THE ANTICIPATION AND INTERPRETATION OF UK COMPANY ANNOUNCEMENTS: THE INCENTIVES TO ACQUIRE INFORMATION

Thesis submitted for PhD degree

by

Denise Ann Wren Foreman

May 1996

Centre for Empirical Research in Finance

Department of Economics and Finance

Brunel University

ACKNOWLEDGEMENTS

I would most like to thank my supervisor Professor Len Skerratt for his help and encouragement throughout my PhD. His friendship and support has proved invaluable in assisting me to complete my research. Professor Tony Antoniou has also helped me enormously by providing financial assistance, without which I would have been unable to finish. In this regard I must also thank Dr. Andrew Clare. Thanks must also be given to both my external examiner, Dr. Richard Morris, and my internal examiner, Gioia Pescetto, for their suggestions and insights which have added clarity to my work.

On a more personal note, I am extremely grateful to Richard Batty for tolerating all my ups and downs, but in particular for all the lengthy discussions and invaluable proof reading. For the time I have known Mani Carounanidy, she has proved to be a good friend and I thank her for all her support. I would also like to thank all my other friends, but especially Michael Kagwa, Richard Priestley and Sian Owen for their encouragement.

Most of all, I am indebted to my mother and Peter for all the love and support they have given over the years. I hope I have not caused you too many hours of worry and hope you think it was all worthwhile in the end.

ABSTRACT

THE ANTICIPATION AND INTERPRETATION OF UK COMPANY ANNOUNCEMENTS: THE INCENTIVES TO ACQUIRE INFORMATION

The objective of this thesis is to explain the behaviour of stock returns around the disclosure of different types of information release by UK companies. Previous literature has documented the existence of both market anticipation and the lagged impounding of value relevant information. The main objective of this research is, therefore, to identify the conditions under which investors choose to be informed in anticipation of and in response to, a corporate disclosure. More specifically, we explain the behaviour of stock returns in terms of the costs and benefits which investors must consider when deciding whether to acquire and interpret information. The results indicate that market anticipation is an increasing function of firm size, the number of years a firm has been trading and the volatility of prior stock returns. However, increased voluntary disclosure by firms would appear to reduce the ability of investors to and anticipate and interpret information. The volatility of stock returns, prior to the disclosure, is nevertheless the main driving force behind the explanation of post-announcement drift. There are also indications that investors' initial reactions to both earnings and non-earnings news are not based on informed judgements, and that bad news is generally associated with greater uncertainty than good news. Bad news would appear to be more difficult to anticipate and interpret, relative to good news. On further examination, however, investor anticipation is shown to be largely based on information as opposed to uninformed trading.

CONTENTS

	INTRODUCTION	1
1.	**THE VALUATION OF SECURITIES: THE ROLE OF INFORMATION**	7
1.1.	OBJECTIVES	7
1.2.	INTRODUCTION	7
1.3.	WHAT IS AN EFFICIENT PRICE?	9
1.3.1.	The Role of the Price System in Communicating Information	9
1.3.2.	The Role of Information	10
1.3.3.	Rational Expectations and Efficient Markets	14
1.3.4.	The Influence of Noise Trading	14
1.3.5.	Fundamental Information and Efficient Markets	17
1.3.6.	In Summary	21
1.4.	THE ABILITY OF THE MARKET TO ANTICIPATE EARNINGS	21
1.5.	THE FAILURE OF THE MARKET TO IMPOUND PAST PRICES	23
1.6.	THE FAILURE OF THE MARKET TO IMPOUND PUBLIC INFORMATION	24
1.6.1.	The Price-Earnings Ratio	25
1.6.2.	The Firm Size Effect	26
1.7.	THE FAILURE OF THE MARKET TO IMPOUND PUBLIC FINANCIAL STATEMENT INFORMATION	27
1.7.1.	Post-Announcement Drift	27
1.7.2.	Annual Report Information	31
1.8.	CONCLUSIONS	36
2.	**EXPLANATIONS FOR INFORMATION ANOMALIES**	37
2.1.	OBJECTIVES	37
2.2.	INTRODUCTION	37
2.3.	ABNORMAL RETURNS ARE MIS-ESTIMATED	38
2.3.1.	The Mis-measurement of Risk	38

2.3.2. Partially Revealing Prices and Residual Uncertainty 40
2.3.3. Transaction Costs 41
2.3.4. The Mis-measurement of Investors' Rates of Return 42

2.4. ANALYSTS' FORECASTS AS A PROXY FOR EARNINGS EXPECTATIONS 42

2.5. FUNCTIONAL FIXATION HYPOTHESIS 46

2.6. LONG VERSUS SHORT HORIZONS 48

2.7. THE HERDING OF INFORMATION AND ACTIONS 49

2.8. INVESTORS CHOOSE NOT TO BE INFORMED 52
2.8.1. Grossman & Stiglitz 53
2.8.2. Kim & Verrecchia 55
2.8.3. McNichols & Trueman 59
2.8.4. Demski & Feltham 61
2.8.5. In Summary 63

2.9. CONCLUSIONS 64

3. HYPOTHESIS DEVELOPMENT AND EXPERIMENTAL DESIGN 67

3.1. OBJECTIVES 67

3.2. INTRODUCTION 67

3.3. THE INCENTIVES TO ACQUIRE INFORMATION 70

3.4. THE CHOICE OF PROXY VARIABLES 74
3.4.1. Firm Size 74
3.4.2. Age of the Firm 76
3.4.3. Disclosure Policy 77
3.4.4. The Volatility of Stock Returns, Prior to the Disclosure 79

3.5. INFORMATION TYPES 81

3.6. THE ANNOUNCEMENT 82

3.7. EXPERIMENTAL DESIGN 83
3.7.1. Measuring Returns Performance 83
3.7.2. A Note on the Estimation of Market Model Parameters 87
3.7.3. Measuring the Level of Anticipation and Drift 89
3.7.4. The Model 94

3.8. CONCLUSIONS 98

4. **DATA SOURCES AND DESCRIPTIVE STATISTICS** 100

4.1. OBJECTIVES 100

4.2. INTRODUCTION 100

4.3. DATA SOURCES 101

4.4. THE PROCESS OF INFORMATION DISCLOSURE 104
4.4.1. What Information is Required by the LSE 104
4.4.2. The Format of the Information 105
4.4.3. The Timing of the Release 106

4.5. THE PROCESS OF INFORMATION DISCLOSURE BY US SECURITIES 107

4.6. DESCRIPTIVE STATISITICS 109
4.6.1. The Distribution Properties of the Explanatory Variables 109
4.6.2. The Correlation Structure of the Explanatory Variables 113
4.6.3. The Extent to which the Explanatory Variables Overlap 116

4.7. CONCLUSIONS 119

5. **THE PATTERN OF ANTICIPATION AND INTERPRETATION** 122

5.1. OBJECTIVES AND MAIN FINDING 122

5.2. INTRODUCTION 122

5.3. THE PATTERN OF STOCK RETURNS 123
5.3.1. The Comparison of Expected Returns Models 128
5.3.2. Earnings Announcements 133
5.3.3. Annual General Meetings 135
5.3.4. Board Changes 139
5.3.5. Changes in Shareholdings 139
5.3.6. The Effect of Allowing Other Disclosures within the Event Window 140
5.3.7. In Summary 152

5.4. EXPLAINING THE PATTERN OF STOCK RETURNS 153
5.4.1. Market Anticipation and the Net Value of Information Impounded 161
5.4.2. Market Anticipation and the Total Value of Information Impounded 176

5.5. CONCLUSIONS 188

6.	**THE PATTERN OF ANTICIPATION AND INTERPRETATION: GOOD AND BAD NEWS**	191
6.1.	THE OBJECTIVE AND MAIN FINDING	191
6.2.	INTRODUCTION	191
6.3.	THE DISCLOSURE OF INFORMATION	192
6.3.1.	The Disclosure Pattern of Earnings Information	192
6.3.2.	Attributes of Early Disclosers	194
6.3.3.	The Voluntary Disclosure of Information	195
6.3.4.	Alternative Explanations for the Seeming Earlier Arrival of Good News	196
6.4.	THE ADJUSTMENT OF STOCK PRICES TO INFORMATION	197
6.5.	THE PATTERN OF STOCK RETURNS FOR GOOD AND BAD NEWS	198
6.5.1.	The Comparison of Expected Return Models	203
6.5.2.	Earnings Announcements	206
6.5.3.	Annual General Meetings	214
6.5.4.	Board Changes	214
6.5.5.	Changes in Shareholdings	217
6.5.6.	In Summary	217
6.6.	EXPLAINING THE PATTERN OF STOCK RETURNS	219
6.6.1.	Good News Events	229
6.6.2.	Bad News Events	
6.6.3.	Unclear Event Windows	244
6.7.	CONCLUSIONS	252
7.	**IS PRICE MOVEMENT IN RESPONSE TO INFORMATION ?**	255
7.1.	THE OBJECTIVE AND MAIN FINDING	255
7.2.	INTRODUCTION	255
7.3.	EVIDENCE OF UNDER AND OVERREACTION TO INFORMATION	258
7.4.	EVALUATION OF THE POST-EVENT PRICE RESPONSE	262
7.4.1.	The Descriptive Statistics of Security Returns	262
7.4.2.	The Pattern of Sign Reversal in Security Returns	267
7.4.3.	The Relation Between the Post-Event Response and the Initial Price Change	269

7.5. EVALUATION OF POST-EVENT VOLATILITY OF STOCK RETURNS 279

7.6. THE RESOLUTION OF PRIOR UNCERTAINTY 285

7.7. CONCLUSIONS 295

8. CONCLUSIONS 298

APPENDIX 1 307
APPENDIX 2 320
REFERENCES 326

LIST OF TABLES

Table 3.1. Measurement properties of ANN_i. 91

Table 4.1. Distribution Properties of the Explanatory Variables for Each Class of Information -
- 4.1a. Clear Event Window 110
- 4.1b. Unclear Event Window 111

Table 4.2. The Simple Correlation between the Explanatory Variables for Each Class of Information -
- 4.2a. Clear Event Window 114
- 4.2b. Unclear Event Window 115

Table 4.3. OLS Results of the Volatility of Prior Stock Returns Regressed Against Firm Size, Age and the Number of Corporate Disclosures, for Each Class of Information -
- 4.3a. Clear Event Window 117
- 4.3b. Unclear Event Window 118

Table 5.1. Daily Average Abnormal Returns (AAR) and the Abnormal Performance Index (API), Estimated Using Market Model, Market and Mean Adjusted Expected Returns, Using Clear Event Windows -
- 5.1a. Annual Earnings Reports 131
- 5.1b. Interim Earnings Reports 132
- 5.1c. AGMs 136
- 5.1d. Board Changes 137
- 5.1e. Changes in Shareholdings 139

Table 5.2. Daily Average Abnormal Returns (AAR) and the Abnormal Performance Index (API), Estimated Using Market Model, Market and Mean Adjusted Expected Returns, Using Unclear Event Windows -
- 5.2a. Annual Earnings Reports 145
- 5.2b. Interim Earnings Reports 146
- 5.2c. AGMs 148
- 5.2d. Board Changes 149
- 5.2e. Changes in Shareholdings 151

Table 5.3. OLS Regression Results, of the Value of Net Information (LN_ANN_i), Against the Explanatory Variables - Clear Event Window
- 5.3a. Estimated Using Market Model Adjusted Returns (MM) 158
- 5.3b. Estimated Using Market Adjusted Returns (MKT) 159
- 5.3c. Estimated Using Mean Adjusted Returns (MN) 160

Table 5.4. OLS Regression Results, of the Value of Net Information (LN_POST_i), Against the Explanatory Variables - Clear Event Window
- 5.4a. Estimated Using Market Model Adjusted Returns (MM) 162

5.4b. Estimated Using Market Adjusted Returns (MKT) 163
5.4c. Estimated Using Mean Adjusted Returns (MN) 164

Table 5.5. OLS Regression Results, of the Value of Net Information (LN_ANN_i), Against the Explanatory Variables - Unclear Event Window
5.5a. Estimated Using Market Model Adjusted Returns (MM) 166
5.5b. Estimated Using Market Adjusted Returns (MKT) 167
5.5c. Estimated Using Mean Adjusted Returns (MN) 168

Table 5.6. OLS Regression Results, of the Value of Net Information (LN_POST_i), Against the Explanatory Variables - Unclear Event Window
5.6a. Estimated Using Market Model Adjusted Returns (MM) 169
5.6b. Estimated Using Market Adjusted Returns (MKT) 170
5.6c. Estimated Using Mean Adjusted Returns (MN) 171

Table 5.7. OLS Regression Results, of the Value of Total Information (LN_ANN_i), Against the Explanatory Variables - Clear Event Window
5.7a. Estimated Using Market Model Adjusted Returns (MM) 173
5.7b. Estimated Using Market Adjusted Returns (MKT) 174
5.7c. Estimated Using Mean Adjusted Returns (MN) 175

Table 5.8. OLS Regression Results, of the Value of Total Information (LN_POST_i), Against the Explanatory Variables - Clear Event Window
5.8a. Estimated Using Market Model Adjusted Returns (MM) 177
5.8b. Estimated Using Market Adjusted Returns (MKT) 178
5.8c. Estimated Using Mean Adjusted Returns (MN) 179

Table 5.9. OLS Regression Results, of the Value of Total Information (LN_ANN_i), Against the Explanatory Variables - Unclear Event Window
5.9a. Estimated Using Market Model Adjusted Returns (MM) 180
5.9b. Estimated Using Market Adjusted Returns (MKT) 181
5.9c. Estimated Using Mean Adjusted Returns (MN) 182

Table 5.10. OLS Regression Results, of the Value of Total Information (LN_POST_i), Against the Explanatory Variables - Unclear Event Window
5.10a. Estimated Using Market Model Adjusted Returns (MM) 184
5.10b. Estimated Using Market Adjusted Returns (MKT) 185
5.10c. Estimated Using Mean Adjusted Returns (MN) 186

Table 6.1. Daily Average Abnormal Returns (AAR) and the Abnormal Performance Index (API), Estimated Using Market Model, Market and Mean Adjusted Expected Returns, Using Clear Event Windows -
6.1a. Annual Earnings Reports - Good News 204
6.1b. Annual Earnings Reports - Bad News 205

Table 6.2. Daily Average Abnormal Returns (AAR) and the Abnormal Performance Index (API), Estimated Using Market Model, Market and Mean Adjusted Expected Returns, Using Clear Event Windows -
6.2a. Interim Earnings Reports - Good News 207
6.2b. Interim Earnings Reports - Bad News 208

Table 6.3. Daily Average Abnormal Returns (AAR) and the Abnormal Performance Index (API), Estimated Using Market Model, Market and Mean Adjusted Expected Returns, Using Clear Event Windows -
6.3a. AGMs - Good News 210
6.3b. AGMs - Bad News 211

Table 6.4. Daily Average Abnormal Returns (AAR) and the Abnormal Performance Index (API), Estimated Using Market Model, Market and Mean Adjusted Expected Returns, Using Clear Event Windows -
6.4a. Board Changes - Good News 212
6.4b. Board Changes - Bad News 213

Table 6.5. Daily Average Abnormal Returns (AAR) and the Abnormal Performance Index (API), Estimated Using Market Model, Market and Mean Adjusted Expected Returns, Using Clear Event Windows -
6.5a. Changes in Shareholdings - Good News 215
6.5b. Changes in Shareholdings - Bad News 216

Table 6.6. OLS Regression Results, of the Value of Information (LN_ANN_i), Against the Explanatory Variables, Using Clear Event Windows, Good News -
6.6a. Estimated Using Market Model Adjusted Returns (MM) 223
6.6b. Estimated Using Market Adjusted Returns (MKT) 224
6.6c. Estimated Using Mean Adjusted Returns (MN) 225

Table 6.7. OLS Regression Results, of the Value of Information (LN_POST_i), Against the Explanatory Variables, Using Clear Event Windows, Good News -
6.7a. Estimated Using Market Model Adjusted Returns (MM) 226
6.7b. Estimated Using Market Adjusted Returns (MKT) 227
6.7c. Estimated Using Mean Adjusted Returns (MN) 228

Table 6.8. OLS Regression Results, of the Value of Information (LN_ANN_i), Against the Explanatory Variables, Using Clear Event Windows, Bad News -
6.8a. Estimated Using Market Model Adjusted Returns (MM) 231
6.8b. Estimated Using Market Adjusted Returns (MKT) 232
6.8c. Estimated Using Mean Adjusted Returns (MN) 233

Table 6.9. OLS Regression Results, of the Value of Information (LN_POST_i), Against the Explanatory Variables, Using Clear Event Windows, Bad News -
6.9a. Estimated Using Market Model Adjusted Returns (MM) 234
6.9b. Estimated Using Market Adjusted Returns (MKT) 235
6.9c. Estimated Using Mean Adjusted Returns (MN) 236

Table 6.10. OLS Regression Results, of the Value of Information (LN_ANN_i), Against the Explanatory Variables, Using Unclear Event Windows, Good News -
6.10a. Estimated Using Market Model Adjusted Returns (MM) 238
6.10b. Estimated Using Market Adjusted Returns (MKT) 239
6.10c. Estimated Using Mean Adjusted Returns (MN) 240

Table 6.11. OLS Regression Results, of the Value of Information (LN_POST_i), Against the Explanatory Variables, Using Unclear Event Windows, Good News -
6.11a. Estimated Using Market Model Adjusted Returns (MM) 241
6.11b. Estimated Using Market Adjusted Returns (MKT) 242
6.11c. Estimated Using Mean Adjusted Returns (MN) 243

Table 6.12. OLS Regression Results, of the Value of Information (LN_ANN_i), Against the Explanatory Variables, Using Unclear Event Windows, Bad News -
6.12a. Estimated Using Market Model Adjusted Returns (MM) 245
6.12b. Estimated Using Market Adjusted Returns (MKT) 246
6.12c. Estimated Using Mean Adjusted Returns (MN) 247

Table 6.13. OLS Regression Results, of the Value of Information (LN_POST_i), Against the Explanatory Variables, Using Unclear Event Windows, Bad News -
6.13a. Estimated Using Market Model Adjusted Returns (MM) 234
6.13b. Estimated Using Market Adjusted Returns (MKT) 235
6.13c. Estimated Using Mean Adjusted Returns (MN) 236

Table 7.1. Descriptive Statistics of the Changing Returns Performance ($API_{i,window}-1$) of Announcing Securities -
7.1a. Estimated Using Market Model Adjusted Returns (MM) 263
7.1b. Estimated Using Market Adjusted Returns (MKT) 264
7.1c. Estimated Using Mean Adjusted Returns (MN) 265

Table 7.2. The Number of Under or Overreactions, Estimated Using Market Model (MM), Market Adjusted (MKT) and Mean Adjusted (MN) Expected Returns 268

Table 7.3. The Relation Between Post-Event Stock Returns and the Residual Return on the Event Day -
7.3a. Estimated Using Market Model Adjusted Returns (MM) 272
7.3b. Estimated Using Market Adjusted Returns (MKT) 273
7.3c. Estimated Using Mean Adjusted Returns (MN) 274

Table 7.4. The Relation Between Post-Event Stock Returns and the Residual Return on the Event Day, for Major News Events
7.4a. Estimated Using Market Model Adjusted Returns (MM) 275
7.4b. Estimated Using Market Adjusted Returns (MKT) 276
7.4c. Estimated Using Mean Adjusted Returns (MN) 277

Table 7.5. The Relation Between the Volatility of Post-Event Stock Returns ($VOLPOST_i$), and the Sign of the News -
7.5a. Estimated Using Market Model Adjusted Returns (MM) 281

7.5b. Estimated Using Market Adjusted Returns (MKT) 282
7.5c. Estimated Using Mean Adjusted Returns (MN) 283

Table 7.6. Distribution Properties of the Volatility of Stock Returns over the Event Period, for Each Class of Information 288

Table 7.7. The Relation Between the Volatility of Post-Event Stock Returns ($VOLPOST_i$) and Prior Stock Returns ($VOLPR_i$) -
7.7a. Estimated Using Market Model Adjusted Returns (MM) 291
7.7b. Estimated Using Market Adjusted Returns (MKT) 292
7.7c. Estimated Using Mean Adjusted Returns (MN) 293

LIST OF FIGURES

Figure 3.1.	Graphical Representation of Table 3.1.	92
Figure 3.2.	The Level of Market Anticipation of Forthcoming Announcements by Large and Small Firms	96
Figure 5.1.	The Abnormal Performance Index Around Annual Earnings Reports, Using Clear Event Windows	126
Figure 5.2.	The Abnormal Performance Index Around Interim Earnings Reports, Using Clear Event Windows	126
Figure 5.3.	The Abnormal Performance Index Around AGMs, Using Clear Event Windows	127
Figure 5.4.	The Abnormal Performance Index Around Board Changes, Using Clear Event Windows	127
Figure 5.5.	The Abnormal Performance Index Around Changes in Shareholdings, Using Clear Event Windows	127
Figure 5.6.	The Abnormal Performance Index Around Annual Earnings Reports, Using Unclear Event Windows	142
Figure 5.7.	The Abnormal Performance Index Around Interim Earnings Reports, Using Unclear Event Windows	142
Figure 5.8.	The Abnormal Performance Index Around AGMs, Using Unclear Event Windows	143
Figure 5.9.	The Abnormal Performance Index Around Board Changes, Using Unclear Event Windows	143
Figure 5.10.	The Abnormal Performance Index Around Changes in Shareholdings, Using Unclear Event Windows	144
Figure 6.1.	The Abnormal Performance Index Around Annual Earnings Reports for Good and News, Using Clear Event Windows	201
Figure 6.2.	The Abnormal Performance Index Around Interim Earnings Reports for Good and Bad News, Using Clear Event Windows	201
Figure 6.3.	The Abnormal Performance Index Around AGMs for Good and Bad News, Using Clear Event Windows	202

Figure 6.4. The Abnormal Performance Index Around Board Changes for Good and Bad News, Using Clear Event Windows 202

Figure 6.5. The Abnormal Performance Index Around Changes in Shareholdings for Good and Bad News, Using Clear Event Windows 203

Page numbering as found in the original thesis

1. SECURITY VALUATION AND THE ROLE OF INFORMATION

1.1 OBJECTIVES

The objective of this chapter, is to conduct an overall review of the market efficiency literature. In this regard, we examine the process by which stock markets impound information into security prices. The chapter proceeds by:

- explaining the meaning of market efficiency, by describing the role of information, rational expectations, and the implications of noise trading for security pricing;
- providing an evaluation of current empirical evidence, reporting findings of both market overreaction (eg. DeBondt & Thaler 1989, 1990) and underreaction (eg. Ou & Penman 1990) to publicly available information. This includes evidence that indicates earnings information is frequently ignored, and only impounded with a lag (Bernard & Thomas 1989, 1990).

1.2 INTRODUCTION

Ball & Brown (1968) and Beaver (1968) launched a new era of research into the role of accounting information in security valuation, during a period of rising and undeniable support for efficient markets. The ultimate test of accounting information is its 'usefulness' - although the definition of usefulness and how it should be measured is rather elusive. Rather than formally defining usefulness, we observe the (economic) consequences of using accounting information by the major group of users - shareholders. With reliance on stock market efficiency, security prices were therefore used as benchmarks against which the 'information content' of accounting numbers could be evaluated, and the issue of the usefulness of accounting information in firm valuation became of secondary importance. As a consequence of relying on the Efficient Markets Hypothesis, we have learned little of how accounting information can be used to give a measure of value independent of prices (Penman 1991).

Fama (1970) was among the first to provide a formal definition of an efficient price. The prevalent hypothesis was one of market efficiency, with the market unbiasedly interpreting all available information and with reasonable speed. The definition was criticised on the grounds of being too ambiguous to be testable, and stimulated wide debate which remains unresolved. From the late 1970's growing evidence emerged of market inefficiency, which further questioned what we understood by the term 'efficiency'. Subsequently, Fama redefined efficiency in 1976 and again in 1991 (see later). The literature has also witnessed a number of other notable contributions towards the debate by Jensen (1978), Figlewski (1978), Grossman & Stiglitz (1980) and Beaver (1981), among others.

Defining the term efficiency is a feat yet to be accomplished, but perhaps is an impossible task. For instance, is a singular definition of efficiency feasible when the degree of efficiency is a matter of opinion. Given heterogenous beliefs, what is efficient to one investor may be regarded as inefficient to another (Figlewski 1978, Beaver 1981). Despite problems of definition, it is well recognised that tests of market efficiency are a joint hypothesis of: (i) the efficiency with which information is processed, and (ii) the descriptive validity of the chosen asset pricing model. Tests can fail to reject the null hypothesis of market efficiency, either because one of the two hypotheses are false, or because both are false. Thus, if it is not possible to test whether the market is efficient, perhaps it is sufficient to determine if investor behaviour is rational in response to new information. However, what may be considered a rational action for an individual investor, may not be seen as rational from the market's point of view. For instance, trading on noise is considered to be irrational, though De Long, Schliefer, Summers & Waldmann (1990) prove it can be profitable.

To determine if the stock market efficiently values securities, we need a benchmark with which we can compare security prices in order to recognise if they are correctly priced. To define efficiency we need to understand the role of information, for without information there would be no price. Section 1.3 below addresses the issue of defining an efficient price, discussing the role of information and rational expectations, and the implications of noise trading for efficient pricing. Sections 1.4 to 1.7 review recent evidence found both in support of, and against, market efficiency. More specifically, section 1.4 looks at the ability of the market to anticipate future earnings in advance of the release of current earnings (Collins, Kothari & Rayburn 1987, Kothari & Sloan 1992). Section 1.5 briefly reviews evidence of return predictability in stock returns (French & Roll 1986, Keim 1983, DeBondt & Thaler 1987). The market fails to impound historic information contained in security price, though unfortunately we cannot infer the type of information being ignored. Section 1.6 identifies two information variables that have been widely documented in their ability to predict the cross-sectional behaviour of security returns: the price-earnings ratio (Basu 1983, 1987), and the firm size effect (Banz 1981, Reinganum 1981). Section 1.7 examines in detail the phenomena of systematic underreaction to financial statement information, paying particular attention to the work of Bernard & Thomas (1989, 1990) and Ou & Penman (1989a). The chapter concludes with section 1.8, questioning the conditions under which the market is able to anticipate future earnings, and when the market appears to be surprised.

