years after the acquisition.

Figure 6.12. Three years post acuqisition average CARs of of all, insititutional holding, and non-institutional holding bidding firms 1994-1998



A: All the bidding firms.
H: Bidding firms largely and consistently held by institutional funds.
N: Bidding firms not largely or/and consistently held by institutional funds.

In line with our work at the pre-acquisition stage, we will once again examine the non-overlapping and overlapping sub-samples to enhance our findings. Table 6.18 reports the three years post acquisition average ARs and CARs of non-overlapping bidding firms that are largely and consistently held by institutional funds. Only 3 out of 36 average ARs are statistically significant. All the CARs are negative, however only two of them are statistically significant different from zero

Table 6.18. Non-overlapping bidding firms (1994-1998, held>=3% by institutional funds) three years post acquisition average ARs and CARs

There are 33 UK non-overlapping bidding firms that are largely and consistently held by institutional funds involved in the acquisitions during 1994-1998 periods. AR is the monthly average abnormal return of all the bidding firms. CAR is the cumulative average abnormal return of all the bidding firms. T-statistics of the monthly ARs and CARs are also given in the table.

EM	AR	T-Stat	CAR	T-Stat
Month 1	-0.0037	-0.234	-0.0037	-0.234
Month 2	-0.0393	-2.023	-0.0430	-1.875
Month 3	**-0.0512***	-2.408	**-0.0942***	-2.705
Month 4	0.0102	0.285	-0.0840	-1.750
Month 5	-0.0308	-1.413	**-0.1148***	-2.043
Month 6	0.0017	0.074	-0.1132	-1.670
Month 7	-0.0134	-0.572	-0.1265	-1.655

Month 8	0.0260	0.957	-0.1006	-1.245
Month 9	0.0059	0.236	-0.0946	-1.024
Month 10	-0.0111	-0.549	-0.1057	-1.017
Month 11	-0.0500	-1.688	-0.1557	-1.451
Month 12	0.0226	1.117	-0.1331	-1.239
Month 13	0.0033	0.120	-0.1298	-1.276
Month 14	-0.0289	-1.369	-0.1587	-1.400
Month 15	0.0350	1.696	-0.1238	-1.070
Month 16	-0.0037	-0.149	-0.1275	-1.056
Month 17	-0.0379	-1.140	-0.1654	-1.309
Month 18	0.0255	0.813	-0.1399	-1.021
Month 19	0.0031	0.129	-0.1369	-1.008
Month 20	-0.0224	-0.916	-0.1593	-1.169
Month 21	0.0009	0.035	-0.1584	-1.084
Month 22	-0.0442	-1.995	-0.2026	-1.400
Month 23	-0.0498	-1.570	-0.2523	-1.764
Month 24	0.0024	0.089	-0.2500	-1.816
Month 25	-0.0022	-0.088	-0.2522	-1.782
Month 26	0.0250	0.858	-0.2272	-1.646
Month 27	0.0327	1.672	-0.1944	-1.367
Month 28	-0.0153	-0.583	-0.2097	-1.393
Month 29	-0.0037	-0.123	-0.2134	-1.390
Month 30	**0.0596***	2.277	-0.1537	-0.965
Month 31	0.0398	1.537	-0.1139	-0.713
Month 32	0.0096	0.307	-0.1043	-0.673
Month 33	**-0.0920***	-2.970	-0.1963	-1.241
Month 34	0.0051	0.135	-0.1913	-1.219
Month 35	-0.0186	-0.571	-0.2099	-1.357
Month 36	-0.0792	-1.810	-0.2891	-1.859

* Indicate significant at 5%, two-sided t-test.

Figure 6.13 shows the three years post acquisition CARs of non-overlapping bidding firms that are largely and consistently held by institutional funds. As the figure shows these bidding firms start to lose immediately after the completion of the acquisition, and none of the CARs are positive. However, 34 out of 36 CARs shown in the figure are statistically insignificant different from zero.

Figure 6.13. Non-overlapping Bidding firms (94-98, held >=3% by institutional funds) three years post acquisition average CARs

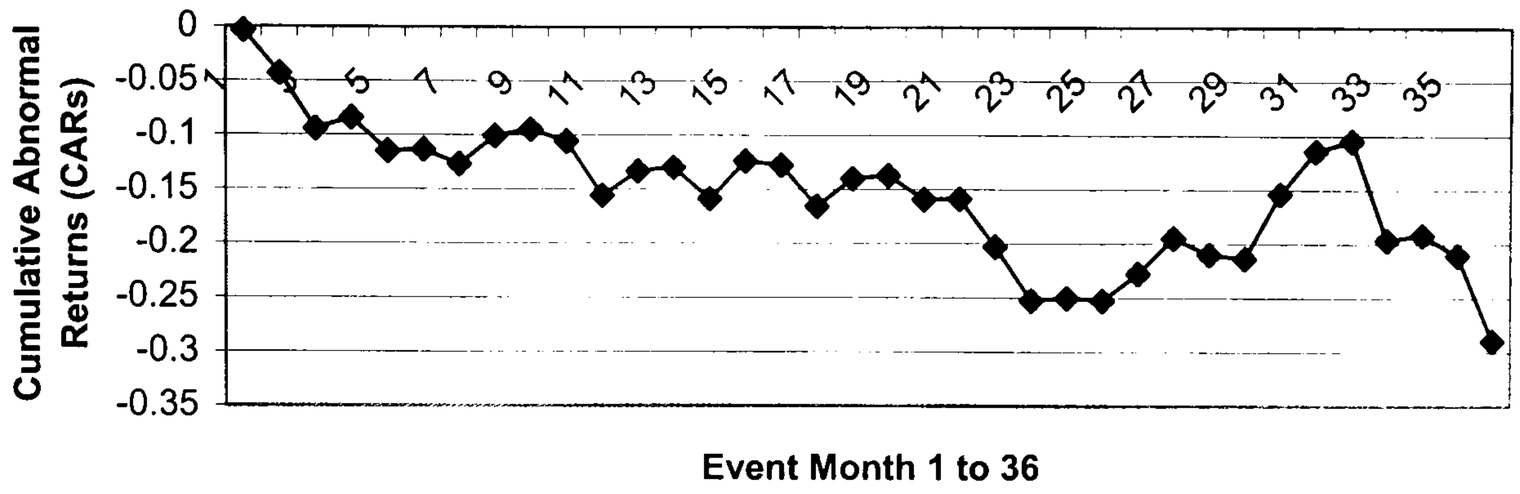


Table 6.19.1 reports the one, two, and three years post acquisition CARs and BHARs of non-overlapping bidding firms that are largely and consistently held by institutional funds. All the CARs are negative and insignificant, and the one and three years BHARs are negative and insignificant. However, the two years BHARs are statistically significant different from zero at 5% significance level according to either the t- or the P-values. Table 6.19.2 reports three large and negative intercept terms, the two and three years α s are statistically significant different from zero. Thus, based on either the control firms approach or the Fama-French three-factor model, we find evidence of statistically significant negative abnormal returns of the institutional holding non-overlapping bidding firms. We will now turn to examine the post acquisition stock returns of the non-overlapping bidding firms that are not largely or/and consistently held by institutional funds.

Table 6.19. Non-overlapping bidding firms (1994-1998, held>=3% by institutional funds) three years post acquisition average CARs and BHARs

There are 33 UK non-overlapping bidding firms that are largely and consistently held by institutional funds involved in the acquisition during 1994-1998 periods. Table 6.19.1 reports the result calculated by using the control firms approach. Table 6.19.2 presents the result calculated by using the Fama-French three-factor model. CAR is the average cumulative abnormal return of all the bidding firms. BHAR is the

average buy-and-hold abnormal return of all the bidding firms. α is the mean intercept term of Fama-French three-factor model. Implied CAR is the mean α multiplying by 12, 24, and 36. T-statistics of the CARs and the BHARs as well as the corresponding P-values calculated by using the non-parametric Wilcoxon Signed-Rank test are given in the table.

Table 6.19.1

EM	CAR	T-Stat	P-Value
1 to 12	-0.1331	-1.239	0.448
1 to 24	-0.2500	-1.816	0.095
1 to 36	-0.2891	-1.859	0.088

EM	BHAR	T-Stat	P-Value
1 to 12	-0.1422	-1.379	0.357
1 to 24	**-0.3250***	-2.211	0.044
1 to 36	-0.2680	-1.828	0.140

Table 6.19.2

EM	α	T-Stat	P-Value	Implied CAR
1 to 12	-0.0113	-1.992	0.205	-0.1356
1 to 24	**-0.0158***	-4.119	0.001	-0.3792
1 to 36	**-0.0141***	-4.558	0.001	-0.5076

* Indicate significant at 5%, two-sided t-test.

Table 6.20 reports the three years post acquisition average ARs, CARs, and FDCARs of non-overlapping bidding firms that are not largely or/and consistently held by institutional funds. 4 out of 36 monthly average ARs are significant, and only 2 out of 36 monthly average CARs are statistically significant different from zero. 2 out of 36 FDCARs are significant different from zero, it shows that non-institutional holding non-overlapping bidding firms outperforms their institutional holding counterparts at least in these two months time.

Table 6.20. Non-overlapping bidding firms (1994-1998, held<3% by institutional funds) three years post acquisition average ARs and CARs

There are 32 UK non-overlapping bidding firms that are not largely or/and consistently held by institutional funds involved in the acquisitions during 1994-1998 periods. AR is the monthly average abnormal return of all the bidding firms. CAR is the cumulative average abnormal return of all the bidding firms. FDCAR is the first difference of CARs between non-institutional holding non-overlapping bidding firms and institutional holding non-overlapping bidding firms. T-statistics of the monthly ARs, CARs, and FDCARs are also given in the table.

EM	AR	T-Stat	CAR	T-Stat	FDCAR	T-Stat
Month 1	-0.0220	-1.110	-0.0220	-1.110	-0.0183	-0.73
Month 2	-0.0082	-0.615	-0.0302	-1.348	0.0128	0.40
Month 3	-0.0144	-0.738	-0.0447	-1.537	0.0495	1.09
Month 4	0.0049	0.299	-0.0398	-1.231	0.0442	0.76
Month 5	0.0070	0.400	-0.0328	-0.889	0.0820	1.22
Month 6	0.0003	0.025	-0.0325	-0.858	0.0807	1.04
Month 7	-0.0118	-0.835	-0.0443	-1.053	0.0822	0.94
Month 8	-0.0305	-1.964	-0.0748	-1.558	0.0258	0.27
Month 9	-0.0445	-1.649	**-0.1193***	-2.228	-0.0247	-0.23
Month 10	-0.0028	-0.188	**-0.1221***	-2.232	-0.0164	-0.14
Month 11	**0.0469***	2.491	-0.0751	-1.399	0.0806	0.67
Month 12	0.0008	0.042	-0.0744	-1.194	0.0587	0.47
Month 13	0.0357	1.759	-0.0386	-0.565	0.0912	0.74
Month 14	-0.0306	-1.421	-0.0693	-0.918	0.0894	0.66
Month 15	0.0412	1.950	-0.028	-0.373	0.0958	0.69
Month 16	0.0114	0.523	-0.0166	-0.207	0.1109	0.76
Month 17	0.0053	0.220	-0.0113	-0.134	0.1541	1.01
Month 18	0.0257	1.621	0.0144	0.167	0.1543	0.95
Month 19	-0.0204	-1.016	-0.006	-0.070	0.1309	0.82
Month 20	**-0.0629***	-3.182	-0.0689	-0.797	0.0904	0.56
Month 21	0.0078	0.303	-0.0611	-0.714	0.0973	0.57
Month 22	0.0173	1.038	-0.0437	-0.507	0.1589	0.94
Month 23	0.0222	0.925	-0.0216	-0.243	0.2307	1.37
Month 24	-0.0003	-0.018	-0.0219	-0.233	0.2281	1.37
Month 25	0.0015	0.077	-0.0205	-0.217	0.2317	1.36
Month 26	0.0203	0.944	-0.0002	-0.002	0.2270	1.34
Month 27	-0.0068	-0.331	-0.0070	-0.067	0.1874	1.07
Month 28	**0.0467***	2.179	0.0398	0.388	0.2495	1.37
Month 29	-0.0053	-0.226	0.0344	0.350	0.2478	1.36
Month 30	-0.0137	-0.532	0.0207	0.212	0.1744	0.93
Month 31	0.0391	1.517	0.0598	0.588	0.1737	0.92
Month 32	0.0395	1.922	0.0993	0.973	0.2036	1.10
Month 33	0.0123	0.579	0.1116	1.081	0.3079	1.63
Month 34	-0.0097	-0.473	0.1019	0.978	0.2932	1.56
Month 35	**0.0838***	2.717	0.1857	1.687	**0.3956***	2.08
Month 36	0.0371	1.453	0.2229	1.928	**0.5120***	2.64

* Indicate significant at 5%, two-sided t-test.

Figure 6.14 shows three years post acquisition average CARs of non-overlapping bidding firms that are not large or/and consistently held by institutional funds. In contrast with Figure 6.13, most of the CARs in the third year after the acquisition are positive. However, 34 out 36 CARs are statistically insignificant different from zero.

Figure 6.14. Non-overlapping bidding firms (94-98, held <3% by insitutional funds) three years post acquisition average CARs

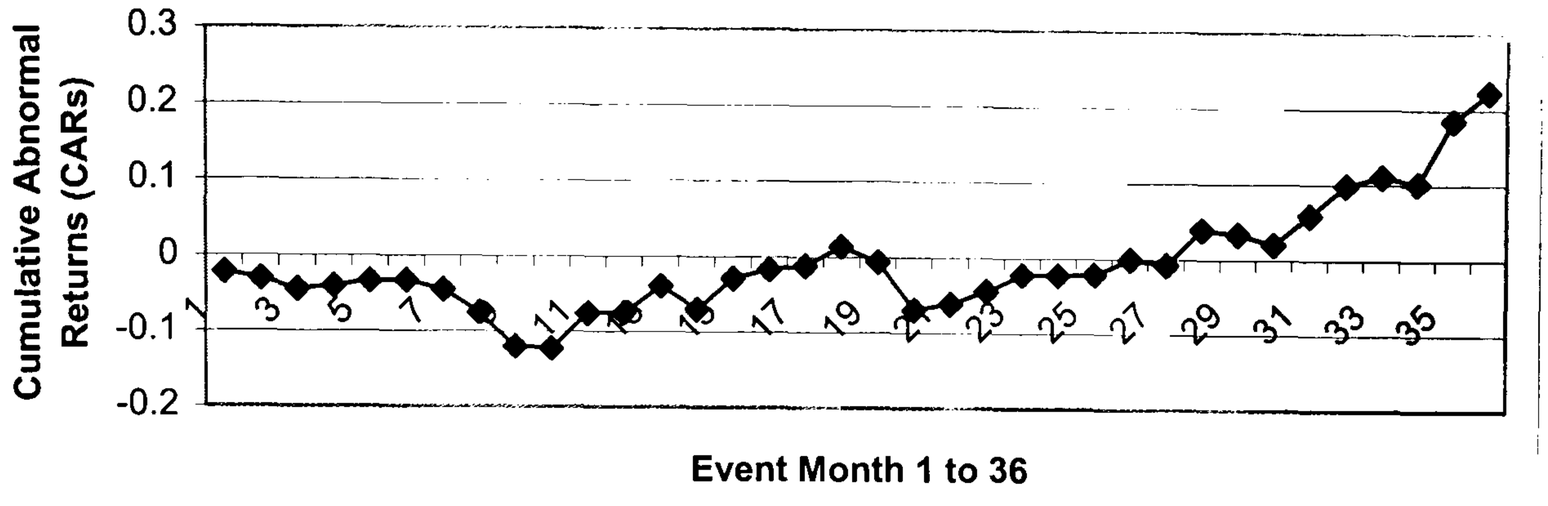


Table 6.21 reports the three years post acquisition average CARs and BHARs, and the implied CARs of non-overlapping bidding firms that are not largely or/and consistently held by institutional funds. All the results either based on the control firms approach or the Fama-French three-factor model are statistically insignificant different from zero. All the t-statistics and the P-values are consistent with each other. Thus, by comparing with Table 6.19 that reports some significant long-run negative abnormal returns with this table, we do not find any evidence that institutional funds holding non-overlapping bidding firms outperform their non-institutional holding counterparts, on the contrary, we even find some evidence against it. In a word, no monitoring role of institutional funds has been observed so far.

Table 6.21. Non-overlapping bidding firms (1994-1998, held<3% by institutional funds) three years post acquisition average CARs and BHARs

There are 32 UK non-overlapping bidding firms that are not largely or/and consistently held by institutional funds involved in the acquisition during 1994-1998 periods. Table 6.21.1 reports the result calculated by using the control firms approach. Table 6.21.2 presents the result calculated by using the Fama-French three-factor model. CAR is the average cumulative abnormal return of all the bidding firms. BHAR is the average buy-and-hold abnormal return of all the bidding firms. α is the mean intercept term of Fama-French three-factor model. Implied CAR is the mean α multiplying by 12, 24, and 36. T-statistics of the CARs and the BHARs as well as the corresponding P-values calculated by using the non-parametric Wilcoxon Signed-Rank test are given in the table.

Table 6.21.1

EM	CAR	T-Stat	P-Value
1 to 12	-0.0744	-1.194	0.360
1 to 24	-0.0219	-0.233	0.765
1 to 36	0.2229	1.928	0.150

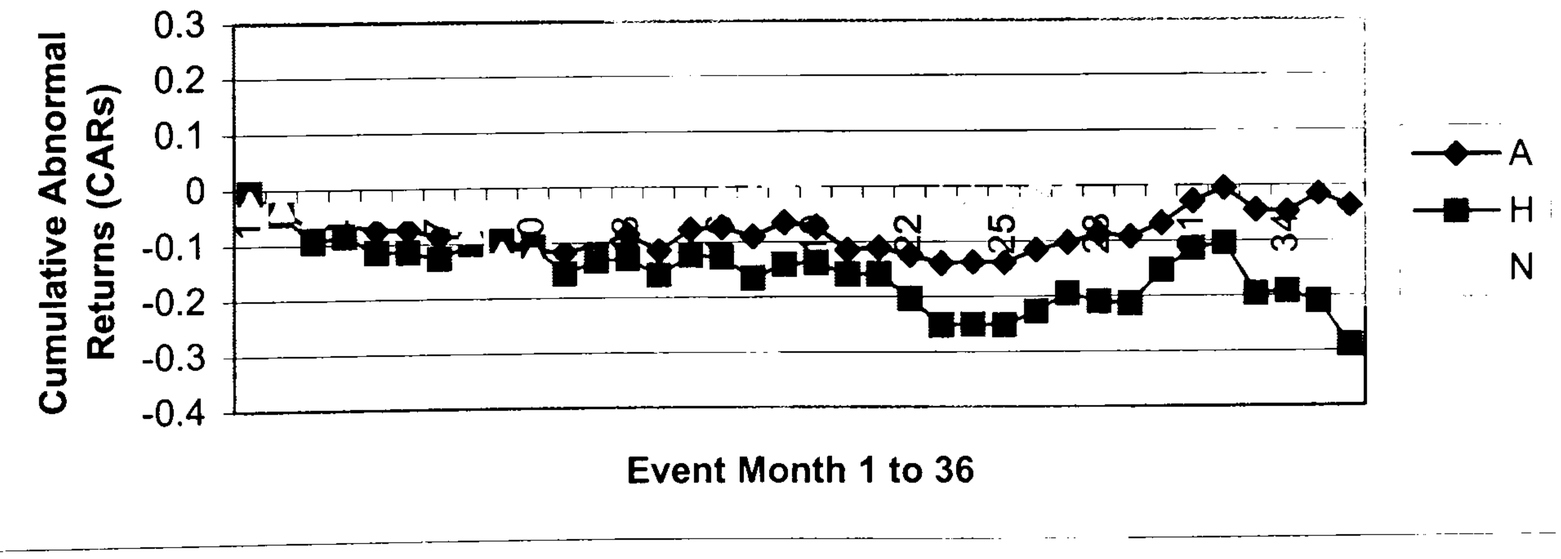
EM	BHAR	T-Stat	P-Value
1 to 12	-0.1098	-1.314	0.295
1 to 24	-0.0404	-0.397	0.489
1 to 36	0.3368	1.588	0.155

Table 6.21.2

EM	α	T-Stat	P-Value	Implied CAR
1 to 12	-0.0045	-0.803	0.427	-0.0540
1 to 24	-0.0049	-1.476	0.110	-0.1176
1 to 36	-0.0039	-1.369	0.116	-0.1404

Figure 6.15 shows that non-institutional holding non-overlapping bidding firms outperform their institutional holding counterparts in almost all the months in three years after the acquisition. However, most of the CARs shown in Figure 6.15 are statistically insignificant different from zero.

Figure 6.15. Three years post acquisition average CARs of all, institutional holding, and non-institutional holding non-overlapping bidding firms 1994-1998



A: All the non-overlapping bidding firms.
H: Non-overlapping bidding firms largely and consistently held by institutional funds.
N: Non-overlapping bidding firms not largely or/and consistently held by institutional funds.

We have so far examined the three years post acquisition stock returns of two sub-samples (held >=3% and held <3%) of the whole bidding firms and the two sub-samples (held >=3% and held <3%) of the non-overlapping bidding firms. We do not find any evidence in supporting the monitoring role of institutional funds, and we even find some evidence against it. Thus, there is no obvious monitoring role of institutional funds has been detected so far. However, how are the overlapping bidding firms, will they show a significant different between the pair samples? We turn to examine the two sub-samples of overlapping bidding firms.

Table 6.22 reports the three years post acquisition average ARs and CARs of overlapping bidding firms that are largely and consistently held by institutional funds. Only one monthly average AR is statistically significant at 5% significance level, none of the CARs are statistically significant different from zero.

Table 6.22. Overlapping bidding firms (1994-1998, held>=3% by institutional funds) three years post acquisition average ARs and CARs

There are 10 UK overlapping bidding firms that are largely and consistently held by institutional funds involved in the acquisitions during 1994-1998 periods. AR is the monthly average abnormal return of all the bidding firms. CAR is the cumulative average abnormal return of all the bidding firms. T-statistics of the monthly ARs and CARs are also given in the table.

EM	AR	T-Stat	CAR	T-Stat
Month 1	-0.0318	-0.773	-0.0318	-0.773
Month 2	-0.0060	-0.182	-0.0378	-0.847
Month 3	0.0014	0.033	-0.0364	-0.626
Month 4	-0.0244	-0.645	-0.0608	-0.879
Month 5	0.0562	1.915	-0.0046	-0.057
Month 6	-0.0748	-1.793	-0.0794	-0.729
Month 7	-0.1035	-1.478	-0.1828	-1.086
Month 8	-0.0285	-0.683	-0.2114	-1.189
Month 9	-0.0209	-0.323	-0.2322	-1.080
Month 10	0.0309	1.061	-0.2014	-0.889
Month 11	0.0742	1.072	-0.1272	-0.612
Month 12	0.0333	1.241	-0.0939	-0.457
Month 13	0.0045	0.094	-0.0894	-0.457
Month 14	0.0268	0.480	-0.0626	-0.318

Month 15	**-0.0578***	-2.515	-0.1204	-0.611
Month 16	0.0362	0.523	-0.0842	-0.471
Month 17	-0.0308	-0.670	-0.115	-0.624
Month 18	0.0593	1.577	-0.0557	-0.338
Month 19	0.0253	0.623	-0.0305	-0.214
Month 20	-0.0587	-0.972	-0.0892	-0.483
Month 21	-0.0327	-0.377	-0.122	-0.625
Month 22	0.0276	0.390	-0.0943	-0.616
Month 23	-0.051	-0.678	-0.1454	-0.816
Month 24	0.0972	1.896	-0.0481	-0.302
Month 25	-0.0135	-0.318	-0.0617	-0.342
Month 26	0.0409	1.623	-0.0208	-0.123
Month 27	0.0016	0.047	-0.0192	-0.124
Month 28	0.0749	1.691	0.0557	0.337
Month 29	-0.0002	-0.004	0.0555	0.334
Month 30	-0.0492	-0.578	0.0063	0.029
Month 31	-0.1030	-1.288	-0.0967	-0.530
Month 32	0.0914	1.392	-0.0053	-0.024
Month 33	0.0275	0.545	0.0222	0.114
Month 34	0.0272	0.750	0.0494	0.255
Month 35	-0.0068	-0.224	0.0426	0.235
Month 36	-0.0495	-0.815	-0.0069	-0.035

* Indicate significant at 5%, two-sided t-test.