1.3 WHAT IS AN EFFICIENT PRICE ?

1.3.1 *The Role of the Price System in Communicating Information*

The price system is the mechanism used for communicating information, where equilibrium is dependent upon the markets' expectations of future stock prices. As investors act on their information, prices will reflect their diverse set of endowments, preferences and beliefs about the future states of nature (Beaver 1981). The role of the price system was characterised by Hayek (1945) as a

> 'system where the knowledge of the relevant facts is dispersed among many people, prices can act to coördinate the separate actions of different people in the same way as subjective values help the individual to coördinate the parts of his plan ... their limited fields of vision sufficiently overlap so that through many intermediaries the relevant information is communicated to all' which 'brings about the solution which might have been arrived at by one single mind possessing all the information.'

Hayek argues the total information set reflected in prices is unknown to all individuals. Each investor trades without knowing what information other investors have used in trading, and thus what information has influenced prices. An investor on the receipt of new information, must process the information to form an opinion of its effect on price, but also must decide whether other investors have used that information and so is already reflected in price. In other words, the market price embodies the aggregate opinion of all investors, and incorporates all of the information available to any of them. How well the price system communicates information depends on how efficiently priced the securities are perceived to be.

1.3.2 *The Role of Information*

An efficient capital market has been frequently defined as where 'security prices fully reflect all available information' (Fama 1970).[1] The sufficient (but not necessary) conditions for efficiency were (i) no transaction costs, (ii) all available information costlessly available to all investors, and (iii) all investors have homogenous expectations. This definition has been extensively criticised on the grounds that the terms 'fully reflect' and 'available information' are too vague and non-operational. For instance, how wide is the definition of available information, all publicly available information, does it include private information, or only the information reflected by security prices. If the latter, then by definition all security markets are efficient.

In later years Fama (1976) redefined an efficient price as one always fully reflecting 'all relevant information'. Could this imply not all public information is relevant or not all relevant information is publicly known? However, an efficient market implies that the entire body of relevant information concerning a company's future prospects is 'correctly' impounded into its share price. Furthermore, the stock market is rational in assimilating new information into price, instantaneously and unbiasedly. The mathematical interpretation of an efficient market is defined by Fama (1976) as the joint distribution of security prices, $f_m(P_{1t},P_{2t},...,P_{nt}|\Phi^m_{t-1})$, given the set of information that the market uses to determine security prices at t-1, is identical to the joint

[1] Here we are concerned with the information efficiency hypothesis, as opposed to other definitions of operational efficiency. See Foster (1986) for a discussion.

distribution of prices that would exist if all relevant information available at t-1 were used, $f(P_{1t},P_{2t},...,P_{nt}|\Phi_{t-1})$, ie. the market 'correctly' uses all information. This is written as

$$f_m(P_{1t},P_{2t},...,P_{nt}|\Phi^m_{t-1}) = f(P_{1t},P_{2t},...,P_{nt}|\Phi_{t-1}) \quad (1.1)$$

In short, today's price is the best estimate of tomorrow's price given currently available information.

Fama partitions information into three subsets, each of which is based on a different notion of what type of information is understood to be relevant: (i) weak-form efficiency, where an investor cannot earn excess returns by developing trading strategies based on historic price information; (ii) semi-strong form efficiency, which nullifies any trading strategies based on past prices and publicly available information to earn excess returns. Where publicly available information is defined as information that is accessible to all investors at precisely zero cost; (iii) strong-form efficiency, where no individual can profit from private information.

Assuming efficiency, information is considered 'relevant' if it invokes a price reaction upon its release, thereby prompting individuals to reassess their expectations (ie. the probability distribution), of the future payoffs of holding that asset (Beaver 1968).[2] The information must tell us something we do not already know about the level and risk of future cash flows of the associated security.[3] With respect to individuals, informational value will vary depending on whether or not they can act upon it, and

---

[2] Lev & Ohlson (1982) explains the dual role of information in the capital markets. 'First, it aids in establishing a set of equilibrium security prices that affects the allocation of "real" resources and the productive decisions implemented by firms. Second, it enables individuals to exchange claims to present and future consumption across different states, thereby attaining both preferred patterns of lifetime consumption and the sharing of societal risks.'

[3] In the original paper of price behaviour and volume reaction surrounding earnings announcements, Beaver (1968) quoted two definitions of information. Firstly, information represents a 'change in expectations about the outcome of an event' which is reflected by a price reaction. Secondly, the change must be 'sufficiently large to induce a change in the decision-maker's behaviour' to induce a volume reaction.

how the news coincides with their prior expectations.[4] Price change is therefore proportional to both the unexpected (the 'surprise') element and the announcements' relative importance across prior beliefs. Relative importance is contingent upon the precision of the announcement, or rather its perceived 'quality' compared to that of pre-announcement information.

Where price change reflects the average change in all traders' beliefs, the reaction of individual traders is dependent on the precision of their own prior information and beliefs. Hence, newly announced information is relatively more important to those with less precise knowledge and will have a greater impact on their beliefs. Therefore, the extent of the price change reflects the degree of informational asymmetry among individuals (Kim & Verrecchia 1991a and 1991b).

With increasing research suggestive of market inefficiency, the precise definition of market efficiency has become a contentious issue. Consequently, a number of contributions have since been made towards the debate[5]. Grossman & Stiglitz (1980) rejected Fama's 1970 definition on the grounds that, for security prices to impound *all* available information requires information to be costless. Information costs comprise the cost of acquiring and processing the information, but also the costs of transacting on the basis of the information (Ball 1992). If market prices accurately reflect all available information at any time for free, there would be no incentive for anyone to collect information. Yet if no one collects information, there would be none for the market to reveal. Thus, given Fama's definition, an informationally efficient market is incompatible with costly information. As a consequence of the existence of information costs, at any one time price will only partially reveal a security's full information set. In equilibrium, price must reflect just enough information so that individuals are indifferent between producing private information

[4] Of course, informational value also depends on whether the gain that can be earned from its knowledge is greater than the cost of the action from its use. The issues of transaction and processing costs will be discussed later in the text.

[5] For example, Jensen (1978), Figlewski (1978), Grossman & Stiglitz (1980), and Beaver (1981). See Ball (1992) for a thorough review.

(ie. information which is not publicly available) or remaining uninformed. Private gains from producing private information are therefore allowed, but are exactly offset by the costs of processing.

Fama's definition of efficiency also assumes investors have homogenous beliefs with respect to the same information set. The more risk adverse investors are and the more homogenous their information, the more efficient we expect the market to be (Figlewski 1978). In a market where beliefs are homogenous but the information item is not known by all, the market will be perceived to be less efficient to the relatively less informed. In a market of heterogenous beliefs, even if all investors possess the same information they may not necessarily agree on its implications, so not all will believe the market to be efficient.[6] This is substantiated by the work of Figlewski (1978), which demonstrates the market can deviate relatively far from efficiency, when there is a wide range of expectations among investors. Consequently, Beaver (1981) defines the market as being efficient with respect to an information item as long as 'prices act *as if* everyone knows the information'. Such a definition allows the existence of heterogenous beliefs, by permitting individuals to perceive the market to be inefficient even if it is not.

Fama in 1991, in response to the recent tests of market efficiency and criticisms, reverted to his former broader definition of 1970, despite its shortcomings. The argument for doing so, was to provide a 'clean benchmark' that allows one to sidestep the problem of quantifying what are 'reasonable information and trading costs.' It is then for the individual to judge the degree of efficiency.[7] Thus, as of yet we do not have an operational definition of market efficiency, and therefore remains untestable. Perhaps instead, it is sufficient to determine whether investor behaviour is rational in response to new information.

---

[6] Plus, what is considered information to some is not necessarily information to others.

[7] Fama (1991) also took the opportunity to change the categories of market efficiency: the definition of weak-form tests has been generalised to encapsulate all tests of return predictability. Semi-strong form tests are to be now known as event studies, and strong form tests as tests for private information.

1.3.3 *Rational Expectations and Efficient Markets*

A sufficient but not necessary condition of market efficiency is for individuals to have rational expectations. Rationality implies that expected utility maximisers correctly use all information that is relevant in the determination of security prices. Rational individuals are therefore assumed to have full knowledge of all publicly available information, and will in turn make the best possible use of this information to remove any profitable opportunities (Muth 1961). An optimizing model where people exploit information until its marginal benefit equals its marginal cost. Hence, speculative behaviour is ruled out by rational expectations. However, generally a less stringent definition of rational expectations is adopted - people maybe unaware of the complete information set, but are at least expected to learn from their mistakes. If forecast errors follow a pattern, they hold information that can be used to make a more accurate forecast. The implication of this is not that rational people do not make mistakes, but rather their mistakes are random and not the same ones each time.

A similarity between the efficient markets hypothesis and the hypothesis of rational expectations, is that they both assume all information is used correctly. Though unlike the former, the rational expectations hypothesis does not require an instantaneous and complete reaction to new information, but gradual impounding as the full implications become known. If the implications of an information item are uncertain, it is rational not to trade until further confirmation is received and the uncertainty (partially) resolved. Unfortunately, both rational expectations and the efficient markets hypothesis, tell us nothing of how information is processed by investors and impounded into price, as it is impossible to know all the different information sets faced by individuals.

1.3.4 *The Influence of Noise Trading*

Hayek (1945) described the price system as a 'mechanism for communicating information'. Its ability to do so is hampered by the presence of noise, particularly in the short run. Noise can transpire for a number of reasons (see Black 1986, for a fuller description). Firstly, it reflects the actions of investors who need to trade for liquidity reasons and not due to information. Similarly, it reflects the impact of the trading mechanism by which prices are set in the market, by capturing errors in the analysis and interpretation of information. For example, consider two 'information traders' who trade on the same asset, for one to be selling and the other buying, one of these traders must be making a mistake, given they have the same information set.

Noise trading is thus essential to the existence of a liquid market, but it also makes the market imperfect. Noise is unobservable, and its existence makes it impossible to distinguish between price movements due to new information, from noise trading. Consequently, the price system is only partially revealing of a security's intrinsic value.[8] Thus, while noise increases the number of profitable opportunities available, at the same time, noise makes it difficult to trade profitably by increasing uncertainty.[9] Trade is therefore a function of noise. Similarly, if assuming homogenous expectations, if there was no noise there would be very little trade. In sum, prices do not change in sole response to information but also reflect the frictions of an operating market.

However, noise trading is more generally thought of as the activity of those who trade on 'irrelevant' information - 'uninformed traders'. Those who trade on information as if it were fundamental. The greater the volume of uninformed trading, the greater the economic incentive for other investors to become informed (Grossman & Stiglitz 1980). The further price deviates from its intrinsic value, the more aggressively 'informed' traders will trade against the 'uninformed'. The actions of the informed will slowly gravitate the stock price back towards its value.[10] Traditional thinking implies however, uninformed traders will on average fail to make excess returns due to their ignorance, and will eventually leave the market (Black 1986, Schliefer & Summers 1990).

---

[8] This is similar to the idea of Grossman & Stiglitz (1980), who argue prices are only partially revealing due to information costs.

[9] See Schliefer & Summers (1990) for the welfare implications of noise trading.

[10] This viewpoint is supported by Fama & French (1988) and Poterba & Summers (1988) who found significant serial correlation in long run returns.

Since intrinsic value is unobservable, informed traders can never be sure whether they are trading on relevant information or noise. Although this does not necessarily imply informed traders trade solely on fundamentals, as the key to investment success is not only predicting fundamentals but also the movement of others. Thus, when noise traders are optimistic about particular securities, it profits fundamentalists (informed traders) to 'jump on the band-wagon' and generate further noise with the intention of increasing the securities' perceived value, taking advantage of the noise traders' naivety.

Contrary to traditional thinking, De Long, Schliefer, Summers & Waldmann (1990) were able to show that noise traders do not only survive in the long run, but earn a higher than average return than the so-called informed traders. A return for bearing a disproportionate amount of risk that they themselves in part create. Increased noise trading amplifies the volatility of share price relative to its underlying value. It is therefore doubtful whether informed traders, especially if risk averse, will take a large enough position to fully eliminate noise. For information gathering in itself does not ensure increased profit, and secondly, and more importantly, an increasing position means greater risk (Black 1986).[11]

The existence of 'uninformed' noise traders brings into question the applicability of the theory of rationality and the implications their existence has for asset pricing models, especially as 'irrational' behaviour can be profitable (DeLong et al 1990). Can it be irrational to use 'irrelevant' information that increases ones expected utility? In addition, it highlights the problem of what may be considered a rational act on the part of an individual, may not necessarily be rational for the market. How can the necessity of liquidity trading be incorporated into a functional definition of efficiency? The existence of noise traders has a practical implication for information content and event studies, in that it becomes extremely difficult to quantify a large fraction of security price behaviour around public announcements (Roll 1988). Making it difficult to separate price movement due to the event under examination, from price movement

[11] See for example, Grossman & Stiglitz (1980) and Dow & Gorton (1994) who consider the importance of the existence of arbitrage chains.

due to noise trading.

1.3.5 *Fundamental Information and Efficient Markets*

As previously stated, new information is considered 'relevant' if it invokes a price reaction. Though not all price movements are in response to relevant information but also reflect noise trading. For instance, Shiller (1981) found stock returns were too volatile to be explained by shocks to future cash flows, and Roll (1988) was unable to quantify for more than one-third of monthly variation in stock returns. Cutler, Poterba & Summers (1989) found the days of the largest aggregate market movements were not the days of the most important fundamental news. The presence of noise makes it not only difficult to distinguish the extent to which stock prices move in response to relevant information, but more importantly, what type of information is considered as relevant in the pricing of securities.

The work of the fundamental analyst is based on the belief that the stock market is inefficient in pricing securities, and it is their role to detect securities that are either under or overpriced. This involves using financial statement information to estimating a security's intrinsic value, and then comparing it to market price. Previously, when few doubted the market to be inefficient, the role of the fundamental analyst was viewed as nonessential as the market was considered efficient with respect to accounting information. However, the precise definition of intrinsic value is as ambiguous as is the concept of market efficiency. Intrinsic value is generally thought to be the security price when all investors possess the same endowments, preferences and more importantly, homogenous beliefs. Of course, in a society of heterogenous beliefs a security's intrinsic value could be one of many prices. Hence, the market will always appear to be inefficient to at least some investors at any one time. Alternatively, Graham & Dodd (1962) define intrinsic value as the 'value which is justified by the facts', ie. a firms' intrinsic value can be identified by examining financial statement information. However, the method by which this value is extracted is unknown.

The traditional valuation model is that of Miller & Modigliani (1961). They express price, P_t, as the present value of the expected future payoffs to holding a particular security,

$$P_t = \frac{\sum_{\tau=0}^{\infty} E(d_{t+\tau} \mid Z_t)}{(1 + \rho)^t} \qquad (1.2)$$

Where $d_{t+\tau}$ is the expected dividend to be paid at $t+\tau$, conditional on information available at time t, Z_t, and ρ the rate at which expected future dividends are discounted. Alternatively, expected future payoffs may be defined as the sum of the capitalized current earnings and the present value of future investment opportunities, as derived from the dividend irrelevancy proposition.[12]

The former definition of expected future payoffs requires the fundamental analyst to distinguish between information which indicates future dividends, from that which indicates the risk of the firm. A security price is presumed to change only in response to new information about future real dividends, thereby value-relevant attributes are identified on the basis of their correlation with future dividend payoffs. The principle problem of this model, given the short dividend history, is that it is not possible to observe the full set of future dividend payoffs, *ex ante*. Secondly, share price movements appear too volatile to reflect solely underlying changes in dividend policy (Shiller 1981). In addition, dividend payments are generally viewed as arbitrary and discretionary: a firm doing very well with high growth prospects may pay no dividends, while a firm doing poorly with no growth prospects may pay substantial dividends. The direct relationship between price and future dividends is therefore brought into question (Penman 1991).[13] Consequently, researchers have substituted earnings for dividends as a proxy for expected future payoffs. However, the value relevance of accounting earnings is also debateable.

---

[12] The dividend irrelevancy proposition argues price is unrelated to dividends, given the separation of the financing decision from the investment decision, on the assumption of no personal taxation (Miller & Modigliani, 1961).

[13] Price is based on future dividends but observed dividends do not tell us anything about price (Penman 1991).

Besides the results of Ball & Brown (1968) who found earnings to be valued positively by investors, ie. higher (lower) earnings implies higher (lower) value, there exists other supported intuition that earnings are relevant. Graham & Dodd (1962) consider future earning power to be the single most important determinant of a company's value. There is a fundamental link between accounting earnings and share price in that they both attempt to measure the change in value of the firm. Over the lifetime of a company, essentially all of the activities influencing the future value will ultimately be captured in earnings. In the long run, there is therefore a fundamental link between earnings and the return to shareholders. In the short run, the link is less precise due to the difficulties in calculating periodic earnings associated with the accrual based accounting system. It may be argued it is the discretionary nature of dividends that makes them uninformative but earnings are (largely) not at the discretion of management.

More importantly, future dividends are paid from earnings: before wealth can be distributed it must first be created. Easton (1985) provides empirical evidence of earnings reflecting the dividend paying ability of the firm. Earnings are relevant to assessing the amount, timing and uncertainty of future cash flows of the firm. However, the payment of dividends has implications for future earning power. Based on this intuition Ohlson (1988, 1991a) devised a model which incorporated (residual) earnings as a prime element in determining intrinsic value, V_i^T,[14]

$$V_t^T = (\rho^T - 1)^{-1}. E\ [\ (\sum_{\tau=1}^{T} X_{t+\tau}^{*} + \sum_{\tau=1}^{T} (\rho^{T-\tau} - 1)\ d_{t+\tau}^{*})\ |\ Z_t\ ] \tag{1.3}$$

Where $X_{t+\tau}$ represents expected future earnings in period $t+\tau$, and $d_{t+\tau}$ is the expected dividend to be paid at $t+\tau$, conditional on information available at time t, Z_t, and ρ the rate at which expected future cash flows are discounted.

Value is based on projections of future accounting earnings from current information. Its advantage over the dividend discount model is that it does not involve the problem

[14] Where residual earnings are defined as profit minus a capital charge based on net assets employed. See O'Hanlon (1993) for a fuller discussion.

of timing. Creative accounting is not of concern if it merely results in timing differences that work their way through by period T. Dividends are included as their payment affects future earnings, rather than as an determining factor of value.[15] Such a presentation is intuitively pleasing to the accountant and the analyst alike, as it is a representation of accounting data as fundamentals. Justifying earnings to take more of a measurement role as opposed solely to an information role, demonstrating the ability of earnings to measure the change in a security's value, rather than just provide an insight into what a security's value should be (Penman 1991), or will be.

One danger of treating accounting earnings as the single most important indicator of intrinsic value, is that it may lead to researchers trying to identify descriptors of earnings rather than descriptors of price; an approach adopted by Ou & Penman (1989) to identify turns in the earnings series. Until the 1980's, relatively little attention had been given to the explanatory power of non-earnings data. Though on the whole, the research demonstrates it is difficult to find other data items that convey any information beyond that reflected in earnings (Easton 1985, Lipe 1986, Swaminathan & Weintrop 1991, Smith & Tremayne 1992).[16] Bernard (1989) questions the lack of information content in anything beyond bottom-line earnings, given a whole industry is devoted to dissecting financial statement data. The evidence also appears inconsistent with the findings of Ou & Penman (1989) (see later). Bernard rationalises the results to the poor quality of supplemental data and a naive research design.

Only when the stock market is efficient can security prices be reliably used as benchmarks against which the information content of accounting attributes can be evaluated. The alternative is to develop a valuation model whereby one determines the types of information that should be used in the formation of price, as opposed to what information the market employs. Bearing in mind, indicators of intrinsic value

---

[15] A potential problem with Ohlson's model is that it may lead to double-counting by including both earnings at time t and the later earnings that accrue when time t earnings are reinvested.

[16] See Lev & Ohlsen (1982) and Bernard (1989) for a comprehensive review.

will vary in importance across firms and industries, and will also vary across time reflecting ever changing economic conditions (Lev & Thiagaran 1994). Furthermore, knowledge of a security's intrinsic value will not necessarily earn the analyst a return. This knowledge is only of value if others will also become aware of it (Dow & Gorton 1994). It may be more profitable to know of the information of others, relevant or not.

1.3.6 *In Summary*

The debate continues as to the meaning of 'efficiency', and to the role of information costs, heterogenous beliefs and the implication of noise trading in judging the efficiency of security valuation. Without a precise definition it is not apparent under what conditions efficiency can hold, making it therefore impossible to interpret tests of market efficiency. Alas, it is not surprising to find a deluge of evidence both for and against the existence of efficient financial markets. What follows is a brief discussion, which is by no means exhaustive, of this literature.

1.4 THE ABILITY OF THE MARKET TO ANTICIPATE EARNINGS

The seminal paper of Ball & Brown (1968) demonstrated the ability of the market to anticipate a substantial proportion of future earnings up to 12 months in advance of the announcement, and subsequently encouraged research into the predictability price changes of future earnings. Beaver, Lambert & Morse (1980) found prices lead earnings by up to two years, whereas, Collins, Kothari & Rayburn (1987) found the future earnings of larger firms to be anticipated by the market at least one year in advance, with the level of market anticipation an increasing function of firm size.

The emergence of so-called earnings response coefficient studies, explicitly test the price-earnings relation, and are variations of a simple regression of returns on a measure of unexpected earnings (Kothari 1992, Kothari & Sloan 1992). The explanatory power of such models are generally found to be low, which may in part reflect the simplistic relation assumed between returns and unexpected earnings[17]. It more likely reflects the effect of prices leading earnings causing the downward bias in earnings response coefficients (Kothari & Sloan 1992). Kothari and Sloan utilized evidence of prices leading earnings by including leading period returns in the price-earnings regression.[18] By including one, two, and three year leading returns in the regression, as well as contemporaneous returns, increased the average earnings response coefficient from 4.69, to 5.08 and 5.45 respectively.

The basic intuition underlying price leading earnings literature, is the ability of stock prices to incorporate information from alternative and more timely sources, adjusting promptly to events that have future earnings implications which are only reflected in earnings with a lag. For example, on the announcement of a long term sales contract or new investment, stock prices will adjust instantaneously to reflect changing expectations of future earnings and cash flows. However, the implications of the new contract or investment will only be partially reflected in this period's earnings. In the short term, earnings are most limited in their ability to contemporaneously reflect shareholders' changing expectations of future cash flows. Over longer intervals, the contemporary relation between aggregated earnings and stock prices grows stronger (Easton, Harris & Ohlson 1992, Dechow 1994). Over longer periods the estimation problems of accrual accounting constitute a lower proportion of the variability in earnings.

Undoubtedly prices do lead earnings to a certain extent, and of course this has implications for the role of accounting. Most it questions the timeliness of earnings as an information signal. Much of the earnings figure appears to be anticipated before it is announced, Kothari and Sloan show by up to 4 years in advance. Whether this

---

[17] See the papers of Beaver, Lambert & Ryan (1987) (BLR) and Kothari (1992) which evaluate different aspects of alternative specifications of the price-earnings relation. BLR employ reverse regression (regressing percentage change in earnings on percentage change in prices as opposed to the reverse) and finds both procedures give equivalent results. Kothari finds while earnings level specification outperforms the earnings change specification, both are noisy estimates of the market unexpected earnings. An accurate proxy for unexpected earnings is therefore preferred.

[18] Furthermore, they find this technique produces less biased earnings response coefficients than incorporating longer windows for both returns and earnings.

low contemporaneous price-earnings association is seen as a weakness in the accounting measurement process depends on the objective of earnings measurement. If the two sets of information should be identical, then accounting practice needs to be changed to fully reflect the market's unbiased expectation of future cash flows. From the analytical work of Figlewski (1978), we can observe that when there is diversity of expectations among investors, the market may deviate relatively far from efficiency. Thus, the ability of price in predicting earnings relies on the diversity of expectations. More importantly, evidence of price leading earnings would appear to assume away the anomalous 'post-announcement drift'.

1.5 THE FAILURE OF THE MARKET TO IMPOUND PAST PRICES

Evidence of price leading earnings is suggestive of efficient pricing, however the literature documents a number of technical anomalies, of the failure of the market to recognise systematic patterns in the time series behaviour of stock returns. Once unthinkable, the late 1980's found us even questioning weak-form efficiency - the ability to predict future stock returns from past stock returns. French & Roll (1986) found negative autocorrelation in the daily returns of individual stocks on the New York Stock Exchange (NYSE), argued not to be price correcting behaviour to noise trading. Lo & Mackinley (1988) found positive autocorrelation in weekly portfolio returns on the NYSE, induced by non-synchronous trading. Fama & French (1988) reported significant serial correlation in returns, when returns are measured over long (3 to 10 year) intervals. Although, often these tests have been argued to be low in statistical power (Fama 1991), the debate has been one of whether the predictability of long term returns is the result of irrational bubbles in prices or of rational time-varying swings in expected returns; it still remains unclear.