Figure 6.16 shows the three years post acquisition average CARs of institutional funds holding overlapping bidding firms. As the figure shows, these firms experience a quite volatile three years period after the acquisition, the CARs rise and fall for many times. Most of the CARs are negative, however, none of the 36 monthly CARs are statistically significant different from zero at 5% significance level.

Figure 6.16. Overlapping bidding firms (94-98, held >=3% by institutional funds) three years post acquisition average CARs

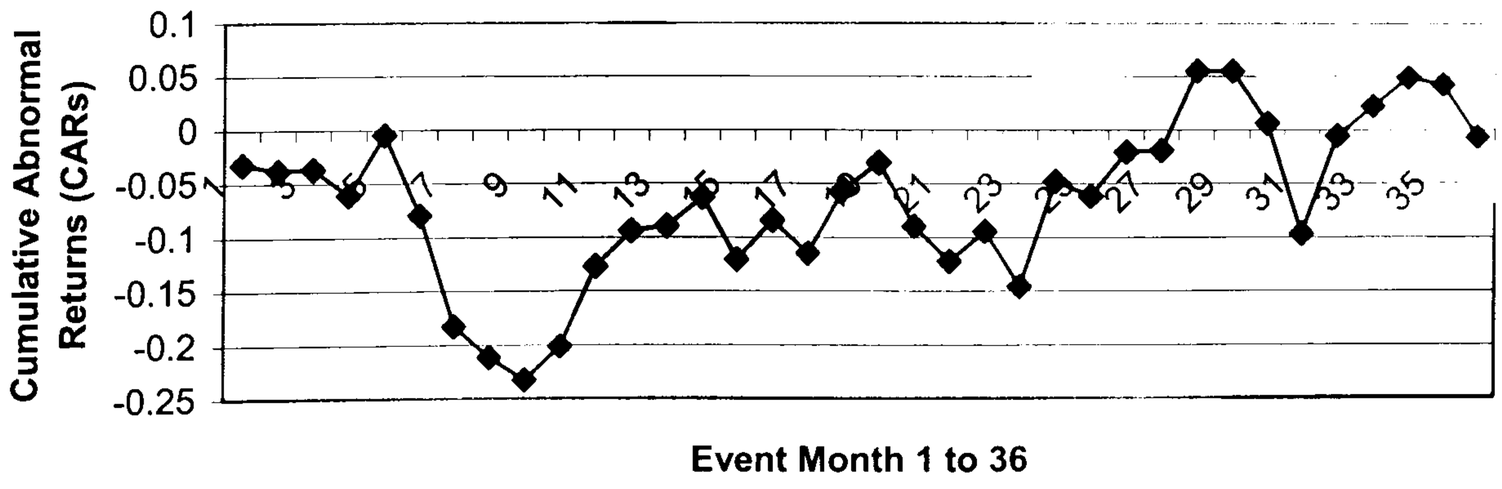


Table 6.23 reports the one, two, and three years average CARs, BHARs and the implied CARs of overlapping firms that are largely and consistently held by institutional funds. According to the table, none of the CARs and the BHARs either positive or negative are statistically significant different from zero at 5% significance level. All the t-statistics and the P-values are consistent with each other.

Table 6.23. Overlapping bidding firms (1994-1998, held>=3% by institutional funds) three years post acquisition average CARs and BHARs

There are 10 UK overlapping bidding firms that are largely and consistently held by institutional funds involved in the acquisition during 1994-1998 periods. Table 6.23.1 reports the result calculated by using the control firms approach. Table 6.23.2 presents the result calculated by using the Fama-French three-factor model. CAR is the average cumulative abnormal return of all the bidding firms. BHAR is the average buy-and-hold abnormal return of all the bidding firms. α is the mean intercept term of Fama-French three-factor model. Implied CAR is the mean α multiplying by 12, 24, 36. T-statistics of the CARs and the BHARs as well as the corresponding P-values calculated by using the non-parametric Wilcoxon Signed-Rank test are given in the table.

Table 6.23.1

EM	CAR	T-Stat	P-Value
1 to 12	-0.0939	-0.457	0.508
1 to 24	-0.0481	-0.302	0.721
1 to 36	-0.0069	-0.035	0.508

EM	BHAR	T-Stat	P-Value
1 to 12	0.0375	0.268	0.508
1 to 24	0.0696	0.438	0.799
1 to 36	-0.0439	-0.123	0.333

Table 6.23.2

EM	α	T-Stat	P-Value	Implied CAR
1 to 12	-0.0071	-0.692	1.000	-0.0852
1 to 24	-0.0055	-0.883	0.476	-0.1320
1 to 36	-0.0072	-1.291	0.185	-0.2592

Table 6.24 reports the three years post acquisition average ARs, CARs, and FDCARs of overlapping firms that are not largely or/and consistently held by institutional funds. As the table clearly shows, none of the monthly average ARs and CARs of these firms are statistically significant different from zero, and none of the FDCARs are significant different from zero at 5% significance level.

Table 6.24. Overlapping bidding firms (1994-1998, held <3% by institutional funds) three years post acquisition average ARs and CARs

There are 24 UK overlapping bidding firms that are not largely or/and consistently held by institutional funds involved in the acquisitions during 1994-1998 periods. AR is the monthly average abnormal return of all the bidding firms. CAR is the cumulative average abnormal return of all the bidding firms. FDCAR is the first difference of CARs between non-institutional holding overlapping bidding firms and institutional holding overlapping bidding firms. T-statistics of the monthly ARs, CARs and FDCARs are also given in the table.

EM	AR	T-Stat	CAR	T-Stat	FDCAR	T-Stat
Month 1	-0.0006	-0.039	-0.0006	-0.039	0.0312	0.71
Month 2	-0.0070	-0.479	-0.0076	-0.422	0.0302	0.63
Month 3	0.0196	1.362	0.0121	0.616	0.0485	0.79
Month 4	0.0294	1.562	0.0415	1.499	0.1023	1.37
Month 5	0.0161	0.950	0.0576	1.614	0.0622	0.71
Month 6	0.0010	0.084	0.0585	1.521	0.1379	1.19
Month 7	-0.0190	-0.949	0.0396	1.057	0.2224	1.29
Month 8	-0.0191	-1.130	0.0205	0.483	0.2319	1.27
Month 9	-0.0132	-0.932	0.0073	0.165	0.2395	1.09
Month 10	0.0194	0.866	0.0266	0.562	0.2280	0.99
Month 11	-0.0071	-0.394	0.0196	0.362	0.1468	0.68
Month 12	0.0108	0.620	0.0303	0.512	0.1242	0.58
Month 13	0.0246	1.277	0.0549	0.916	0.1443	0.71
Month 14	0.0038	0.243	0.0587	0.877	0.1213	0.58
Month 15	0.0027	0.185	0.0614	0.880	0.1818	0.87
Month 16	0.0220	1.077	0.0834	1.134	0.1676	0.87
Month 17	0.0168	0.889	0.1002	1.251	0.2152	1.07
Month 18	0.0126	0.632	0.1128	1.291	0.1685	0.90
Month 19	0.0056	0.271	0.1184	1.258	0.1489	0.87
Month 20	0.0207	1.322	0.1391	1.412	0.2283	1.09
Month 21	0.0177	0.628	0.1568	1.512	0.2788	1.26
Month 22	-0.0275	-1.279	0.1293	1.342	0.2236	1.24
Month 23	0.0099	0.387	0.1392	1.408	0.2846	1.40
Month 24	0.0157	0.787	0.1548	1.585	0.2029	1.09
Month 25	0.0077	0.338	0.1626	1.546	0.2243	1.07
Month 26	-0.0176	-0.639	0.1449	1.359	0.1657	0.83
Month 27	0.0269	1.138	0.1718	1.540	0.1910	1.00
Month 28	0.0086	0.605	0.1804	1.632	0.1247	0.63
Month 29	0.0065	0.239	0.1869	1.555	0.1314	0.64
Month 30	0.0175	0.802	0.2043	1.664	0.1980	0.80
Month 31	-0.0069	-0.279	0.1974	1.606	0.2941	1.34
Month 32	-0.0067	-0.275	0.1907	1.425	0.1960	0.75
Month 33	0.0171	0.754	0.2078	1.608	0.1856	0.80
Month 34	0.0437	1.526	0.2515	1.813	0.2021	0.85
Month 35	0.0271	1.016	0.2786	1.883	0.2360	1.01
Month 36	-0.0026	-0.110	0.2760	1.765	0.2829	1.14

Figure 6.17 shows the three years post acquisition average CARs of overlapping bidding firms that are not largely or/and consistently held by institutional funds. In contrast with Figure 6.16, Figure 6.17 shows a strong pattern of returns, the CARs

consistently rise after the completion of the acquisition and finally reached 28% in the end of the three years period. However, all these monthly CARs are statistically insignificant different from zero.

Figure 6.17. Overlapping bidding firms (94-98, held <3% by institutional funds) three years post acquisition average CARs

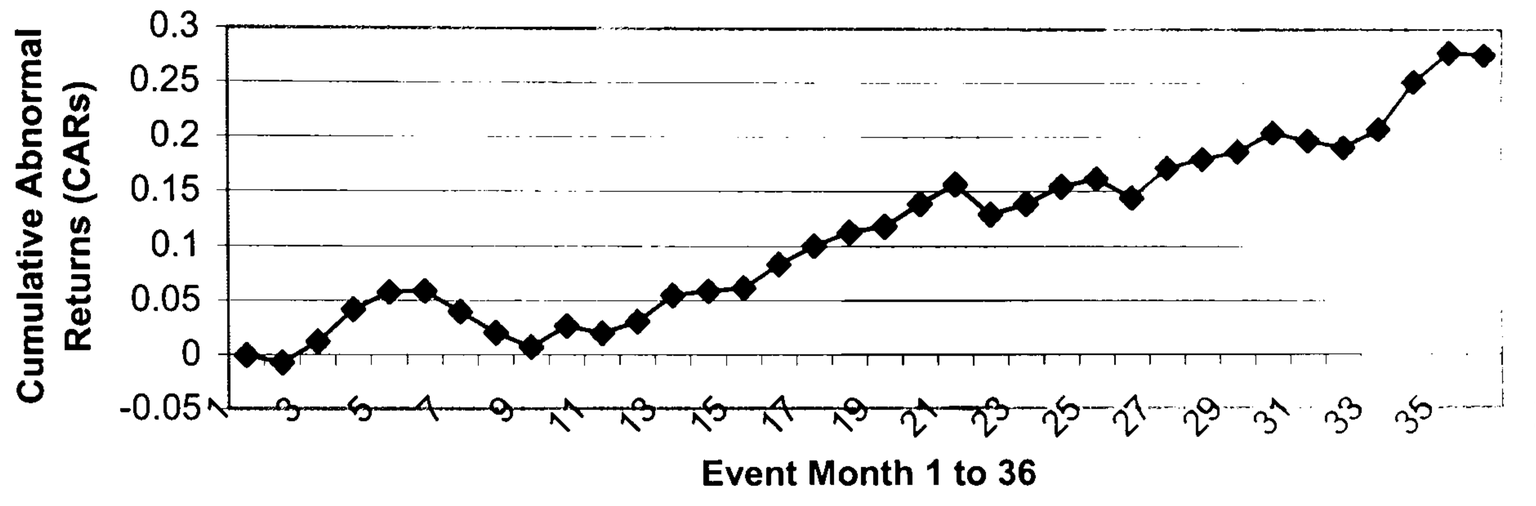


Table 6.25.1 presents the one, two, and three years post acquisition CARs and BHARs of overlapping firms that are not largely or/and consistently held by institutional funds. All the CARs are positive and insignificant, however, the t-value and the P-value of the three-year CAR are inconsistent. According to the P-value, the three-year CAR is significant at 5% significance level. All the BHARs are positive, the three-year BHAR are statistically significant according to the t-statistics, however, according to the P-values, the two- and three-year BHARs are statistically significant at 5% significance level. Table 6.25.2 reports three intercept terms that are statistically insignificant at 5% significance level, and their t- and P-values are consistent with each other. Thus, by comparing the results shown in Table 6.23, we find some evidence that institutional holding overlapping bidding firms underperform their non-institutional holding counterparts, and this is against the hypothesized monitoring role of institutional funds.

Table 6.25. Overlapping Bidding firms (1994-1998, held<3% by institutional funds) three years post acquisition average CARs and BHARs

There are 24 UK overlapping bidding firms that are not largely or/and consistently held by institutional funds involved in the acquisition during 1994-1998 periods. Table 6.25.1 reports the result calculated by using the control firms approach. Table 6.25.2 presents the result calculated by using the Fama-French three-factor model. CAR is the average cumulative abnormal return of all the bidding firms. BHAR is the average buy-and-hold abnormal return of all the bidding firms. α is the mean intercept term of Fama-French three-factor model. Implied CAR is the mean α multiplying by 12, 24, and 36. T-statistics of the CARs and the BHARs as well as the corresponding P-values calculated by using the non-parametric Wilcoxon Signed-Rank test are given in the table.

Table 6.25.1

EM	CAR	T-Stat	P-Value
1 to 12	0.0303	0.512	0.710
1 to 24	0.1548	1.585	0.059
1 to 36	0.2760	1.765	0.042

EM	BHAR	T-Stat	P-Value
1 to 12	0.0369	0.576	0.668
1 to 24	0.2058	1.829	0.049
1 to 36	**0.4726***	2.295	0.022

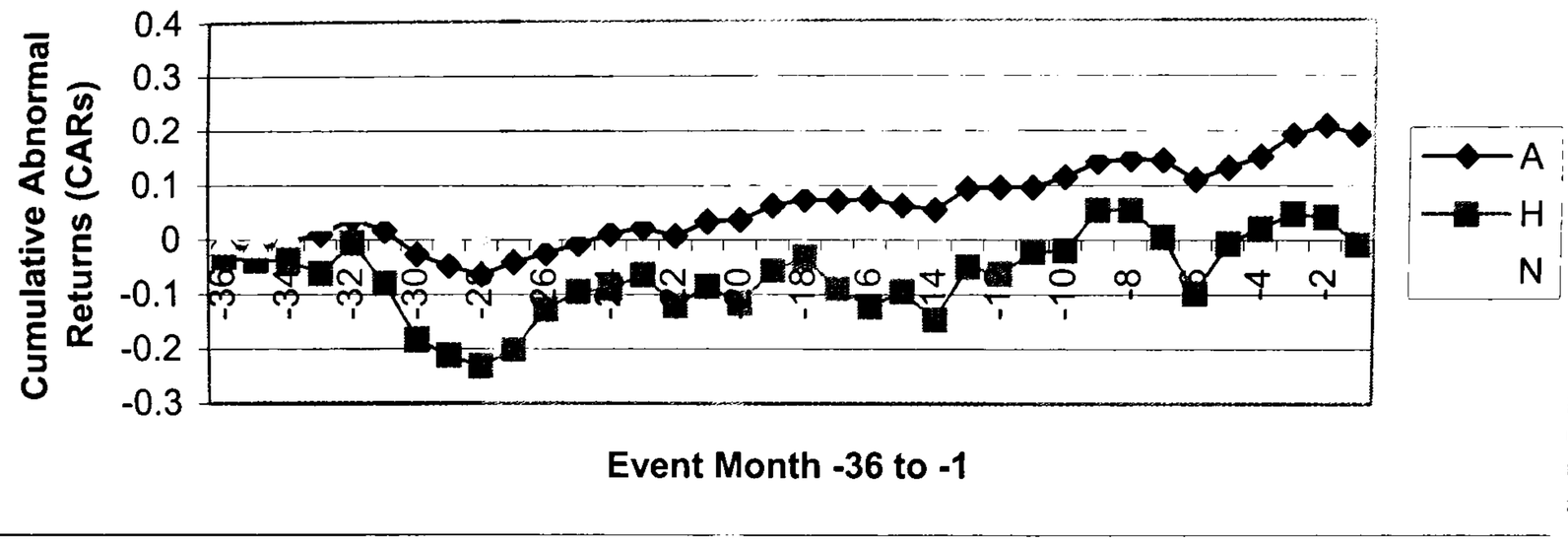
Table 6.25.2

EM	α	T-Stat	P-Value	Implied CAR
1 to 12	-0.0011	-0.226	0.658	-0.0132
1 to 24	0.0025	0.599	0.617	0.0600
1 to 36	0.0037	1.313	0.310	0.1332

* Indicate significant at 5%, two-sided t-test.

Consistent with Figure 6.12 and 6.15, Figure 6.18 shows overlapping bidding firms that are not largely or/and consistent held by institutional funds outperform their institutional holding counterparts in all the 36 month after the completion of the takeover. However, none of the CARs in Figure 6.18 are statistically significant different from zero at 5% significance level two-sided t-test.

Figure 6.18. Three years post acquisition average CARs of all, institutional holding and non-institutional holding overlapping bidding firms 1994-1998



A: all the overlapping bidding firms.
H: overlapping bidding firms largely and consistently held by institutional funds.
N: overlapping bidding firms not largely or/and consistently held by institutional funds.

In sum, after examining and comparing the three years post acquisition stock returns of three pairs of sub-samples (institutional holding bidding firms *vs.* non-institutional holding bidding firms; institutional holding non-overlapping bidding firms *vs.* non-institutional holding non-overlapping bidding firms; institutional holding overlapping bidding firms *vs.* non-institutional holding overlapping bidding firms), we do not find any evidence in supporting the monitoring role of institutional funds, and we even obtain some evidence against it. Thus, we conclude that no obvious or significant monitoring role of institutional funds have been observed in the three years after the acquisition.

5. Conclusion

This chapter examines two controversial hypothesises regarding the monitoring role of institutional funds through a new framework of the long-run stock returns of UK corporate takeovers. Since it is long argued that institutional funds are finance professionals with special expertise in corporate governance and investment management, if they are indeed monitoring firms, we would expect that stock returns of bidding firms with high level of institutional funds ownership outperform their counterparts with low or without institutional ownership in the long-run before and after the corporate takeover event.

We separate our investigation into two stages. Firstly, we examine monitoring role of institutional funds through investigating bidding firms three years pre-acquisition stock returns. We construct three pairs of sub-samples (institutional holding bidding firms *vs.* non-institutional holding bidding firms; institutional holding non-overlapping bidding firms *vs.* non-institutional holding non-overlapping bidding firms; institutional holding overlapping bidding firms *vs.* non-institutional holding overlapping bidding firms), and then calculate and compare their three years pre-acquisition stock returns of each paired sub-samples. We do not find any evidence that bidding firms with high level of institutional funds ownership outperform their counterparts with low or without this institutional ownership in three years prior to the takeover, thus no monitoring role has been detected in the three-year pre-acquisition stage.

Secondly, we turn to examine bidding firms three years post acquisition stock returns. In line with the pre-acquisition stage, we once again construct three pairs of sub-samples and compare their performance. Consistent with the findings of the pre-acquisition stage, we still do not find any evidence that institutional-holding bidding firms outperform their peers with low or non-institutional holdings in three years after the takeover. On the contrary, some evidence has been detected that low or non-institutional holding bidding firms significantly outperform their institutional holding counterparts in the three years post acquisition period, and this is against the active monitoring role hypothesis.

Put together, we do not find any evidence of active monitoring role of institutional funds in both three years pre- and post acquisition period, this observed evidence may be due to the incapability of institutional funds to monitor firms, such as their passivity, myopic goals, legal constraints, and conflict of interests. In a word, we cast our doubt on the monitoring role of institutional funds to the firms in which they hold large stakes.

Chapter Seven: Conclusions and Suggestions for Future Research

Mergers and acquisitions is one of the most researched areas in finance. Most research on the financial performance of mergers and acquisitions has focused on stock returns of target and bidding firms surrounding the takeover announcement and completion dates. Virtually all researchers have reported that target firm shareholders either successful or unsuccessful earn large significant positive abnormal returns from the takeover. Bidding firm shareholders break even or earn a small significant abnormal return around the time of acquisition.

In comparing with the research on announcement or completion period returns, only a small body of work has devoted to the investigation of long-run pre- or post acquisition stock returns to both target and bidding firms. Although the results are not all one-sided, a majority of studies (both in the UK and the US) have reported a long-run significant abnormal return to target and bidding firms in a few years prior to the takeover announcement, and a long-run significant abnormal return to the bidding firms in several years after the completion of the acquisition. Because these findings are inconsistent with the efficient market hypothesis (EMH), they remain as anomalies to us, and these anomalies make the research on the long-run stock returns of corporate takeovers particularly interesting to us.

7.1. Conclusions

In *Chapter 1*, the motivation and the objectives of the present thesis are briefly introduced and an overview of the main points addressed in the following chapters is presented. *Chapter 2* aims to provide a contemporary and comprehensive review of the key points in the mergers and acquisitions literature, especially on the shareholders' wealth effects of corporate takeovers. We discuss the motives for takeovers and analyse the size effect and the impact of methods of payment to shareholders' returns. We review a few key papers of the past three decades that have a great contribution to the development of the M & A literature. We then critically analyse the stock returns to both target and bidding firms in the entire acquisition process (i.e., from several years prior to the takeover announcement to a few years after the completion of the takeover) and summarise the previous findings on each stage of the takeover process. Finally, we provide a detailed review of the methodologies that have been applied in all these previous studies. Thus, Chapter 2 presents a general background of researches on the financial performance of mergers and acquisitions, and the empirical issues addressed in the following empirical chapters are derived on the limitations of the existing findings on mergers and acquisitions.

Chapter 3 is the methodological chapter of this thesis; it presents all the methodologies that we apply in this thesis. In Chapter 3, we firstly discuss and analyze the misspecification problems associated with previous methodologies in detecting the long-run abnormal stock returns. We then introduce the Control Firms Approach advanced by Barber and Lyon (1997). Since the control firms approach minimizes the

chances that the test statistics are misspecified, we set this approach as our main method to calculate the CARs and the BHARs throughout the whole thesis. In addition to the control firms approach, we also present the Fama-French three-factor model as an alternative to calculate the CARs. Finally, Chapter 3 describes both the conventional parametric t-test and the nonparametric Wilcoxon Signed-Rank test; both of them are used as the test statistics throughout the empirical chapters.

In *Chapter 4*, we test the validity of the control firms approach advanced by Barber and Lyon (1997) in the countries such as UK where the listed firms have various accounting year endings. We apply both CAR and BHAR to calculate the long-run abnormal stock returns for our sample firms under Barber and Lyon's approach and other approaches according to firms' accounting year endings, and test the differences of these abnormal returns calculated under these different approaches. Our findings are remarkably consistent. We do not find any statistically significant difference from either the CARs or the BHARs calculated under the Barber and Lyon's approach and other corresponding approaches. We conclude that at least in our case there is no statistically significant difference of the long-run abnormal stock returns calculated under the Barber and Lyon's approach and the approaches according to firms' accounting year endings. In a word, we find that the differences of the accounting year endings of the UK firms will not significantly affect the validity of Barber and Lyon's control firms approach.

In *Chapter 5*, we apply the control firms approach and Fama-French three-factor model as an alternative to examine the impact of overlapping returns, takeover premiums, and

methods of payment to the long-run post acquisition stock returns. Firstly, in contrast to most previous studies, we do not find any statistically significant three-year post acquisition abnormal stock returns for the UK bidding firms in the 1990s; our results are consistent with the EMH. Secondly, we find that overlapping returns do inflate the test statistics as argued by Lyon et al (1999) through inflating the long-run post acquisition average stock returns. Thirdly, after a full scale of investigation of takeover premiums, we find an optimal premium region for the bidding firms to takeover the targets. We also reject the explanation that the previous evidence of long-run post acquisition negative abnormal returns is due to a delayed market reaction to overpriced takeovers. Fourthly, we find that stock offer underperforms the other three offers in two years after the completion of the takeover. Finally, we find that Fama-French three-factor model is severely mis-specified by indicating abnormal performance too frequently. We conclude that previous findings of statistically significant long-run post acquisition abnormal returns are more likely caused by the five biases argued by Lyon et al (1999), and that leads to the mis-specification of the test statistics.

In *Chapter 6*, we apply the control firms approach and the Fama-French three-factor model as an alternative to examine the monitoring role of institutional funds through a new framework of long-run stock returns of corporate takeovers. We firstly test the monitoring role by examining bidding firms (with large level of institutional ownership or with low or without this ownership) three years pre-acquisition stock returns; we do not find any evidence in supporting the monitoring role of institutional funds in this pre-acquisition stage. Secondly, we turn to investigate the monitoring role by examine bidding firms (with large level of institutional ownership or with low or without this

ownership) three years post acquisition stock returns, we once again fail to find any evidence in favour of the monitoring role of institutional funds, on the contrary, even some evidence against the monitoring role has been detected in the three years post acquisition period. Put together, we cast our doubt on the monitoring role of institutional funds to the companies in which they hold large stakes.

7.2. Suggestions for Future Research

In the present thesis, we have re-examined the long-run pre- and post acquisition stock returns of UK bidding firms. In *Chapter 6,* we report that we do not find any statistically significant pre-acquisition abnormal returns for the UK bidding firms. In *Chapter 5*, the same results are presented to the UK bidding firms in the post acquisition period. These findings are inconsistent with most previous studies that report a significant positive pre-acquisition abnormal returns and a significant negative post acquisition abnormal returns to the bidding firms. However, our results are consistent with the efficient market hypothesis and in line with several most recent studies[9] that resolve the statistically significant long-run anomalies in quite a few corporate events.

Since a majority of previous studies[10] have also reported a long-run pre-acquisition significant negative abnormal return[11] to the target firms, and we think the detected underperformance of target firms in the pre-takeover period may also be resolved by applying the new methodologies that eliminate the chances of misspecification to the parametric t-test. Thus, we suggest that the issue of underperformance of target firms in the pre-acquisition period would better be revisited.

---

[9] A few researchers have recently reexamined the anomalies that were previously reported in the event studies. See, for example, Mitchell and Stafford (2000) does not find any statistically significant long-run anomalies in corporate takeovers; share repurchases, and seasoned equity offerings (SEOs). Brav et al (2000) have resolved the long-run anomalies associated with SEOs and IPO. Eckbo et al (2000) and Eckbo and Norli (2000) have resolved the long-run anomalies associated with SEOs and IPO respectively. Gompers and Lerner (2001) have resolved the long-run anomalies associated with IPO. Boehme and Sorescu (2002) have resolved the anomalies following dividend initiations and resumptions.

[10] Most previous studies regarding the long-run pre-acquisition stock returns of target firms are written in a long time ago, and mainly conducted in the 1970s and early 1980s, with the sample period prior to the 1980.

[11] See, for example, Mandelker (1974), Ellert (1976), Langetieg (1978), Firth (1979), Asquith (1983), Malatesta (1983). This list is by no means exhaustive.

Furthermore, in *Chapter 5*, we have examined the bidding firms long-run post acquisition stock returns based on various takeover premiums and methods of payment. Since bidding firms experience different stock returns with offering different premiums or methods of payment, there must be some distinctive characteristics of these firms to offer different premiums or payments. These characteristics could be similar size or book-to-market ratio of a group of bidding firms that offer one kind of premiums or payments. In addition, what kinds of long-run pre-acquisition stock return of each group of bidding firms (according to the premium or payment) are? Do these different pre-acquisition stock returns affect the bidding firms' decision-making on offering takeover premiums or methods of payment. Finally, what kind of relationship between takeover premiums and methods of payment? Are the premiums and payments mutually affected? We believe it would be interesting to explore the above questions.

Finally, in *Chapter 6*, we compare the pre- and post acquisition stock returns of bidding firms with large level of institutional funds ownership or with low or without this ownership. What are the characteristics of some bidding firms that are particularly interested to the institutional funds and attract them to hold a large stake? Are there significant differences, for example, size, book-to-market ratio, and earnings/share etc., between the bidding firms largely held by institutional funds and the bidding firms with low or without institutional ownership? It demands further investigation.

Bibliography

Acquisition Monthly, (issues from 1991-2001), Thomson Financial

Admati, A. R., P. Pleiderer, and J. Zechner, 1994, Large shareholder activism, risk sharing and financial market equilibrium, Journal of Political Economy 102, 1097-1130.

Agrawal, A. and C. R. Knoeber, 1998, Managerial compensation and the threat of takeover, *Journal of Financial Economics* 47, 219-239.

Agrawal, A. and J. F. Jaffe, 2000, The Post-Merger Performance Puzzle, *JAI Series: Advances in Mergers and Acquisitions,* [G. Cooper and A. Gregory eds.] JAI, Elsevier Science, Vol. 1, Oct. 2000, 7-41.

Agrawal, A. and G. N. Mandelker, 1990, Large shareholders and the monitoring of managers: the case of antitakeover charter amendments, *Journal of Financial and Quantitative Analysis* 25, 143-161.

Agrawal, A., J. F. Jaffe, and G. N. Mandelker, 1992, The post-merger performance of acquiring firms: A re-examination of an anomaly, *Journal of Finance* 47, 1605-1622.

Agrawal, A. and G. N. Mandelker, 1987, Managerial incentives and corporate investment and financing decisions, *Journal of Finance* 42, 823-837.

Agrawal, A. and R. A. Walkling, 1994, Executive careers and compensation surrounding takeover bids, *Journal of Finance* 49, 985-1014.

Alberts, W. W. and N. P. Varaiya, 1989, Assessing the profitability of growth by acquisition: a premium recapture approach, *International Journal of Industrial Organization* 7, 133-149.

Amihud, Y., B. Lev, and N. G. Travlos, 1990, Corporate control and the choice of investment financing: the case of corporate acquisitions, *Journal of Finance* 45, 603-616.

Anderson, C. and G. Mandelker, 1993, Long run return anomalies and the book-to-market effect: evidence on mergers and IPOs, Working Paper, Joseph M. Katz Graduate School of Business, University of Pittsburgh.

Asquith, P., 1983, Merger bids, uncertainty, and stockholder returns, *Journal of Financial Economics* 11, 51-83.

Asquith, P., R. F. Bruner, and D. W. Mullins, Jr., 1983, The gains to bidding firms from merger, *Journal of Financial Economics* 11, 121-139.

Asquith, P. and E. H. Kim, 1982, The impact of merger bids on the participating firms' security holders, *Journal of Finance* 37, 1209-1228.

Auerbach, A. J. and D. Reishus, 1988, The impact of taxation on mergers and acquisitions, in A. J. Auerbach, ed.: *Mergers and Acquisitions* (The University of Chicago Press), 69-85.

Baker, R. D. and R. J. Limmack, 2001, UK takeovers and acquiring company wealth changes: the impact of survivorship and other potential selection biases on post-outcome performance, Working Paper, University of Stirling.

Barber, B. M. and J. D. Lyon, 1997, Detecting long-run abnormal stock returns: the empirical power and specification of test statistics, *Journal of Financial Economics* 43, 341-372.

Barber, B. M. and J. D. Lyon, 1997, Firm size, book-to-market ratio, and security returns: a holdout sample of financial firms, *Journal of Finance* 52, 875-883.

Barnes, P., 1984, The effect of a merger on the share price of the attacker, revisited, *Accounting and Business Research* 15, 45-49.

Barnes, P., 1998, Why do bidders do badly out of mergers? Some UK evidence, *Journal of Business Finance and Accounting* 25, 571-594.

Bergin, P. R., 1988, Voting by institutional investors on corporate governance issues in the 1988 proxy season, (Investor Responsibility Research Center, Washington, DC).

Berkovitch, E. and N. Khanna, 1990, How target shareholders benefit from value-reducing defensive strategies in takeovers, *Journal of Finance* 45, 137-156.

Berkovitch, E. and M. P. Narayanan, 1993, Motives for takeovers: An empirical investigation, *Journal of Financial and Quantitative Analysis* 28, 347-362.

Billett, M. T. and M. Ryngaert, 1997, Capital structure, asset structure and equity takeover premiums in cash tender offers, *Journal of Corporate Finance* 3, 141-165.

Blake, D., B. N. Lehmann, and A. Timmermann, 1999, Asset allocation dynamics and pension fund performance, *Journal of Business* 72, 429-461.

Boehme, R. D. and S. M. Sorescu, 2002, The long-run performance following dividend initiations and resumptions: underreaction or product of chance? *Journal of Finance* 57, 871-900.

Bradley, M., 1980, Interfirm tender offers and the market for corporate control, *Journal of Business* 53, No.4, 345-376.

Bradley, M., A. Desai, and E. H. Kim, 1983, The rationale behind interfirm tender offers, information or synergy? *Journal of Financial Economics* 11, 183-206.

Bradley, M., A. Desai, and E. H. Kim, 1988, Synergistic gains from corporate acquisitions and their division between the stockholders of target and acquiring firms, *Journal of Financial Economics* 21, 3-40.

Bradley, M. and G. A. Jarrell, 1988, "Comment," in J. C. Coffee, L. Lowenstein, and S. Rose-Ackerman, eds., *Knights, Raiders and Targets: The Impact of the Hostile Takeover*, Oxford University Press.

Brav, A., 2000, Inference in long-horizon event studies: a Bayesian approach with application to initial public offerings, *Journal of Finance* 55, 1979-2016.

Brav, A., C. Geczy, and P. Gompers, 2000, Is the abnormal return following equity issuances anomalies? *Journal of Financial Economics* 56, 209-249.

Brealey, R. A. and S. C. Myers, *Principles of Corporate Finance*, 6th edition (McGraw-Hill)

Brown, D. T. and M. D. Ryngaert, 1991, The mode of acquisition in takeovers: taxes and asymmetric information, *Journal of Finance* 46, 653-669.

Brown S. J. and J. B. Warner, 1980, Measuring security price performance, *Journal of Financial Economics* 8, 205-258.

Brown S. J. and J. B. Warner, 1985, Using daily stock returns: The case of event studies,*Journal of Financial Economics* 14, 3-31.

Burkart, M., 1995, Initial shareholdings and overbidding in takeover contests, *Journal of Finance* 50, 1491-1515.

Bushee, B, 1998, Institutional investors, long-term investment, and earnings management, Working Paper, Graduate School of Business Administration, Harvard University.

Carleton, W. T., D. K. Guilkey, R. S. Harris, and J. F. Stewart, 1983, An empirical analysis of the role of the medium of exchange in mergers, *Journal of Finance* 38, 813-826.

Carleton, W. T., J. M. Nelson, and M. S. Weisbach, 1998, The influence of institutions on corporate governance through private negotiations: evidence from TIAA-CAEF. *Journal of Finance* 53, 1335-1362.

Chang, S., 1998, Takeovers of privately held targets, method of payment, and bidder returns, *Journal of Finance* 53, 773-784.

Coggin, T. D., F. J. Fabozzi, and S. Rahman, 1993, The investment performance of U.S. equity pension fund managers: an empirical investigation, *Journal of Finance* 48, 1039-1055.

Copeland, T. E. and J. F. Weston, *Financial Theory and Corporate Policy*, 3rd edition (Addison Wesley).

Cotter, J. F. and M. Zenner, 1994, How managerial wealth affects the tender offer process, *Journal of Financial Economics* 35, 63-97.

Cuthbertson, K., 1996, *Quantitative Financial Economics* (John Wiley & Sons).

Davidson III W. N. and L. T. W. Cheng, 1997, Target firm returns: Does the form of payment affect abnormal returns? *Journal of Business Finance and Accounting*24, 465-479.

Davidson III W. N., D. Dutia, and L. Cheng, 1989, A re-examination of the market reacti on to failed mergers, *Journal of Finance* 44, 1077-1083.

Davis, E. P., 1995, *Pension Funds, Retirement-Income, Security and Capital Markets. An International Perspective,* (Clarendon Press, Oxford).

Del Guercio, D. and J. Hawkins, 1999, The motivation and impact of pension fund activism, *Journal of Financial Economics* 52, 293-340.

Demsetz, H., 1983, The structure of ownership and the theory of the firm, *Journal of Law and Economics* 26, 375-390.

Demsetz, H. and K. Lehn, 1985, The structure of corporate ownership: causes and consequences, *Journal of Political Economy* 93, 1155-1177.

Dennis, D. K. and J. J. McConnell, 1986, Corporate mergers and security returns, *Journal of Financial Economics* 16, 143-187.

Dimson, E. and P. Marsh, 1986, Event study methodologies and the size effect: The case of U.K. press recommendations, *Journal of Financial Economics* 17, 113-142.

Dodd, P., 1980, Merger proposals, management discretion and stockholder wealth, *Journal of Financial Economics* 8, 105-137.

Dodd, P. and R. Ruback, 1977, Tender offers and stockholders returns: An empirical analysis, *Journal of Financial Economics* 5, 351-373.

Dodds, J. C. and J. P. Quek, 1985, Effect of mergers on the share price movement of the acquiring firms: A U.K. study, *Journal of Business Finance and Accounting*12, 285-296.

Draper, P. and K. Paudyal, 1999, Corporate takeovers: Mode of payment, returns and trading activity, *Journal of Business Finance and Accounting* 26, 521-558.

Duggal, R. and J. A. Millar, 1999, Institutional ownership and firm performance: the case of bidder returns, *Journal of Corporate Finance* 5, 103-117.

Eckbo, B. E., R. Masulis, and O. Norli, 2000, Seasoned public offerings: resolution of the "new issue puzzle," *Journal of Financial Economics* 56, 251-291.

Eckbo, B. E. and O. Norli, 2000, Leverage, liquidity, and long-run IPO returns, Working paper, Tuck School of Business Administration, Dartmouth College.

Ellert, J. C., 1976, Mergers, antitrust law enforcement and stockholder returns, *Journal of Finance* 31, 715-732.

Fabozzi, F. J., M. G. Ferri, T. D. Fabozzi, and J. Tucker, 1988, A note on unsuccessful tender offers and stockholder returns, *Journal of Finance* 43, 1275-1283.

Faccio, M. and M. A. Lasfer, 2000, Do occupational pension funds monitor companies in which they hold large stakes? *Journal of Corporate Finance* 6, 71-110.

Fama, E. F., 1976, *Foundations of Finance*, (Basic Books, New York).

Fama, E. F., 1991, Efficient capital markets: II, *Journal of Finance* 46, 1575-1617.

Fama, E. F., 1998, Market efficiency, long-term returns, and behavioural finance, *Journal of Financial Economics* 49, 283-306.

Fama, E. F., L. Fisher, M. C. Jensen, and R. Roll, 1969, The adjustment of stock prices to new information, *International Economic Review* 10, 1-21.

Fama, E.F. and K. R. French, 1992, The cross-section of expected stock returns, *Journal of finance* 47, 427-465.

Fama, E.F. and K. R. French, 1993, Common risk factors in the returns on stocks and bonds, *Journal of Financial Economics* 33, 3-56.

Fama, E.F. and K. R. French, 1996, Multifactor explanations of asset pricing anomalies, *Journal of Finance* 51, 55-84.

Fama, E. F. and J. D. MacBeth, 1973, Risk, return, and equilibrium:Empirical tests, *Journal of Political Economy*, 607-636.

Firth, M., 1979, The profitability of takeovers and mergers, *The Economic Journal* 89, 316-328.

Firth, M., 1980, Takeovers, shareholder returns, and the theory of the firm, *Quarterly Journal of Economics*, 235-260.

Fishman, M., 1989, Preemptive bidding and the role of the medium of exchange in acquisitions, *Journal of Finance* 44, 41-58.

Franks, J., J. E. Broyles, and M. J. Hecht, 1977, An industry study of the profitability of mergers in the United Kingdom, *Journal of Finance* 32, 1513-1525

Franks, J. R. and R. S. Harris, 1989, Shareholder wealth effects of corporate takeovers: the U.K. experience 1955-1985, *Journal of Financial Economics* 23, 225-249.

Franks, J. R. and R. S. Harris, 1989, Shareholder wealth effects of U.K. takeovers: Implications for merger policy, in J. A. Fairburn and J. A. Kay, eds.: *Mergers and Merger Policy* (Oxford University Press), 148-174.

Franks, J. R., R. S. Harris, and C. Mayer, 1988, Means of payment in takeovers: results for the U.K. and the U.S., in A. Auerbach, ed.: *Mergers and Acquisitions* (University of Chicago Press).

Franks, J., R. Harris, and S. Titman, 1991,The postmerger share-price performance of acquiring firms, *Journal of Financial Economics* 29, 81-96.

Franks, J. and C. Mayer, 1996, Hostile takeovers and the correction of managerial failure, *Journal of Financial Economics* 40, 163-181.

Galai, D. and R. W. Masulis, 1976, The option pricing model and the risk factor of stock, *Journal of Financial Economics*.

Fama, E.F. and K. R. French, 1992, The cross-section of expected stock returns, *Journal of finance* 47, 427-465.

Fama, E.F. and K. R. French, 1993, Common risk factors in the returns on stocks and bonds, *Journal of Financial Economics* 33, 3-56.

Fama, E.F. and K. R. French, 1996, Multifactor explanations of asset pricing anomalies, *Journal of Finance* 51, 55-84.

Fama, E. F. and J. D. MacBeth, 1973, Risk, return, and equilibrium:Empirical tests, *Journal of Political Economy*, 607-636.

Firth, M., 1979, The profitability of takeovers and mergers, *The Economic Journal* 89, 316-328.

Firth, M., 1980, Takeovers, shareholder returns, and the theory of the firm, *Quarterly Journal of Economics*, 235-260.

Fishman, M., 1989, Preemptive bidding and the role of the medium of exchange in acquisitions, *Journal of Finance* 44, 41-58.

Franks, J., J. E. Broyles, and M. J. Hecht, 1977, An industry study of the profitability of mergers in the United Kingdom, *Journal of Finance* 32, 1513-1525

Franks, J. R. and R. S. Harris, 1989, Shareholder wealth effects of corporate takeovers: the U.K. experience 1955-1985, *Journal of Financial Economics* 23, 225-249.

Franks, J. R. and R. S. Harris, 1989, Shareholder wealth effects of U.K. takeovers: Implications for merger policy, in J. A. Fairburn and J. A. Kay, eds.: *Mergers and Merger Policy* (Oxford University Press), 148-174.

Franks, J. R., R. S. Harris, and C. Mayer, 1988, Means of payment in takeovers: results for the U.K. and the U.S., in A. Auerbach, ed.: *Mergers and Acquisitions* (University of Chicago Press).

Franks, J., R. Harris, and S. Titman, 1991,The postmerger share-price performance of acquiring firms, *Journal of Financial Economics* 29, 81-96.

Franks, J. and C. Mayer, 1996, Hostile takeovers and the correction of managerial failure, *Journal of Financial Economics* 40, 163-181.

Galai, D. and R. W. Masulis, 1976, The option pricing model and the risk factor of stock, *Journal of Financial Economics*.

Gillan, S. L. and L. T. Starks, 2000, Corporate governance proposals and shareholder activism: the role of institutional investors, *Journal of Financial Economics* 57, 275-305.

Gompers, P. and J. Lerner, 2001, The really long-run performance of initial public offerings: the pre-NASDAQ evidence, Working paper, Harvard Business School.

Gompers, P. and A. Metrick, 2001, Institutional investors and equity prices, *Quarterly Journal of Economics 116.*

Grinblatt, M. and S. Titman, 1988, The evaluation of mutual fund performance: An analysis of monthly returns, Working paper, UCLA.

Grinblatt, M. and S. Titman, 1989a, Mutual fund performance: An analysis of quarterly portfolio holdings, *Journal of Business* 62, 393-416.

Grinblatt, M. and S. Titman, 1989b, Portfolio performance evaluation: Old issues and new insights, *Review of Financial Studies* 2, 391-421.

Gregory, A., 1997, An examination of the long run performance of UK acquiring firms, *Journal of Business Finance and Accounting* 24, 971-1002.

Guercio, D. D. and J. Hawkins, 1999,The motivation and impact of pension fund activism, *Journal of Financial Economics* 52, 293-340.

Halpern, P., 1983, Corporate acquisitions: A theory of special cases? A review of event studies applied to acquisitions, *Journal of Finance* 38, 297-317.

Hansen, R., 1987, A theory of the medium of exchange in mergers and acquisitions, *Journal of Business* 60, 75-96.

Harford, J., 1999, Corporate cash reserves and acquisitions, *Journal of Finance* 54, 1969-1997.

Harris, R. S. and D. Ravenscraft, 1991,The role of acquisitions in foreign direct investment: evidence from the U.S. stock market, *Journal of Finance* 46, 825-844.

Hayward M. L. A. and D. C. Hambrick, 1995, Explaining premiums paid for large acquisitions: evidence of CEO hubris, Working Paper, Columbia University.

Healy, P. M., K. G. Palepu, and R. S. Ruback, 1992, Does corporate performance improve after mergers? *Journal of Financial Economics* 31, 135-175.

Helm, D., 1989, Mergers, takeovers, and the enforcement of profit maximization, in J. A. Fairburn and J. A. Kay, eds.: *Mergers and Merger Policy* (Oxford University Press), 133-147.

Herman, E. and L. Lowenstein, 1988, The efficiency effects of hostile takeovers, in J. Coffee, Jr., L. Lowenstein and S. Rose-Ackerman, eds: *Knights, Raiders and Targets* (Oxford University Press, Oxford, England), 211-240.

Higgins R. C. and L. D. Schall, 1975, Corporate bankruptcy and conglomerate merger, *Journal of Finance* 30,

Hogarty, T., 1970, The profitability of corporate mergers, *Journal of Business*, 1970, 317-327.

Holland, K. M. and L. Hodgkingson, 1994, The pre-announcement share price behaviour of UK takeover targets, *Journal of Business Finance and Accounting* 21, 467-490.

Huang, Y. S. and R. A. Walkling, 1987, Target abnormal returns associated with acquisition announcements, payment, acquisition form, and managerial resistance, *Journal of Financial Economics* 19, 329-349.

Hughes, A., 1989, The impact of merger: A survey of empirical evidence of the U.K., in J. A. Fairburn and J. A. Kay, eds.: *Mergers and Merger Policy*(Oxford University Press), 30-98.

Ibbotson R. G., 1975, Price performance of common stock new issues, *Journal of Financial Economics* 2, 235-272.

IFSL, 2001, Fund Management Brief, International Financial Services, London (IFSL), September, 2001.

Ikenberry, D., J. Lakonishok, and T. Vermaelen, 1995, Market underreaction to open market share repurchases, *Journal of Financial Economics* 39, 181-208.

Israel, R., 1991, Capital structure and the market for corporate control: the defensive role of debt financing, *Journal of Finance* 46, 1391-1409.

Jarrell, G. A., J. A. Brickley, and J. M. Netter, 1988, The market for corporate control: the empirical evidence since 1980, *Journal of Economic Perspectives* 2, 49-68.

Jarrell, G. A., K. Lehn, and W. Marr, 1985, Institutional ownership, tender offers and long term investments, Unpublished SEC study.