The literature also reports a number of seasonal anomalies. A weekend effect where returns on a Monday are lower than the average return on other week days (French 1980). The most well noted is the January effect, where small stocks earn above average returns in January compared to other months (Keim 1983, Roll 1983). Early volatility papers implied that expected returns were too volatile to be driven entirely by shocks in expected dividends (Shiller 1981).[19]

DeBondt & Thaler (1985, 1987) find NYSE stocks identified as the most extreme losers over a 3 to 5 year period tended to outperform past winners during the following years, particularly in January. They attributed the results to market overreaction to extreme news (both good and bad) about firms, with investors overweighing recent information in making forecasts. Chan (1988) and Ball & Kothari (1989) argue that the winner-loser results are due to the failure to risk-adjust returns. Zarowin (1990) attributes this overreaction effect to the size effect, where small stocks (often losers) have higher expected returns than larger stocks. The extreme past losers were found to be significantly smaller than the extreme winners at the time of the portfolio formation, which explains their ability to outperform the winners. After size was controlled for, the losers were only able to outperform the winners in January, revealing that firm size rather than investor overreaction is driving the phenomenon. A similar phenomena has been more recently noted by Lakonishok, Shleifer & Vishny (1994), who found value stocks (those for example with high book to market values), on average outperformed glamour stocks (those with low book to market values) over the period 1968 to 1989.

In sum, short run and long run autocorrelation in returns, seasonal anomalies, excess volatility and investor overreaction all have implications for weak-form efficiency. This begs the question: why do such seemingly exploitable patterns of price behaviour exist? Unfortunately, studies of return predictability tell us nothing more than expected returns vary through time, and offer no explanation as to why. This gives no indication as to what type of information the market is inefficient, and therefore whether such behaviour is irrational or not.

1.6 THE FAILURE OF THE MARKET TO IMPOUND PUBLIC INFORMATION

Subsequent studies investigate systematic differences across security returns. The

[19] See Cochrane (1991) for a review.

price-earnings ratio and firm size have both been found to possess explanatory power in predicting future expected returns after controlling for risk.[20] A common explanation is that they proxy for risk other than that captured by beta. It remains uncertain whether these anomalies arise from the use of deficient asset pricing models or represent systematic mis-pricing of securities from the failure to impound public information.

1.6.1 *The Price-Earnings Ratio*

The price-earnings ratio (PE) is an indicator of the market's perception of the future earning power of a security. Basu (1977) found the PE ratio to have marginal explanatory power in predicting future abnormal returns after controlling for risk. During the period 1957 to 1971, Basu observed that portfolios composed of low PE securities earned on average higher risk-adjusted rates of return than those consisting of high PE securities. Similar in nature to the overreaction hypothesis of DeBondt & Thaler (1989), investors appear unduly optimistic about the performance of high PE securities and unduly pessimistic about the performance of low PE securities. Thus, high (low) PE ratios tend to be followed by lower (higher) PE ratios in future years.

In a later re-examination, Basu (1983) was unable to support the contention of Reinganum (1981) that the PE effect was merely the size effect in disguise. Cook & Rozeff (1984) rationalised the contrary findings by the use of different methods of portfolio formation, finding evidence of both a size and a earnings-price (EP) effect at work together. Both effects are operative throughout the year, with half of each occurring in January, although there exists no interaction between the two anomalies. It is possible that both size and EP ratio measure separate aspects of a single underlying effect, but it does not appear that one effect subsumes the other.

The PE ratio can be interpreted as a comparison of two information sets, the information about current and future earnings that is summarized in price, relative to the information in current earnings alone. Accordingly, evidence of mean-reverting

---

[20] Leverage (Chan, Chen & Hsieh 1985) and book-to-market value (Fama & French 1992) have similarly been found to have explanatory power, but for reasons of brevity will not be discussed here.

behaviour of PE ratios has been interpreted as price indicating future changes in earnings relative. High (low) price-earnings ratios indicate that earnings will be higher (lower) in the future. When these higher (lower) earnings are ultimately recorded, observed PE ratios revert back towards the mean. In support of this, Beaver & Morse (1978) found PE ratios to be positively correlated with subsequent earnings changes, and negatively correlated with current earnings changes. Thus, PE ratios appear to indicate reversals in the direction of future earnings, but also identify the extent of transitory behaviour of current earnings. Extremely low (high) PE ratios indicate that earnings are transitorily low (high), and non-extreme PE ratios indicate that earnings are largely permanent (Ou & Penman 1989). The explanatory power of PE supports the theory of price leading earnings, but further implies that PE ratios lead both prices and earnings.

1.6.2 *The Firm Size Effect*

Firm size, as measured by market capitalisation, has consistently been found to be a better predictor of expected returns than estimated betas (Banz 1981, Reinganum 1981, Fama & French 1991).[21] Reinganum (1981) finds the PE effect, as reported by Basu (1977), disappears when he controls for firm size, but there is still a significant size effect when he controls for the PE ratio. Banz (1981) reports an above average risk-adjusted return for small firms, though the relationship appears to be non-linear. Average returns on small stocks are too high given their beta estimates, and average returns on large stocks are too low.

Collins, Kothari & Rayburn (1987) find the level of market anticipation to be an increasing function of firm size. The prices of smaller firms capturing little information with respect to future earnings beyond that conveyed in the past time series of earnings. Future earnings of larger firms are anticipated by the market at least one year in advance. They attribute this result to the broader information set available for larger firms and the greater number of individuals processing this

[21] This literature can be classified into two groups: cross-sectional differences in expected returns (see Banz 1981, Reinganum 1981) and the time series behaviour of the size effect (see Reinganum 1983, Keim 1983 and Roll 1983). We are only concerned with the former.

information. Similarly, Freeman (1987) demonstrates that security prices of large firms begin to reflect reported earnings 22 months before the announcement date. Abnormal returns for small firms can be detected 3 months later. More specifically, the percentage of abnormal returns for large firms realized in the early months exceed the percentage for small firms. However, the cumulative abnormal returns of small firms ultimately exceed the total for large firms by 44 per cent.

The question that remains unanswered, is why information in firm size that is publicly available and easy to process, is so comprehensively ignored by investors in their pursuit of abnormal returns. Several explanations exist in the literature. Firm size may proxy for the costs of information acquisition and processing. Though the precise relation between firm size and information costs remains unknown, there are reasons to expect private information production to increase with firm size (Atiase 1985 and 1987, Bhushan 1989, and Ho 1993). Bhandari (1988) speculates the small firm effect could reflect smaller firms being more highly levered. Chan & Chen (1991) explain the phenomena being due to a distressed firm factor which increases risk not captured by beta. When size is defined as the market value of equity, small stocks may include depressed firms that are sensitive to business conditions.[22] Stoll & Whaley (1983) and Schultz (1983) provide evidence that transaction costs partially explain the anomaly. While not fully understood, the evidence implies the size effect is proxying for expected returns (Ball 1992).

1.7 THE FAILURE OF THE MARKET TO IMPOUND PUBLIC FINANCIAL STATEMENT INFORMATION

1.7.1 *Post-Announcement Drift*

For nearly thirty years there has been evidence of increased price and volume activity around announcements of stock splits, changes in corporate control and macro-economic announcements, but in particular earnings announcements (Beaver 1968, Morse 1981). The majority of this early literature indicated an almost complete and instantaneous price adjustment to the release of corporate announcements, displaying

[22] In a similar vein, Chen (1983) and Chan, Chen & Hseih (1985) found that the firm size effect is essentially captured by a multi-factor pricing model.

negligible 'drift'. Patell & Wolfson (1984) reported the level of abnormal returns to be greatest within 30 minutes of the announcement, with most of that return being earned within the first 5 to 10 minutes.[23] Papers that have examined a longer post-announcement interval found the initial reaction to be incomplete, with the full adjustment taking several days. Ball & Brown (1968) noticed the market anticipated a substantial amount of the content of future earnings up to 12 months in advance, but prices continued to 'drift' after the announcement. Prices continued on an upward drift for 'good news' firms and a downward drift for 'bad news' firms, for up to two months after the event.[24] Morse (1981) detected the most significant price changes and trading volume, the day prior to and on the day of Wall Street Journal earnings announcements, with the market continuing to adjust for several days afterwards. Hence, a large proportion of the price response to new information is instantaneous, but a portion is delayed with the complete reaction taking several days.

Many of these earlier studies were viewed with scepticism due to limitations in research design and a failure to control adequately for risk (Beaver 1989). With known design flaws having been corrected in more recent papers (Bernard & Thomas 1989), post-announcement drift is more apparent than ever, with prices taking in some cases several months to completely adjust to the new information (Bernard & Thomas, 1989 and 1990). It has subsequently been shown to be even more pronounced for quarterly earnings announcements (Foster, Ohlsen & Shevlin 1984, Bernard & Thomas 1989 and 1990, Freeman & Tse 1989, Wiggins 1991 and Bartov 1992). In general, the sign and magnitude of security returns in the post-announcement period are positively correlated with the sign and magnitude of the unexpected element of the earnings announcement, but also inversely related to firm size.

---

[23] Ederington & Lee (1994) found major price adjustment occurs within one minute of the release of scheduled macroeconomic news announcements for the interest rate and foreign exchange futures markets. Although price continued to be considerably more volatile for several hours. Quicker adjustment than indicated by Patell & Wolfson (1984) in the equity market suggests greater trading volume, using announcements that are more widely anticipated (and different microstructure of the two markets), may all partially improve the efficiency of the futures market.

[24] Good (bad) news represents an increase (decrease) in the earnings figure from the previous year.

Bernard & Thomas (1989) conducted an exhaustive investigation of approximately 100,000 quarterly earnings announcements over the period 1974 to 1986 for NYSE/AMEX firms. Firms were assigned to one of ten portfolios on the basis of their standardized unexpected earnings (SUE).[25] Over the subsequent 60 trading days to the announcement, firms with extreme good earnings news experienced a mean abnormal return of approximately 2 per cent, while firms with extreme bad news earned a negative return of similar magnitude. By going long in the top performers and short in the worst performers, earned an estimated 4.19 per cent abnormal return, before transaction costs. A similar trading strategy over a 180 trading period earned approximately 7.74 per cent, or 10 per cent, 9 per cent and 4.5 per cent for small, medium and large firms, respectively. Beyond 180 trading days the drift is statistically insignificant.

Encouraged by this, Bernard & Thomas (1990) using a similar methodology, investigated the hypothesis that the market systematically fails to fully reflect the implications of current earnings for future earnings.[26] The time series behaviour of quarterly earnings confirmed previous findings that a change in the earnings of quarter t tend to be followed by progressively smaller changes of the same sign for quarters t+1, t+2 and t+3 (sample mean autocorrelations of 0.34, 0.19 and 0.06). A fraction of this earnings change is reversed in quarter t+4 (negative mean autocorrelation of -0.24). Only the remaining portion of the initial change represents a permanent shock. This pattern was found to be consistent across firms, industry and firm size, where large firms were associated with greater positive autocorrelations.

These findings were used to test the more general hypothesis that prices fail to reflect a naive earnings expectation: a seasonal random walk, where expected earnings will be equal to earnings for the corresponding quarter from the previous year. If this is

---

[25] SUE represents forecast errors calculated as the difference between actual earnings and a statistical forecast of earnings. Where the forecast is estimated using a first-order autocorrelation earnings expectation model (see Foster 1977). The errors are then scaled by their historic standard deviation.

[26] SUEs are calculated this time using an earnings expectation model based on a seasonal random walk with drift.

not the case and the autocorrelations mimic the same earnings pattern described above, then stock price responses are predictable.[27] If a market impounds all prior earnings information, the forecast errors should not autocorrelated.

Bernard and Thomas found the three-day abnormal return around each earnings announcement to be predictable at least four quarters in advance.[28] With the pattern (both sign and magnitude) of abnormal returns in accordance with the autocorrelation pattern of earnings. In other words, if a firm announces an earnings increase (decrease) in quarter t, the market would be positively (negatively) surprised to learn of further increases (decreases) over the prior year, in quarters t+1, t+2 and t+3. With the magnitude of the surprise declining over each of the three quarters. The market continues to be surprised in quarter t+4, when the earnings pattern is reversed. Specifically, 23 to 31 per cent of the post-announcement drift is 'delayed' until the subsequent quarter's earning announcement. The behaviour of returns from quarter t+1 through to t+3 suggest the market initially underreacts to quarter t earnings announcement, with quarter t+4 correcting for an overreaction. The greatest abnormal returns are concentrated in the first few days of the first quarter, suggesting most of the correction occurs early on in the financial year.

A long position in quarter t's extreme good news firms and a short position in the bad news firms, earned a three-day abnormal return of 1.32 per cent, 0.7 per cent and 0.04 per cent over quarters t+1 to t+3, respectively. The same position yielded a three-day abnormal return around the fourth quarter of -0.66 per cent. To establish the economic importance of these results, Bernard and Thomas devised a trading strategy which involved taking a position 15 days before the expected quarterly announcement, and holding the position throughout the announcement period; to take advantage of the concentration in abnormal returns focused around each announcement. The portfolio earned an estimated abnormal return of 4.2 per cent for an average holding

---

[27] Just as the forecast errors of a naive expectation model are predictable due to autocorrelation - Freeman & Tse (1989).

[28] The three-day window includes 2 days prior to the announcement and the disclosure date.

period of 15 days. Hence, from only using historic earnings information Bernard and Thomas were able to generate an abnormal return about as half as large as that based on the perfect foresight of earnings.

Supporting evidence was obtained by Freeman & Tse (1989), Wiggins (1991) and Bartov (1992). Bartov (1992) shows that the market failure to recognise the time series process underlying earnings explains the full extent of the post-announcement drift, as opposed to a risk explanation. Bartov argues the strength of these results lies in the use of information only available to the market in quarter t rather than using actual reported earnings for quarter t+1 (hence, which are unavailable in t) to control for unexpected earnings in quarter t+1.

In short, the market does not seem to fully appreciate the time series behaviour of quarterly earnings, assuming a seasonal random walk in quarterly earnings, unaware of the complete implications of current earnings for the next four quarters. The market seems to expect that future earnings will be equal to earnings for the corresponding quarter of the previous year. Kothari & Sloan (1992) incorporated the findings of Bernard & Thomas (1989, 1990) by including a lagged return of 9 months as well as a three year leading return in the price-earnings regression (see section 1.4).[29] This increased the estimated average earnings response coefficient from 5.45 to 6.92. Thus, evidence of post-announcement drift is not wholly inconsistent with evidence of price leading earnings - the two effects appear to persist side by side. The question is thus, what are the conditions under which the market anticipates earnings and when is the market continually surprised.

1.7.2 *Annual Report Information*

Ou & Penman (1989a) studied the 'usefulness' of a wide variety of financial statement items in predicting changes in future earnings. The basis of their hypothesis being, that financial statement items other than current earnings capture fundamentals not utilized by the market, and so subsequently can be used to generate abnormal returns.

[29] Nine months is consistent with the results of Bernard & Thomas (1989) who find the majority of the drift occurs over a 180 day period.

From an original set of 68 accounting variables, data was gathered over the two subperiods 1965 to 1972, and 1973 to 1977, from which 28 variables were selected purely on their ability to predict earnings.[30] They develop a LOGIT model incorporating these variables to predict changes in annual EPS one year ahead, using publicly available information. Based on the assumption the pattern of annual EPS follows a random walk plus drift.

More specifically, Ou and Penman formed portfolios on the basis of a Pr measure, which is essentially the outcome of a computerised fundamental analysis. Where Pr represents an estimate of the probability of an annual earnings increase in the coming year, based on a function of historic financial statement items. The Pr indicator is calculated by weighting the selected accounting variables by coefficients estimated using LOGIT estimation techniques during a prior estimation period. These weighted accounting variables are summed and transformed into an estimated probability as follows,

$$Pr_{it} = [\ 1 + \exp(-\theta' X_{it})\ ]^{-1} \tag{1.4}$$

Where X_{it} is the set of accounting variables in the financial accounts for firm i in year t, and θ is the estimated coefficient weights applied to the variables. The value of Pr ranges from zero to unity, with values of Pr away from 0.5 indicating the direction of future earnings (increase or decrease) while those close to 0.5 indicate that the financial statement variables are unable to predict changes in future earnings.

They developed an investment strategy by forming a hedge portfolio that takes a long position in 45.3 per cent of the stocks with highest predicted probability of an earnings increase, and a short position in the lowest 10.8 per cent of all stocks.[31] This strategy earned a pure profits of 8.3 per cent over a 12 month holding period, and 20.8

[30] Sixteen from the former subperiod and eighteen from the other, with only six in common. The six variables being return on assets, return on equity, change in return in equity, debt/equity ratio, percent change in dividend per share, and percent change in inventories.

[31] These proportions were determined using arbitrary cut-off points 0.6 and 0.3 for the Pr measure, respectively. See Ou & Penman (1989a) for details.

per cent annual abnormal return over the following three years.

The Pr measure is shown to identify not only the direction of future earnings changes but also has the ability to predict abnormal returns of up to three years. The results suggest that the market fails to utilise fundamental information contained in financial statements. Replication of their work by Grieg (1992), Holthausen & Larcker (1992) and Stober (1992) however, seriously questions the validity of their results.

Holthausen & Larcker (1992) replicate the Pr strategy instead for the period 1978 to 1988. Their results were markedly different from Ou and Penman's, producing average annual returns of between -0.1 and 1.6 per cent, depending on the metric of excess returns. Implying the performance of the trading strategy is sensitive to the period examined. They refine the strategy slightly to test whether it is indeed the unexploited link between the various financial statement items and future earnings, that is driving the Pr measure. Their strategy of correlating the financial statement items directly with abnormal, returns rather than earnings changes, outperforms the OP strategy.

Holthausen and Larcker also find evidence of continuing increasing abnormal returns for up to four years after the earnings announcement. This is consistent with the replication of Ou and Penman's work by Stober (1992) who shows Pr predicts abnormal returns for at least six years. Is it possible for stock prices to consistently underreact to fundamental information for such a long time? For instance, Bernard & Thomas (1990) find little or no drift occurs beyond 180 trading days. It would appear more likely that the Pr strategy is proxying for cross-sectional differences in expected returns.

Grieg (1992) tested whether the abnormal returns of Ou and Penman could be explained by factors that act as a proxy for expected returns. The Pr measure would then merely be 'a function of accounting ratios' which of course vary systematically across firms and across time reflecting cross-sectional differences in risk, size, and other determinants of expected returns. Thus, forming portfolios on the basis of Pr is equivalent to forming portfolios on the basis of current earnings changes, prior stock performance and firm size. After controlling for beta and implementing a more precise control for size, Pr would appear to lose its apparent ability to predict for abnormal returns, from which Grieg draws the conclusion that the Ou and Penman result is dominated by the size effect.

The likelihood of the Pr measure proxying for expected returns, is augmented by the manner in which accounting variables were selected for inclusion in the Pr measure (Ball 1992). Many of the descriptive variables (eg. return on equity, dividend payout, change in gross assets) possibly proxy for expected returns, on an individual basis. Therefore their combined effect of proxying for expected returns is presumably magnified. Moreover, their choice of accounting variables had no theoretical underpinnings, as they were chosen purely on their predictive ability of one year ahead earnings. This increases further the likelihood of an association between the chosen variables, of factors other than those hypothesised.

Bernard (1992) draws a similarity between the findings of Ou and Penman to those of DeBondt & Thaler (1987). He contributes the success of Pr as a predictor of future earnings changes to mean reversion in earnings scaled by equity. On closer inspection, firms with recent earnings declines (growth) have high (low) Prs and subsequently increasing (falling) earnings. The high (low) Pr firms correspond to DeBondt and Thaler's losers (winners). Furthermore, high Pr firms stock underperform low Pr firms during the portfolio formation period, just as DeBondt and Thaler's losers underperformed winners. Bernard contends that Ou and Penman find instead further evidence of the stock market overreacting to current changes in earnings, and not an underreaction to financial statement items. Though despite these criticisms, Ou and Penman highlight the ability of various financial statement items to predict future abnormal returns.

1.8 CONCLUSIONS

There is considerable evidence that security prices anticipate future earnings, in some cases by up to 4 years in advance (Kothari & Sloan 1992), and that the level of anticipation is an increasing function of firm size (Collins, Kothari & Rayburn 1987, Freeman 1987). Such evidence would suggest the market is using alternative more timely information sources, besides the information from the firm's financial statements. Both Ou & Penman (1989) and Bernard & Thomas (1990) show the market underreacts to this same publicly available information that can be used to predict future earnings changes. Bernard and Thomas find the market not only fails to fully impound current earnings, but appears to systematically ignore the full implications of current earnings for future earnings, and only impounds this information with a lag. It could possibly be construed the market is awaiting confirmation, but this does not explain why information in firm size, that is publicly available, is so comprehensively ignored by investors in their pursuit of abnormal returns. Several papers highlight the ability of other financial variables in predicting abnormal returns, in particular the PE ratio (Basu 1983). However, evidence of price leading earnings appears not to be inconsistent with evidence of lagged impounding, as Kothari & Sloan (1992) go on to demonstrate. The question is therefore, when does the market anticipate earnings and when is it consistently surprised.

Post-announcement drift, in particular, has been extensively documented for nearly 30 years. Such a result could indicate an intriguing anomaly related to potential market inefficiency, but many argue that (like other known anomalies) it is a mere statistical artifact. The extensive anomalies literature of the late 1970's and 1980's shows how far we have advanced in the efficiency debate. Until we fully understand the role of information costs and differential expectations, and implications of noise trading for security pricing, we cannot define efficiency. Without a precise definition we cannot conclude lagged impounding and persistent underreaction to accounting information, are examples of market inefficiency. However, tests of market efficiency remain impossible with dependence on the joint hypothesis problem. With the impossibility of testing market efficiency, perhaps it will suffice to determine if investors respond rationally to information releases.

The underlying assumption of individuals is that they make rational choices based on rational expectations. However, people are subject to loss aversion, in that they treat gains and losses differently, with losses looming larger than gains. People also seem subject to excessive optimism or pessimism. This may certainly be the case regarding P/E ratios. P/E ratios can be interpreted as the market forecast of future earnings growth. With hindsight, evidence suggests P/E ratios are systematically too extreme, explaining why low P/E stocks outperform high P/E stocks. Similarly, DeBondt & Thaler (1985) found by investing in prior losers outperforms prior winners.

At first sight, the evidence of Bernard & Thomas (1990) certainly implies investors are irrational: they fail to recognise that if the first quarters' earnings are up on last years' first quarter, then the second quarter will also tend to be up on last year too. Though to correctly determine rational behaviour, we still need to fully understand the role of information costs and the implications of differential expectations for security pricing. More importantly, to distinguish between price changes due to information and those reflecting the actions of noise traders.

The presence of any pre-announcement effects or indeed the absence of any post-announcement drift is not evidence enough to suggest the market is in fact informationally efficient. Information efficiency is only a sufficient condition in the context of information content studies (Lev & Ohlson 1982). If it is the case information that is worthwhile in stock valuation is being ignored, it has serious implications for market efficiency and also for the relevancy of accounting data in equity valuation.

2. EXPLANATIONS FOR LAGGED IMPOUNDING

2.1 OBJECTIVES

Chapter 2 discusses explanations in the literature for the apparent lagged impounding of public information disclosures. The main explanations reviewed in the chapter are:

- the mis-estimation of abnormal returns;
- the inappropriate use of analysts' forecasts;
- investors' fixation on bottom line numbers;
- short term investors who overlook long term information;
- investors who 'herd' on the information of others.

The chapter also reviews the explanation implied by Grossman & Stiglitz (1980), and identified by Kim & Verrecchia (1991a and 1991b), McNichols & Trueman (1994) and Demski & Feltham (1994), that investors choose not to be informed. This is because the expected costs of being informed exceed the expected benefits.

2.2 INTRODUCTION

Drift in prices following earnings announcements has been extensively documented, along with growing evidence of the predictive power of financial statement information for future returns. For example, the observation by Bernard & Thomas (1990) that the (three day) stock price response to current quarter's earnings announcement is partially predictable from past earnings, directly challenges market efficiency. In addition they find, the market systematically fails to reflect the implications of current earnings for future earnings, questioning the rational behaviour of investors. These findings may indicate a potential market inefficiency with respect to certain information types or irrationality on the part of investors, or both. Alternatively, markets could be efficient and these apparent anomalies may be no more than statistical artifacts. This chapter proposes a rational explanation for the apparent underreaction by investors to public information. This is investors will only choose to be informed if they can earn a return.

We address first, in section 2.3, the traditional criticism that the abnormal returns which investors can expect to earn are mis-estimated. This covers the issues of: failing to capture unmeasured risk (Ball, Kothari & Watts 1992, Dontoh, Ronen & Sarath 1994); the exclusion of transaction costs (Stoll 1991, Bhushan 1994); and the mis-calculation of investor's rates of return. Section 2.4 explains the observed behaviour also as a fault of the research design, by the inappropriate use of analyst forecasts as a proxy for earnings expectations. Both Mendenhall (1991) and DeBondt & Thaler (1990) suggest that inefficient analyst forecasts and recommendations may be the originating source of any price under or overreaction. Section 2.5 argues investors are irrationally fixated by accounting numbers and pay little attention in how they are generated (Hand 1990).

Sections 2.6 to 2.8 explain the dichotomy that what at first sight appears to be irrational investor behaviour is in fact rational. Section 2.6 suggests investors with short term horizons overlook information with long term implications. Prices will therefore fail to incorporate all available information (Dow & Gorton 1994). Section 2.7 argues it may more profitable to 'herd' on somebody else's information even if it is incorrect, than trade on one's own private information (Bikchandani, Hirshleifer & Welch 1992, Trueman 1990 and 1994). Section 2.8 discusses the idea that the market rationally chooses not to be informed, when the costs of being informed exceed the benefits (Kim & Verrecchia 1991a and 1991b, McNichols & Trueman 1994, Demski & Feltham 1994). Section 2.9 concludes the chapter.