Jarrell, G. A. and A. Poulsen, 1987, Shark repellents and stock prices: the effects of anti-takeover amendments since 1980, *Journal of Financial Economics* 19, 127-168.

Jensen, M. C, 1989, The eclipse of the public corporate, *Harvard Business Review* 5, 61-75.

Jensen, M. C. and R. S. Ruback, 1983, The market for corporate control: The scientific evidence, *Journal of Financial Economics* 11, 5-50.

Kaplan, S. N. and M. S. Weisbach, 1992, The success of acquisitions: evidence from divestitures, *Journal of Finance* 47, 107-138.

Karpoff, J. M., P. H. Malatesta, and R. A. Walkling, 1996, Corporate governance and shareholder initiatives: empirical evidence, *Journal of Financial Economics* 42, 365-395.

Kelly, E. M., 1967, The profitability of growth through mergers, Pennsylvania State Univ.

Kennedy, V. A. and R. J. Limmack, 1996, Takeover activity, CEO turnover, and the market for corporate control, *Journal of Business Finance and Accounting* 23, 267-285.

Keown, A. J., J. M. Pinkerton, and P. J. Bolster, 1992, Merger announcements, asymmetrical information, and trading volume: An empirical investigation, *Journal of Business Finance and Accounting* 19, 901-910.

Kim, E. H. and J. J. McConnell, 1977, Corporate mergers and the co-insurance of corporate debt, *Journal of Finance* 32, 349-363.

King, M., 1989, Takeover activity in the United Kingdom, in J. A. Fairburn and J. A. Kay, eds.: *Mergers and Merger Policy* (Oxford University Press), 99-115.

Kothari, S. P. and J. B. Warner, 1997, Measuring long-horizon security price performance, *Journal of Financial Economics* 43, 301-339.

Lahey, K. E. and R. L. Conn, 1990, Sensitivity of acquiring firms' returns to alternative model specifications and disaggregation, *Journal of Business Finance and Accounting*17, 421-439.

Langetieg, T. C., 1978, An application of a three-factor performance index to measure stockholder gains from merger, *Journal of Financial Economics* 6, 365-383.

Lefanowicz, C. E., J. R. Robinson and R. Smith, 2000, Golden parachutes and managerial incentives in corporate acquisitions: evidence from the 1980s and 1990s, *Journal of Corporate Finance* 6, 215-239.

Lehmann, E. and J. Weigand, 2000, Does the governed corporation perform better? Governance structures and corporate performance in Germany, *European Finance Review* 4, 157-195.

Lev, B. and G. Mandelker, 1972, The microeconomic consequences of corporate mergers, *Journal of Business*, 1972, 85-104.

Lewellen, W. G., 1971, A pure financial rationale for the conglomerate merger, *Journal of Finance* 26,

Limmack, R. J., 1991, Corporate mergers and shareholder wealth effects: 1977-1986, *Accounting and Business Research* 21, 239-251.

Limmack, R. J., 1997, Discussion of an examination of the long run performance of UK acquiring firms, *Journal of Business Finance and Accounting* 24, 1003-1007.

Linn, S. C. and J. A. Switzer, 2001, Are cash acquisitions associated with better post combination operating performance than stock acquisitions? *Journal of Banking and Finance* 25, 1113-1138.

Lintner, J., 1965, The valuation of risk assets and the selection of risky investments in stock portfolios and capital budgets, *Review of Economics and Statistics* 47, 13-37.

Loderer, C. and K. Martin, 1992, Post acquisition performance of acquiring firms, *Financial Management*, 21(3), 69-79.

Loughran, T. and J. R. Ritter, 2000, Uniformly least powerful tests of market efficiency, *Journal of Financial Economics* 55, 361-389.

Loughran, T. and A. M. Vijh, 1997, Do long-term shareholders benefit from corporate acquisitions? *Journal of Finance* 52, 1765-1790.

Lyon, J. D., B. M. Barber and C. Tsai, 1999, Improved methods for tests of long-run abnormal stock returns, *Journal of Finance* 54, 165-201.

Maddala, G. S., 1992, *Introduction to Econometrics*, 2th Edition, (Prentice Hall).

Magenheim, E. B. and D. C. Mueller, 1988, Are acquiring firm shareholders better off after an acquisition, in J. C. Coffee, Jr., L. Lowenstein, and S. Rose-Ackerman, editors,

Knights, Raiders and Targets: The Impact of the Hostile Takeover, New York, Oxford University Press.

Malatesta P. H., 1983, The wealth effect of merger activity and the objective functions of merging firms, *Journal of Financial Economics* 11, 155-181.

Mandelker, G., 1974, Risk and return:The case of merging firms, *Journal of Financial Economics* 1, 303-335.

Manson, S., A. W. Stark and H. M. Thomas, 1994, A cash flow analysis of the operational gains from takeovers, ACCA Research Report 35.

Maquieira, C. P., W. L. Megginson and L. Nail, 1998, Wealth creation versus wealth redistributions in pure stock-to-stock mergers, *Journal of Financial Economics* 48, 3-33.

Martin, K. J., 1996, The method of payment in corporate acquisitions, investment opportunities, and management ownership, *Journal of Finance* 51, 1227-1246.

Martin, K. J. and J. J. McConnell, 1991, Corporate performance, Corporate takeovers, and management turnover, *Journal of Finance* 46, 671-687.

Mitchell, M. L. and E. Stafford, 2000, Managerial decisions and long-term stock price performance, *Journal of Business* 73, 287-329.

Morck, R., A. Shleifer, and R. W. Vishny, 1990, Do managerial objectives drive bad acquisitions? *Journal of Finance* 45, 31-48.

Mueller, D. C., 1989, Mergers: causes, effects and policies, *International Journal of Industrial Organization* 7, 1-10.

Mulherin, J. H. and A. L. Boone, 2000, Comparing acquisitions and divestitures, *Journal of Corporate Finance* 6, 117-139.

Murphy, K. and K. Van Nuys, 1994, State pension fund shareholder activism, working paper, Harvard Business School, Boston, MA.

Myers, S. C. and N. S. Majluf, 1984, Corporate financing and investment decisions when firms have information that investors do not have, *Journal of Financial Economics* 13, 187-221.

Nesbitt, S. L., 1994, Long-term rewards from shareholder activism: a study of the 'CalPERS effect', *Journal of Applied Corporate Finance* 6, 75-80.

Newbould, G. D., 1970, *Management and Merger Activity* (Liverpool: Guthstead, 1970).

Peacock, A. and G. Bannock, 1991, *Corporate Takeovers and the Public Interest*, (Aberdeen University Press, Aberdeen).

Pension Week, 2001, FT Business, Financial Times.

Pratten, C. and S. Satchell, 1998, *Pension Scheme Investment Policies*, DSS Research Report No. 82.

Rajgopal, S. and M. Venkatachalam, 1998, The role of institutional investors in corporate governance: an empirical investigation, Working Paper, University of Washington.

Rajgopal, S., M. Venkatachalam, and J. Jiambalvo, 1999, Is institutional ownership associated with earnings management and the extent to which stock prices reflect future Earnings? Working Paper, University of Washington.

Rau, P. R. and T. Vermaelen, 1998, Glamour, value and the post-acquisition performance of acquiring firms, *Journal of Financial Economics* 49, 223-253.

Ravenscraft, D. and F. M. Scherer, 1987, *Mergers, Selloffs and Economic Efficiency* (The Brookings Institution, Washington, DC)

Ritter, J., 1991, The long-run performance of initial public offerings, *Journal of Finance* 46, 3-27.

Roll, R., 1986, The hubris hypothesis of corporate takeovers, *Journal of Business* 59, 197-216.

Romano, R., 1994, Public pension fund activism in corporate governance reconsidered, *Columbia Law Review* 93, 795-853.

Ruback, R. S., 1983, Assessing competition in the market for corporate acquisitions, *Journal of Financial Economics* 11, 141-153.

Ruback, R. S., 1988, Do target shareholders lose in unsuccessful control contests? in: Alan Auerbach, ed., *Corporate takeovers: causes and consequences,* University of Chicago Press, Chicago.

Safieddine, A. and S. Titman, 1999, Leverage and corporate performance: evidence from unsuccessful takeovers, *Journal of Finance* 54, 547-580.

Samuelson, W. and L. Rosenthal, 1986, Price movements as indicators of tender offer success, *Journal of Finance* 41, 481-499.

Sanders, R. W. Jr., and J. S. Zdanowicz, 1992, Target firm abnormal returns and trading volume around the initiation of change in control transactions, *Journal of Financial and Quantitative Analysis* 27, 99-129.

Schipper, K. and R. Thompson, 1983, Evidence on the capitalized value of merger activity for acquiring firms, *Journal of Financial Economics* 11, 85-119.

Seyhun, H. N., 1990, Do bidder managers knowingly pay too much for target firms? *Journal of Business* 63, 439-464.

Sharpe, W. F., 1964, Capital asset prices: a theory of market equilibrium under conditions of risk, *Journal of Finance* 19, 425-442.

Shleifer, A. and R. W. Vishny, 1986, Large shareholders and corporate control, *Journal of Political Economy* 94, 461-488.

Sicherman, N. W. and R. H. Pettway, 1987, Acquisition of divested assets and shareholders' wealth, *Journal of Finance* 42, 1261-1273.

Singh, A., 1975, Takeovers, economic natural selection, and the theory of the firm, *Economic Journal*, Sept, 1975, 497-515.

Slusky, A. R. and R. E. Caves, 1991, Synergy, agency, and the determinants of premium paid in mergers, *Journal of Industrial Economics* 39, 277-296.

Smith, M. P., 1996, Shareholder activism by institutional investors: evidence from CalPERS, *Journal of Finance* 51, 227-252.

Song, M. H. and R. A. Walking, 2000, Abnormal returns to rivals of acquisition targets: a test of the "acquisition probability hypothesis", *Journal of Financial Economics* 55, 143-171.

Sorensen, D. E., 2000, Characteristics of merging firms, *Journal of Economics and Business* 52, 423-433.

Strong, N., 1992, Modeling abnormal returns: A review article, *Journal of Business Finance and Accounting* 19, 533-553.

Stulz, R. M., R. A. Walkling, and M. H. Song, 1990, The distribution of target ownership and the division of gains in successful takeovers, *Journal of Finance* 45, 817-833.

Sudarsanam, S., P. Holl, and A. Salami, 1996, Shareholder wealth gains in mergers: effect of synergy and ownership structure, *Journal of Business Finance and Accounting* 23, 673-698.

Taggart, Jr. R. A., 1988, The growth of the "Junk" bond market and its role in financing takeovers, in A. J. Auerbach, ed.: *Mergers and Acquisitions*(The University of Chicago Press), 5-23.

Travlos, N. G., 1987, Corporate takeover bids, methods of payment, and bidding firms' stock returns, *Journal of Finance* 42, 943-963.

Wahal, S., 1996, Pension fund activism and firm performance, *Journal of Financial and Quantitative Analysis* 31, 1-23.

Wahal, S. and J. J. McConnell, 2000, Do institutional investors exacerbate managerial myopia? *Journal of Corporate Finance* 6, 307-329.

Wansley, J. W., W. R. Lane, and H. C. Yang, 1983, Abnormal returns to acquired firms by type of acquisition and method of payment, *Financial Management* 12, 16-22.

Appendix 1. Long-Run Post Acquisition Stock Returns and the Impact of Overlapping Returns: A Sub-Sample (1995-1998)

Table A1.1 reports bidding firms (1995-1998) three years post acquisition average ARs and CARs. Three monthly average ARs are significant at 5% two-sided t-test. They are month 15, month 18, and month 28, that is consistent with the results reported in Table 5.2 for the UK bidding firms of 1991-1998 periods. Comparing to the CARs presented in Table 5.2, 2 out of 14 CARs are statistically significant different from zero in the first 14 months, while the t-values of other 12 CARs are quite big and close to the significant point. There is no CAR significant from month 15 to month 36, which is consistent with previous evidence.

Table A1.1. Bidding firms (1995-1998) three-year post acquisition average ARs and CARs

There are 112 UK bidding firms involved in the acquisitions during 1995-1998 periods. AR is the monthly average abnormal return of all the bidding firms. CAR is the cumulative average abnormal return of all the bidding firms. T-statistics of the monthly ARs and CARs are also given in the table.

EM	AR	T-Stat	CAR	T-Stat
Month 1	-0.0122	-1.215	-0.0122	-1.215
Month 2	-0.0173	-1.859	**-0.0294***	-2.122
Month 3	-0.0203	-1.809	**-0.0497***	-2.686
Month 4	0.0056	0.416	-0.0441	-1.908
Month 5	-0.0047	-0.421	-0.0489	-1.805
Month 6	-0.0053	-0.517	-0.0542	-1.755
Month 7	-0.0147	-1.283	-0.0689	-1.946
Month 8	-0.0024	-0.176	-0.0713	-1.776
Month 9	-0.0153	-1.132	-0.0866	-1.952
Month 10	-0.0036	-0.334	-0.0902	-1.896
Month 11	-0.0048	-0.302	-0.0950	-1.883
Month 12	0.0011	0.113	-0.0939	-1.804
Month 13	0.0064	0.437	-0.0875	-1.650
Month 14	-0.0029	-0.212	-0.0903	-1.568
Month 15	**0.0266***	2.092	-0.0637	-1.092
Month 16	0.0226	1.691	-0.0411	-0.686
Month 17	-0.0142	-0.860	-0.0553	-0.880
Month 18	**0.0384***	2.736	-0.0170	-0.253
Month 19	-0.0030	-0.259	-0.0200	-0.301
Month 20	-0.0189	-1.387	-0.0388	-0.558
Month 21	0.0019	0.126	-0.0369	-0.517
Month 22	-0.0007	-0.049	-0.0377	-0.515

Month 23	-0.0121	-0.696	-0.0498	-0.667
Month 24	0.0112	0.829	-0.0386	-0.530
Month 25	-0.0141	-0.995	-0.0527	-0.704
Month 26	0.0214	1.463	-0.0313	-0.412
Month 27	0.0102	0.565	-0.0211	-0.280
Month 28	**0.0317***	2.036	0.0105	0.140
Month 29	0.0131	0.814	0.0237	0.306
Month 30	0.0140	0.862	0.0377	0.474
Month 31	0.0070	0.443	0.0447	0.554
Month 32	0.0129	0.775	0.0576	0.718
Month 33	-0.0028	-0.195	0.0549	0.692
Month 34	0.0139	0.872	0.0687	0.859
Month 35	0.0188	1.118	0.0876	1.085
Month 36	-0.0268	-1.441	0.0607	0.721

* Indicate significant at 5%, two-sided t-test.

Figure A1.1 shows the bidding firms (1995-1998) three-year post acquisition monthly average CARs. We find that the return pattern is closely consistent with our findings of bidding firms in 1991-1998 periods shown in Figure 5.1. However, it is only two points significant in the first 14 months (though the t-values are quite big for other months), while 11 out of 14 points are significant in Figure 5.1.

Figure A1.1. Bidding firms (95-98) three-year post acquisition average CARs

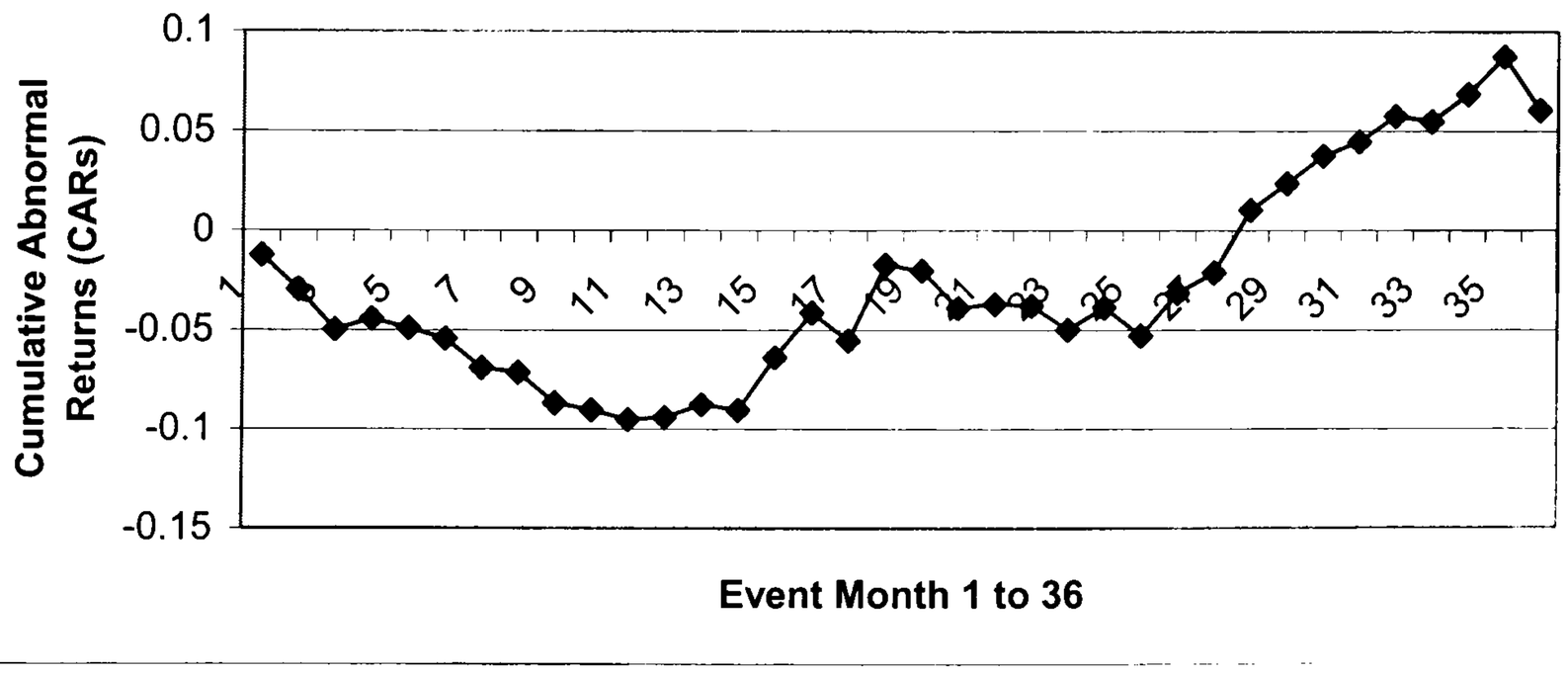


Table A1.2.1 presents bidding firms (1995-1998) three years post acquisition average CARs and average BHARs, their t-statistics and the nonparametric p-values. None of the CARs in the three periods are statistically significant different from zero at the 5% significance level according to both t-statistics and p-values. On the other hand, the first year BHAR is statistically significant at 5% significance level based on the t-statistics, while none of them is significant according to the nonparametric p-values. Because the first year t-values are inconsistent with the corresponding p-values, the higher t-values might be inflated by the overlapping returns. In the long-run, both the three-year CAR and the three-year BHAR are positive and economically significant, but they are again statistically insignificant different from zero. Consistent with Table 5.3.2, Table A1.2.2 reports three significant negative intercept terms and hence three significant implied negative CARs, these are consistent with the majority of previous studies that find a significant negative long-run post acquisition stock returns. Comparing Table A1.2.1 with Table 5.3.1, we find that not only the three-year CARs and the three-year BHARs, but also their t-values and p-values are remarkably similar, It indicates that removing a four-year sub-sample (1991-1994) do not significantly affect the general results of the bidding firms three-year post acquisition abnormal returns in the 1990s.

Table A1.2. Bidding firms (1995-1998) three-year post acquisition average CAR and BHAR

There are 112 UK bidding firms involved in the acquisitions during 1995-1998 periods. Table A1.2.1 reports the result calculated by using the control firms approach. Table A1.2.2 presents the result calculated by using the Fama-French three-factor model. CAR is the average cumulative abnormal return of all the bidding firms. BHAR is the average buy-and-hold abnormal return of all the bidding firms. α is the mean intercept term of Fama-French three-factor model. Implied CAR is the mean α multiplying by 12, 24, and 36. T-statistics of the CARs and the BHARs as well as the corresponding P-values calculated by using the non-parametric Wilcoxon Signed-Rank test are given in the table.

Table A1.2.1

EM	CAR	T-Stat	P-Value
1 to 12	-0.0939	-1.804	0.326
1 to 24	-0.0386	-0.530	0.552

1 to 36	0.0607	0.721	0.359

EM	BHAR	T-Stat	P-Value
1 to 12	**-0.1035***	-2.037	0.267
1 to 24	-0.080	-1.158	0.495
1 to 36	0.0795	0.856	0.215