2.3 ABNORMAL RETURNS ARE MIS-ESTIMATED

A common criticism of event study findings is that measured abnormal returns are biased estimates of true economic profits investors can expect to earn. This is a consequence of our limited knowledge of the asset pricing theory. The mis-measurement is a function of the failure to control fully for risk, residual uncertainty, transaction costs, and the incorrect estimation of investors' rates of return.

2.3.1 *The Mis-measurement of Risk*

A frequent criticism of event studies is the failure to control adequately for risk. In instances where the post-announcement drift lasts for years, it is difficult to suggest it could be anything other than a risk problem, although Bernard & Thomas (1989 and 1990) and Ou & Penman (1989a) go to great lengths to eliminate this likelihood. One possibility is that trading strategies based on accounting variables reflect a risk premium not captured by beta or the market index (Bernard & Thomas 1989). It is plausible that changes in accounting variables (such as earnings) used to derive trading strategies are inevitably correlated with changes in the underlying economic characteristics, and therefore the risk profile of the firm (Ball, Kothari & Watts 1992).

An alternative explanation is where the changing risk profile observed over event periods is not captured by the research design (Ball, Kothari & Watts 1992, Ball & Kothari 1991). Beta shifts are obviously a concern in a design that estimates betas in one period, and uses these betas in another period to measure abnormal returns. After controlling for changes in beta, Ball Kothari and Watts estimate the difference in abnormal returns between the extreme portfolios to be only 2.98 per cent, considerably smaller than the drift estimated elsewhere. Their evidence suggests that beta shifts might explain a large proportion of post-announcement drift (hereafter abbreviated as PAD). However their research design is a more likely explanation. For instance, the use of a change in annual earnings as opposed to quarterly earnings in forming portfolios. Much of the change in annual earnings is old news by the time its announced, so this approach tends to reduce the power to capture the full magnitude of PAD. Also, using annual data magnifies the importance of PAD and therefore cannot provide clear indications about the extent to which drift is explained by risk.

However, this is less of a concern for Bernard and Thomas who do not rely on estimates of betas, but instead assume all security betas are equal in the post-announcement period. Under this assumption, the combined long position in extreme good news firms and short position in extreme bad news, has zero systematic risk. Their concern is therefore to explain any difference in the level of betas for high and low SUE firms in the post-announcement period.

If mis-measured betas are the explanation, then the sign of the drift should vary according to whether the excess return on the market is positive or negative.

Specifically, good news stocks, which would have to be riskier than assumed, should have positive estimated returns in rising markets but negative abnormal returns for falling markets. However, Bernard and Thomas find for extreme good news abnormal returns are positive for both rising and falling markets, and are on average negative for extreme bad news. A result that is consistent with Ball, Kothari and Watts, who provide evidence that good news firms suffer temporary risk increases, and bad news firms suffer temporary risk decreases following annual earnings announcements. The magnitude of the shift around earnings announcements however appears to fall short of the amount necessary to explain the magnitude of the drift (Bernard & Thomas 1989).

Other aspects of the evidence of Bernard and Thomas also cast doubt on a risk explanation. Their trading strategy of a zero-investment portfolio, with long (short) positions in extremely good (bad) news firms, consistently earned positive returns. Secondly, the mean returns for extreme bad news stocks were so low it is doubtful whether declines in risk of any kind could plausibly explain their magnitude. Specifically, returns were less than that on Treasury bill rates during the announcement week, and only slightly greater during the first two months of the post-announcement period. Most compelling is how the failure to account for risk could explain the seasonal pattern of the earnings anomaly observed by Bernard and Thomas. It requires that the risk changes occur over short periods that coincide with the earnings announcement date.

2.3.2 *Partially Revealing Prices and Residual Uncertainty*

The existence of noise makes it impossible to distinguish between price changes due to new information, from changes due to liquidity trading. As a result there will be some residual uncertainty in the price process, and prices will only be partially revealing (Grossman & Stiglitz 1980). Prices will fail to reveal private information, but also fail to reveal consensus beliefs regarding future prices based on public information. Dontoh, Ronen & Sarath (1994) demonstrate that prices will therefore exhibit correlated drifts because 'observed prices do not reveal the *entirety* of private information held by traders, and hence, do not allow for accurate risk adjustments.'[1] More specifically, in a partially revealing equilibrium, when investors receive a new signal (given that they are risk averse), they will not act with complete confidence regarding its implications. An additional signal which reflects the same underlying information as the first signal, will reduce residual uncertainty and generate demands (or sales) correlated with those that were obtained on receiving the first signal. Consequently, price changes will also exhibit serial correlation and produce a price series consistent with an underreaction to information. Hence, investors while fully comprehending their information, will rationally await further confirmation before trading. Dontoh, Ronen and Sarath go on to illustrate with high negative correlation between public signals, produces patterns of stock price overreaction. In sum, they show that apparent delays in the impounding of public information can be rationally explained by the mis-measurement of risk, caused by liquidity trading and heterogenous beliefs.

2.3.3 *Transaction costs*

The role of transaction costs is little understood, but it seems doubtful whether transaction costs are wholly responsible for lagged impounding, as the size of abnormal returns appear too large. For instance, the trading rule of Bernard and Thomas earned a return of 7.74 per cent over the first 180 post-announcement days. Stoll (1991) calculated a crude measure of the average transaction cost by comparing the sum of economy wide commission income, market maker trader gains and underwriting profits with aggregate trading volume on all stock exchanges. He estimated the mean round-trip transaction cost to be 1.2 per cent, and 0.75 per cent for institutions. Even after doubling these average costs they are far too low to explain abnormal returns. In contrast, Bhushan (1994) presents evidence that the magnitude of the post-announcement drift is an increasing function of direct and indirect costs of trading.[2] The observed inverse relation between drift and firm size

[1] See Dontoh, Ronen & Sarath (1994) (p1).

[2] The direct costs of transacting include percent bid-ask spreads and commissions, while the indirect costs include the price pressure effect and the delay in getting the entire order filled. These are proxied by share price and annual dollar trading volume, respectively.

disappears when transaction costs are controlled for.

Those who trade aggressively may face higher costs, but lagged impounding lasts for several months and so it does not make sense for traders to continue trading in this manner. Transaction costs are likely to predict a delayed price response to announcements until the information is impounded by traders for whom the costs are lower. As Bernard & Thomas (1990) propose, it is hard to understand why the mis-pricing continues for so many months, presumably the market would process less costly information in the meantime. Although it prevents investors initially from trading, it does not explain why information is not fully impounded. More mystifying is why it would be related to the time series behaviour of earnings (Bernard & Thomas 1990).

2.3.4 *The Mis-measurement of Investors' Rates of Return*

The estimates of returns are unlikely to be the true returns of investors, due to inherent measurement problems. The recorded prices are unlikely to be the prices investors have traded at, on the basis of the earnings information. As the recorded price may equal either the closing-bid, the closing-ask, or even a bid-ask average, but not necessarily the transaction price. Therefore, the returns of portfolios that trade frequently over short intervals are more likely to be biased in comparison to portfolios with long holding stocks (with the probable exception for small priced stocks which trade less frequently). This will bias the results in studies that sell short and buy long frequently (Ball 1992).[3] The return estimates also ignore the possible effects on security returns of differential tax treatment of dividend income and capital gains, which are likely to be correlated with earnings (Ball 1992).

2.4 ANALYSTS' FORECASTS OF AS A PROXY FOR EARNINGS EXPECTATIONS

This section surveys a number of papers which suggest analysts produce inefficient forecasts. This subsequently has implications for researchers who use analyst forecasts

[3] Bid-ask bias appears not to be a problem in Bernard & Thomas (1990).

as a proxy for earnings expectations. Therefore, any measured post-announcement drift would reflect a fault in the research design of the inappropriate use of analyst forecasts.

There has been increased use of analyst forecasts as a proxy for investors' earnings expectations, in an attempt to identify with greater accuracy the unexpected element of earnings. Both Mendenhall (1991) and DeBondt & Thaler (1990) suggest that inefficient analyst forecasts and recommendations may be the originating source of any price under or overreaction. We would expect at least, analysts to produce superior forecasts over times series models as they are able to survey a richer set of information, plus they have direct access to the statistical models themselves. Brown et al (1987) draws caution to inferring conclusions from use of a proxy for market expectations when we do not sufficiently understand what is driving the market's response to earnings announcements.[4] The use of analysts' earnings forecasts implies a certain decision process on the part of investors.

Butler & Lang (1991) found analysts either tend to be persistently optimistic or pessimistic relative to the use of consensus forecasts.[5] So the efficiency of analysts' forecasts may be in doubt, but evidence suggests their predictive ability relative to other proxies is significantly more accurate in forecasting abnormal returns (Brown et al 1987, O'Brien 1988, Bhushan 1989, Kross, Ro & Schroeder 1990). Kross, Ro and Schroeder show the advantage of Value-Line analysts' over time series models is positively related to the amount of coverage of the firm in the Wall Street Journal, earnings variability and their timing advantage, but negatively related to number of

[4] Brown et al (1987): "If the unexpected earnings proxy measures the market's assessment with error, the results can, in certain experimental designs, lead to incorrect inferences. This issue is potentially important when the researcher attempts to hold constant the effects of unexpected earnings while testing hypotheses for other financial variables. Any correlation between the measurement error in the unexpected earnings proxy and the other financial variables results in biased statistics."

[5] Butler & Lang (1991) and O'Brien (1988) found no statistically significant evidence of differential analyst forecast accuracy (using IBES data).

lines of business and firm size.[6]

Abarbanell (1991) reveals that Value-Line analysts do not fully incorporate prior price changes in their earnings forecast revisions, and that it is possible to predict the sign of the forecast error from the price change. Elgers & Murray (1992) evaluate the relative performance of IBES consensus financial analyst forecasts and forecasts based on the anticipatory behaviour of security prices. Security price based models are envisaged to be superior forecasters, encompassing a broader set of publicly available information presumably including analyst forecasts. The relative accuracy depends upon the extent to which analysts exploit the earnings relevant information in security returns, as well as upon the degree to which analysts' forecasts reflect information not yet impounded in security returns and even information not relevant to security evaluation. Elgers and Murray find that neither forecast source dominates the other with respect to their accuracy to predict earnings growth, or their contemporaneous association between unexpected earnings and security returns. Instead they appear to be complementary sources of information, each providing a unique source of information.

Analysts would appear to underestimate the persistence of earnings forecast errors when revising their earnings forecasts (Mendenhall 1991), which investors in turn use. Therefore, not surprisingly, Mendenhall found a significant positive association between forecast revisions and the abnormal returns around subsequent earnings announcements, implying investors also underestimate the persistence level signalled by earnings forecast revisions, as a likely result from using analyst revisions. Abarbanell & Bernard (1992) examined the extent to which Value-Line analyst responses to earning announcements could explain post-announcement drift, and found the magnitude of the autocorrelations in analyst forecast errors were only approximately half as large as necessary to explain the magnitude of the delayed price

[6] Philbrick & Ricks (1991) found that the source of analysts' forecast data is not as important as the selection of actual EPS data, although Value-Line data appears to represent the most appropriate source of actual EPS data. Studies that use IBES forecasts ad especially COMPUSTAT are likely to find a greater overreaction effect (Bartov 1992).

reaction to earnings. Hence, stock prices appear to underreact to even a greater extent, consistent with the results of Mendenhall (1991), and perhaps suggests stock prices reflect less information than analyst forecasts.

Implicit in the use of analyst forecasts, is that they reflect analysts' own private information in an unbiased manner. Trueman (1994) shows that analysts are subject to herding behaviour. Analysts prefer to give a forecast that is close to prior earnings forecasts, even if issuing a more extreme forecast is justified by their own private information. Such behaviour is motivated by the analyst's objective of maximising his or her client's assessment of their forecasting ability, which may in part determine their compensation. Analysts with greater forecasting ability are not only less influenced by previous forecasts, but are also likely to release their forecasts first as they have no incentive to delay it. This contradicts conventional wisdom, that later forecasts are therefore more accurate as more information becomes available.

The greater the variability of the firm's earnings, the less likely a weaker analyst will deviate from their unbiased opinion. Trueman postulates that investors are aware of this herding behaviour among analysts, as well as their forecasting ability, and so realise forecasts close to prior forecasts in actual fact justify a more extreme forecast. An implication of this is that the price reaction surrounding earnings releases will not be as large as expected assuming analysts are unbiased. Investors are also expected to be aware that a small positive forecast warrants the belief that the analyst has information that the expected earnings are even more positive.

With regard to the UK, the evidence is inconclusive. Lonie, Lonie & Powers (1989) find data to justify overreaction among analysts, whereas O'Hanlon & Whiddett (1991) find IBES analysts are prone to underreaction. Their 1990 paper found overreaction due to biased expectations of analysts' forecasts, so confirming with the earlier results of O'Brien (1988).

A question that remains is why have analysts not traded on known stock price anomalies, thereby eliminating their existence. While instead they continue to make systematic errors in forecasting earnings. One suggestion may be that it is a reflection of psychological forces, or perhaps the incentive structure analysts face (see McNichols 1989, Kang, O'Brien & Sivaramakrishnan 1994). Evidence suggests that analysts tend to give optimistic forecasts which tend to result in a greater number of trades, than pessimistic forecasts. This enables analysts to augment their compensation.

2.5 FUNCTIONAL FIXATION HYPOTHESIS

By examining the market reaction to information we are testing the hypothesis that the market is rational in its interpretation and assimilation of information into security prices in a rapid and unbiased manner. Rationality implies that expected utility maximising investors correctly use all information that is relevant in security valuation. The functional fixation hypothesis (FFH) claims that investors who are unfamiliar with the numerable accounting techniques used to produce financial statements, rely on 'bottom line' accounting figures without paying attention to the procedures in generating them. Investors should be able to distinguish whether a change in accounting figures represents a change in underlying economic factors or is a result of reshuffling numbers. FFH asserts investors are unable to distinguish between the two. This area of research was one of the most active in the 1970's where research was concerned with whether the market could 'see through' the impacts of alternative accounting methods. On the whole, investors appeared able to differentiate between the effects on accounting numbers of alternative methods.[7]

Hand (1990) examined the stock price reaction to quarterly earnings announcements of firms that undertook debt/equity swaps during 1981 to 1984. Using a modified version of FFH, in which he assumes only 'unsophisticated' investors fail to correctly distinguish the true cause of a change in earnings. On occasions the price of a stock may be determined by the sole actions of a unsophisticated marginal investor, the coincidence of which is believed to be greater in smaller firms. Since the financial repercussions of a debt/equity swap for accounting earnings are disclosed at the time

[7] See Beaver (1989) for a brief review.

of the swap transactions are announced, the accounting gain produced by the swap should not cause a further stock price reaction when the quarterly earnings are announced for that period. Hand shows that abnormal returns in the earnings announcement period are positively related to the magnitude of the previously known swap gain, surely supporting evidence that investors are fixated by numbers. Tinic (1990) begs to differ, and suggests that due to a number of conceptual and empirical problems not addressed by Hand, the evidence is neither conclusive one way or the other. Large abnormal returns may in part be explained by the non-trivial transaction costs associated with swap transactions. Ball & Kothari (1991) argue that the effect Hand observes is indistinguishable from the firm size effect.

In an earlier study, Harris & Ohlsen (1987) found the book value of oil and gas producers contained useful information in determining a firm's market value, during 1979 to 1984. Furthermore, they showed the market could discriminate between full cost and successful efforts method of accounting. Based on these initial findings, they later examined in 1990 whether the observed relationship between book and market values is driven by the value relevance of the book values or by the actions of investors who are fixated by balance sheet figures. Harris and Ohlsen find investors to be fixated with balance sheet figures. By extending the time period covered by Harris and Ohlsen by four years, Tinic (1990) however found the reverse of these results.

The results thus far are inconclusive, neither supportive nor unsupportive of the FFH. It is entirely plausible that there are investors who are fixated by numbers, but unless they are also irrational, they would soon realise that relying on the 'bottom line' is not financially beneficial. Unless of course, it is not cost-effective to look beyond the bottom line figures. It is arguable whether they need to incur costs to become more 'sophisticated' in the interpretation of accounting numbers, and can instead merely observe the interpretation of others by observing the market price. There is little doubt that the market uses accounting information, but whether it correctly interprets it or how much weight it places on it relative to other sources is unclear.

Choice of accounting methods is more likely to be governed by financial incentives rather than providing for a 'true and fair view'. The change in accounting method is likely to be as important as the figure itself, as changes in accounting methods are often seen as signs of changing operational or financial characteristics. The inability to control for whether the market's reaction to accounting changes is caused by unexpected changes in the real characteristics of the firm or purely by the altered accounting procedures, reduces the power of these tests. Furthermore, the importance placed on accounting information and likewise the importance of accounting method, may alter systematically across firms - it may be more evidence of the small firm effect in disguise.

2.6 LONG VERSUS SHORT HORIZONS

Traditional information based asset pricing models implicitly assume traders have long term horizons and will hold assets until their liquidation. There are many instances when this is not the case. For instance, investors may need to trade for liquidity reasons, or a portfolio manager may need to liquidate his funds for his performance to be assessed. Also, the meaning of long term information may be less explicit than for short term information. Therefore, short term information may be more easily interpreted. Dow & Gorton (1994) show investors may adopt a shorter trading horizon because of increased risk, transaction fees and the opportunity cost associated with a buy and hold policy over an extended period of time. The question is, does a market with numerous short term traders operate less efficiently than one with traders who adopt a buy and hold policy? We look to Dow and Gorton for an answer.

Conventional wisdom assumes as long as traders are rational, trading horizons should not affect asset prices. A trader who plans to sell his stock in five minutes is concerned with the expected price at that time. That price, in turn, depends on the expected price five minutes hence, and so on. Backward deduction assures that short term traders will replicate the actions of long term traders, by speculating on long run fundamentals. Hence, the asset must be correctly priced today. Dow and Gorton argue although this may apply to public information, it does not include private information.[8] For a privately informed trader to engage in costly arbitrage, the asset price must not adjust immediately to reflect his information, but have adjusted by the time he closes out his position. If he believes this not to be the case, he will not purchase the stock and its price will not reflect his information. So the initial trader's actions are dependent upon the belief that another similarly informed trader will arrive, before the end of his trading horizon, and also purchase the stock. Although, for the second trader to trade he must also believe that other traders will arrive otherwise he will not buy, and so on. Slowly a continuous 'chain of arbitrageurs' will develop.

In short, a trader will only trade if there is a high enough probability of another trader arriving in the market within the same horizon. This implies a privately informed trader is unlikely to trade a long time in advance of an event. Long term information may be worthless therefore to short term traders. Consequently not all private information will be impounded into price due to the associated risk. This risk is likely to be an decreasing function of firm size. Larger firms are associated with a higher volume of trade, and so increase the probability of different investors trading on the same information.[9] Dow and Gorton conclude, short term horizons can cause security mis-pricing with respect to private information, even when traders are fully rational.

2.7 THE 'HERDING' OF INFORMATION AND ACTIONS

If traders have long horizons, it is assumed long term information is more valuable to them than short term information. It is considered more profitable for traders to learn information that others do not know. This behaviour is contrary to the practice of professional traders, whose objectives include predicting short term changes in assets' prices. Instead traders may 'herd' on the same information, trying to learn what others also know. They may consequently trade on information that is profitable but which is not necessarily fundamental. Consider an informed trader who wishes to liquidate his position before any public news arrives. He can only profit from his

[8] However, this presumes that public information is precise and therefore requires no interpretation; i.e. the implications are known and immediately impounded into price. This contradicts the existence of post-announcement drift, which is the lagged impounding of public information.

[9] This may explain why earnings are anticipated earlier for larger firms (Freeman 1987).

information if it is impounded into price by other similarly informed traders. For the trader to be better off therefore, others must act on the same information.

Froot, Scharfstein & Stein (1990, 1992) show theoretically that rational short term traders induce short term informational inefficiency; a conclusion consistent with Dow & Gorton (1994). As more speculators study a given piece of information more of that information disseminates into the market, and therefore profits from that learning early decrease. Hence, traders will tend to focus on one source of information rather than a diverse set of data. This may lead to other fundamental information being ignored, which may explain why data in the financial statements is often not incorporated into security prices (Ou & Penman 1989a and 1989b). Herding may also explain the behaviour of traders who focus on different variables over different periods of time (see Lev & Thiagaran 1994).[10]

Bikhchandani, Hirshleifer & Welch (1992) address the behaviour of traders who herd on the actions of previous traders, as opposed to herding on similar information. They term such behaviour as an 'information cascade' - when an individual follows the actions of those ahead of him without regard to his own private information. The earlier in the sequence of actions the cascade starts, the greater the probability that the traders will be wrong in their decisions. Alternatively, to start a cascade may be the rational decision for a trader who is late in the sequence, assuming all prior trades reflect information. The former scenario highlights the problem with cascades, by everyone following suit they may prevent the aggregation of information. It more importantly shows, cascades will always eventually occur whether traders trade on information or others' actions. But once a cascade has started all further trades are uninformative.

A similar idea is entertained by Brennan (1990). Although the market may systematically use the wrong procedure in valuing securities the reward to knowing the correct procedure may be slight, unless there is a sufficient degree of coördination

[10] This does not necessarily imply the underlying valuation model is continually changing.

among investors' information acquisition activities (and interpretation), especially when it is costly to do so. Brennan explains 'while too much information acquisition activity will compete away the rewards to acquiring information..., too little information acquisition also may make it not worthwhile for any individual to undertake it.' As a result, two states of equilibrium may exist, one in which there is information acquisition and another where asset values remain latent even despite relatively low information costs.

Whether a cascade causes individuals to converge on the 'wrong' or 'correct' decision, will depend on the sequence of individuals, the precision of their respective information, and if the sequence of traders is known. The trader with the most precise information may have more to lose by not trading on new information immediately, before it is disseminated by others. Less precise traders will therefore have the incentive delay their decision, and free-ride on these earlier more precise decisions. Similarly, the more uncertain an individual is about the correctness of his judgement, the more susceptible he is to free-riding. Alternatively, if the same precise trader acts on her own judgement later in the sequence, such an action could 'shatter' the cascade.

In a similar vein to Bikhchandani et al (1992), Trueman (1994) explains the forecasting behaviour of analysts. Implicit in the use of analyst forecasts is that they reflect information. By employing a theoretical model to examine the behaviour of two analysts who release their forecasts sequentially, Trueman finds analysts are also subject to herding. Especially if the second analyst's ability is 'weak', he will condition his forecast on the previous forecast of the first analyst, even if his own private information warrants a more extreme forecast. But unlike Bikhchandani et al's paper, the second analysts' forecast is still informative.

This is similar to previous research (Trueman 1990) that shows an analyst may be reluctant to revise a previously issued forecast upon the receipt of new information. This is because a forecast revision implies the analyst's original information was incorrect, and may affect the investor's assessment of the analyst's ability. The analyst's objective for biasing his forecast arises from how he is compensated; i.e. if the fee he can charge for his forecasts directly depends on his client's assessment of his forecasting ability. This suggests the weaker analyst has an incentive to delay his forecast to after that of the stronger analyst. So as Trueman states, later forecasts in the financial year do not necessarily reflect more information but may instead replicate earlier forecasts. Hence, earlier forecasts may be more accurate forecasts of future earnings.

Trueman presumes investors are aware of analysts' forecasting behaviour, and they recognize that an analyst who issues a forecast close to prior forecasts may have information that justifies a more extreme forecast. Thus, the observed price reaction to an extreme earnings announcement may be smaller than expected, if former expectations were based on analyst forecasts (which are assumed to be unbiased). Additionally, analysts appear optimistic for forecasts that represent an negative change from prior expectations, as opposed to those reflecting a positive change. This is supportive of evidence that buy recommendations often accompany optimistic forecasts, as buy recommendations generate greater stock turnover than sell recommendations, and analyst compensation methods is partly based on sales commission. This begs the question, that if investors are aware of analyst behaviour why should analysts try to deceive them. An alternative explanation may be investors do not use analyst forecasts (see Bhushan 1994).

2.8 INVESTORS CHOOSE NOT TO BE INFORMED

The above sections have surveyed a number of explanations for why the market appears not to instantaneously impound new information. A further explanation is that market agents *choose* not to be informed, so consequently not all potential information is reflected by price. The seminal paper in this area was by Grossman & Stiglitz (1980), who identify the conditions under which information search will take place. It was one of the first papers to suggest that prices in equilibrium are unlikely to fully reflect all information, because the costs of information search exceed the expected benefits. The more recent papers of Kim & Verrecchia (1991a, 1991b), McNichols & Trueman (1994) and Demski & Feltman (1994), have tackled the problem analytically. They collectively identify several incentives for investors to be informed. These four papers derive theoretical models under similar frameworks, that rationalise and explain the behaviour of market participants around public corporate announcements.

The papers employ a multi-period rational expectations model of three distinct trading periods with endogenous private information acquisition. In the first period traders achieve their optimal portfolio by trading on public pre-disclosure information and any private information they are privy to, in the expectation of the forthcoming event. The information arrives in the second period which may change traders' beliefs and induce them into a new round of trading securities. In the third period the return is realized and consumed. Beyond this, the papers have several distinguishing features with respect to underlying assumptions regarding the assumed information structure and the required equilibrium conditions. Before we discuss each of these later papers in greater depth, we will briefly review the seminal paper on information efficiency by Grossman & Stiglitz (1980).

2.8.1 *Grossman & Stiglitz*

Grossman & Stiglitz (1980) address the conflict between an informationally efficient price and the incentives to acquire information. While rejecting to Fama's 1970 (and 1991) definition of market efficiency; that an efficient price is defined as one which 'fully reflects all *available* information'. Grossman and Stiglitz suggest that for security prices to impound ALL available information, information must be costless. Or similarly, for profits to be eliminated, arbitrage must be costless. If market prices accurately reflect all available information at any one time for free, there is no incentive to acquire any further information. Thus, an informationally efficient market, as defined by Fama, would appear to be incompatible with costly information.

Their statement is based on an equilibrium model that consists of two sets of traders: the informed who acquire information at a cost, and the uninformed who can observe only price. As more individuals become informed, the more informative price becomes. The proportion of those being informed will depend on the cost of information, the level of noise in the price system, and the quality of the information acquired by the informed traders. The smaller information costs and the higher the level of noise, the greater the incentive to become informed. An increase in noise reduces the informativeness of price. This in turn increases the return to information and leads to more individuals becoming informed, ceteris paribus. What Grossman and Stiglitz show is that the two effects exactly offset each other, so the level of price informativeness remains constant. The effect of an increase in the quality of the informed traders' information is similarly a two edged sword. Increased quality will increase the demand for further information, reflected in increased price informativeness. Increased price informativeness reduces the benefits of being uninformed, ceteris paribus. Thus a point will be reached when the costs of being informed exceeds the benefits.

Through theoretical deduction, they show equilibrium can only exist when information is very inexpensive, or when informed traders receive very precise information. Hence, an efficient price is a noisy estimate of the asset's future payoff; i.e. security prices are only partially revealing. This can be simply explained by observing two extreme conditions of price informativeness. When there is no noise, prices will convey all information (both public and private), decreasing the incentive to be informed. Conversely, if everyone is uninformed, it clearly pays a single individual to become informed and trade against the uninformativeness of other traders.

Grossman and Stiglitz finally highlight a further conflict (p404): 'whenever there are differences in beliefs that are not completely arbitraged, there is an incentive to create a market.' They cite an earlier paper of Grossman (1970), which examined how the presence of noise in a commodity's spot price led to different expectations as to its future price. This led to the opening of a futures market. Thus, uninformed traders were able to observe two prices reflecting information, and thereby eliminating any noise. The underlying assumption being that differences in beliefs are endogenous, arising from the acquisition of information and the informativeness of the price system. Assuming the creation of markets is costless, equilibrium is unlikely to ever exist, and the whole theory becomes untenable.

2.8.2 *Kim & Verrecchia*

Kim & Verrecchia (1991a and 1991b) (hereafter KV), use a rational expectations framework to model the market's anticipation of and reaction to accounting disclosures. They theoretically deduce that market anticipation is an increasing function of:

- the precision of the public disclosure,
- the precision of private information,
- the level of noise in the price system,
- the risk aversion of the investor, and
- the cost of information.

(i) Kim & Verrecchia 1991a

More specifically, KV assume traders are diversely informed and differ in the precision of their private information. Some traders are therefore more informed than others and will hold differing expectations, and hence, upon an announcement will respond in different ways creating a positive volume of trade. Traders will be aware that the securities' prices reflect, although only partially, the private information of other traders, and so influence their own demand for further information (i.e. price acts as a substitute for information that would otherwise be acquired). If security prices were to fully reflect all private information, all traders' beliefs would converge and there would be no inducement to trade.

When information is publicly announced, investors will revise their beliefs unless it equals their prior expectations. The price reaction measures the average change in investors' beliefs, whereas trading volume reflects the accumulated reaction of all investors. More precisely, KV defines the price reaction to a public release as

$$\hat{P}_2 - \hat{P}_1 = \frac{n}{K_2}\left[Surprise + Noise\right] \qquad (2.1)$$

Where the change in price ($\hat{P}_2$ - $\hat{P}_1$) at the time of the announcement is proportional to both the unexpected element of the announcement (plus noise), and its relative importance across the posterior beliefs of traders. Its relative importance is increasing in the precision of the announced information, n, and decreasing in the average precision of traders total private information after the public announcement, K_2. Noise provides an additional source of uncertainty and prevents security prices from fully revealing all private information; this in turn supports the incentive to acquire costly private information (see Grossman & Stiglitz 1980).

Trading volume is not only an increasing function of the absolute change in price, but also reflects the level of information asymmetry prevailing before the announcement,

$$\begin{aligned} TradingVolume &= \left[\frac{1}{2}\int r_i \,|\, s_i - s \,|\, di\right]\left|\hat{P}_2 - \hat{P}_1\right| \\ &= \left[\frac{1}{2}\int r_i \,|\, s_i - s \,|\, di\right]\frac{n}{K_2}\,|\, Surprise + Noise \,| \end{aligned} \tag{2.2}$$

Where $\int r_i \,|\, s_i - s \,|\, di$ is the weighted average of the absolute deviations of the precision of traders' private information, s_i, from the average precision, s, weighted by investor i's risk tolerance, r_i. A trader's risk tolerance determines the degree of aggressiveness with which he exploits his position. The greater the information asymmetry across investors, the greater the expected volume reaction due to the extent of belief revisions.[11]

Hence, the expected volume and price reaction are increasing functions of the precision of the announced information and decreasing functions of the amount of preannouncement public and private information. As the quality of the announcement increases, traders react to the news with greater conviction. As the quality of preannouncement information increases, the relative importance of the announcement decreases, and so traders respond less strongly to the announcement.

Atiase & Bamber (1994) are the first to empirically test KV's trading volume proposition, using 5,282 annual earnings announcements. As a proxy for the unobservable level of pre-disclosure information asymmetry, both the dispersion and

[11] Volume, hence, may be a noisier indicator than a change in price of the precision of the event and of private information.

range in analyst forecasts were used. One limitation in using analyst forecasts, is that their divergence in beliefs are likely to underestimate the true divergence in beliefs of a broader, more heterogeneously and a less well informed, set of investors. Secondly, analyst forecasts reflect divergent expectations rather than differential precision of information. The use of expectation variables is likely to reflect more than information asymmetry, as differential expectations can occur even if investors are privy to information of the same precision.

By employing a multivariate analysis, trading volume is regressed on the abnormal return metric, proxies for information asymmetry, and firm size as a control variable. As shown in equation (2.2) above, the difference between the precision of each investor's private information and the average precision of all investors' private information is weighted by each investor's risk tolerance. Of course, empirically this is not possible to assess, so Atiase and Bamber assume that investors' risk tolerance is uncorrelated with the precision of their private information. Using various volume measures, they examine the market response over both a two day event window (t=-1,0) and a seven day window (t=-1,+5).

The results are consistent with KV's theoretical proposition that the trading volume reaction to earnings announcements is an increasing function of both the magnitude of the associated price reaction on the day, and the level of information asymmetry. Moreover, even after controlling for the absolute price reaction, the level of information asymmetry is significantly positively related to investors' trading volume reactions to earnings announcements. This provides insight into the market's assimilation of information by suggesting that pre-disclosure information asymmetry in part explains the relationship between the volume and price reactions to public disclosures. The greater the level of pre-disclosure information asymmetry, the greater the earnings announcement's effect on the investors' trading activity, ceteris paribus.

(ii) Kim & Verrecchia 1991b

In a later paper, KV develop the theory by incorporating more fully the implications of investor risk preferences and the marginal cost of information acquisition. An important result of the paper is that the behaviour of information asymmetry is unimodal; i.e. informational asymmetry increases as the precision of the public announcement increases up to some point, and steadily decreases thereafter. Here, the extent of information asymmetry is greatest when anticipating a less precise disclosure than when anticipating either a perfect announcement or no announcement at all (the equivalent of an announcement of zero precision). If the quality of an announcement is so precise (i.e. dominates all investors' beliefs) there exists no need to acquire further private information, and consequently individual beliefs will converge. Similarly, if no announcement is expected there exists little incentive for acquiring further private information, as there will be few profitable opportunities. In between these two extremes, the impact of the announcement must be large enough and sufficiently imprecise (although above zero precision) to create a large divergence in investors' beliefs providing enough profitable opportunities to induce trade.

Regarding risk preference, the lower the risk aversity of the investor, the lower their demand for more accurate private information. Similarly, the higher the marginal cost of acquiring information, the greater the reluctance to acquire high quality information. The reduction in information acquisition is assumed greater for those relatively more informed than for the less well informed. The differential in precision levels between individuals will become closer, reducing informational asymmetry. Thus, the price reaction at the time of the announcement will be stronger reflecting a greater unexpected element. The volume reaction may either increase or decrease, depending on which is the greater - an increased price variance relative to the reduction in information asymmetry.

The greater the presence of noise in prices, the greater the demand for more accurate information. As the level of noise declines (or as the quality of prior information increases), the quality of free information improves perfectly offsetting the reduction in the cost of information acquisition. The overall quality of the trader's total information remains the same. KV assume each investor reduces his private information acquisition by the same amount, so average precision remains the same and the level of informational asymmetry is unaltered. Consequently, both the variance of price change and expected trading volume both decline because residual uncertainty is reduced.

On the assumption that the announcement and its precision are correctly anticipated by investors, KV demonstrate that anticipating an announcement encourages relatively more information gathering, implying a weaker price reaction at the time of the announcement. The volume reaction is less clear, as the price reaction is smaller but information asymmetry has increased. Relaxing the assumption of known precision of the announcement until it is released, further increases both the price and volume response.

2.8.3 *McNichols & Trueman*

The paper of McNichols & Trueman (1994) (hereafter MT) contrasts with the work of KV, and Demski & Feltham (1994) (hereafter DF) in the following ways. MT focus on the activities of a single informed trader, who chooses the precision of his information, who is risk neutral and takes into account how his demand for a firm's shares affects the firm's market price.[12] MT argue this allows them to extract from the risk implications and understand more fully the impact a public signal has on information acquisition. MT hypothesise market anticipation to be an increasing function of:

- the precision of the public disclosure,
- the precision of the private information,
- the level of noise in the price system, and
- the probability of the public disclosure.

More specifically, the informed trader has a finite horizon, so he can only gain profit from his information if the firm makes a public disclosure during third period (see Dow & Gorton 1994). More importantly, MT assume the announcement is released in period 2 with probability *p*, whereas KV and DF assume that *p* is equal to one; i.e. its probability of occurrence is known with accuracy. The higher the probability or

[12] KV and DF assume demand does not affect price and traders are risk averse.

greater the expected precision of an announcement, the greater the expected trading profits of the informed trader which gives him an incentive to increase the precision of his information.

By holding constant the precision of the informed trader's private information, MT demonstrate the trader's expected trading profits are an increasing function of the covariance between the errors in the public and private signals. This implies the informed trader can capitalise upon his informational advantage, by trading against the less well informed. His expected return is an increasing function of noise and the imprecision of the announcement. The more precise the informed trader's information, the more aggressively he acts on it, and the greater its impact on pre-announcement price. This relation arises because the greater the covariance, the greater is the informed traders ability to predict the price change that will occur when the public signal is announced. A trader will therefore prefer to collect information that is highly correlated with the firm's forthcoming disclosure.[13]

Finally, they observe the absolute price change is an increasing function of both the probability and precision of the public disclosure. As a consequence, the magnitude of the announcement date price change is decreasing in the probability of the disclosure, and in some cases, is also decreasing in its precision. Hence, it is not always possible to use the magnitude of the announcement date price reaction to assess the informativeness of a public disclosure.[14]

Their model supports the opinion that traders have short term horizons, as opposed to holding their positions in the firm until its liquidating value is revealed, as alternatively assumed by KV and DF. Through theoretical deduction, MT show it is more valuable to the trader to be informed with respect to the forthcoming

[13] The papers of KV and DF assume the errors in the public and private signals are independent. There is considerable empirical evidence in support of greater association between earnings forecast errors and contemporaneous stock price changes than for any other financial statement variables, suggesting that private information about forthcoming earnings is more valuable to investors than private information about forthcoming cash flows.

[14] This has implications for post-announcement drift studies.

announcement than of the firm's liquidating value. A public disclosure is likely to be of little value to a long term trader.

2.8.4 *Demski & Feltham*

Demski & Feltham (1994) (hereafter DF) assume all traders, who are risk averse, receive the same signal of a fixed precision. Their model consists of two sets of traders, those who are informed and the uninformed (i.e. noise traders). Consistent with KV, they presume that the public signal is sufficient for the private signal; i.e. the public signal is of a quality to dominate all beliefs, so all parties are on an equal information footing after its release. As informed traders have the same information of equal precision, price is uninformative to them. Whereas price is the only information available to the uninformed. In short, DF hypothesise market anticipation to be an increasing function of:

- the precision of the public disclosure,
- the precision of private information,
- the level of noise in the price system,
- the cost of information, and
- the accessibility of information.

More specifically, DF apply their model in questioning the timeliness of accounting, and query whether increased quality in public disclosure affects the demand for more timely alternative sources of information. They tackle the answer by varying the level of accessibility of the information contained in the report prior to its release, combined with the proportion of the market informed, with the assumption the information is 'knowable'. In an inaccessible case (equivalent to no-one being informed), increased disclosure (increasing the information content of the report) increases the trader's risk in period 1 due to the great uncertainty as to price in period 2 after the announcement. This increased risk reduces the aggressiveness by which traders trade, reduces the level of information acquisition resulting in a less informative price (assuming the fraction informed remains constant). Greater the information content of an inaccessible announcement the greater the change in price variance, due to a larger unexpected element.

In the accessible case (i.e. the information is available from more timely sources), increasing disclosure reduces the risk of the informed investor, and so increases their aggressiveness to trade (take larger speculative positions) thereby increasing the informativeness of price. The amount of information acquired depends on the proportion already informed, which is in turn dependent on the cost of information. Initially, increased disclosure in an accessible case, increases the risk differential between informed and uninformed traders. Hence, the value of being informed increases and the risk premium falls, thereby increasing the aggressiveness of his trade. The proportion of traders increase up to a point, when price informativeness decreases the incentive to be informed.

Increasing prior information acquisition, increases prior price informativeness and reduces the impact of the announcement, reflected as a decline in price change variability. The effect on the proportion of those that become informed depends on the relative informativeness of price compared to the costs of further information acquisition. Initial increases in the quality of prior information increases the risk differential between those informed and those uninformed, thereby further increasing the value of becoming informed. As price increases in informativeness about the forthcoming event, decreasing returns set in from investing further in costly information acquisition. Hence, there exists a point where the costs of increased private informativeness outweigh the benefits.

DT conclude that the magnitude of the price change at the time of the announcement depends on the precision of the public announcement with respect to the future value of the firm. This depends on the extent to which prior information has resulted in the forthcoming public information being impounded in prior prices, and the amount of variation in prices due to noise. The extent to which the information contained in the report is impounded into prior prices depends on two key factors:

(i) the extent to which the information in the public report is knowable prior to its release, and

(ii) the extent to which this knowable information is impounded into price.

This in turn depends on the proportion of investors that are informed, and the amount of noise in prices. The proportion of those that become informed depends on the cost of information acquisition, the precision of both prior and public information, and the amount of noise prevalent in price in period one.

DT's results have important implications for financial reporting. Increased public disclosure can result in either an increase or decrease in price variance after its publication depending upon information priors, or in particular its accessibility prior to the event. The highest price variance will occur when the public report contains precise knowledge about the future value of the firm, and is costly to obtain foreknowledge of that report. Hence, if information is relatively more costly for small firms, DT's findings are consistent with a higher price variance following announcements of smaller firms when compared to larger firms.

These findings imply that no reaction following an announcement does not necessarily imply the event is of no value. The event can be so precise that it dominates all beliefs; i.e. all traders receive the same signal. Any change in trading volume is thus due to differences in information held by investors (as is the case in KV). If all or none of the traders acquire the accessible public information only normal (noise) trading occurs. Yet if only some of the traders are informed, then trading volume increases due to speculative positions taken at the prior information acquisition date and the reversal of these positions after the release of the public report (ie. investors are risk adverse).

2.8.5 *In Summary*

The papers reviewed in this section, all identify conditions under which information search will take place. Grossman & Stiglitz (1980) were among the first to suggest that prices in equilibrium are unlikely to reflect all information, because the expected costs of information search exceed the expected benefits. The papers of Kim & Verrecchia (1991a, 1991b), McNichols & Trueman (1994) and Demski & Feltham (1994) identify precise factors which determine the extent to which investors will choose to become informed. Although their respective models are based on different assumptions regarding the information structure and equilibrium conditions, their findings are nonetheless very similar.

Kim and Verrecchia demonstrate how the expected precision of public and private information, investors' risk preference, noise and the expected cost of information, all influence the level of market anticipation of a forthcoming disclosure. McNichols and Trueman show the extent to which investors become informed, is also dependent on the expected probability an event arriving at the market place. However, Demski and Feltham show that no matter the expected probability of an event, to extent to which investors can be informed depends on the accessibility of the information prior to the disclosure.

To derive workable theories it is necessary to make a number of simplifying assumptions, so instances exist when the models will not be applicable. Hence, there remain a number of issues yet to be addressed. MT and DF assumed, both that the precision of the announcement and the announcement date are known with accuracy beforehand. The greater the uncertainty introduced surrounding announcements can only further complicate the price and volume reaction, regardless of the effect of increased noise induced by the greater uncertainty. It is also commonly assumed that if investors examine the same signal, their expectations will converge. Surely, this will depend to a large extent on the precision of the announcement. The testability of these models is questionable, as they include variables that are unobservable: the level of information asymmetry, investor's risk preferences, the cost of information, the probability of the event, and a measure of noise. Thus, the use of inaccurate proxies may have a material effect on the results.

2.9 CONCLUSIONS

This chapter attempts to reconcile apparent findings of investor irrationality with rational explanations. Explanations that abnormal returns are attributable to unmeasured risk and transaction costs have not proved conclusive. A plausible reason for lagged impounding may be a reflection of investors awaiting confirmation that a previous earnings change was not transitory (Dontoh, Ronen & Sarath 1994). Or alternatively, the use of inappropriate proxies measuring investor expectations, such as analysts forecasts may explain this lagged impounding effect (DeBondt & Thaler 1990, Mendenhall 1991).

Evidence is growing that investor psychology plays an important role in decision making. Abarbanell & Barnard (1992) suggest that anomalous stock price behaviour around earnings announcements is caused by a failure to infer correctly, the distribution of future earnings based on past earnings. Stock prices appear to reflect even less information than analyst forecasts (Mendenhall 1991, Abarbanell & Barnard 1992). Investors are possibly fixated by accounting numbers, and appear unconcerned with how these figures are derived (Hand 1990, Harris & Ohlsen 1990). Herding behaviour may be partly due to the belief of investors that they can outwit other market participants. However, it is human nature to 'follow the crowd' (Trueman 1994).

Investors who are irrational are expected to lose wealth and leave the market when trading against rational traders. De Long et al (1990b, 1991) show that, in some circumstances, noise traders may actually earn higher returns than rational traders, for bearing greater risk. Can such behaviour be termed irrational if it is profitable? It can be more profitable to trade on others' information, even if incorrect, than on one's own information. Consequently, some public information may be ignored.

Alternatively, prices may only partially reflect earnings information, as investors choose not to be informed - investors will only become informed if they can earn a return. Collectively, Kim & Verrecchia (1991a and 1991b), McNichols & Trueman (1994), and Demski & Feltham (1994) identify a number of incentives to being informed which are:

- the expected probability of a public signal,
- the expected precision of the public signal,
- the precision of private information,
- the level of noise in the price system,
- the costs of accessing and processing information.

Consequently, if it is costly for investors to determine the full implications of financial statement information for future earnings, they may wait until future earnings are announced before adjusting prices. However, it is unlikely processing costs explain the results of Bernard and Thomas. As investors are only required to recognise that if the first quarters' earnings are better than last years' first quarter, then the second quarter will also tend to be up on last year too.

3. HYPOTHESIS DEVELOPMENT AND EXPERIMENTAL DESIGN

3.1 OBJECTIVES

The objective of chapter 3, is to develop a testable specification of the theory discussed in the previous chapter, that investors choose not to become informed. Specifically, it is intended to explain stock market behaviour in terms of the costs and benefits of information, which investors must consider when faced with the decision of whether to acquire and interpret information. The chapter proceeds by:

- identifying proxies for the associated costs and benefits of being informed;
- developing a measure of the extent to which investors choose to become informed both prior to a disclosure, and following the disclosure's release. The subsequent model will be used later to explain the cross-sectional behaviour of security returns surrounding corporate disclosure.

3.2 INTRODUCTION

In order to gauge the effects of information release on security prices, we need a theory of how the security market processes new information. Hence, we need to understand what type of information is impounded into security prices and why. Specifically, this research is an examination of the stock market anticipation of, and reaction to, different classes of information. Chapter 2 discussed different explanations for the apparent lagged impounding of stock returns, following the release of earnings related news. However, it is the explanation that investors choose not to be informed which is investigated throughout the remainder of this thesis. The seminal paper in this area is by Grossman & Stiglitz (1980), who identify the conditions under which information search will take place. It was one of the first papers to suggest that prices in equilibrium are unlikely to fully reflect all information because the costs of information search exceed the expected benefits.

The theoretical papers of Kim & Verrecchia (1991a and 1991b), McNichols &

Trueman (1994) and Demski & Feltham (1994) explain stock market behaviour in relation to the *incentives* facing investors deciding on whether to devote resources *to being informed* of a forthcoming announcement. The rationale for this is that, a rational investor will only invest in the acquisition and processing of information, in order to improve the precision of their own private information, providing it is cost-effective to do so. Collectively, these papers identify several incentives for investors to become informed, which include:

- the expected probability of a public signal;
- the expected precision of the public signal;
- the precision of private information;
- the level of noise in the price system; and,
- the costs of accessing and analysing the information.

Thus, the intention is to explain the structure of the impounding process in terms of the associated costs and benefits of information, which investors must consider when faced with the decision of whether to acquire and interpret information.

Since we are unable to determine the costs and benefits of information faced by investors, we look to the empirical literature to help identify suitable proxies. Previous evidence suggests that cross-sectional differences in security returns around corporate announcements, can in part be explained by various characteristics related to the firm's pre-disclosure information environment; the information regarding a firm's activities available prior to an event.[1] The theory assumes increasing levels of pre-disclosure information, increases the informativeness of price and the ability to anticipate the content of forthcoming disclosures. In this sense, the information content of an earnings announcement is pre-empted by the level of pre-disclosure information.[2,3] The difference across securities in the level of 'surprise' following

[1] See for example, Atiase (1985, 1987), Brookfield & Morris (1992), and Pope & Inyangete (1992).

[2] The share price reaction to earnings announcements has dominated this area of research, with little attention paid to non-earnings announcements; see Brookfield & Morris (1992).

[3] The notion of information content has not been formerly defined, only implied by event study procedures. If measured, for instance, as the variability of stock returns given an announcement, the relationship assumes that the variability of stock returns associated with an (earnings) announcement will be an inverse function of the amount of pre-disclosure information available; this is generally

an announcement is therefore attributed to the availability of pre-disclosure information.

The empirical literature has adopted various firm-specific characteristics expected to proxy for the level of pre-disclosure information. These include firm size (Atiase 1985, Freeman 1987), exchange listing (Atiase 1987, Pope & Inyangete 1992), analyst following (Bhushan 1989), institutional ownership (O'Brien & Bhushan 1990), press coverage (Shores 1990, Ho 1993) and option listed firms (Ho 1993). All of these characteristics are believed to be positively related to information production.

Both firm-specific characteristics and different information types are chosen to proxy for the associated costs and benefits of being informed. These are firm size, the number of years a firm has been trading, the number of disclosure a firm makes, and the volatility of stock returns prior to the disclosure under examination. Different information types are chosen to examine whether the anticipation and the interpretation of an event varies according to its expected probability and expected precision. The information types examined are the annual earnings report, the interim earnings report, the annual general meeting, notification of a board change and of a change in shareholding. In sum, this research is an attempt to further our understanding of how and why investors react to new information, and may provide a further explanation for post-announcement drift.

The chapter begins with characterising the environment in which information search and processing takes place, defining the terms and conditions associated with being informed, in section 3.3. Sections 3.4 and 3.5 identify suitable proxies for the pre-disclosure environment. Section 3.6 extends the theory of anticipation to the theory of interpretation. We argue that the incentives to interpret and to work out the implications of a signal are the same as for anticipating the signal. The experimental design is outlined in section 3.7. This includes identifying the impounding process

---

referred to as the differential information hypothesis (see Atiase 1985, 1987 and more recently Pope & Inyangete 1992).

for a set of company signals, which measures the extent to which the information in the signal is *anticipated prior to*, *impounded on*, and *impounded after* the announcement. Finally, section 3.8 concludes the chapter.

3.3 THE INCENTIVES TO ACQUIRE INFORMATION

This section characterises the environment in which information search and processing takes place. In order to do this, and to develop the link between the incentives and the pre-disclosure environment, it is crucial that the terms and conditions associated with the costs and benefits of being informed, are clearly defined. Definitions are more often implied in the literature rather than formally specified, and consequently they are often too vague. To address this problem, we provide the following definitions.

Investors are motivated to acquire information in order to anticipate the future value of a security, by trading against the less well informed. Grossman & Stiglitz (1980) theorise the demand for information as a function of its expected utility, which all depends on the proportion of those informed. The higher the proportion of those informed, the more informative the price system. This reduces the divergence between the information sets of the informed and uninformed investors, and accordingly, the per capita gain that investors can earn from being informed. Thus, as the proportion of those informed increases, the expected utility from being informed falls relative to being uninformed. The more precise the private information of investors, the more aggressively they trade, improving price informativeness and increasing the incentive to be informed. However, the extent to which price reveals the information of the informed, is offset by the level of noise in the price system.

The incentive to acquire information will therefore depend on the extent the **expected benefits** of being informed exceed the **expected costs** (Grossman & Stiglitz 1980).[4] Using the theory of Kim & Verrecchia (1991a and 1991b), McNichols & Trueman (1994) and Demski & Feltham (1994), we can identify several factors associated with

[4] Where the expected benefit is the expected risk-adjusted return.

the benefits of being informed. We therefore hypothesise the **expected benefits** of being informed to be an increasing function of

(i) the **'depth'** of the market,

(ii) the **expected probability of a public signal,**

(iii) the **expected precision of that public signal.**

(i) The **'depth'** of the market.