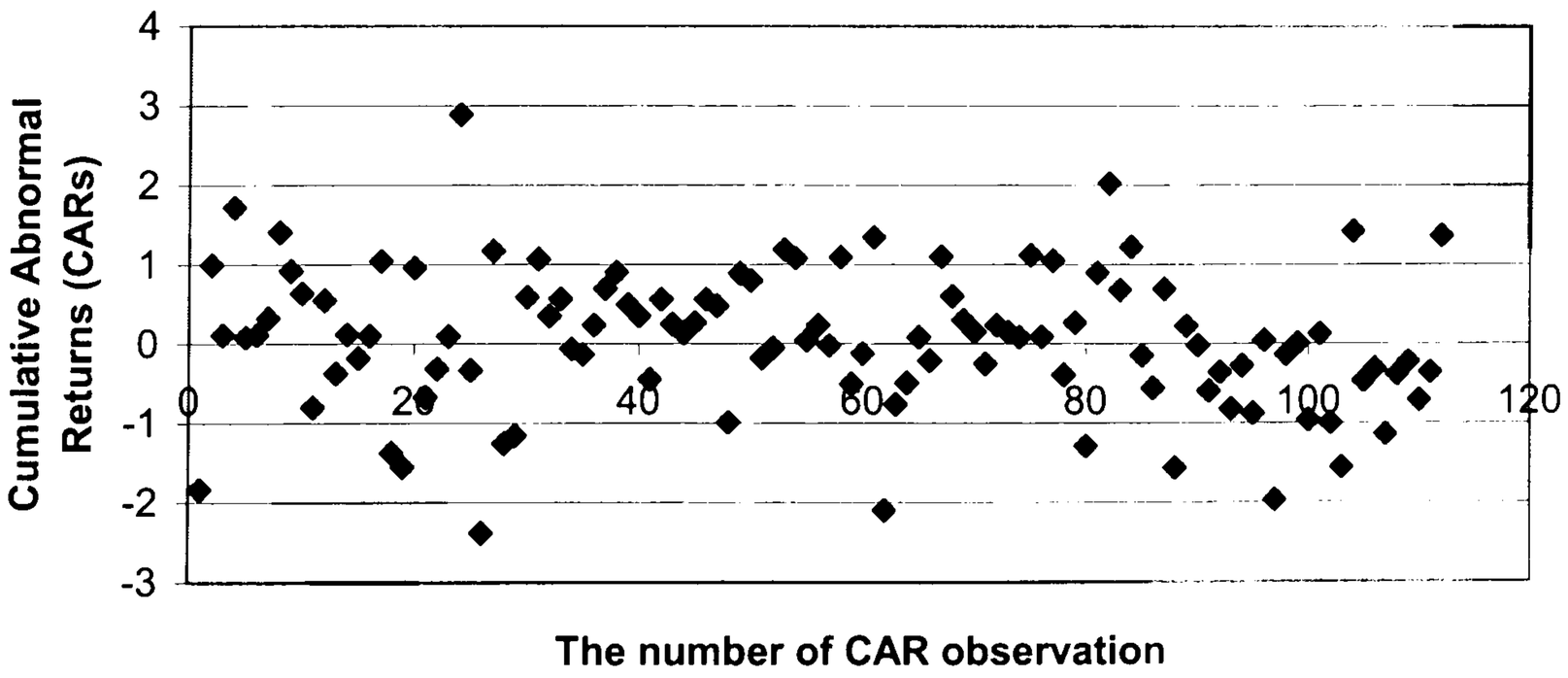
Table A1.2.2

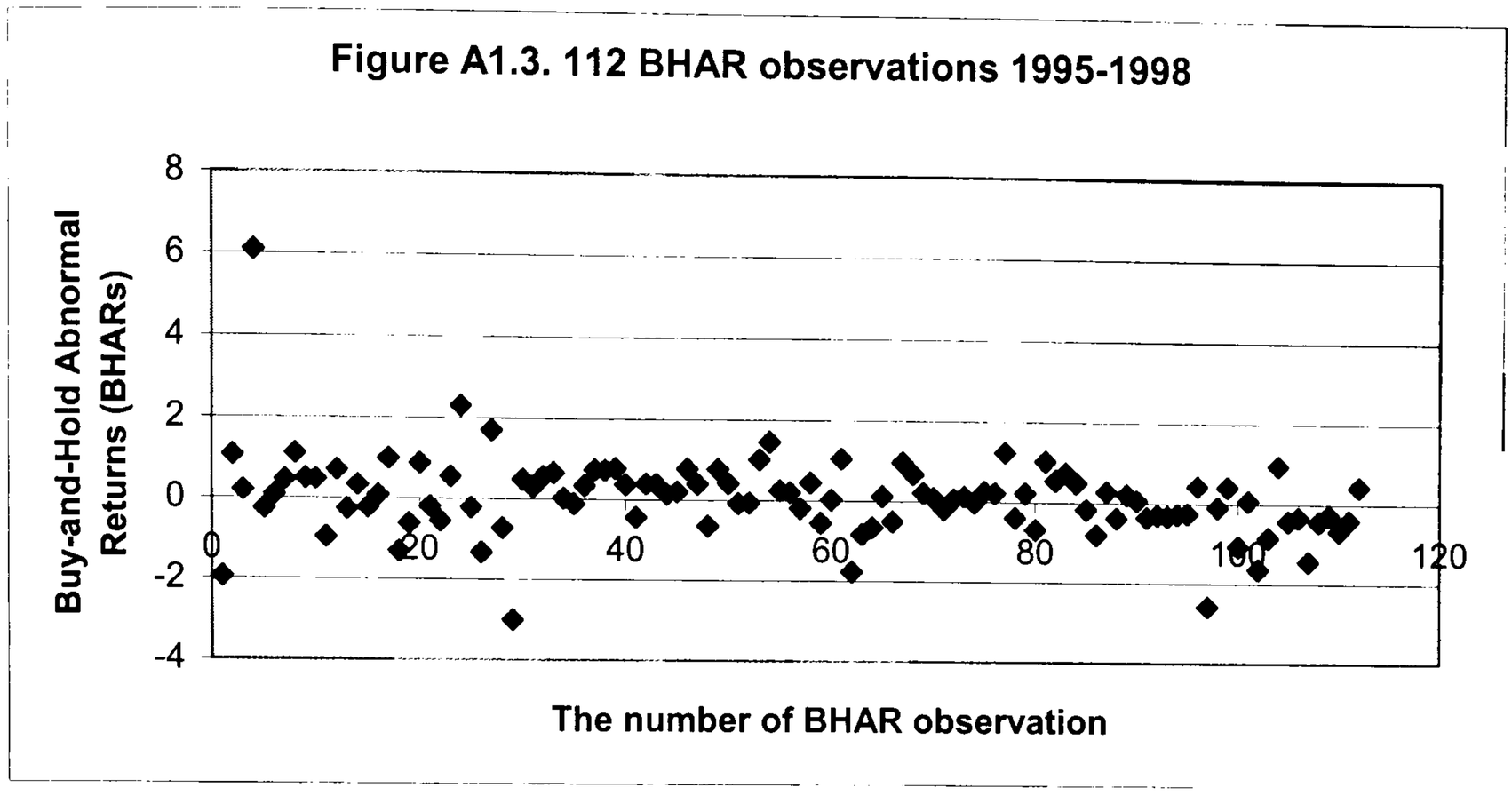
EM	α	T-Stat	P-Value	Implied CAR
1 to 12	**-0.0107***	-3.121	0.010	-0.1284
1 to 24	**-0.0108***	-5.164	0.000	-0.2592
1 to 36	**-0.0087***	-5.023	0.000	-0.3132

* Indicate significant at 5%, two-sided t-test.

To show why the average three-year CAR and the average three-year BHAR are statistically insignificant different from zero, we once again use the scatter charts to show the CAR and BHAR observations. Figure A1.2 and Figure A1.3 plot all the three-year CAR and BHAR observations for the UK biding firms of 1995-1998 periods. Both Figures show the observations are randomly fall up and down the zero line, and no obvious pattern (either a positive trend or a negative trend) can be found from the figures. It indicates why both the three-year average CAR and average BHAR are statistically insignificant different from zero.

Figure A1.2. 112 average CAR observations 1995-1998





To check and to confirm the previous findings of overlapping returns effect, we remove the overlapping firms from our 1995-1998 sub-samples, and re-examine the overlapping returns effect. Table A1.3 reports the non-overlapping bidding firms (1995-1998) three-year post acquisition monthly average ARs and CARs. 4 out of 36 monthly average ARs are significant at 5% two-sided test. 12 out of 14 monthly average CARs are statistically significant in the first 14 months, and no CARs are significant in the rest of 22 months. It is remarkably consistent with our findings reported in Table 5.4.

Table A1.3. Non-overlapping bidding firms (1995-1998) three-year post acquisition average ARs and CARs

There are 89 UK non-overlapping bidding firms involved in the acquisitions during 1995-1998 periods. AR is the monthly average abnormal return of all the bidding firms. CAR is the cumulative average abnormal return of all the bidding firms. T-statistics of the monthly ARs and CARs are also given in the table.

EM	AR	T-Stat	CAR	T-Stat
Month 1	-0.0108	-0.946	-0.0108	-0.946
Month 2	**-0.0228***	-2.161	**-0.0336***	-2.066
Month 3	**-0.0293***	-2.223	**-0.0628***	-2.847
Month 4	0.0002	0.013	**-0.0626***	-2.306
Month 5	-0.0174	-1.327	**-0.0800***	-2.566
Month 6	-0.0007	-0.056	**-0.0807***	-2.241
Month 7	-0.0128	-0.957	**-0.0935***	-2.223

Month 8	0.0064	0.445	-0.0871	-1.885
Month 9	-0.0239	-1.488	**-0.1110***	-2.153
Month 10	-0.0112	-0.932	**-0.1222***	-2.151
Month 11	-0.0127	-0.675	**-0.1349***	-2.262
Month 12	-0.0039	-0.334	**-0.1388***	-2.272
Month 13	0.0120	0.686	**-0.1268***	-2.044
Month 14	-0.0089	-0.537	**-0.1357***	-1.992
Month 15	**0.0364***	2.406	-0.0993	-1.430
Month 16	0.0183	1.139	-0.0810	-1.139
Month 17	-0.0184	-0.934	-0.0994	-1.344
Month 18	**0.0481***	2.910	-0.0513	-0.645
Month 19	0.0006	0.046	-0.0507	-0.652
Month 20	-0.0272	-1.678	-0.0779	-0.955
Month 21	0.0115	0.719	-0.0664	-0.785
Month 22	0.0092	0.541	-0.0572	-0.652
Month 23	-0.0132	-0.708	-0.0704	-0.788
Month 24	-0.0033	-0.221	-0.0736	-0.844
Month 25	-0.0079	-0.473	-0.0815	-0.909
Month 26	0.0310	1.846	-0.0506	-0.553
Month 27	0.0134	0.654	-0.0372	-0.409
Month 28	0.0341	1.893	-0.0031	-0.034
Month 29	0.0111	0.594	0.0080	0.086
Month 30	0.0062	0.323	0.0142	0.149
Month 31	0.0235	1.317	0.0377	0.391
Month 32	0.0129	0.692	0.0506	0.537
Month 33	-0.0126	-0.823	0.0380	0.404
Month 34	0.0131	0.700	0.0511	0.543
Month 35	0.0186	0.926	0.0696	0.739
Month 36	-0.0208	-0.940	0.0488	0.494

* Indicate significant at 5%, two-sided t-test.

Figure A1.4 shows the three-year post acquisition monthly average CARs of non-overlapping bidding firms. It follows a similar return pattern with the results of the whole sample shown in Figure A1.1. The CARs are consistently negative until month 29, and then it becomes positive in the rest of months. Comparing these two Figures, we find that non-overlapping firms experience a lower abnormal return than the whole sample. It also confirms our previous findings that the higher long-run stock returns of the whole sample (comparing to the non-overlapping sample) are inflated by the overlapping returns.

Figure A1.4. Non-overlapping bidding firms (95-98) three-year post acquisition average CARs

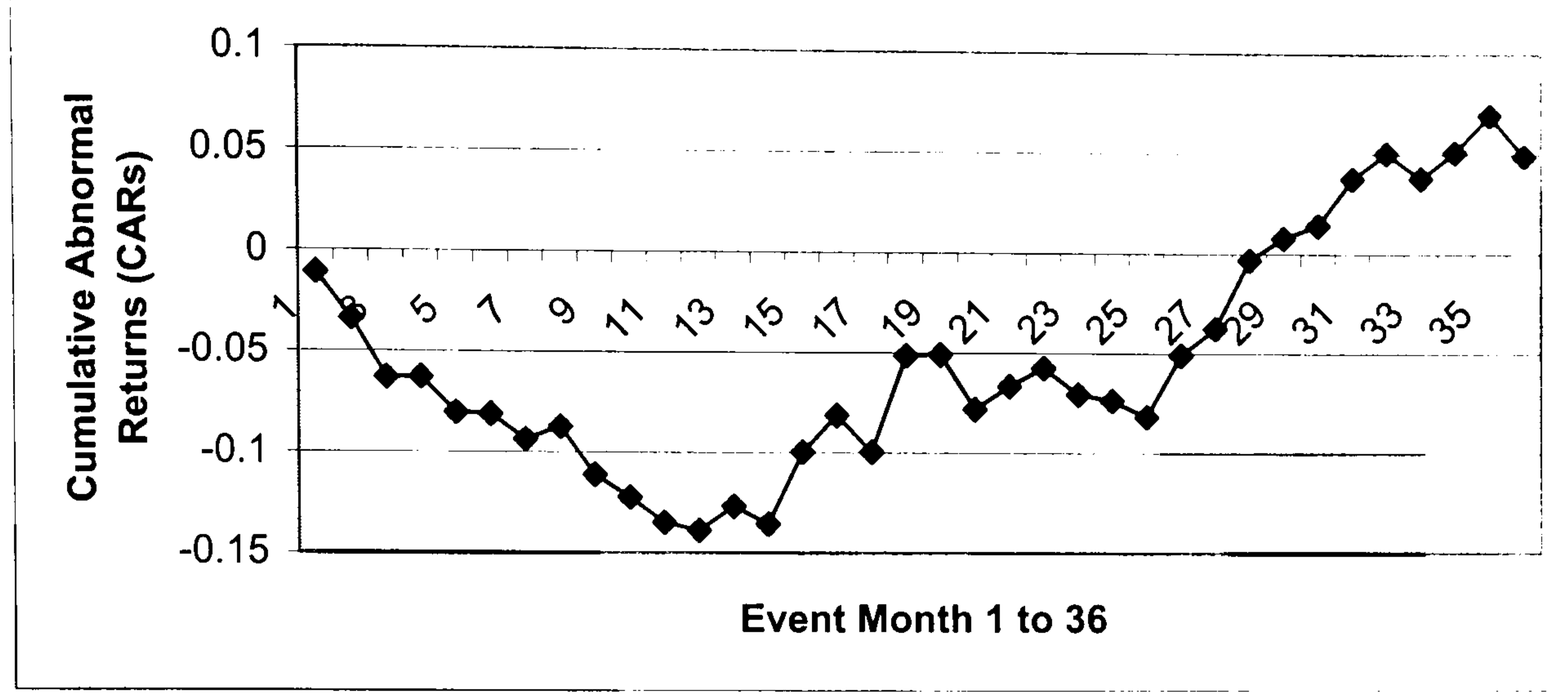


Table A1.4.1 reports the non-overlapping bidding firms three years post acquisition average CARs and average BHARs, their t-statistics, and p-values. Consistent with the results reported in Table 5.5.1 for the non-overlapping UK bidding firms in 1991-1998 sample period, the first year CAR of 1995-1998 sample period is statistically significant different from zero at the 5% significance level. Furthermore, the first year BHAR is also statistically significant, while the second year BHAR is not significant as reported in the Table 5.5.1. To take a look for the longer period, both the three-year average CAR and the three-year average BHAR are positive and economically small, but once again they are statistically insignificant. By comparing Table A1.2.1 and Table A1.4.1, we find that all the CARs and BHARs in Table A1.2.1 are bigger than their counterparts in Table A1.4.1. Based on our previous findings, the higher average abnormal returns in Table A1.2.1 must be inflated by the overlapping returns. If we take a close look at their t-values and p-values, we find that the results are inconsistent in Table A1.2.1. The first year CAR and the first and BHAR are statistically significant at 5% or 10% significance level based on their t-statistics, however, their p-values tell us they are not significant at

the 5% or 10% significance level. On the contrary, after removing the overlapping returns, Table A1.4.1 presents a consistent story.

Consistent with Table 5.3.2, Table 5.5.2, and Table A1.2.2, Table A1.4.2, by using the Fama-French three-factor model, once again reports three significant negative intercept terms with large implied negative CARs. It is inconsistent with our results calculated by using the control firms approach, and particularly the three-year CARs. In Table 5.3.1, Table 5.5.1, Table A1.2.1, and Table A1.4.1, we all report a positive but insignificant three-year CARs. However, the three-factor model provides us large negative and significant three-year CARs. This may well confirm the evidence given by Barber and Lyon (1997) and Kothari and Warner (1997), the Fama-French three-factor model are severely mis-specified, and has significantly over-rejected the null hypothesis of no abnormal performance.

Table A1.4. Non-overlapping Bidding firms (1995-1998) three-year post acquisition average CARs and BHARs

There are 89 UK non-overlapping bidding firms involved in the acquisitions during 1995-1998 periods. Table A1.4.1 reports the result calculated by using the control firms approach. Table A1.4.2 presents the result calculated by using the Fama-French three-factor model. CAR is the average cumulative abnormal return of all the bidding firms. BHAR is the average buy-and-hold abnormal return of all the bidding firms. α is the mean intercept term of Fama-French three-factor model. Implied CAR is the mean α multiplying by 12, 24, and 36. T-statistics of the CARs and the BHARs as well as the corresponding P-values calculated by using the non-parametric Wilcoxon Signed-Rank test are given in the table.

Table A1.4.1

EM	CAR	T-Stat	P-Value
1 to 12	**-0.1388***	-2.272	0.047
1 to 24	-0.0736	-0.844	0.268
1 to 36	0.0488	0.494	0.616

EM	BHAR	T-Stat	P-Value
1 to 12	**-0.1585***	-2.663	0.041
1 to 24	-0.1312	-1.598	0.166
1 to 36	0.0677	0.639	0.642

Table A1.4.2

EM	α	T-Stat	P-Value	Implied CAR
1 to 12	**-0.0115***	-2.809	0.037	-0.1380
1 to 24	**-0.0119***	-4.677	0.000	-0.2856
1 to 36	**-0.0105***	-5.036	0.000	-0.3780

* Indicate significant at 5%, two-sided t-test.

Because the three-year average CAR (about 5%) and the three-year average BHAR (about 7%) are economically significant, it is once again necessary to use the scatter charts to show why the mean of the CAR and BHAR observations are statistically insignificant different from zero. Figure A1.5 and Figure A1.6 plot all the three-year CAR and BHAR observations for the non-overlapping biding firms of 1995-1998 sample periods. Both Figures show the observations are randomly fall up and down the zero line, and no obvious pattern (either a positive trend or a negative trend) can be found from the figures. It indicates why both the three-year average CAR and average BHAR are statistically insignificant different from zero.

Figure A1.5. 89 three-year non-overlapping CAR observations 1995-1998

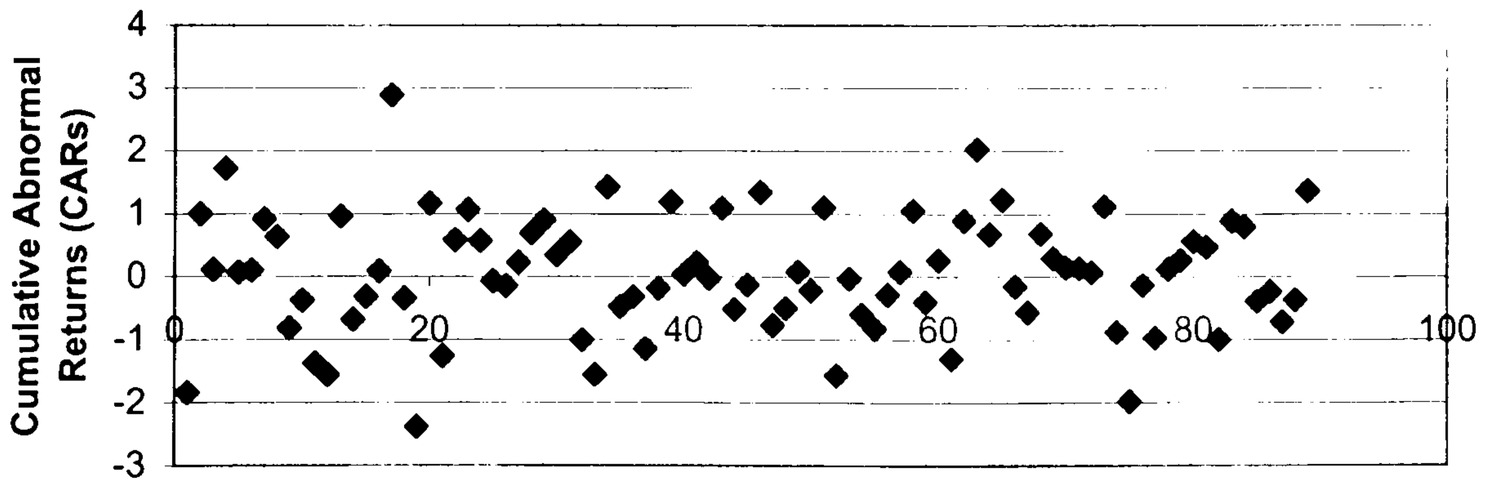
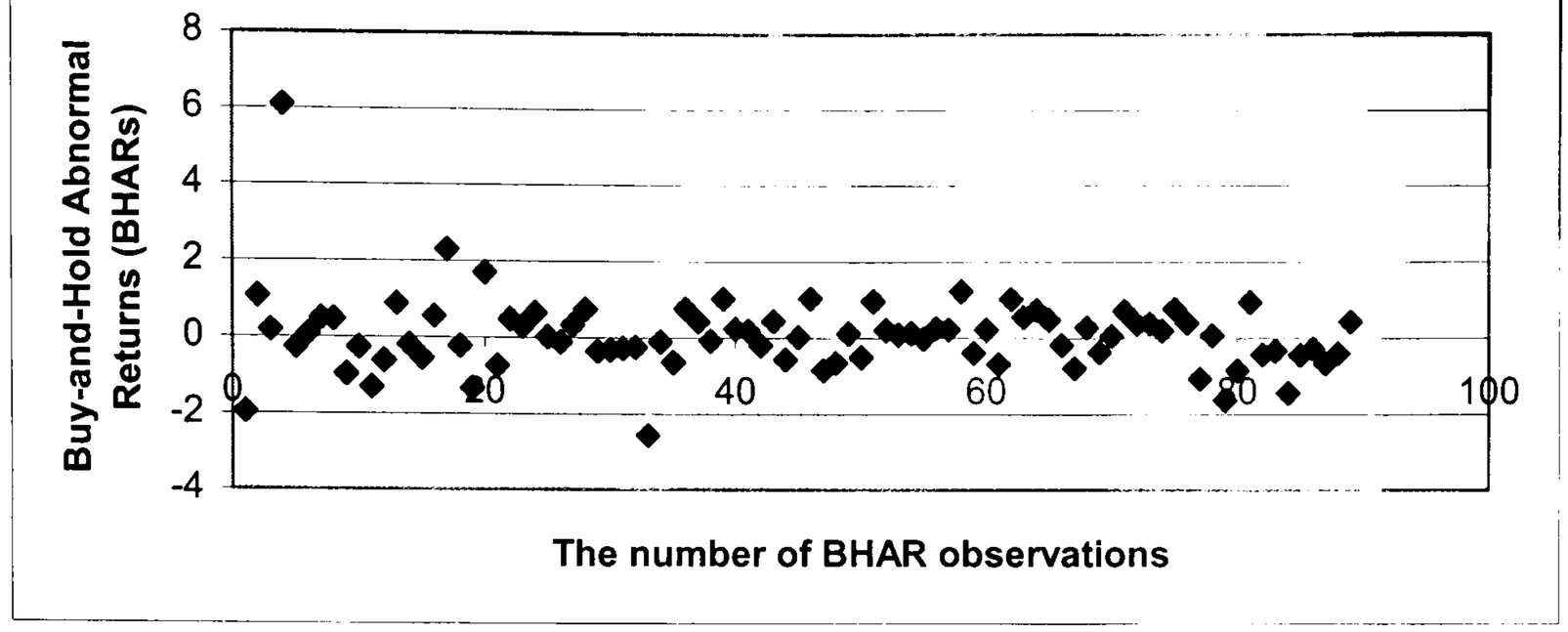


Figure A1.6. 89 three-year non-overlapping BHAR observations 1995-1998



To double-check the impact of overlapping returns, we examine the three-year post acquisition abnormal returns of a sample (1995-1998) that contains all the overlapping bidding firms. The long-run abnormal returns of overlapping firms are essential for us to find out the overlapping returns effect and to reaffirm our previous findings.

Table A1.5 reports the three-year post acquisition average ARs and CARs of the overlapping firms. Two monthly average ARs are significant at 5% significance level, two-sided t-test, and none of the CARs are statistically significant different from zero at the 5% significance level. It is closely consistent with the finding reported in Table 5.6 for the overlapping bidding firms of 1991-1998 sample period. Although they are statistically insignificant, the average monthly CARs show a strong pattern of returns of overlapping firms, 33 out of 36 monthly average CARs are positive.

Table A1.5. Overlapping bidding firms (1995-1998) three-year post acquisition average ARs and CARs

There are 23 UK overlapping bidding firms involved in the acquisitions during 1995-1998 periods. AR is the monthly average abnormal return of all the bidding firms. CAR is the cumulative average abnormal return of all the bidding firms. T-statistics of the monthly ARs and CARs are also given in the table.

EM	AR	T-Stat	CAR	T-Stat
Month 1	-0.0174	-0.829	-0.0174	-0.829
Month 2	0.0040	0.204	-0.0134	-0.536
Month 3	0.0145	0.792	0.0011	0.041
Month 4	0.0263	1.095	0.0274	0.720
Month 5	**0.0442***	2.458	0.0716	1.544
Month 6	-0.0232	-1.390	0.0484	0.923
Month 7	-0.0223	-1.016	0.0261	0.481
Month 8	-0.0363	-1.057	-0.0102	-0.128
Month 9	0.0182	0.896	0.0080	0.098
Month 10	0.0256	1.009	0.0336	0.485
Month 11	0.0260	1.115	0.0596	0.767
Month 12	0.0205	1.088	0.0801	0.957
Month 13	-0.0154	-0.699	0.0647	0.716
Month 14	0.0203	1.179	0.0850	0.953
Month 15	-0.0111	-0.587	0.0739	0.831
Month 16	0.0394	1.981	0.1133	1.223
Month 17	0.0019	0.073	0.1152	1.105
Month 18	0.0006	0.028	0.1158	1.061
Month 19	-0.0169	-0.736	0.0989	0.853
Month 20	0.0136	0.679	0.1125	0.937
Month 21	-0.0354	-0.955	0.0771	0.657
Month 22	-0.0393	-1.323	0.0378	0.343
Month 23	-0.0079	-0.174	0.0299	0.261
Month 24	**0.0670***	2.183	0.0968	0.902
Month 25	-0.0381	-1.598	0.0587	0.521
Month 26	-0.0157	-0.546	0.0430	0.388
Month 27	-0.0021	-0.054	0.0409	0.367
Month 28	0.0222	0.736	0.0631	0.529
Month 29	0.0212	0.658	0.0843	0.708
Month 30	0.0442	1.662	0.1285	1.063
Month 31	-0.0569	-1.836	0.0716	0.575
Month 32	0.0131	0.342	0.0848	0.591
Month 33	0.0354	1.025	0.1202	0.903
Month 34	0.0169	0.592	0.1371	0.966
Month 35	0.0198	0.731	0.1569	1.053
Month 36	-0.0501	-1.668	0.1068	0.708

* Indicate significant at 5%, two-sided t-test.

Figure A1.7 shows the overlapping bidding firms (1995-1998) three-year post acquisition CARs. It presents a strong pattern of performance. The CARs rise consistently after the event month, and the vast majority (33 out 36) of monthly average CARs are positive. Thus, we can see that the higher returns shown in Figure A1.1 comparing to Figure A1.4 are solely driven by the overlapping returns.

Figure A1.7. Overlapping firms (95-98) three-year post acquisition average CARs

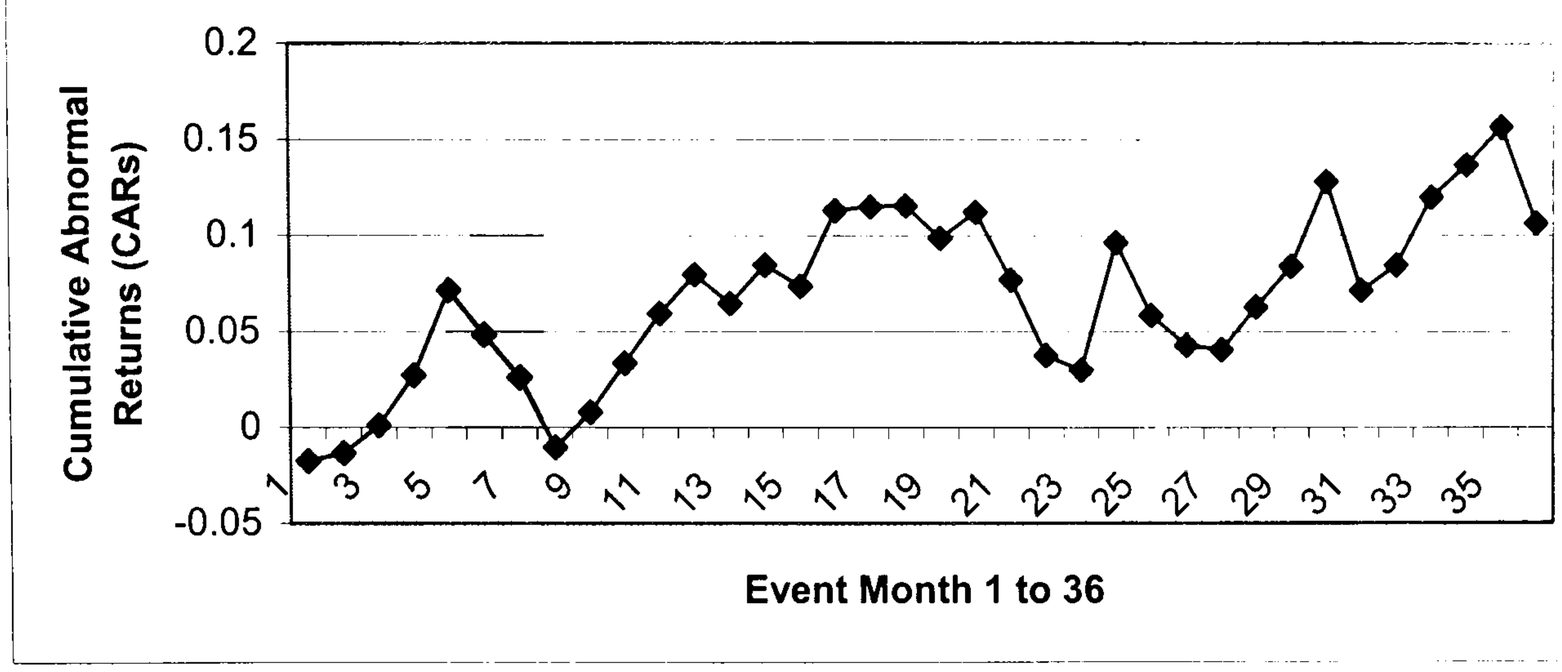


Table A1.6.1 presents the overlapping bidding firms three years post acquisition average CARs and BHARs, their t-statistics, and p-values. Consistent with the results reported in Table 5.7.1, neither the CARs nor the BHARs are statistically significant different from zero at 5% significance level for all the three periods. The evidence from Table 5.7.1 and Table A1.6.1 also show that the longer the period after the completion of the takeovers, the higher the average abnormal returns to the UK bidding firms. Once again, we are able to confirm that the higher average three-years CARs and BHARs of the whole sample shown in Table 5.3.1 and Table A1.2.1 comparing to that of the non-overlapping sample shown in Table 5.5.1 and Table A1.4.1 are inflated by the high positive average abnormal returns of the overlapping returns. In contrast with Table 5.7.2, Table A1.6.2 reports three negative intercept terms, however, two of them are insignificant, and the other significant one may be due to the misspecification of the three-factor model. Thus, we can conclude that the long-run (one to three years) post acquisition abnormal stock returns of overlapping bidding firms, calculated by either the control firms approach or the Fama-French three-factor model, are statistically insignificant different from zero.

Table A1.6. Overlapping bidding firms (1995-1998) three-year post acquisition average CAR and BHAR

There are 23 UK overlapping bidding firms involved in the acquisitions during 1995-1998 periods. Table A1.6.1 reports the result calculated by using the control firms approach. Table A1.6.2 presents the result calculated by using the Fama-French three-factor model. CAR is the average cumulative abnormal return of all the bidding firms. BHAR is the average buy-and-hold abnormal return of all the bidding firms. α is the mean intercept term of Fama-French three-factor model. Implied CAR is the mean α multiplying by 12, 24, and 36. T-statistics of the CARs and the BHARs as well as the corresponding P-values calculated by using the non-parametric Wilcoxon Signed-Rank test are given in the table.

Table A1.6.1

EM	CAR	T-Stat	P-Value
1 to 12	0.0801	0.957	0.101
1 to 24	0.0968	0.902	0.260
1 to 36	0.1068	0.708	0.171

EM	BHAR	T-Stat	P-Value
1 to 12	0.1092	1.408	0.078
1 to 24	0.1184	1.154	0.162
1 to 36	0.1253	0.643	0.068

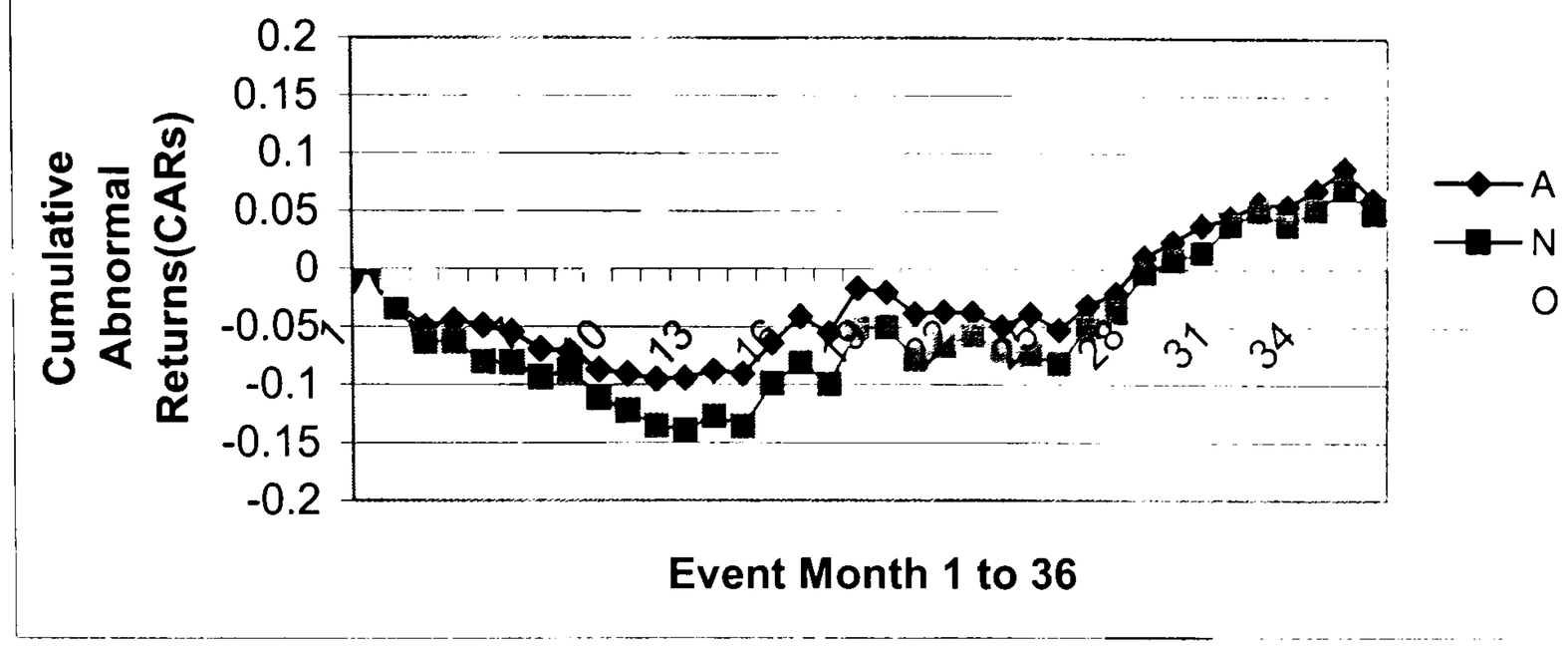
Table A1.6.2

EM	α	T-Stat	P-Value	Implied CAR
1 to 12	-0.0077	-1.408	0.110	-0.0924
1 to 24	**-0.0068***	-2.501	0.050	-0.1632
1 to 36	-0.0019	-0.912	0.616	-0.0684

* Indicate significant at 5%, two-sided t-test.

Figure A1.8 puts Figure A1.1, A1.4, and A1.7 together and compares their long-run post acquisition stock returns. Consistent with Figure 5.6, overlapping bidding firms outperform the other two, and non-overlapping bidding firms underperform the whole sample. It once again shows that overlapping returns have inflated the average returns of the whole sample, and that may well inflate the test-statistics of the whole sample and leads to an over-rejection of the null hypothesis.

Figure A1.8. Three years post acquisition average CARs of All, Overlapping and Non-overlapping bidding firms 1995-1998



A: all samples, non-overlapping and overlapping bidding firms.
N: non-overlapping bidding firms.
O: overlapping bidding firms.

Appendix 2. Bidding firms (1997-2001) long-run pre-acquisition stock returns

Table A2.1 reports the three-year pre-acquisition average ARs (abnormal returns), average CARs, and the t-statistics of 78 UK bidding firms from 1997 to 2001. As we can see that only 2 out of 36 average ARs are statistically significant at 5% two-sided t-test, the ARs of remaining 34 months are statistically insignificant different from zero. There is no CAR statistically significant different from zero. This result demonstrates that there are no statistically significant CARs for bidding firms in the three-year period prior to the takeover announcement.

Table A2.1. Bidding firms (1997-2001) three years pre-acquisition average ARs and CARs

There are 78 UK bidding firms involved in the acquisitions during 1997-2001 periods. AR is the monthly average abnormal return of all the bidding firms. CAR is the cumulative average abnormal return of all the bidding firms. T-statistics of the monthly ARs and CARs are also given in the table.

EM	AR	T-Stat	CAR	T-Stat
Month -36	0.0037	0.347	0.0037	0.347
Month -35	0.0061	0.651	0.0098	0.702
Month -34	-0.0157	-1.252	-0.0058	-0.315
Month -33	0.0169	1.487	0.0111	0.458
Month -32	-0.0089	-0.864	0.0022	0.076
Month -31	-0.0099	-0.874	-0.0077	-0.238
Month -30	-0.0197	-1.545	-0.0274	-0.773
Month -29	-0.0079	-0.696	-0.0354	-0.944
Month -28	-0.0055	-0.459	-0.0408	-0.954
Month -27	-0.0016	-0.111	-0.0424	-0.884
Month -26	-0.0213	-1.681	-0.0637	-1.216
Month -25	-0.0255	-1.720	-0.0892	-1.715
Month -24	0.0101	0.978	-0.0791	-1.560
Month -23	0.0287	1.726	-0.0504	-1.032
Month -22	-0.0077	-0.630	-0.0580	-1.100
Month -21	0.0060	0.473	-0.0520	-0.975
Month -20	0.0154	1.036	-0.0366	-0.662
Month -19	-0.0118	-0.851	-0.0484	-0.885
Month -18	0.0182	1.379	-0.0302	-0.537
Month -17	0.0092	0.628	-0.0210	-0.361
Month -16	0.0113	0.818	-0.0097	-0.165
Month -15	-0.0107	-0.631	-0.0204	-0.320
Month -14	0.0052	0.379	-0.0152	-0.229
Month -13	0.0109	0.702	-0.0043	-0.062
Month -12	0.0194	1.330	0.0151	0.203

Month -11	0.0143	0.700	0.0293	0.379
Month -10	-0.0048	-0.295	0.0245	0.321
Month -9	0.0146	0.950	0.0391	0.492
Month -8	**-0.0329***	-2.202	0.0061	0.075
Month -7	-0.0056	-0.446	0.0006	0.007
Month -6	0.0123	1.126	0.0129	0.157
Month -5	0.0138	1.024	0.0267	0.315
Month -4	0.0130	0.777	0.0397	0.455
Month -3	-0.0235	-1.580	0.0162	0.179
Month -2	**0.0443***	2.336	0.0605	0.662
Month -1	0.0224	0.846	0.0829	0.870

* Indicate significant at 5%, two-sided t-test.

Figure A2.1 shows the trend of 36 months CARs. As we can see that CARs continually fall from the event month –36 to –25, and start to rise consistently from month –24 to the month –1. It presents that bidding firms start to experience positive abnormal returns two years prior to the announcements of takeover bids. However, these CARs are statistically insignificant different from zero.

Figure A2.1. Bidding firms (97-01) three-year pre-acquisition average CARs

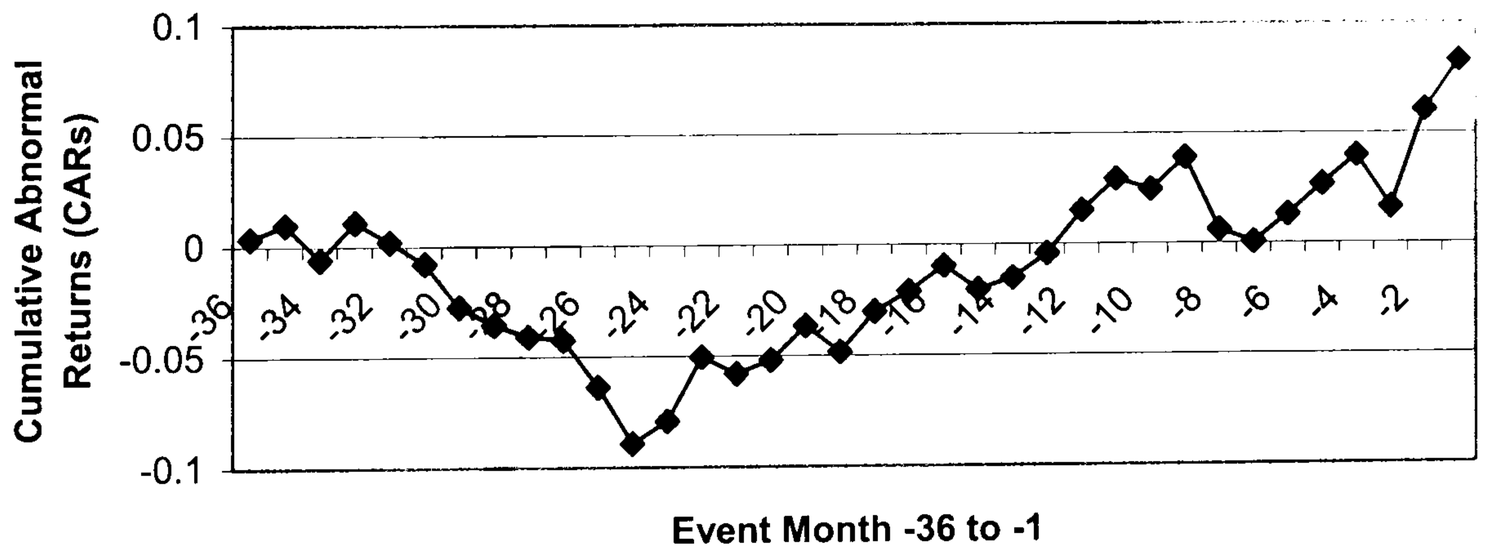


Table A2.2.1 presents bidding firms one, two, and three years pre-acquisition CARs and BHARs, their t-statistics and P-values. It is clearly shown that there are no statistically significant CARs or BHARs in one-, two-, and three-year prior to the takeover

announcement[12], all the t-statistics and P-values but one are consistent with each other. Table A2.2.2 also reports three insignificant intercept terms. Thus, based on these results, we conclude that bidding firms do not experience a statistically significant positive abnormal returns in three years prior to the announcements of takeover bids.

Table A2.2. Bidding firms (1997-2001) three years pre-acquisition average CARs and BHARs

There are 78 UK bidding firms involved in the acquisitions during 1997-2001 periods. Table A2.2.1 reports the result calculated by using the control firms approach. Table A2.2.2 presents the result calculated by using the Fama-French three-factor model. CAR is the average cumulative abnormal return of all the bidding firms. BHAR is the average buy-and-hold abnormal return of all the bidding firms. α is the mean intercept term of Fama-French three-factor model. Implied CAR is the mean α multiplying by 12, 24, and 36. T-statistics of the CARs and the BHARs as well as the corresponding P-values calculated by using the non-parametric Wilcoxon Signed-Rank test are given in the table.

Table A2.2.1

EM	CAR	T-Stat	P-Value
-12 to -1	0.0872	1.397	0.268
-24 to -1	0.1721	1.955	0.024
-36 to -1	0.0829	0.870	0.393

EM	BHAR	T-Stat	P-Value
-12 to -1	0.1619	1.797	0.144
-24 to -1	0.1089	0.462	0.190
-36 to -1	-0.0282	-0.102	0.350

Table A2.2.2

EM	α	T-Stat	P-Value	Implied CAR
-12 to -1	0.0073	1.578	0.501	0.0876
-24 to -1	0.0036	1.421	0.352	0.0864
-36 to -1	-0.0011	-0.631	0.310	-0.0396

We have so far examined the bidding firms (1997-2001) three years pre-acquisition stock returns. In line with most previous studies, we report a positive three-year CAR of

[12] Because the shareholding details are not available for dead companies at the time of investigation, our results shown above are calculated from the sample that has excluded the dead firms (less than 20 dead bidding firms have been omitted). However, we have also examined the sample that includes all the alive and dead bidding firms for the 1997-2001 sample period, the results remain the same, there are no statistically significant CARs and BHARs in one-, two- and three-year prior to the takeover announcement. For the purpose of this article and the space limit, we have omitted these results.

8.29%, and in contrast, we find a negative three-year BHAR of –2.82%[13] and a negative implied CAR of –3.96%, the results are inconsistent. However, all of them are statistically insignificant different from zero. Furthermore, we must acknowledge that the sample (1997-2001) contains a proportion of overlapping firms, and the positive and negative three-year abnormal returns found above might be due to these overlapping returns. In *Chapter 5*, we find that overlapping returns inflate the test statistics[14] of a whole sample of takeover bidding firms that includes overlapping and non-overlapping bidding firms, and hence lead to a misleading inference. Thus, we remove the potential bias of overlapping returns by excluding the overlapping bidding firms from the whole sample, and reexamine the non-overlapping bidding firms three years pre-acquisition abnormal returns.

Table A2.3 presents the non-overlapping bidding firms three years pre-acquisition ARs and CARs. All but one average abnormal returns are statistically insignificant, and all the CARs are statistically insignificant different from zero. It is consistent with the results reported in Table A2.1 that no CAR is statistically significant even after removing the overlapping returns.

Table A2.3. Non-overlapping bidding firms (1997-2001) three years pre-acquisition average ARs and CARs

There are 56 UK non-overlapping bidding firms involved in the acquisitions during 1997-2001 periods. AR is the monthly average abnormal return of all the bidding firms. CAR is the cumulative average abnormal return of all the bidding firms. T-statistics of the monthly ARs and CARs are also given in the table.

---

[13] Most of previous studies in corporate takeovers have applied CAR to calculate the long-run abnormal returns, and only recently, the BHAR is applied to measure investors long-run experience.

[14] Lyon, Barber, and Tsai (1999) argue that overlapping returns are the most severe form of cross-sectional dependence in the event study of long-run abnormal returns. They find that the lack of independence generated by overlapping returns yields misspecified test statistics, and suggest the only solution to this problem is to remove the sample of observations of overlapping returns.

EM	AR	T-Stat	CAR	T-Stat
Month -36	0.0070	0.516	0.0070	0.516
Month -35	0.0098	0.904	0.0168	0.977
Month -34	0.0043	0.288	0.0211	0.951
Month -33	0.0196	1.403	0.0407	1.389
Month -32	-0.0034	-0.310	0.0373	1.146
Month -31	-0.0257	-1.884	0.0115	0.295
Month -30	-0.0113	-0.740	0.0002	0.006
Month -29	-0.0036	-0.253	-0.0033	-0.076
Month -28	-0.0055	-0.375	-0.0088	-0.173
Month -27	0.0131	0.987	0.0043	0.082
Month -26	-0.0073	-0.465	-0.0030	-0.052
Month -25	-0.0205	-1.103	-0.0235	-0.432
Month -24	0.0134	1.043	-0.0101	-0.194
Month -23	0.0310	1.516	0.0209	0.400
Month -22	-0.0148	-0.952	0.0061	0.105
Month -21	0.0074	0.455	0.0135	0.231
Month -20	0.0201	1.137	0.0336	0.532
Month -19	-0.0186	-1.219	0.0150	0.231
Month -18	0.0233	1.628	0.0383	0.578
Month -17	0	-0.002	0.0383	0.538
Month -16	-0.0012	-0.094	0.0371	0.519
Month -15	-0.0230	-1.063	0.0140	0.175
Month -14	0.0075	0.440	0.0215	0.255
Month -13	0.0044	0.239	0.0259	0.286
Month -12	0.0206	1.163	0.0465	0.484
Month -11	0.0226	0.834	0.0690	0.690
Month -10	-0.0313	-1.565	0.0378	0.378
Month -9	0.0120	0.615	0.0498	0.482
Month -8	-0.0287	-1.600	0.0211	0.198
Month -7	-0.0157	-1.113	0.0055	0.050
Month -6	0.0186	1.344	0.0241	0.224
Month -5	0.0219	1.412	0.0460	0.418
Month -4	0.0153	0.717	0.0612	0.541
Month -3	-0.0343	-1.791	0.0269	0.229
Month -2	**0.0589***	2.640	0.0859	0.736
Month -1	0.0317	0.880	0.1175	0.956

* Indicate significant at 5%, two-sided t-test.