For there to be expected benefits from information, relies on there being opportunities to trade. Trading opportunities reflect the divergence of beliefs across investors (Kim & Verrecchia, 1991a and 1991b), but more importantly is a function of the **'depth'** of the market. The market must be 'deep' enough so that price is not easily affected by a single informed trader's actions, so as to not reveal her information at the time of the trade. The more thinly traded a stock, the easier it is to spot trading by informed investors and the less the potential gain from private information (Atiase 1985).[5] Instead, price must have adjusted by the time she closes out her position.

(ii) **The expected probability of a public signal.**

Dow & Gorton (1994) show a trader will not enter into costly arbitrage, unless there is a high enough probability of a similarly informed trader arriving in the market within the same trading period.[6] If the informed trader believes this not to be the case, she will not purchase the stock and its price will consequently not reflect her private information. Along similar intuition to Dow and Gorton, McNichols & Trueman (1994) demonstrate how the expected gain of an informed trader will increase if the firm makes a public disclosure within their trading period.[7] Inevitably, this also increases the likelihood of similarly informed traders entering the market. Hence, an increase in the **expected probability of a public disclosure** increases the expected benefits to being informed, and provides the trader with greater incentive to

---

[5] Atiase (1980) refers to this as the partial signalling hypothesis.

[6] A similarly informed trader is one who trades in the same stock, but is of the opposing view to whether it is under or overvalued.

[7] For a proof of this proposition refer to equation (15) of McNichols & Trueman (1994).

increase the precision of her prior information.

(iii) **The expected precision of that public signal.**

The greater the **expected precision of the public disclosure** the greater expected benefits of being informed (Kim & Verrecchia 1991a and 1991b, McNichols & Trueman 1994). Jennings & Starks (1985) observed earnings reports of high information content were associated with greater anticipation. The expected degree of precision of the forthcoming disclosure is all important.[8] If the quality of the announcement is so precise to cause individual beliefs to converge, there is no further incentive to improve the precision of private information prior to the event. Similarly, if the announcement is expected to be of zero precision (equivalent to no announcement being expected) there exists little incentive to acquire information, as profitable opportunities will be few. The announcement must be expected to be sufficiently imprecise (although above zero precision), to create a wide divergence across investors' beliefs providing enough profitable opportunities to induce trade (Kim & Verrecchia 1991a and 1991b).

Once the expected benefits of being informed have been estimated, they must be weighed against the expected costs. The **expected costs** of information are hypothesised to comprise:

(i) the **expected cost of access** - searching for and obtaining information,

(ii) the **expected cost of analysis** - processing and interpreting the information.[9]

(i) **The expected cost of access.**

This reflects the ease of acquiring more timely information from alternative sources (Demski & Feltham 1994). This can be related to the case of small versus large firms

---

[8] Choi & Jeter (1992) observes the market's responsiveness to earnings announcements declines significantly after the issue of qualified audit reports. Audit qualifications may be interpreted as a signal of the persistence of noise in the earnings figure. Similarly, Lev & Thiagaran (1994) noted investors view audit qualifications as bad news.

[9] Expected costs also include the cost of transacting, for which we do not provide a proxy for in our analysis on the basis that transaction costs are unrelated to the process of accessing and analysing information.

documented in the literature (eg. Atiase 1985). It is generally held, that information is more readily available for larger firms in the public domain, prior to an announcement. To access equivalent information for a smaller firm entails higher marginal costs, ceteris paribus. The level of anticipation by the market, or the proportion of those informed, is hypothesised to be a decreasing function of the expected cost of access.

(ii) **The expected cost of analysis.**

Once acquired, information only becomes 'information' after it has been processed and interpreted, involving time and effort ie. the **cost of analysis**. If it is too costly for investors to determine the full implications of the information for future earnings, they will not do so. Instead, they will wait for future earnings to be announced before adjusting prices.

In summary, the **level of anticipation** is therefore hypothesised to be a function of both the **expected benefits** and **expected costs** of being informed. The level of anticipation therefore:

(i) increases with the depth of the market, the expected probability of an announcement and its expected precision; but

(ii) decreases with respect to the costs of accessing and analysing information.

For example, an increase in the expected precision of an announcement results in an increase in the magnitude of the pre-announcement price change, and potentially, a decrease in the price reaction to the announcement itself. Whereas, high expected costs of access and analysis result in a lower fraction of the market being informed prior to the event, and potentially, a greater price reaction on its announcement. Thus, a highly precise announcement can either increase or decrease the price reaction on the report date, depending on the accessibility of the announcement's content beforehand. If the revealed quality of the announcement is higher (lower) than expected, the price reaction will be stronger (weaker) to its release.

An added dimension, is that information costs vary according to the type of investor, and consequently investors will differ in the precision of their private (prior) information. Newly announced information will therefore be more informative to traders of less precise information, and thus will have a greater impact on their beliefs. We are unable to measure the individual investors' costs and benefits of being informed. However, by observing the average price reaction to announcements, we are in effect examining the average costs or benefits to being informed.

The expected benefits and costs of acquiring information may vary across securities, and hence, so will the rate and level of anticipation of the information content of their respective announcements. For some firms, information may easily be discovered and at a relatively low cost. For others, the cost of acquiring information may be disproportionately high relative to the expected benefits, and as a result, relatively little will be anticipated prior to an announcement. Consequently, across securities, there will remain a cost-efficient amount of unexploited information (Ball 1992).

3.4 THE CHOICE OF PROXY VARIABLES

Chapter 2 described several factors, identified by Kim & Verrecchia (1991a and 1991b), McNichols & Trueman (1994) and Demski & Feltham (1994), believed to promote the acquisition of information in anticipation of a forthcoming announcement. This discussion plus our specification of the information acquisition process (section 3.3), helps to identify suitable proxies from the pre-disclosure environment for the expected costs and benefits of being informed. The chosen firm characteristics include:

- firm size (as measured by market capitalisation);
- the age of the firm;
- the disclosure policy of the firm; and
- the volatility of stock returns prior to the announcement.

All the characteristics except firm size, have not been previously tested in the empirical literature.

3.4.1 *Firm Size*

By and large, profitability of information varies in direct proportion to market value. For example, knowledge that a large firm's security is mispriced by one percent, earns a higher return than information that generates a one percent adjustment in the market value of a small firm's stock. Since any potential profit from small firms is reduced by the problem of thin-trading. Stocks in larger firms are generally more frequently traded than those of smaller firms, so an informed trade in a larger firm is more likely to be seen as a liquidity trade and arouse less suspicion. As a consequence of this partial signalling, the potential return from small firm information is reduced more severely than the return from large firm information (Atiase 1985). Firm size is thus a proxy for the **'depth'** of a security's market.

Intuition suggests the **costs of access** are a decreasing function of market capitalisation. There are several reasons to expect private information production to increase with firm size (Atiase 1985 and 1987). There is a greater availability of 'free' public information regarding larger firms, supplied through the efforts of market analysts and through the firm's own voluntary disclosure policy.[10] The financial press and market analysts have incentives to focus on large firms because they are more widely held (Atiase 1985, Bhushan 1989, Ho 1993).[11,12] Bhushan (1989) finds that the number of analysts following a firm is positively related to the percentage of institutional holding in the firm's ownership structure. It follows, since institutions do not generally invest in firms with low market capitalisations due to liquidity problems, analyst following is believed to be positively related to firm size.

Similarly, the **cost of analysis** is believed to increase with firm size. Larger firms have generally more complex structures, with greater lines of business, and wider geographical dispersement, all of which increase the marginal cost of interpreting the implications of earnings figures and various announcements. It may be this increased cost that discourages analysts following firms with greater lines of business (Bhushan

[10] Brennan, Jegadeesh & Swaminathan (1994) find analyst following is positively related to speed of adjustment, however the effect is non-linear. So that a significant effect is found only for large firms and those listed on the NYSE.

[11] O'Brien & Bhushan (1990) were unable to find a definite link between analyst following and firm size.

[12] Or perhaps more is reported about large firms because there is more to report.

1989). Kross, Ro & Schroeder (1990) show the advantage of Value-Line analysts over time series models in predicting future earnings, decreases with the number of lines of business.[13]

The combined expected cost of access and analysis will determine the relation between the level of anticipation and firm size, although the evidence implies market anticipation to be an increasing function of firm size (Grossman & Stiglitz 1980, Freeman 1987, Collins, Kothari & Rayburn 1987). Grossman & Stiglitz (1980) find the informativeness of price is positively related to the proportion of traders who are informed with respect to a given signal. Assuming the amount of information available and the number of informed traders is a positive function of firm size, the announcements of larger firms will be anticipated earlier than those of smaller firms, ceteris paribus. We know from the work of Freeman (1987) that security prices of larger firms begin to reflect reported earnings 22 months before the announcement date. The anticipation process of smaller firms begins 3 months later. More specifically, the percentage of abnormal returns for large firms realized in the early months exceeds the percentage for small firms. However, the cumulative abnormal returns of small firms ultimately exceed the total for large firms by 44 percent. This is later corroborated by Collins, Kothari & Rayburn (1987), who find the stock prices of smaller firms capture little information beyond that conveyed in the past time series of earnings.

3.4.2 *Age of the Firm*

Age affects the pool of background information available in the public domain. Age therefore measures the accessibility of the information content of a public announcement prior to its release, from alternative information sources. The shorter a firm's track record, the lower the available information due to the time constraint. The ability to anticipate is therefore impeded by the lack of past information, in

[13] In addition, the relation between firm size and information costs of access and analysis, is expected to be non-linear. As more is known about a company's activities, for an investor to have an informational advantage over the rest of the market traders, new information can only be obtained at increasing marginal costs.

addition giving rise to problems of interpretation. The younger the firm, the less well acquainted is the market, not only with the outcome of an event, but also with the future implications of available information. Therefore, on average, we expect younger firms to more likely suffer from greater mispricing reflecting the uncertainty and wider divergence in beliefs across investors. The level of surprise associated with a public signal is therefore expected to be a decreasing function of a firm's age, ceteris paribus. For firms about which relatively little is known, Lang (1991) observes the magnitude of the stock price response to earnings announcements decreases over time as a longer time series of earnings becomes available. Hence it follows, the younger the firm the lower the availability of information. Consequently, a firm's age proxies for the **costs of access and analysis**. Though in some instances, the early growth potential of some firms may attract the attention of analysts, offsetting the cost disadvantage.

3.4.3 *Disclosure Policy*

The market receives a continuous flow of information, supplied through the work of analysts and the financial press, but also by the companies themselves. The London Stock Exchange and company law provides a basic framework and minimum requirements for financial disclosures. However, considerable latitude remains with managers who determine what information is actually provided. Some firms go well beyond the required disclosures, while others are extremely stark.[14]

The number of disclosures made by a company, either mandatory or voluntary, increases the availability of 'free' information.[15] Presumably increased disclosure reduces the **cost of access,** trusting the disclosure is of sufficient precision to reduce private information production. For instance, if interim information is of value

[14] See Lang & Landholm (1993) for a thorough analysis of the incentives underlying corporate disclosure.

[15] This is the first known use of the number of firm-specific announcements. A comparable proxy for information production, found in the literature, is press coverage: the number of related articles in the Wall Street Journal Index in US studies (Shores 1990, Ho 1993), or the number of news releases identified using the McCarthy Information fiche service in the UK (Brookfield & Morris 1992). In either case, the coverage of company announcements is not comprehensive suffering from selection-bias, but does include third-party comments and forecasts.

relevance (ie. has earnings implications), the theory assumes the information will be reflected in security prices prior to the release of annual earnings.[16] The greater the availability of interim information, the more acquainted the market is of the firm's performance, reducing the level of surprise associated with the earnings announcement (Shores 1990). In fact, Kross, Ro & Schroeder (1990) find the predictive ability of analysts is a positive function of press coverage in the Wall Street Journal. The market's expectations can therefore be conditioned on the level of interim information.

On the contrary, the paper of Brookfield & Morris (1992) finds non-earnings news announcements to have little impact upon security prices. This implies the market does not continually update its expectations as new information arrives. Either much of the interim information contains news of little economic relevance, or the cost of interpreting vague signals outweighs the expected benefit. Interim information of low precision may increase the **costs of analysis** of the disclosure.

If a company is a frequent discloser of voluntary information, this will increase the probability of voluntary announcements in the future. Increased voluntary disclosure will increase the likelihood of similarly informed traders arriving in the market (Dow & Gorton 1994). This will in turn increase the expected gain to being informed, and further encourage the acquisition of information (McNichols & Trueman 1994). Alternatively, increased voluntary disclosure may reduce the incentive to acquire information (Diamond 1985). Stickel (1989) finds analysts are reluctant to update forecasts frequently in case new information renders their forecasts out-of-date and inaccurate.[17] More recently, Trueman (1994) suggests analysts are reluctant to update forecasts upon the receipt of new information, as it reflects the poor quality of their information, and adversely affects the investor's assessment of their capabilities. Investors may be similarly perturbed from acquiring costly information, if they expect their expectations will soon need be revised on the release of new information. Prices

---

[16] Interim information, in this context, refers to all the information releases made by a firm throughout its trading year. It does not solely refer to interim earnings reports.

[17] Forecast revisions are greater approaching the end of the financial year than earlier on.

will not consequently reflect their information. Furthermore, why invest in costly information acquisition if the company produces free information; presuming public information is a substitute for the production of private information.

Alternatively, the frequency of disclosure may capture the ease with which investors can interpret a given news announcement. The rationale is that the more frequently a company tends to make announcements, the more difficult it will be for investors to disentangle the effect of a given release. The content of voluntary disclosures may be less precise than mandatory disclosures, thereby the constant release of information to the market may augment uncertainty associated with a given announcement. In summary, increased voluntary disclosure may either have a negative or positive effect on the level of market anticipation.

3.4.4 *The Volatility of Stock Returns, Prior to the Disclosure*

The relative increase in the volatility of stock returns surrounding the announcement of earnings, compared to non-announcement periods, is well documented.[18] An increase in volatility is interpreted as an indicator of more information arriving in the market, on average, during periods when earnings are reported than at other times. Attempts are made to explain the cross-sectional variation in stock return volatility as a function of various firm-specific characteristics expected to be related to the pre-disclosure environment, as a proxy for prior uncertainty (Atiase 1985, Freeman 1987, Pope & Inyangete 1992). Higher volatility surrounding earnings announcements, is associated with firms with relatively low levels pre-disclosure information (in particular small firms), given the relatively higher levels of investor uncertainty that may exist for these firms.[19] However, the explanatory power of these various proxies of the pre-disclosure information environment, for the volatility of stock returns tends to be very low.[20]

---

[18] See Beaver (1968), Patell & Wolfson (1979), Brookfield & Morris (1992), and Pope & Inyangete (1992).

[19] Otherwise known as the differential information hypothesis; see Atiase (1985).

[20] The adjusted R^2 is often less than 10%; see Pope & Inyangete (1992) for a recent example.

Pre-announcement volatility measures the trading activity of market participants in response to their revised expectations, in anticipation of the forthcoming announcement. The degree of pre-announcement volatility reflects the divergence in prior beliefs across investors, as to the implications of pre-disclosure information for future value. Investors may trade in response to their own private information, or in response to the information of other investors inferred from their actions. Volatility increases the number of (profitable) trading opportunities, encouraging others to become informed and trade. Indeed, analyst following is found by Bhushan (1989) to be a positive function of return variability.[21]

Alternatively, increased volatility may reflect a rise in the number of transactions by speculators; those who do not necessarily trade on information (Froot, Scharfstein & Stein 1990 and 1992, Bikhchandani, Hirshleifer & Welsh 1992). Speculators like risk, so the greater the expected volatility the better, and will be therefore looking to take positions prior to an announcement. As the number of opportunities to trade varies cross-sectionally, so will to some extent the number of trades by speculators. Speculators may similarly be encouraged by the probability of an announcement and its expected precision.[22]

As investors acquire information and revise their expectations in anticipation of an event, and therefore price, stock return variability will increase in advance of an announcement. Stock return volatility prior to an event is therefore argued to measure the extent which investors choose to become informed. High return variability before an event is therefore associated with high anticipation, ceteris paribus. Volatility therefore also proxies for reasons to trade other than those identified in section 3.3. If an informed trader will only trade if there is a high enough probability of another similarly informed trader arriving in the market before she closes her position, she is

---

[21] O'Bhushan & Brien (1990) find analysts avoid volatility.

[22] The proportion of uninformed trading is likely therefore to increase during announcement periods relative to non-announcement periods, but not necessarily relative to informed trading. The percentage of uninformed trading may be inferred from the fraction of post-announcement drift relative to pre-announcement volatility, ceteris paribus. Of course, the precision of the announcement may 'shatter the cascade'; see Bikhchandani, Hirshleifer & Welsh (1992) for a discussion of information cascades.

unlikely to trade a long time in advance of an event in stocks not actively traded (Dow & Gorton 1994). Since smaller firms are notably less actively traded, we expect to observe greater stock return volatility for small firms in the pre-announcement period than for larger firms (Bamber 1987).

3.5 INFORMATION TYPES

The impounding process is argued also to be function of the information type. We predict that the level of anticipation will vary according to the information type, reflecting the **expected probability** and expected **precision**, of the event. Different events therefore provide varying incentives to being informed, ceteris paribus. The information types chosen to test empirically the above theory of anticipation include,

- the annual earnings report,
- the interim earnings report,
- the Annual General Meeting (AGM),
- notification of a board change, and
- notification of a change in shareholding.[23,24]

The probability of a mandatory event occurring is of course equal to one, although there remains uncertainty with respect to its exact timing. The expected probability of a voluntary disclosure will be greater than or equal to zero, but less than one, and will partly depend on whether the firm is a frequent discloser of voluntary information. Though, neither the announcement of a board change nor a change in shareholding, are strictly voluntary, as their disclosure forms part of the minimum requirements as prescribed by the London Stock Exchange (see section 4.4.1). Besides, the extent to which a board change is expected depends if it is on rotation or completely unexpected.

The future prospects of a company are largely determined by the capabilities and

---

[23] The selection of these information types was based on the available sample sizes; see chapter 4.

[24] The company must notify the Stock Exchange of *any* transaction made by a shareholder who has at least a 3 per cent stake in the company.

actions of its board members. Consequently, the appointment of a new board member may lead to major changes in corporate goals, and have unforseen implications for the future operation of the company. Whereas a change in shareholding may be interpreted as a signal by a large market player who possesses inside information; as opposed to a liquidity trade. However, the significance of the signal can only be inferred from the size and sign of the transaction. Thus, the implications of qualitative information for security valuation are therefore vague.

However, the implication of 'a number' or rather quantitative information, for the future value of a security is probably more easily interpreted than the appointment of a new board member. Thus, an earnings announcement is argued to be of greater precision than a board change, for example. The relative precision between quantitative announcements will reflect the reliability of the information. For example, an unaudited statement (ie. interim report) is associated with greater uncertainty or noise in the measurement of the variable of interest (earnings).[25] The greater the precision of an announcement, the clearer its implications for security valuation. Accordingly, we expect to observe different levels of anticipation according to the information type, reflecting the precision and probability of the event.

3.6 THE ANNOUNCEMENT

A public announcement will either confirm or deny expectations. If the variable of interest is annual earnings, only at the end of the financial reporting period is it possible for investors to check whether the effects of interim information were correctly estimated. If the market perfectly anticipates the information content of the signal, there will be no further price reaction upon its release. If a signal is only partially anticipated, and is sufficiently imprecise not to dominate beliefs, the price reaction will continue until there is a consensus of opinion in the marketplace. The theory thus implies, there is a trade-off between pre-announcement anticipation and post-announcement drift.

[25] The market's responsiveness to subsequent earnings announcements is reduced after a qualified earnings report (Choi & Jeter 1992).

For imprecise events, we postulate that the extent of lagged impounding following their release, is also a function of the incentives to be informed. We extend the above theory of anticipation to the theory of interpretation. The incentives to interpret and to work out the implications of a signal are presumed to be the same as for anticipating the signal.

A public announcement is a source of 'free' information, but depending on its precision it will require interpretation.[26] However, investors will only interpret the signal if the expected benefits exceed the expected costs. Presuming the event is value relevant, the greater its precision and therefore the clearer its meaning for security valuation, the lower the required costs of analysis. Similarly, the more precise the information the lower the demand for private information, thereby also offsetting the cost of access. However, an investor will not spend resources to interpret a signal if they believe there are no opportunities to trade on the information (Dow & Gorton 1994). Where the opportunity to trade is an increasing function of the depth of the market.

3.7 EXPERIMENTAL DESIGN

3.7.1 *Measuring Returns Performance*

In an efficient market, returns should not systematically differ from those expected (Beaver 1968). However, for almost 30 years numerous studies have acknowledged the presence of excess returns around major corporate announcements (Beaver 1968, Firth 1981, Brookfield & Morris 1992). In order to capture this announcement effect upon share prices, it is commonplace in event studies to cumulate any excess returns arising over the event window. Where the excess return is defined as the difference between the actual share price, and the share price that would of been observed had no new information arrived. We therefore need to predict what share prices would of been had the announcement not occurred. However, the use of residual analysis is argued not to be a completely satisfactory test of information content (Beaver

[26] Of course, not all investors have free and direct access to the wires of communication.

1968).[27] A statistically significant measure of excess returns might reflect mis-specification of investors' expectations, rather than employing a superior portfolio strategy. Nevertheless, subject to the joint hypothesis problem, we measure return performance in the following manner.

The technique adopted for cumulating returns is the Abnormal Performance Index (API); for an early example, see Ball & Brown (1968).[28] Calculated as

$$API_{it} = \prod_{t=\tau}^{T} (1 + e_{it}) \tag{3.1}$$

API is a compounding measure which follows the value of one pound (£) invested in security i from period τ, and holding the security until the end of some arbitrary period T.[29] Where e_{it} represents the estimate of excess returns for company i at period t.

In order to examine the changing returns profile surrounding company news announcements, we use the API defined as

$$API_{i,window} = \prod_{t=\tau}^{T} (1 + e_{it}) \tag{3.2}$$

Equation (3.2) estimates the value from investing one pound in security i over a given event *window*. The window is therefore the time span over which excess returns performance is measured, and can be one of three periods:

prior - the period over which the content of the announcement is anticipated, where (t=-20,...,-1);

---

[27] And therefore neither a satisfactory test of market efficiency, for that case.

[28] The popular alternative to the API is Cumulative Abnormal Returns (CAR) (see Fama et al. 1969). CAR represents simply the summation of excess returns, e_{it}, for security i over the event window t, ie. $CAR_{it}=\Sigma e_{it}$. Its use implicitly assumes daily portfolio rebalancing and leads to an upward bias in returns cumulated over a long period. Written as $CAR_{it}=CAR_{i,t-1}+AR_{it}$, CAR is therefore by construction a random walk plus drift, which may be positive or negative depending on the sign of the abnormal returns. In the presence of no abnormal performance, the plot of any random walk series can give the impression of a significant drift even if there is none. Hence, when abnormal returns are non-zero the drift is over-emphasised (see Roll 1983, Blume & Stambaugh 1983, Dimson & Marsh 1986).

[29] See Ohlson (1975) for alternative definitions of the API metric.

ann - the announcement period, where (t=0), the report date;

post - the period following the announcement period, where (t=+1,...,+20).

The excess return for a given security is calculated as the difference between its actual *ex post* return, R_{it}, and the *ex ante* expected return, $E(R_{it})$,

$$e_{it} = R_{it} - E(R_{it}) \tag{3.3}$$

Where $E(R_{it})$ is generated from one of three benchmark models:

MM - the expected return of security i estimated using the market model;

MKT - the return on the market over the event window t;

MN - the estimated mean return of security i.

The estimation period used to calculate MM and MN immediately precedes the prior period, where (t=-220,...-21).

(i) Market Model Adjusted Returns, MM

The model assumes returns are generated according to the following process, where

$$R_{it} = \alpha_t + \beta_t R_{mt} + u_{it} \tag{3.4}$$

The security's return is comprised of a systematic component, β_t, which is linearly related to the market return, R_{mt}, and an unsystematic component, u_{it}, which has an expected value of zero.[30] The outcome of firm specific events are assumed to be fully captured by the residual, the assumption being that the information signal and the market return are uncorrelated.[31] The predicted excess return is calculated thus

$$e_{it} = R_{it} - (\alpha_t + \beta_t R_{mt}) \tag{3.5}$$

where α_t and β_t are estimated using equation (3.4) over a prior period. The procedure used for estimating market model parameters will be discussed later.

[30] The API takes the form of a geometric series and therefore the market index used should similarly be calculated geometrically (ie. FTA All Share).

[31] The assumption of independence between R_{mt} and R_{it} is required by OLS for the purposes of efficient statistical estimation. Yet correlation may arise for two reasons: the inclusion of security i in the market index and secondly, due to possible intra-industry effects.

(ii) Market Adjusted Returns, MKT

The *ex post* excess return, for security i, is given as the difference between the actual return and the market return at time t, ie. $E(R_{it})=R_{mt}$,

$$e_{it} = R_{it} - R_{mt} \tag{3.6}$$

This model assumes *ex ante* expected returns are equal across all securities and are therefore equal in any period to the expected market return. The market adjusted returns model is also consistent with Capital Asset Pricing Model (CAPM) assuming all securities have systematic risk of unity.

(iii) Mean Adjusted Returns, MN

The predicted excess return, for security i, is defined as the difference between the *ex post* actual return on day t and the expected return calculated from past returns, where

$$E(R_i) = \frac{1}{k} \sum_{t=\tau}^{\tau+k} R_{it} \tag{3.7}$$

Where k represents the number of past returns. The process assumes the *ex ante* expected return for a given security is constant across time, although may vary across firms. The mean adjusted returns model is consistent with the CAPM under the assumption interest rates, risk premia and security risk remain constant over time.

These models are among the most popular found in the literature used to estimate expected returns.[33] The rationale for using alternative models, is to examine the sensitivity of the results to different 'abnormal' return metrics. Is it necessary to adjust for risk or marketwide effects, or will the use of simpler methods suffice ? In theory, the return generating process of the market model may appear more accurate by incorporating additional information about the determinants of realized returns, such as the security's systematic risk and the market's return. However, the market model implicitly assumes that the firm's systematic risk remains stationary surrounding the event window. The plausibility of this assumption has been

---

[33] See Strong (1994) for a discussion of these and alternative abnormal return metrics.

questioned recently by Ball & Kothari (1991) for earnings announcements.

Whereas, subtracting the market return, R_m, controls for ex post bull and bear markets which would otherwise affect the measurement of excess returns over the event window. However, if R_m and e_{it} are correlated, removing R_m will cause a bias towards accepting the null hypothesis of no information content. Similarly, estimating expected returns from historic data may also introduce bias towards accepting the null, when returns evidently anticipate the information content of future releases, in some cases by several months (Freeman 1987, Kothari & Sloan 1992). Unfortunately, correct specification of the equilibrium model of returns is not sufficient to provide a more powerful test of abnormal performance.[34]

Brown & Warner (1985) find there is little overall difference in the ability of the alternative procedures in detecting abnormal performance using daily data. On closer scrutiny, the market model (MM) and market adjusted returns (MKT) typically generate similar results of detecting abnormal performance on the event day, with event date clustering further reducing the power of the mean adjusted model (MN). In contrast, when the event period is extended from 1 to 11 days, the mean adjusted model (MN) provides a more powerful test, relative to MM and MKT. Hence, the relative power of these models appears highly dependent on the length of the event window, event date clustering, sample size and the level of abnormal performance.

3.7.2 *A Note on the Estimation of Market Model Parameters*

In the estimation of $\hat{\alpha}_i$ and $\hat{\beta}_i$, the length of the estimation period, the proximity of the estimation period to the event window, and whether to adjust for infrequent trading are among the details to be considered. The longer the estimation period, the smaller the component of the variance of excess returns due to parameter estimation error (Salinger 1992). Even so, greater statistical accuracy must be weighed against the concern of parameter non-stationarity. The length of the estimation period used in event studies using daily data has varied enormously ranging from 60 to 600

[34] See Brown & Warner (1980) for a more thorough discussion.

observations (Strong 1992).[35] The estimation period chosen is usually the period immediately prior to the event window, but one under which the disclosure events under study are expected to have no net effect on security prices.[36] This is to ideally estimate parameters when there are no systematic excess returns, to attain an unbiased estimate. Hence, it is commonplace to remove a window from the returns series surrounding earnings announcements from the estimation period. All other events are assumed to have nil effect upon returns, an assumption yet to be tested.

Invariably the observed, or rather measured return of a security may not necessarily equal its true return. Not all securities trade in each return interval, so the end of period price used to calculate returns will more likely reflect a transaction in a previous period.[37] Calculated returns will thus be non-synchronous across securities. Accurate calculation of returns over any fixed interval becomes difficult for securities that trade infrequently, the problem being particularly severe when the interval is a day (Schwartz & Whitcomb 1977). The use of non-synchronous data in simple regressions, results in an errors-in-variables problem, when measured returns are used as proxies for true unobservable returns. As a consequence, OLS estimates of both $\hat{\alpha}_i$ and $\hat{\beta}_i$ for many securities will be biased and inconsistent. Securities which suffer from non-trading effects, have their covariance with the market substantially underestimated, and their variance overestimated. Infrequently traded stocks have downward biased β estimates, and those frequently traded have upwardly biased estimates (see Dimson 1979). As a consequence, biased β estimates may result in biased estimates of excess returns and consequently misspecified test statistics. Although by construction, OLS residuals for a security sum to zero in the estimation

---

[35] In a recent UK study, Briston, Saadouni, Mallin & Coutts (1992) used the estimation period t=-220,...,-41.

[36] The use of parameters estimated prior to the event implicitly assumes that the systematic risk of securities around event time does not alter, contrary to the findings of Ball & Kothari (1991). Consequently, abnormal returns calculated using a constant beta pre-estimated prior to the event may over or understate the information content of the announcement. In an attempt to counter for non-stationarity of parameters, 'moving' betas methods have been devised, see for example, Ball 1972, Bar-Yosef & Brown 1977.

[37] Price adjustment delays and trading frictions, as well as infrequent trading, are other possible explanations which may cause the observed returns on securities to depart from their true values.

period, so that a bias in the estimate of β is compensated for a bias in α (see Cohen et al 1986).

Dimson's technique is chosen to adjust for thin-trading, on the basis that it makes no assumption about the trading frequency within each return interval.[38] The beta estimator, hence, is calculated as

$$\hat{\beta}_i = \sum_{k=-l}^{l} \hat{\beta}_k \qquad (3.8)$$

Where β_i is a summation of the slope coefficients estimated using equation (3.9),

$$R_{it} = \hat{\alpha}_i + \sum_{k=-l}^{l} \hat{\beta}_k R_{m,t+k} + u_{it} \qquad (3.9)$$

of the multiple regression of the return of security i in period t against lagged (t-l), matching (t), and leading (t+l) period returns on the market. The values of *k* are discretionary and can only be inferred from previous research.[39,40] Consistent with Dimson & Marsh (1984) we employ the values of (k=-1,...,5).

3.7.3 *Measuring the Level of Anticipation and Drift*

We argue investor response to the disclosure of new information is a function of the level of prior anticipation. The theory presumes there is a trade-off between pre-announcement anticipation and post-announcement drift. For example, if we are interested in the initial price reaction to an announcement on day 0, we measure the variable ANN_i as

---

[38] An alternative adjustment by Scholes & Williams (1977) assumes a transaction occurs in each returns interval.

[39] Examples include Dimson & Marsh (1984) who used (k=-1,...,5), alternatively Ball & Brown (1985) and Fama & French (1992) both employed (k=-1,...,1). Fama and French found an additional lead and lag of the market had little effect on the sum βs.

[40] Ball and Brown found both the techniques of Scholes & Williams (1977) and Dimson (1979) reduced the bias in OLS estimates, but neither improved the specification or the power of the tests. So adjusting for thin trading in this way does not increase the ability to detect abnormal performance on daily returns for thinly traded stocks.

$$ANN_i = |API_{i,ann} - 1| \;/\; |API_{i,prior} - 1|, \tag{3.10}$$

Where ANN_i measures the absolute value of the market reaction to information in the announcement period, as a proportion of the absolute level of market anticipation in the prior period.[41] In effect, ANN_i measures the absolute marginal return to being informed in the announcement period.[42]

The rationale behind the construction of the dependent variable is illustrated in Table 3.1. See Figure 3.1, also below, for a graphical representation. Smaller values of ANN_i are interpreted as a greater amount of market anticipation of the event. For the model to be operational, the denominator in the variables ANN_i cannot be zero. Therefore, events that are a complete surprise or have been fully anticipated prior to the examination period, are excluded from the sample.

---

[41] The requirement of using absolute values will be explained later.

[42] We also measure a second variable, $POST_i$, where the price response over the post-announcement period is similarly conditioned upon the level of prior anticipation. Where $POST_i$ is measured as

$$POST_i = |API_{i,post} - 1| \;/\; |(API_{i,prior} * API_{i,ann}) - 1|$$

ie. the absolute value of the market reaction to information in the post-announcement period as a proportion of the absolute market reaction in the prior and announcement periods. $POST_i$ therefore measures the absolute marginal return to being informed in the post period.

Table 3.1

Measurement properties of ANN_i. ANN_i measures the proportion of information impounded in the announcement period relative to the prior period.[43]

Values of ANN^* (ANN_i before taking absolute values), for 4 good news and 4 bad news scenarios.[44] EQN 1 is when the announcement is perfectly anticipated in the prior period. EQN 2 is when the sign of the news in the prior period continues in the announcement period. EQN 3 is when the sign and magnitude of the news in the prior period, is partially reversed in the announcement period. EQN 4 is when the sign and magnitude of the news in the prior period, is completely reversed in the announcement period.

	$API_{i,prior}$	$API_{i,ann}$	$API_{i,prior*ann}$	ANN^* $(API_{i,ann}-1)/(API_{i,prior}-1)$
Panel A: Good news in the prior period				
EQN 1	1.25	1.00	1.2500	0.0
EQN 2	1.25	1.05	1.3125	0.2
EQN 3	1.25	0.95	1.1875	-0.2
EQN 4	1.25	0.70	0.8750	-1.2
Panel B: Bad news in the prior period				
EQN 4	0.75	1.30	0.9750	-1.2
EQN 3	0.75	1.05	0.7875	-0.2
EQN 2	0.75	0.95	0.7125	0.2
EQN 1	0.75	1.00	0.7500	0.0

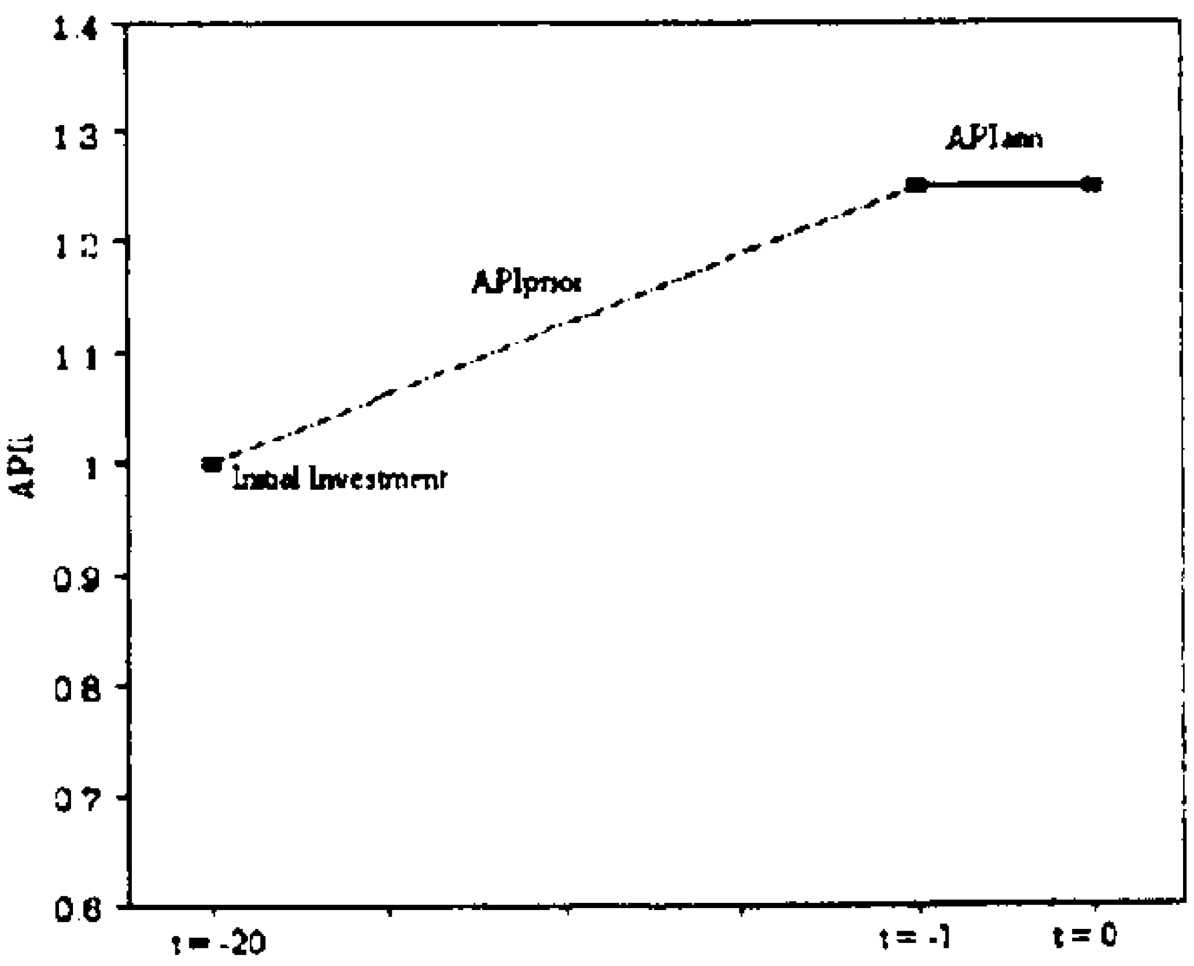
[43] The $POST_i$ variable is similar in structure, but measures the proportion of impounding which takes place in the post announcement period relative to prior and announcement periods combined.

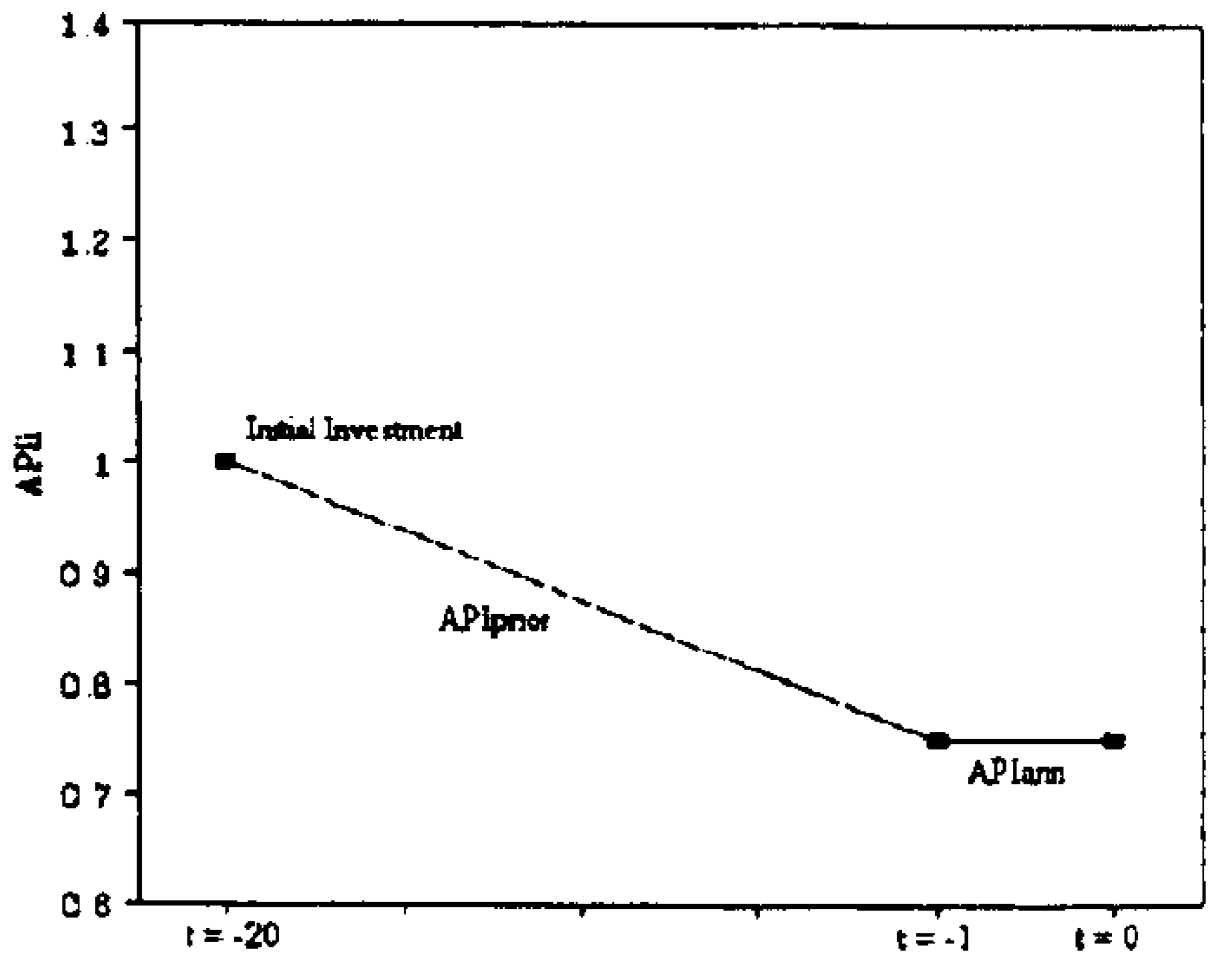
[44] The sign of the news is determined by the value of API over the prior period. An API of a value greater than 1.0 is representative of good news, and an API less than 1.0 represents bad news.

Figure 3.1: Graphical representation of Table 3.1

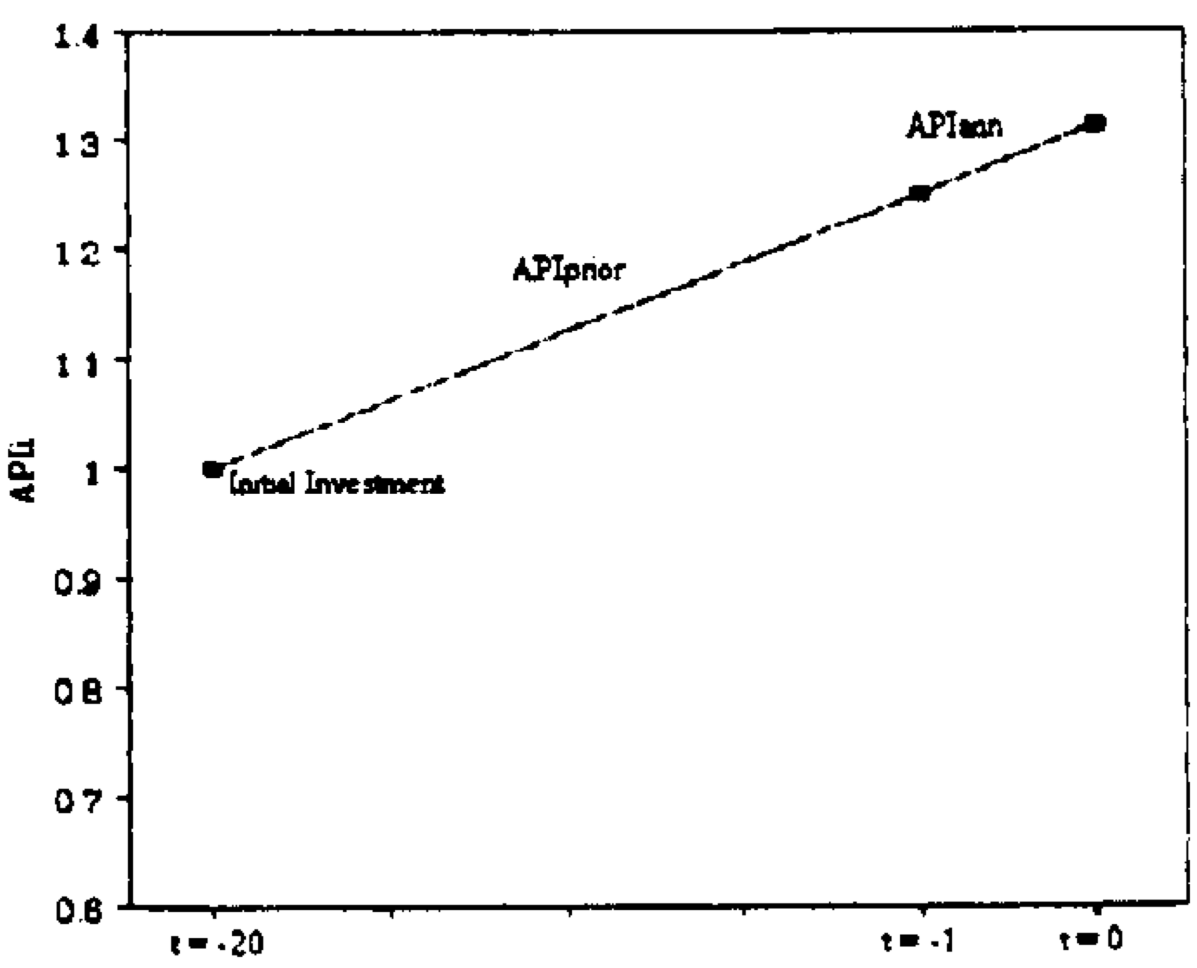
Panel A: Good news in the prior period | **Panel B: Bad news in the prior period**

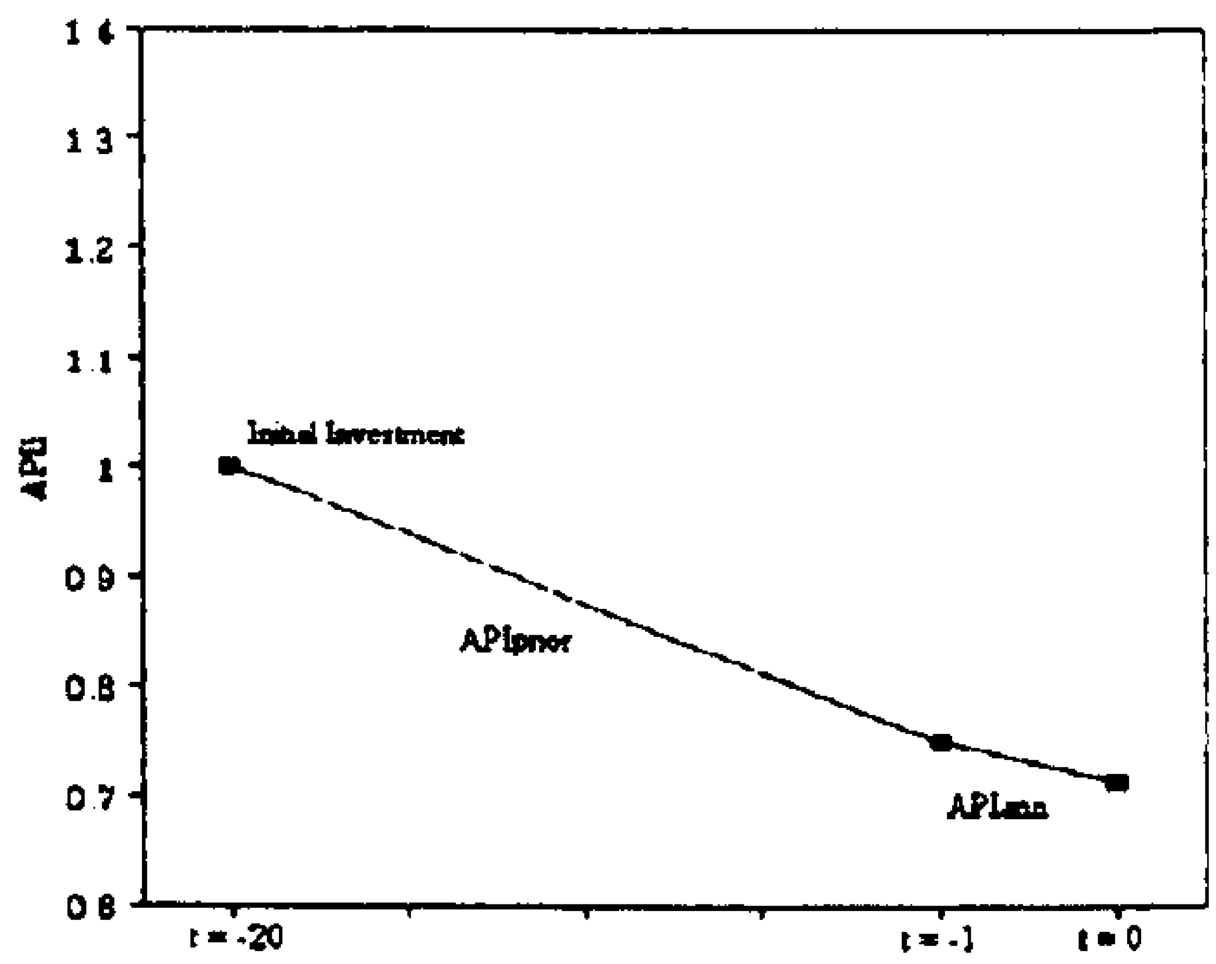
EQN 1 - perfect anticipation in the prior period