Figure A2.2 shows the three years pre-acquisition average CARs of the non-overlapping bidding firms. Almost all the monthly average CARs in Figure A2.2 are higher than the corresponding CARs in Figure A2.1. It means that non-overlapping bidding firms outperform the whole sample in three years prior to the announcement of takeover bids, and it suggests that the overlapping returns have deflated the monthly average CARs of

the whole sample. However, consistent with Table A2.1, there no CARs are statistically significant different from zero.

Figure A2.2. Non-overlapping bidding firms (97-01) three years pre-acquisition average CARs

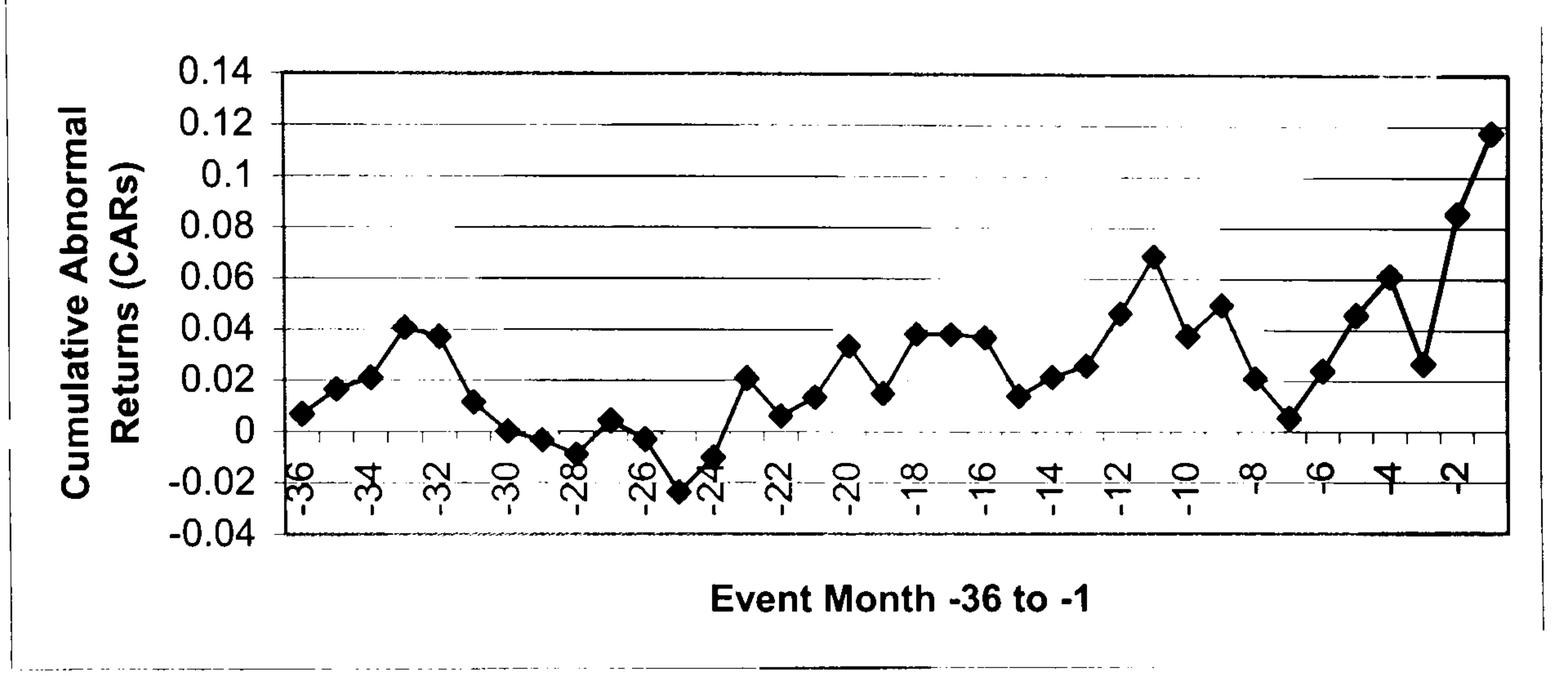


Table A2.4.1 presents bidding firms one-, two-, and three-year pre-acquisition CARs and BHARs, their t-statistics and P-values. After removing the overlapping returns, Table A2.4.1 clearly shows that either the one-, two-, and three-year CARs or the corresponding BHARs are statistically insignificant different from zero at 5% significance level, and all the t-statistics and the P-values are consistent with each other. Table A2.4.2 also reports three insignificant intercept terms and the t-statistics are consistent with their P-values. This once again confirms our findings that there are no statistically significant abnormal returns for bidding firms in three years prior to the takeover announcement.

Table A2.4. Non-overlapping bidding firms (1997-2001) three years pre-acquisition average CARs and BHARs

There are 56 UK non-overlapping bidding firms involved in the acquisitions during 1997-2001 periods. Table A2.4.1 reports the result calculated by using the control firms approach. Table A2.4.2 presents the result calculated by using the Fama-French three-factor model. CAR is the average cumulative abnormal

return of all the bidding firms. BHAR is the average buy-and-hold abnormal return of all the bidding firms. α is the mean intercept term of Fama-French three-factor model. Implied CAR is the mean α multiplying by 12, 24, and 36. T-statistics of the CARs and the BHARs as well as the corresponding P-values calculated by using the non-parametric Wilcoxon Signed-Rank test are given in the table.

Table A2.4.1

EM	CAR	T-Stat	P-Value
-12 to -1	0.0916	1.169	0.250
-24 to -1	0.1410	1.260	0.093
-36 to -1	0.1175	0.956	0.206

EM	BHAR	T-Stat	P-Value
-12 to -1	0.1807	1.538	0.163
-24 to -1	0.0140	0.043	0.123
-36 to -1	-0.0444	-0.117	0.300

Table A2.4.2

EM	α	T-Stat	P-Value	Implied CAR
-12 to -1	0.0086	1.460	0.804	0.1032
-24 to -1	0.0033	1.074	0.627	0.0792
-36 to -1	-0.0002	-0.088	0.517	-0.0072

By comparing Figure A2.1 and Figure A2.2, we argue overlapping returns might have deflated the bidding firms' returns as a whole. To explore this impact, we have to examine the three years pre-acquisition stock returns of a sample that contains all the overlapping bidding firms. Table A2.5 shows the three years pre-acquisition average abnormal returns and the average CARs of 22 overlapping bidding firms. Three average ARs are statistically significant at 5% significance level, and in contrast to Table A2.1 and Table A2.3, Table A2.5 reports five significant CARs. However, most of the CARs of the overlapping bidding firms are still statistically insignificant at 5% significance level in a two-sided t-test.

Table A2.5. Overlapping bidding firms (1997-2001) three years pre-acquisition average ARs and CARs

There are 22 UK overlapping bidding firms involved in the acquisitions during 1997-2001 periods. AR is the monthly average abnormal return of all the bidding firms. CAR is the cumulative average abnormal return of all the bidding firms. T-statistics of the monthly ARs and CARs are also given in the table.

EM	AR	T-Stat	CAR	T-Stat
Month -36	-0.0046	-0.286	-0.0046	-0.286
Month -35	-0.0032	-0.164	-0.0078	-0.324
Month -34	**-0.0666***	-3.567	**-0.0743***	-2.590
Month -33	0.0100	0.517	-0.0643	-1.679
Month -32	-0.0229	-0.966	-0.0872	-1.618
Month -31	0.0304	1.715	-0.0568	-0.981
Month -30	-0.0411	-1.786	-0.0979	-1.549
Month -29	-0.0191	-1.010	-0.1169	-1.652
Month -28	-0.0055	-0.262	-0.1224	-1.558
Month -27	-0.0390	-1.042	-0.1614	-1.549
Month -26	**-0.0569***	-3.037	-0.2182	-2.012
Month -25	-0.0382	-1.642	**-0.2565***	-2.206
Month -24	0.0017	0.100	**-0.2548***	-2.204
Month -23	0.0230	0.805	**-0.2318***	-2.269
Month -22	0.0104	0.599	-0.2214	-2.043
Month -21	0.0026	0.137	-0.2189	-1.973
Month -20	0.0036	0.127	-0.2153	-2.058
Month -19	0.0056	0.186	**-0.2097***	-2.225
Month -18	0.0052	0.174	-0.2045	-2.073
Month -17	0.0326	1.307	-0.1719	-1.835
Month -16	0.0433	1.211	-0.1286	-1.311
Month -15	0.0206	0.857	-0.1080	-1.121
Month -14	-0.0008	-0.035	-0.1088	-1.112
Month -13	0.0275	0.931	-0.0813	-0.866
Month -12	0.0164	0.631	-0.0649	-0.671
Month -11	-0.0068	-0.304	-0.0717	-0.705
Month -10	**0.0624***	2.718	-0.0093	-0.096
Month -9	0.0210	0.938	0.0117	0.113
Month -8	-0.0437	-1.588	-0.0320	-0.319
Month -7	0.0202	0.791	-0.0119	-0.117
Month -6	-0.0037	-0.226	-0.0155	-0.151
Month -5	-0.0068	-0.254	-0.0223	-0.198
Month -4	0.0073	0.292	-0.0151	-0.130
Month -3	0.0039	0.202	-0.0111	-0.093
Month -2	0.0071	0.199	-0.0041	-0.031
Month -1	-0.0012	-0.056	-0.0052	-0.041

* Indicate significant at 5%, two-sided t-test.

Figure A2.3 plots the overlapping bidding firms three years pre-acquisition CARs. It shows a consistent and large loss in the third year prior to the takeover announcement, and then the CARs rise consistently but still below or just close to zero. Overlapping bidding firms suffer the biggest loss between month –26 to month –18, the CARs are less than –20%, and they are significant or very close to significant in a 5% significance level.

Figure A2.3. Overlapping bidding firms (97-01) three years pre-acquisition average CARs

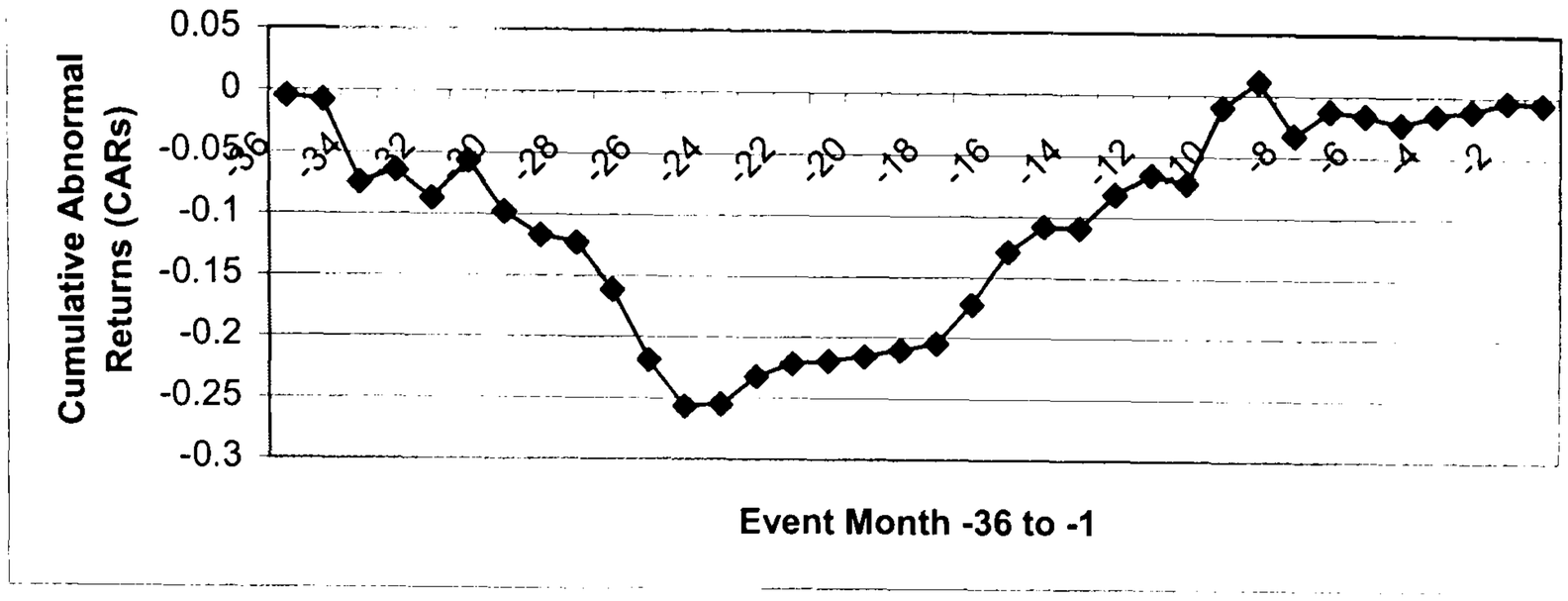


Table A2.6.1 shows that both the three-year CAR and the three-year BHAR are neither economically nor statistically significant. However, the two-year BHAR about 35% is statistically significant different from zero, and the two-year CAR about 25.1% is also close to significance. Thus, although the overlapping bidding firms suffer a large loss at the third year prior to the takeover announcement, they experience large gains in two years before the announcement. However, the two-year BHAR of non-overlapping bidding firms and the bidding firms of the whole sample are statistically insignificant different from zero at 5% significance level. Consistent, Table A2.6.2 reports three insignificant monthly intercept terms and hence three insignificant implied CARs.

Table A2.6. Overlapping bidding firms (1997-2001) three years pre-acquisition average CARs and BHARs

There are 22 UK overlapping bidding firms involved in the acquisitions during 1997-2001 periods. Table A2.6.1 reports the result calculated by using the control firms approach. Table A2.6.2 presents the result calculated by using the Fama-French three-factor model. CAR is the average cumulative abnormal return of all the bidding firms. BHAR is the average buy-and-hold abnormal return of all the bidding firms. α is the mean intercept term of Fama-French three-factor model. Implied CAR is the mean α multiplying by 12, 24, and 36. T-statistics of the CARs and the BHARs as well as the corresponding P-values calculated by using the non-parametric Wilcoxon Signed-Rank test are given in the table.

Table A2.6.1

EM	CAR	T-Stat	P-Value
-12 to -1	0.0760	0.770	0.758
-24 to -1	0.2512	1.942	0.131
-36 to -1	-0.0052	-0.041	0.615

EM	BHAR	T-Stat	P-Value
-12 to -1	0.1141	0.990	0.527
-24 to -1	**0.3504***	2.266	0.042
-36 to -1	0.0130	0.073	0.910

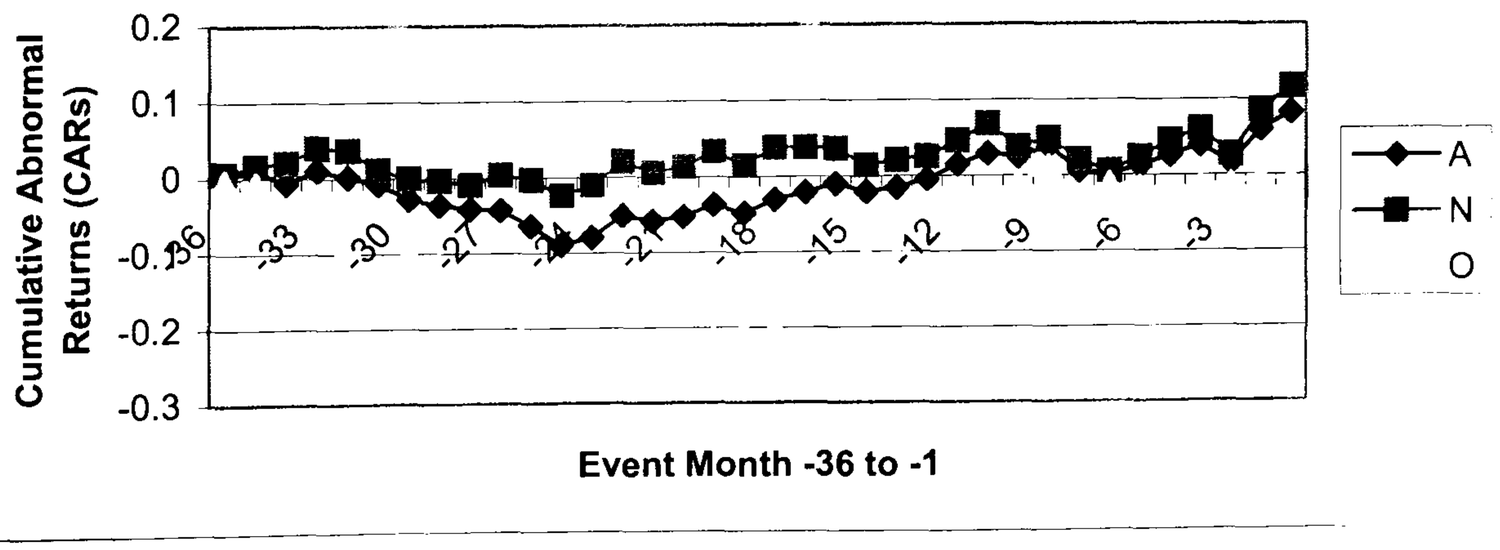
Table A2.6.2

EM	α	T-Stat	P-Value	Implied CAR
-12 to -1	0.0040	0.588	0.455	0.0480
-24 to -1	0.0044	0.961	0.363	0.1056
-36 to -1	-0.0034	-1.224	0.299	-0.1224

* Indicate significant at 5%, two-sided t-test.

Figure A2.4 plots the bidding firms three-year pre-acquisition average CARs of the whole sample, the non-overlapping sample, and the overlapping sample. All samples experience a similar return pattern, that is they all suffer some kind of loss in the third year prior to the takeover announcement, and start to gain in two years before the announcement. Non-overlapping bidding firms outperform the other two in the three years period, and the overlapping returns deflate the average CARs of the whole sample. However, most of the CARs shown in Figure 6.4 are statistically insignificant different from zero.

Figure A2.4. Bidding firms (97-01) three-year pre-acquisition average CARs of the whole sample, the non-overlapping sample, and the overlapping sample.



A: all samples, non-overlapping plus overlapping bidding firms.
N: non-overlapping bidding firms
O: overlapping bidding firms

Appendix 3. Bidding firms (1994-1998) long-run post acquisition stock returns

Table A3.1 reports all the bidding firms three years post acquisition average ARs and CARs. One monthly average ARs and three monthly average CARs are statistically significant different from zero in 5% significance level. CARs are negative in the first two and half years, and then rise to positive, however, 33 out of 36 CARs are statistically insignificant different from zero.

Table A3.1. Bidding firms (1994-1998) three years post acquisition average ARs and CARs

There are 99 UK bidding firms involved in the acquisitions during 1994-1998 periods. AR is the monthly average abnormal return of all the bidding firms. CAR is the cumulative average abnormal return of all the bidding firms. T-statistics of the monthly ARs and CARs are also given in the table.

EM	AR	T-Stat	CAR	T-Stat
Month 1	-0.0117	-1.187	-0.0117	-1.187
Month 2	-0.0180	-1.973	**-0.0297***	-2.452
Month 3	-0.0168	-1.509	**-0.0466***	-2.746
Month 4	0.0096	0.678	-0.0369	-1.706
Month 5	0.0016	0.146	-0.0354	-1.379
Month 6	-0.0067	-0.661	-0.0420	-1.414
Month 7	-0.0233	-1.870	-0.0654	-1.875
Month 8	-0.0087	-0.726	-0.0741	-1.990
Month 9	-0.0177	-1.261	**-0.0918***	-2.159
Month 10	0.0032	0.314	-0.0886	-1.916
Month 11	0.0043	0.292	-0.0843	-1.813
Month 12	0.0138	1.352	-0.0705	-1.476
Month 13	0.0191	1.463	-0.0515	-1.094
Month 14	-0.0159	-1.330	-0.0674	-1.306
Month 15	0.0198	1.821	-0.0476	-0.911
Month 16	0.0114	0.835	-0.0362	-0.669
Month 17	-0.0099	-0.661	-0.0461	-0.808
Month 18	0.0258	1.982	-0.0203	-0.338
Month 19	-0.0017	-0.137	-0.0219	-0.369
Month 20	**-0.0287***	-2.246	-0.0507	-0.824
Month 21	0.0038	0.239	-0.0468	-0.724
Month 22	-0.0130	-1.018	-0.0599	-0.953
Month 23	-0.0122	-0.742	-0.0720	-1.122
Month 24	0.0143	1.101	-0.0577	-0.914
Month 25	0.0002	0.020	-0.0575	-0.879
Month 26	0.0148	1.062	-0.0428	-0.662
Month 27	0.0154	1.349	-0.0273	-0.411
Month 28	0.0197	1.546	-0.0077	-0.112
Month 29	-0.0014	-0.095	-0.0091	-0.130
Month 30	0.0147	0.928	0.0056	0.078
Month 31	0.0138	0.867	0.0195	0.271
Month 32	0.0236	1.548	0.043	0.591

Month 33	-0.0198	-1.303	0.0233	0.317
Month 34	0.0119	0.737	0.0351	0.472
Month 35	0.0268	1.596	0.0619	0.812
Month 36	-0.0200	-1.048	0.0419	0.525

* Indicate significant at 5%, two-sided t-test.

Figure A3.1 presents the bidding firms three years post acquisition average CARs. It shows that bidding firms experience a negative abnormal returns immediately after the completion of the acquisition, and stay negative in two and half years. Bidding firms only gain some positive abnormal returns in the second half of the third year after the acquisition. However, most of the negative CARs and all the positive CARs are statistically insignificant different from zero.

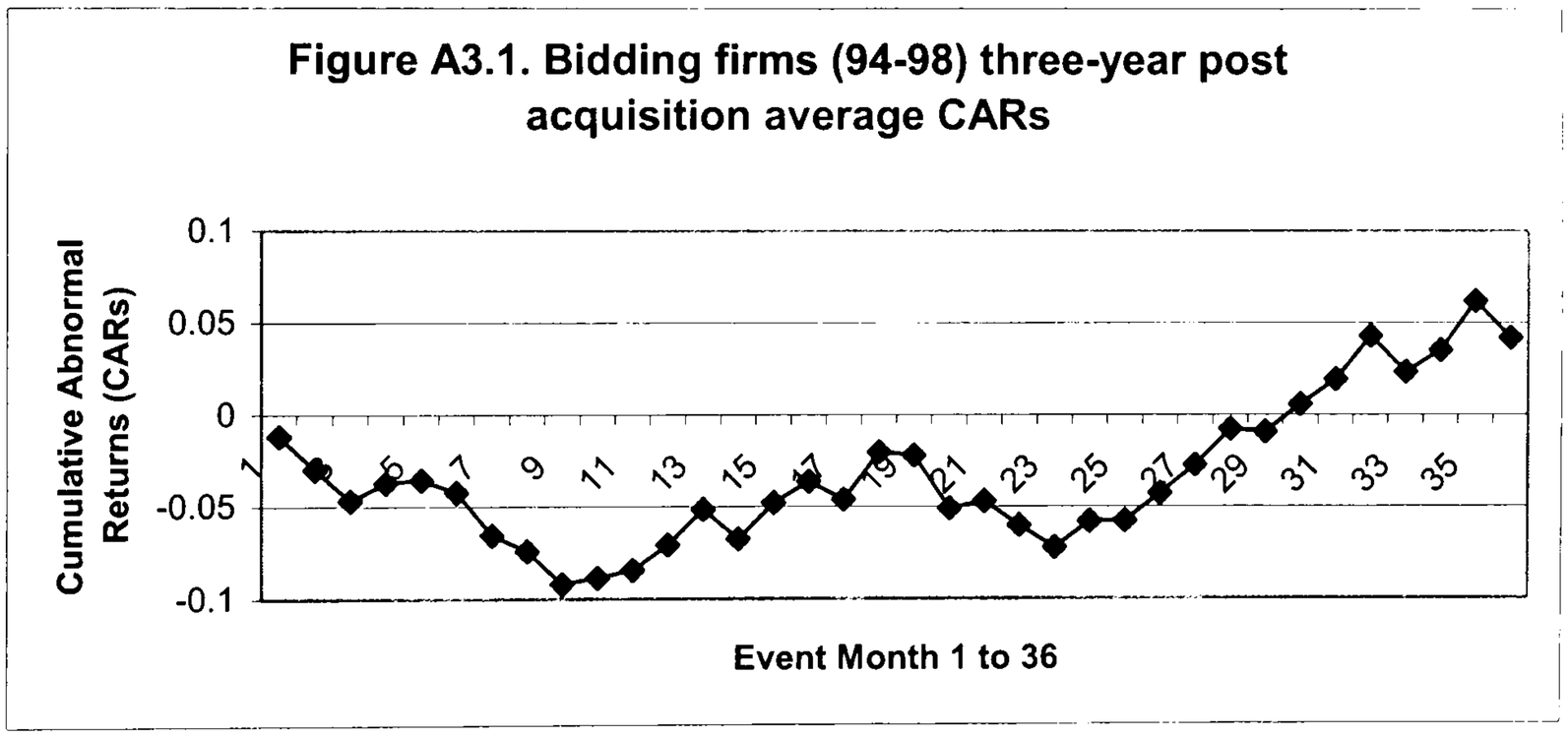


Table A3.2.1 reports the bidding firms one-, two- and three-year post acquisition CARs and BHARs. Both the one- and two-year CARs and BHARs are negative, while the three-year CAR and BHAR are positive. However, All of them are statistically insignificant different from zero at 5% significance level. Table A3.2.2 shows that all the one to three years intercept terms are negative and statistically significant. This is

consistent with previous studies that report significant long-run post acquisition abnormal returns.

Table A3.2. Bidding firms (1994-1998) three years post acquisition average CARs and BHARs

There are 99 UK bidding firms involved in the acquisitions during 1994-1998 periods. Table A3.2.1 reports the result calculated by using the control firms approach. Table A3.2.2 presents the result calculated by using the Fama-French three-factor model. CAR is the average cumulative abnormal return of all the bidding firms. BHAR is the average buy-and-hold abnormal return of all the bidding firms. α is the mean intercept term of Fama-French three-factor model. Implied CAR is the mean α multiplying by 12, 24, and 36. T-statistics of the CARs and the BHARs as well as the corresponding P-values calculated by using the non-parametric Wilcoxon Signed-Rank test are given in the table.

Table A3.2.1

EM	CAR	T-Stat	P-Value
1 to 12	-0.0705	-1.476	0.574
1 to 24	-0.0577	-0.914	0.516
1 to 36	0.0419	0.525	0.424

EM	BHAR	T-Stat	P-Value
1 to 12	-0.0702	-1.447	0.503
1 to 24	-0.0645	-0.931	0.551
1 to 36	0.1297	1.207	0.164

Table A3.2.2

EM	α	T-Stat	P-Value	Implied CAR
1 to 12	**-0.0062***	-2.049	0.126	-0.0744
1 to 24	**-0.0068***	-3.193	0.003	-0.1632
1 to 36	**-0.0058***	-3.307	0.003	-0.2088

* Indicate significant at 5%, two-sided t-test.

To acknowledge the effect of overlapping returns to the inference of test statistics, we once again divide our main sample as non-overlapping and overlapping bidding firms. We examine the non-overlapping bidding firms first.

Table A3.3 reports the non-overlapping bidding firms three years post acquisition average ARs and CARs. 6 out of 36 ARs are significant. All the CARs are negative, however, only 4 out of 36 CARs are statistically significant different from zero.

Table A3.3. Non-overlapping bidding firms (1994-1998) three years post acquisition average ARs and CARs

There are 65 UK non-overlapping bidding firms involved in the acquisitions during 1994-1998 periods. AR is the monthly average abnormal return of all the bidding firms. CAR is the cumulative average abnormal return of all the bidding firms. T-statistics of the monthly ARs and CARs are also given in the table.

EM	AR	T-Stat	CAR	T-Stat
Month 1	-0.0127	-1.011	-0.0127	-1.011
Month 2	**-0.0240***	-2.014	**-0.0367***	-2.303
Month 3	**-0.0331***	-2.278	**-0.0698***	-3.065
Month 4	0.0076	0.384	**-0.0622***	-2.145
Month 5	-0.0122	-0.867	**-0.0744***	-2.193
Month 6	0.0010	0.077	-0.0734	-1.876
Month 7	-0.0126	-0.923	-0.0861	-1.957
Month 8	-0.0018	-0.113	-0.0879	-1.870
Month 9	-0.0189	-1.020	-0.1068	-1.999
Month 10	-0.0070	-0.560	-0.1138	-1.934
Month 11	-0.0023	-0.122	-0.1160	-1.924
Month 12	0.0119	0.872	-0.1042	-1.675
Month 13	0.0193	1.117	-0.0849	-1.382
Month 14	-0.0298	-1.988	-0.1147	-1.682
Month 15	**0.0380***	2.597	-0.0766	-1.109
Month 16	0.0037	0.224	-0.0729	-1.003
Month 17	-0.0166	-0.802	-0.0895	-1.171
Month 18	0.0256	1.455	-0.0640	-0.785
Month 19	-0.0085	-0.546	-0.0724	-0.899
Month 20	**-0.0424***	-2.672	-0.1148	-1.421
Month 21	0.0043	0.240	-0.1105	-1.302
Month 22	-0.0139	-0.969	-0.1244	-1.467
Month 23	-0.0143	-0.707	-0.1387	-1.625
Month 24	0.0010	0.063	-0.1377	-1.631
Month 25	-0.0004	-0.026	-0.1381	-1.603
Month 26	0.0227	1.256	-0.1154	-1.349
Month 27	0.0133	0.933	-0.1021	-1.155
Month 28	0.0152	0.881	-0.0869	-0.942
Month 29	-0.0045	-0.237	-0.0914	-0.989
Month 30	0.0235	1.249	-0.0679	-0.722
Month 31	**0.0395***	2.176	-0.0284	-0.298
Month 32	0.0243	1.296	-0.0041	-0.044
Month 33	**-0.0406***	-2.047	-0.0447	-0.464
Month 34	-0.0022	-0.104	-0.0469	-0.490
Month 35	0.0318	1.371	-0.0151	-0.155
Month 36	-0.0219	-0.832	-0.0371	-0.364

* Indicate significant at 5%, two-sided t-test.

Figure A3.2 presents the non-overlapping bidding firms three years post acquisition average CARs. It shows that no monthly average CARs are positive, it means that non-overlapping bidding firms suffer a negative abnormal returns throughout the three years

after the completion of the takeover. However, 32 out of 36 CARs are statistically insignificant different from zero.

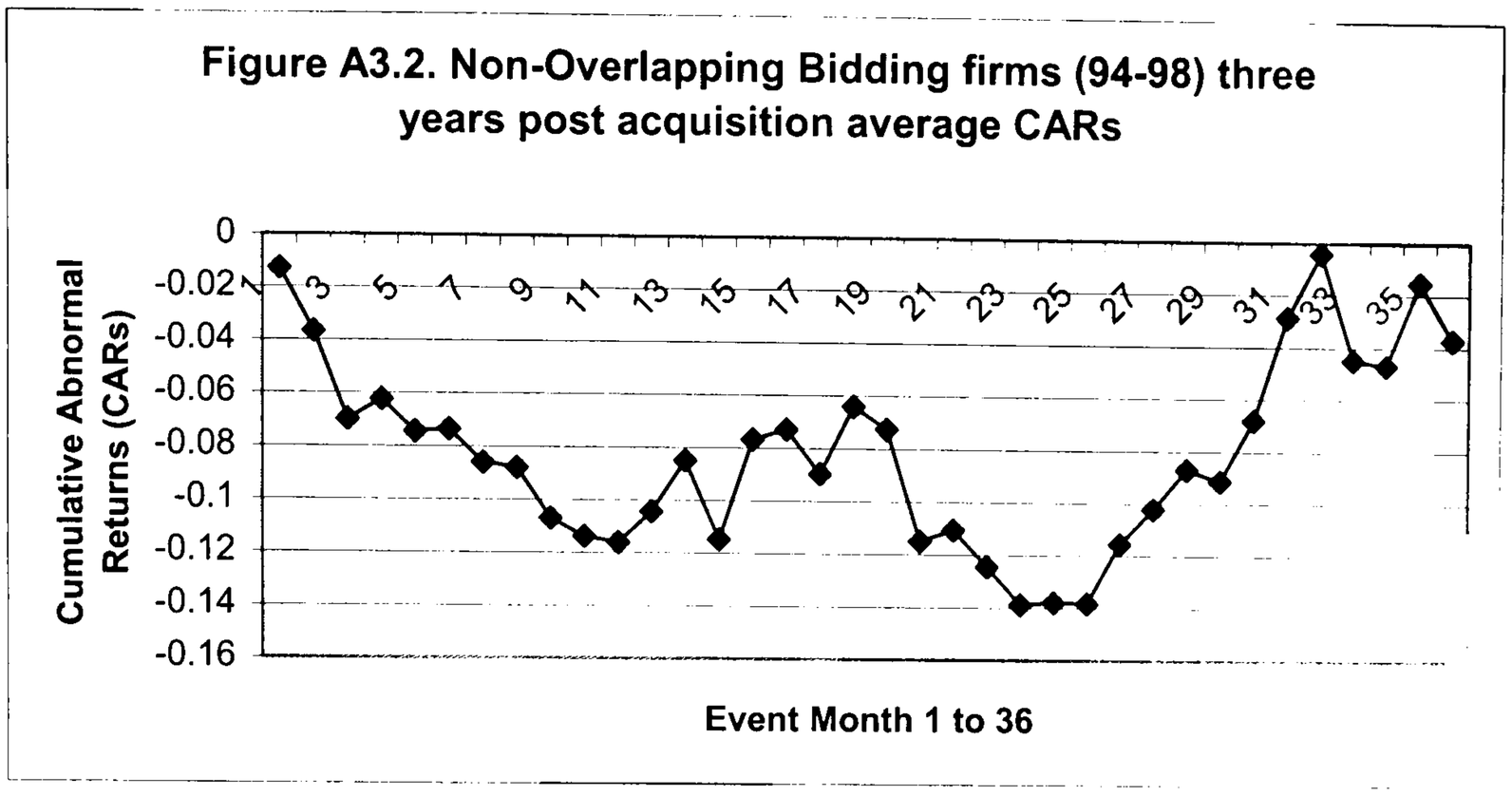


Table A3.4.1 reports the non-overlapping bidding firms one-, two- and three-year post acquisition average CARs and BHARs. All the three CARs are negative and statistically insignificant. However, the t-statistic shows the two years BHAR is significant different from zero at 5% significance level. Although the t-statistic is inconsistent with the nonparametric P-value, the P-value is also very close to the 5% significance level. Thus, the two years BHAR is absolutely significant at 10% significance level, and might also be significant at 5%. Table A3.4.2 reports that the two and three years intercept terms are negative and statistically significant different from zero.

Table A3.4. Non-overlapping bidding firms (1994-1998) three years post acquisition average CARs and BHARs

There are 65 UK non-overlapping bidding firms involved in the acquisitions during 1994-1998 periods. Table A3.4.1 reports the result calculated by using the control firms approach. Table A3.4.2 presents the result calculated by using the Fama-French three-factor model. CAR is the average cumulative abnormal return of all the bidding firms. BHAR is the average buy-and-hold abnormal return of all the bidding firms. α is the mean intercept term of Fama-French three-factor model. Implied CAR is the mean α multiplying by 12, 24, and 36. T-statistics of the CARs and the BHARs as well as the corresponding P-values calculated by using the non-parametric Wilcoxon Signed-Rank test are given in the table.

Table A3.4.1

EM	CAR	T-Stat	P-Value
1 to 12	-0.1042	-1.675	0.271
1 to 24	-0.1377	-1.631	0.113
1 to 36	-0.0371	-0.364	0.688

EM	BHAR	T-Stat	P-Value
1 to 12	-0.1263	-1.910	0.163
1 to 24	**-0.1849***	-2.033	0.053
1 to 36	0.0297	0.224	0.893

Table A3.4.2

EM	α	T-Stat	P-Value	Implied CAR
1 to 12	-0.0080	-1.994	0.130	-0.0960
1 to 24	**-0.0104***	-3.993	0.000	-0.2496
1 to 36	**-0.0091***	-4.162	0.000	-0.3276

* Indicate significant at 5%, two-sided t-test.

Table A3.5 reports the overlapping bidding firms three years post acquisition average ARs and CARs. It clearly shows that all the monthly average ARs and CARs are statistically insignificant different from zero at 5% significance level.

Table A3.5. Overlapping bidding firms (1994-1998) three years post acquisition average ARs and CARs

There are 34 UK overlapping bidding firms involved in the acquisitions during 1994-1998 periods. AR is the monthly average abnormal return of all the bidding firms. CAR is the cumulative average abnormal return of all the bidding firms. T-statistics of the monthly ARs and CARs are also given in the table.

EM	AR	T-Stat	CAR	T-Stat
Month 1	-0.0098	-0.612	-0.0098	-0.612
Month 2	-0.0067	-0.483	-0.0165	-0.915
Month 3	0.0143	0.906	-0.0022	-0.100
Month 4	0.0136	0.775	0.0114	0.397
Month 5	0.0279	1.879	0.0393	1.152
Month 6	-0.0213	-1.375	0.0180	0.423
Month 7	-0.0438	-1.739	-0.0258	-0.451
Month 8	-0.0219	-1.305	-0.0477	-0.778
Month 9	-0.0155	-0.742	-0.0632	-0.892
Month 10	0.0228	1.282	-0.0404	-0.543
Month 11	0.0168	0.697	-0.0236	-0.332
Month 12	0.0174	1.203	-0.0062	-0.086
Month 13	0.0187	0.976	0.0125	0.177

Month 14	0.0106	0.547	0.0230	0.314
Month 15	-0.0151	-1.157	0.0080	0.105
Month 16	0.0262	1.077	0.0341	0.464
Month 17	0.0028	0.148	0.0369	0.470
Month 18	0.0263	1.467	0.0632	0.809
Month 19	0.0114	0.612	0.0746	0.954
Month 20	-0.0027	-0.126	0.0719	0.812
Month 21	0.0029	0.090	0.0748	0.796
Month 22	-0.0113	-0.443	0.0635	0.772
Month 23	-0.0080	-0.283	0.0555	0.626
Month 24	0.0396	1.874	0.0951	1.137
Month 25	0.0015	0.074	0.0966	1.056
Month 26	-0.0004	-0.021	0.0962	1.072
Month 27	0.0195	1.004	0.1156	1.271
Month 28	0.0281	1.666	0.1437	1.577
Month 29	0.0045	0.192	0.1482	1.526
Month 30	-0.0022	-0.074	0.1461	1.369
Month 31	-0.0352	-1.190	0.1109	1.075
Month 32	0.0222	0.837	0.1331	1.166
Month 33	0.0201	0.942	0.1532	1.432
Month 34	0.0389	1.720	0.1921	1.702
Month 35	0.0171	0.825	0.2092	1.783
Month 36	-0.0164	-0.680	0.1928	1.546

Figure A3.3 presents the return pattern of overlapping bidding firms in three years after the acquisition. The CARs consistently rise after the completion of the acquisition, and finally reach 20%. However, all of them are statistically insignificant different from zero.

Figure A3.3. Overlapping bidding firms (94-98) three years post acquisition average CARs

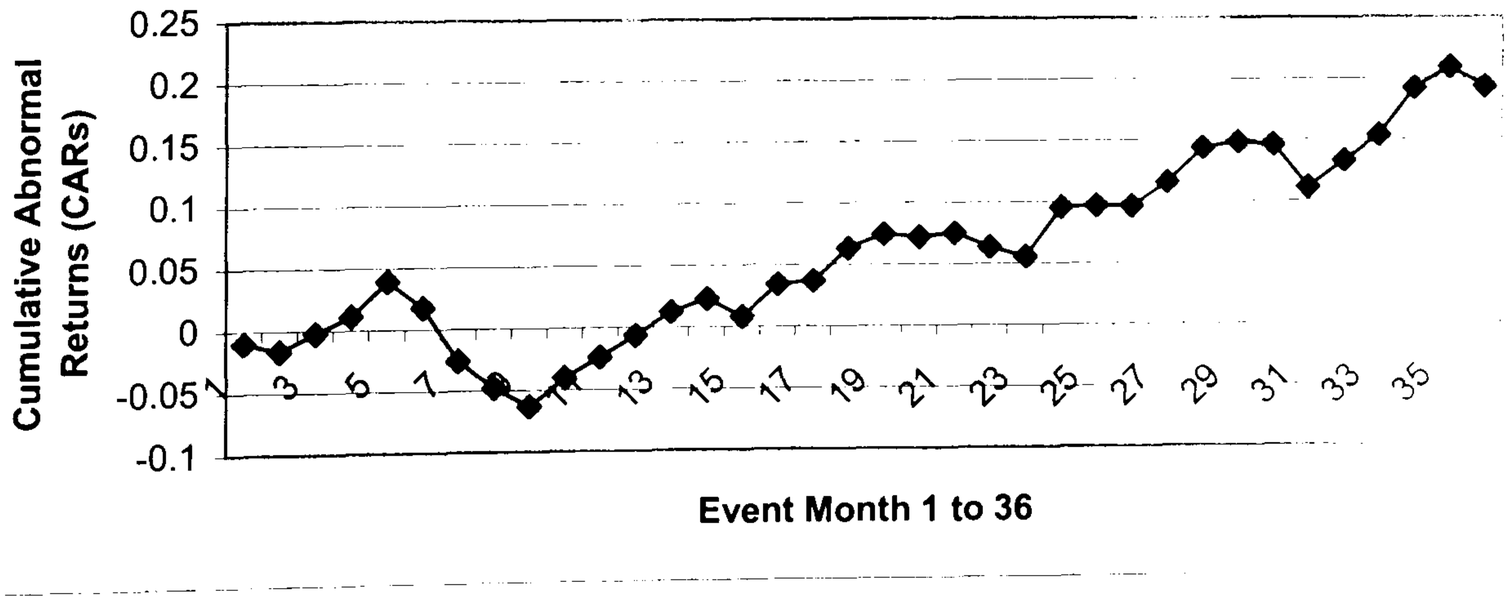


Table A3.6.1 reports overlapping bidding firms one-, two- and three-year post acquisition average CARs and BHARs. According to the t-statistics, all these CARs and BHARs are statistically insignificant at 5% significance level; however, the t-statistics of three-year CAR and BHAR are inconsistent with the nonparametric P-value. According to the P-value, the three-year CAR and BHAR would otherwise significant at 5% significance level. Table A3.6.2 reports three very small and insignificant intercept terms and the implied CARs. Put together, we conclude that the overlapping bidding firms earn a normal rate of returns in three years after the acquisition.

Table A3.6. Overlapping bidding firms (1994-1998) three years post acquisition average CARs and BHARs

There are 34 UK overlapping bidding firms involved in the acquisitions during 1994-1998 periods. Table A3.6.1 reports the result calculated by using the control firms approach. Table A3.6.2 presents the result calculated by using the Fama-French three-factor model. CAR is the average cumulative abnormal return of all the bidding firms. BHAR is the average buy-and-hold abnormal return of all the bidding firms. α is the mean intercept term of Fama-French three-factor model. Implied CAR is the mean α multiplying by 12, 24, and 36. T-statistics of the CARs and the BHARs as well as the corresponding P-values calculated by using the non-parametric Wilcoxon Signed-Rank test are given in the table.

Table A3.6.1

EM	CAR	T-Stat	P-Value
1 to 12	-0.0062	-0.086	0.427
1 to 24	0.0951	1.137	0.149
1 to 36	0.1928	1.546	0.045

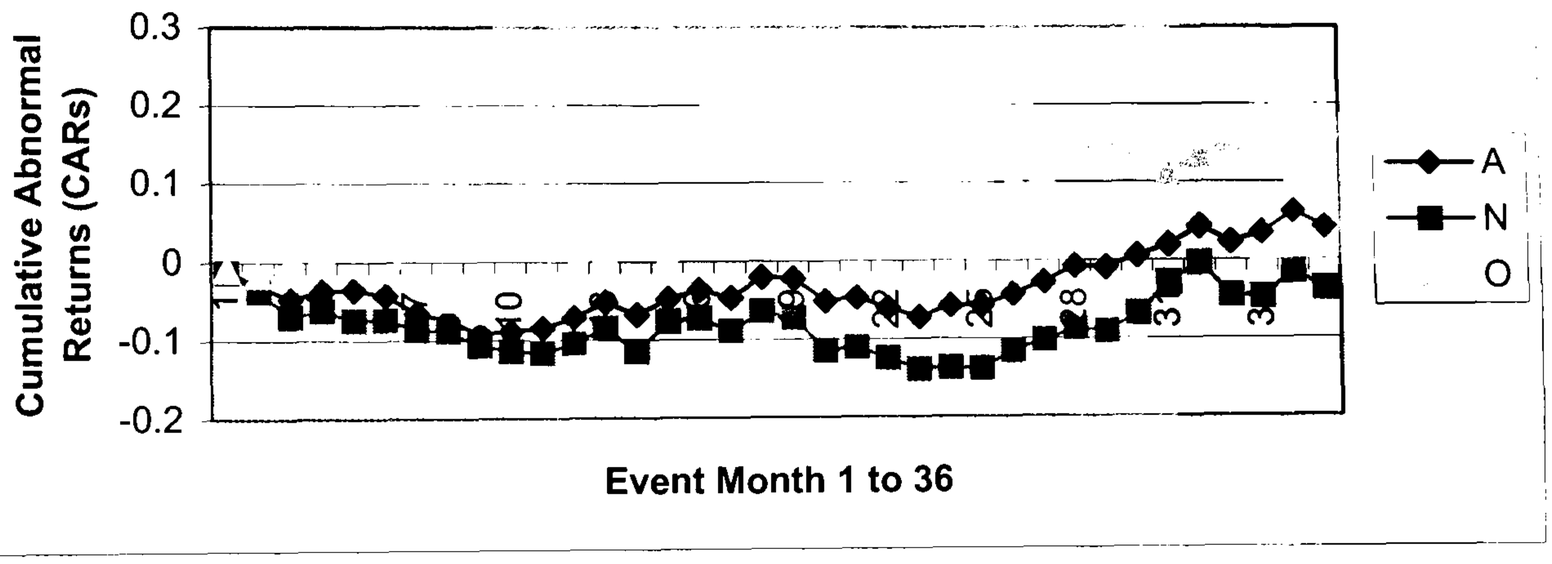
EM	BHAR	T-Stat	P-Value
1 to 12	0.0371	0.618	0.334
1 to 24	0.1657	1.812	0.069
1 to 36	0.3207	1.771	0.017

Table A3.6.2

EM	α	T-Stat	P-Value	Implied CAR
1 to 12	-0.0028	-0.642	0.632	-0.0336
1 to 24	0.0001	0.035	1.000	0.0024
1 to 36	0.0005	0.185	0.798	0.0180

Figure A3.4 puts Figure A3.1, A3.2 and A3.3 together and compares their long-run stock returns. Overlapping bidding firms outperform the whole sample and the non-overlapping bidding firms in three years after the acquisition. The overlapping returns have inflated the CARs of the whole sample of bidding firms. However, most of the CARs shown in Table A3.4 are statistically insignificant different from zero.

Figure A3.4. Three years post acquisition average CARs of All, Non-overlapping and Overlapping bidding firms 1994-1998



A: all samples, non-overlapping plus overlapping bidding firms.
N: non-overlapping bidding firms
O: overlapping bidding firms