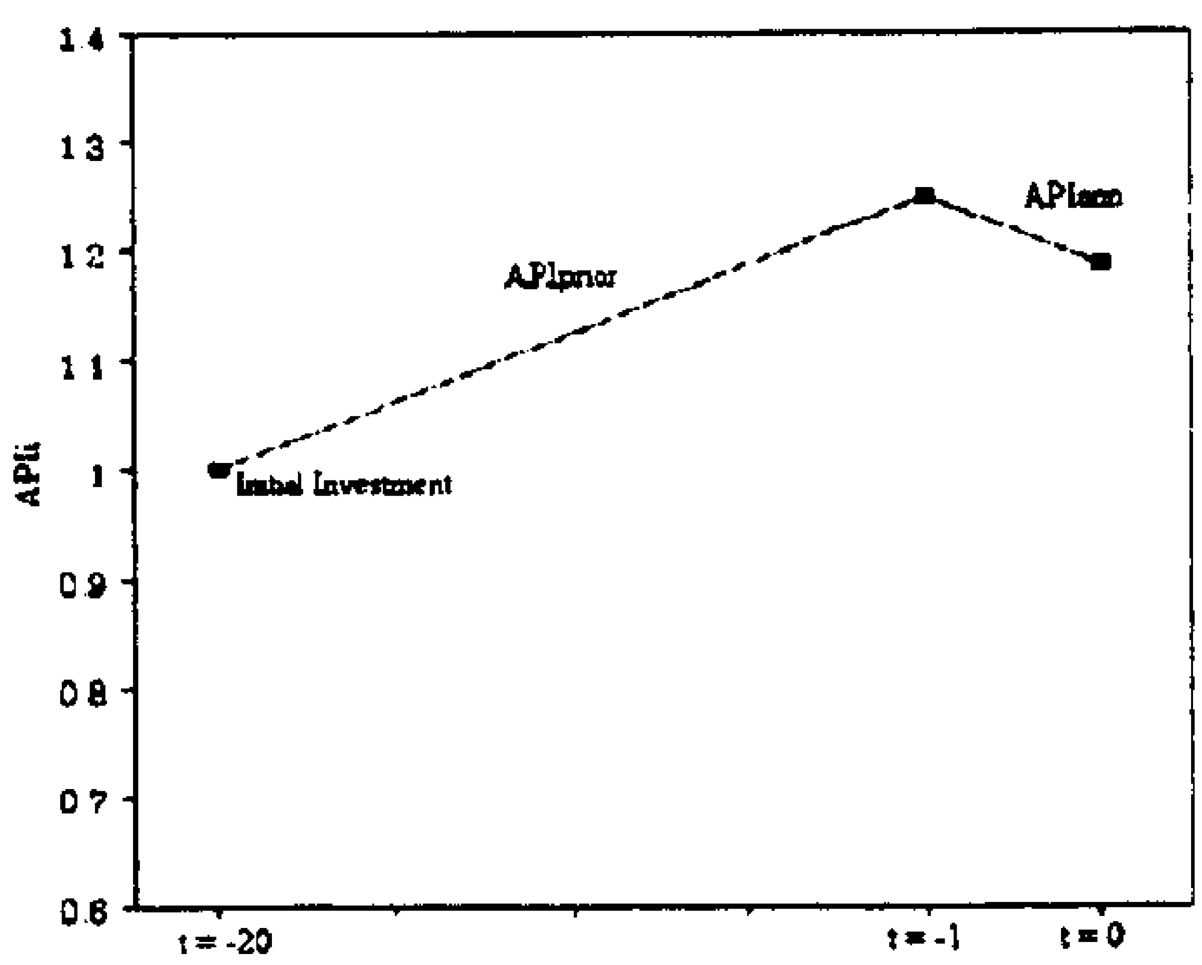


EQN 2 - underreaction in the prior period





EQN 3 - minor sign reversal, partial overreaction in the prior period



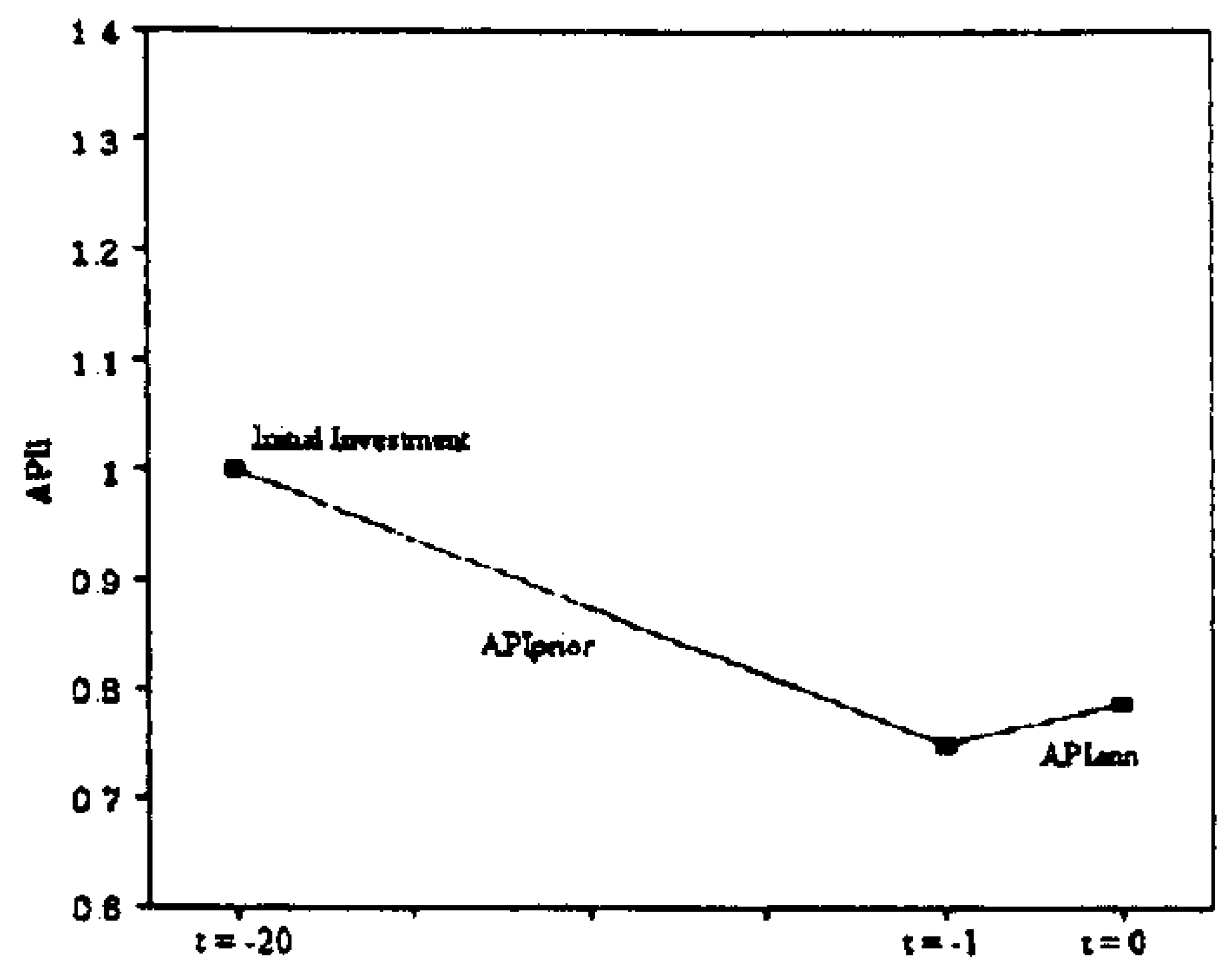
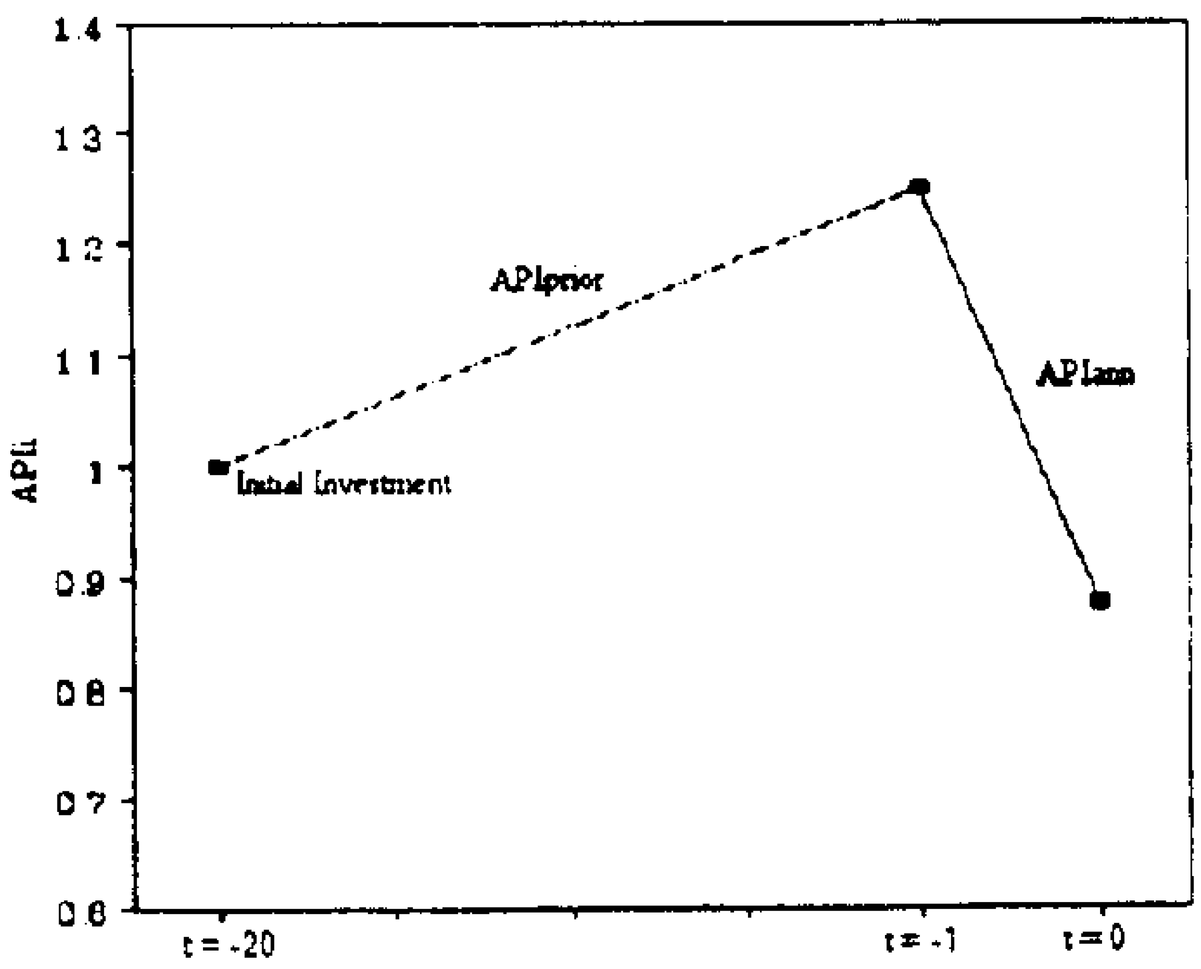
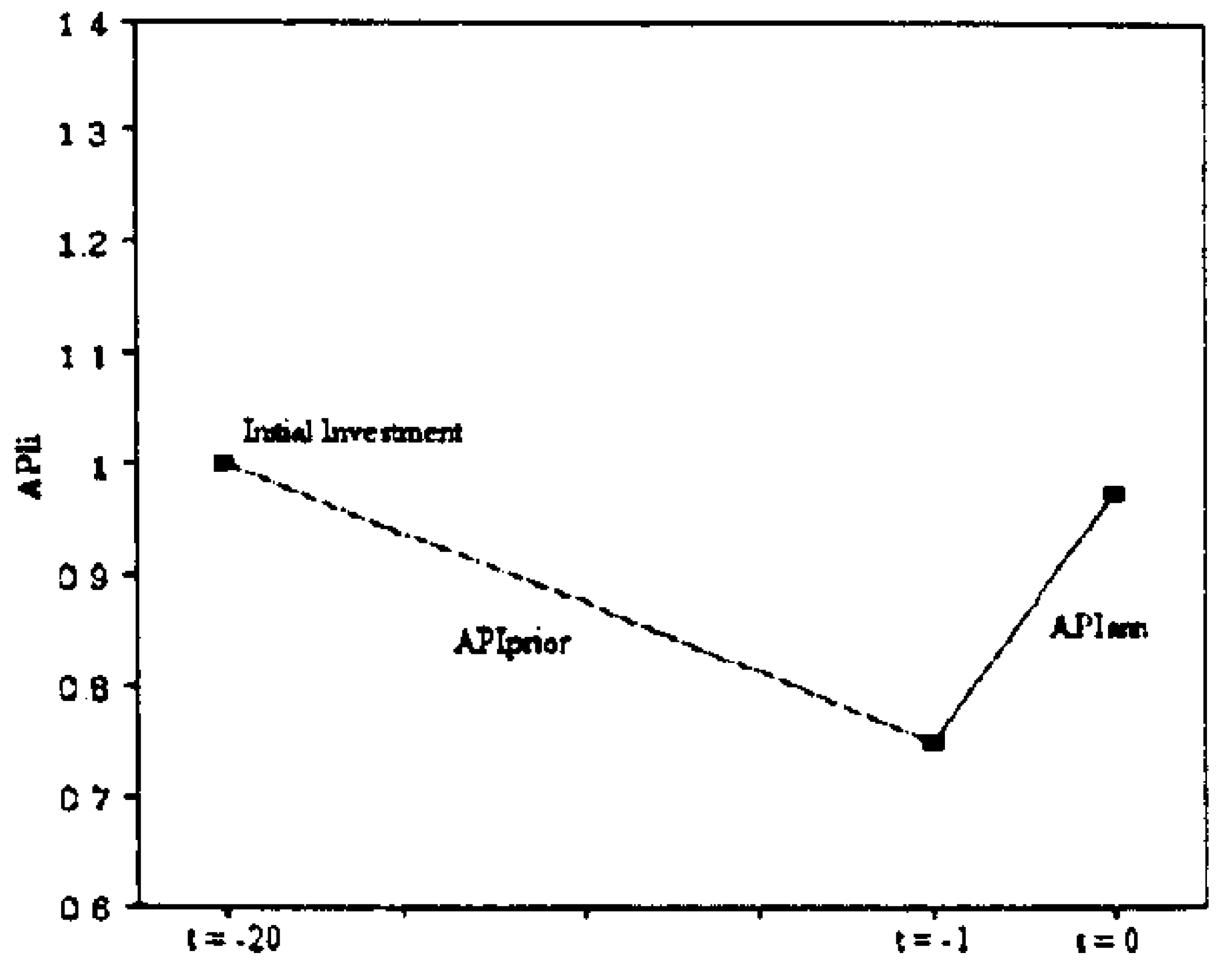


Figure 3.1: contd

Panel A: Good news in the prior period **Panel B: Bad news in the prior period**

EQN 4 - major sign reversal, complete overreaction in the prior period





Panel A portrays good news in the prior period (an API value greater than 1.0, ie. 1.25). Whereas Panel B, portrays bad news in the prior period (an API value less than 1.0, ie. 0.75). The level of anticipation therefore in the prior period, between panels, is of equal magnitude but of opposite sign.

Equation 1 is where the announcement of either good news or bad news, is perfectly anticipated in the prior period. Equation 2 is where the good news or bad news of the prior period continues during the announcement period, indicative of an initial underreaction. The size of news in the anticipation period between panels is the same, but of the opposite sign. In both cases the dependent variable, ANN^*, is 0.2, ie. the reaction in the announcement period is 20 per cent larger than prior anticipation.

Equation 3 is where the information impounding in the prior period is partially reversed during the announcement period, indicative of a minor overreaction. The news in the announcement period is of the opposite sign to that in the prior period, but of smaller magnitude. The dependent variable this time is -0.2, ie. the minus sign indicative of an overreaction. Note the similarity between equations 2 and 3, in all cases the absolute size of the reaction in the announcement period is the same.

Equation 4 is where the information impounding in the prior period is completely reversed, indicative of a major overreaction. The news in the announcement period is of the opposite sign to that in the prior period, but of larger magnitude. The dependent variable is once again the same for both panels, -1.2. Note that the size of reaction in the announcement period, between equations, is of equal magnitude but of opposite sign. Hence, Panel B is the mirror image of Panel A.

The table illustrates why the dependent variable ANN_i needs to be unsigned. For positive values, larger values (ie. 0.2 as opposed to 0.0) of ANN^* imply less anticipation. However, for negative values, larger values (ie. -0.2 as opposed to -1.2) of ANN^* imply more anticipation. A negative sign suggests an overreaction is less well anticipated than an underreaction of equal magnitude. Yet from figure 3.2 we can see clearly the level of anticipation is equal in all cases, ignoring the sign of the news. Therefore, the negative signs attached to ANN^* values in equations 3 and 4 need to be removed so as to be consistent with equation 2. Hence, the larger the absolute value of ANN*, the lower the level of anticipation.[45]

3.7.4 *The Model*

We employ a standard OLS multiple regression model to test the above hypothesised relationships. The dependent variable is therefore modelled as a linear function of the above mentioned explanatory variables,

$$ANN_i = a_0 + a_1 LN\_MV_i + a_2 AGE_i + a_3 NUM_i + a_4 VOLPR_i + u_i, \qquad (3.11)$$

Where

LN_MV_i = the natural log of the market capitalisation of company i, a measure of firm size as at the beginning of the year in the year of announcement.

AGE_i = the number of years the company has been registered as a private limited company or from its date of incorporation.

[45] The equivalent analysis is applicable for the $POST_i$ variable, where $POST_i$ measures the proportion of impounding which takes place in the post-announcement period, relative to the prior and announcement periods combined.

NUM_i = the number of disclosures made by company i to the London Stock Exchange during the sample period examined.

$VOLPR_i$ = the volatility of prior stock returns of security i, as measured by the standard deviation of stock returns over the prior period. Where $VOLPR_i$ captures the volatility of stock returns due to both firm specific and market factors.[46]

The coefficient sign reflects the relation between the measure of pre-disclosure information and the level of anticipation. The incentives to be informed are therefore presumed to be the same for anticipation of a forthcoming event, as for the interpretation of an event. If the level of anticipation is an increasing function of the explanatory variables, we expect them to be negatively related to ANN_i. This relation further implies a negative association between the explanatory variable and the costs of being informed.

The sign on firm size will largely depend on the length of the event window under investigation. If the cost of being informed is a decreasing function of firm size, then we hypothesise the larger the firm, the higher the level of anticipation. Therefore LN_MV_i will be negatively related to ANN_i. However, this relation all depends on the length of the event window - whether the window extends back far enough to capture the full level of market anticipation of the forthcoming announcement. For instance, since ANN_i is scaled by the absolute API over the prior period, larger companies may have larger values of ANN_i due to a relatively smaller price movement in the prior period. If the event window covers only a relatively short period of the whole anticipation process, most of the information content of large firm news may have been already anticipated, so larger firms may be less heavily traded in the days approaching the announcement than smaller firms (Bamber 1987). Any surprise, no matter how small, will appear disproportionately high for larger firms

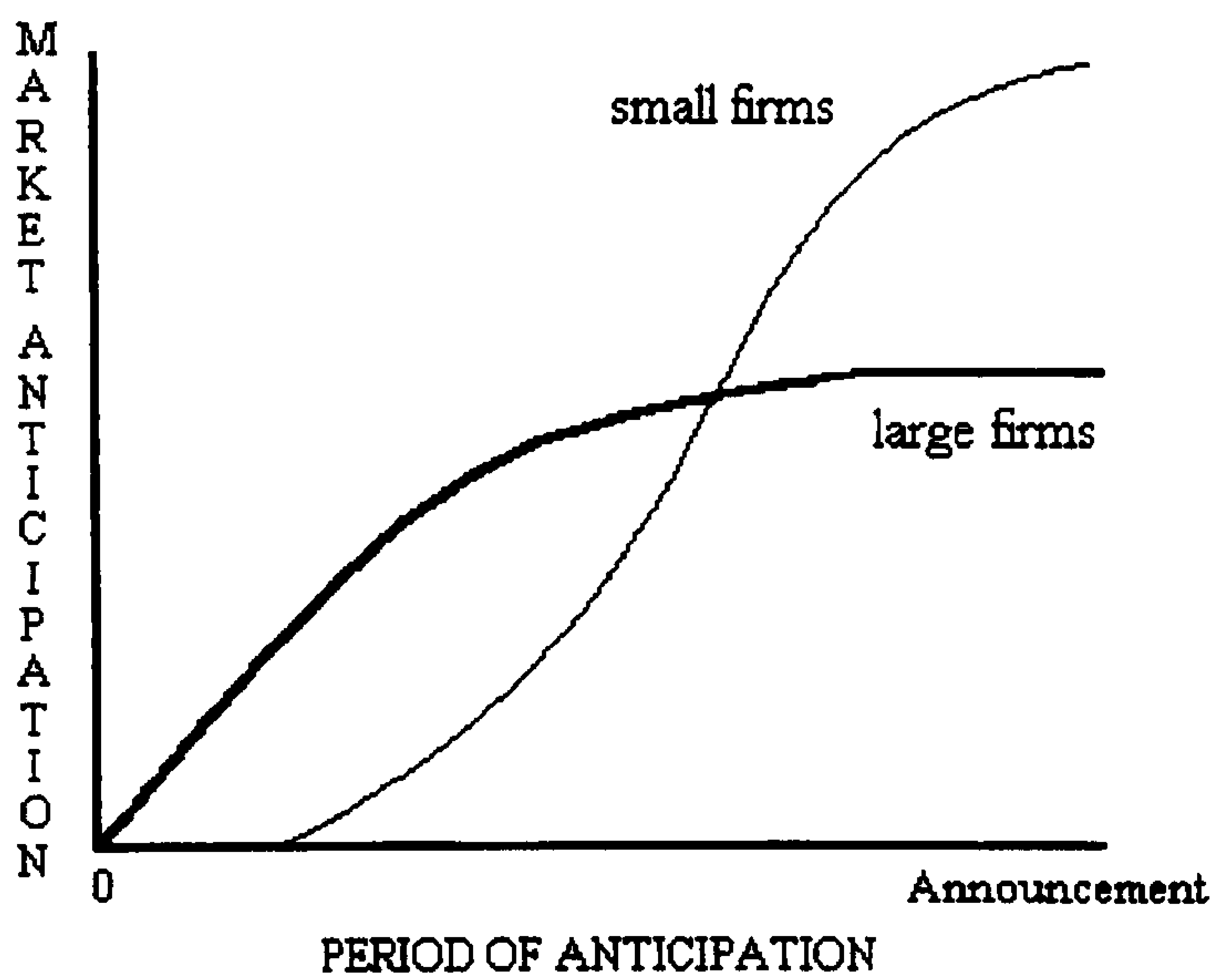
[46] Similarly, $POST_i$ is modelled as

$$POST_i = a_0 + a_1 LN\_MV_i + a_2 AGE_i + a_3 NUM_i + a_4 VOLPR{+}A_i + u_i$$

Where $VOLPR{+}A_i$ represents the volatility of prior stock returns of security i. As measured by the standard deviation of stock returns over the prior and announcement periods.

against a prior period of little trading activity. In sum, if the event window does not capture full anticipation, firm size and ANN_i will be positively related. To illustrate, we adapt figure (1) from Freeman (1987).

Figure 3.2: The Level of Market Anticipation of Forthcoming Announcements by Large and Small Firms



The graph depicts the predicted anticipation process of both large and small firms, as measured by the level of market anticipation, based on taking a long position for good news and going short for bad news. The market begins to anticipate the announcements of larger firms earlier than those of smaller firms. With the percentage of abnormal returns for large firms realized in the early months exceeding the percentage for small firms. Much of the anticipation process of large firms completed by the time the market has largely anticipated the information content of small firm disclosures.

(i) The use of multiple regression

The technique of multiple regression tests directly the association between the security return metric and the chosen pre-disclosure proxies. This technique measures the incremental effect of a single variable, whilst holding the others constant, in the anticipation of the announcement's content. Similarly, we hypothesise the variation in coefficient size between information types will reflect their expected probability and relative precision. For example, holding all explanatory variables constant, the level of anticipation (as measured by dependent variable, ANN_i) will vary across information types. Thus, for some information types the expected benefit of being informed will exceed, to a greater extent the expected costs, reflecting incentives related to the information type rather the pre-disclosure proxies. Where the incentives are an increasing function of the expected probability and expected precision of the information type.

An alternative approach would be to form portfolios on the values of the explanatory variables. Portfolio analysis has the advantage that it makes no assumption about the specific functional form of the relation between market anticipation and the level of pre-disclosure information. However, the use of portfolios results in a potential loss of information from the aggregation of data, since it fails to recognise cross-sectional differences of the information proxy within each portfolio (Stober 1992).

(ii) The selection of the explanatory variables

Given there is not a direct measure of the level of pre-disclosure information, and the lack of any formal theory concerning the relationship between firm specific factors and information flows, it may be difficult to conclude that the above explanatory variables cause cross-sectional differences in returns behaviour. The inclusion of other omitted variables might provide alternative explanations for the results. The use of inappropriate variables increases the probability of a Type I error, favouring the null hypothesis of no information content.

There is the concern of possible correlation between the explanatory variables. For instance, the longer a firm has been trading the larger it is more likely to be. Lang & Lundholm (1993) demonstrate firm size is associated with the frequency and quality of disclosure. More frequent disclosure may be in response to stronger pressure from analysts to provide information, and greater market interest. Perhaps, larger firms have more to report, or economies of scale contribute to large firms disclosing more. Likewise, the volatility of stock returns may capture activity associated with firm size, age and the number of disclosures made.

At first sight the relationship between the dependent variable and $VOLPR_i$ may appear tautological, and therefore naturally negative. However, each variable has discriminating features. The denominator of the dependent variable is a measure of *excess* returns over the period prior to the event, and is regressed against a variable ($VOLPR_i$) which measures the standard deviation of (unadjusted) returns over the same period. Both variables are measures of variation: API_i measures the average movement in returns between two points in time, whereas, $VOLPR_i$ measures the daily variation about the mean. A possible interpretation maybe, API_i measures the level of anticipation, ie. how much the market knows, whereas $VOLPR_i$ indicates how hard the market has looked for information.

To illustrate, for example, if we are interested with the correlation between ANN_i and the standard deviation of excess returns over the prior period, σe_{it}, where $e_{it} = R_{it} - R_{mt}$. In the absence of information arrival, e_{it} is a random variable with a zero mean. R_{it} is also random where $E(R_{it}) = E(R_{mt})$ for all i. Under conditions of repeated sampling σe_{it} is constant and equal to zero, but ANN_i will change. Therefore, there is no automatic definitional correlation between ANN_i and σe_{it}.[47]

3.9 CONCLUSIONS

The drift in prices following earnings announcements has been extensively researched, with explanations of failing to adequately control for risk, to the irrational behaviour of investors ignoring value relevant information. The anomaly would thus appear the result of an inefficient or perhaps an irrational market. Alternatively, this chapter bids to explain investor behaviour as rational - investors choosing not to be informed. More specifically, we explain stock return behaviour in relation to the costs and

[47] The equivalent analysis applies to $POST_i$.

benefits facing investors deciding on whether to spend resources on information to improve the precision of their private information, in anticipation of a forthcoming event.

The papers of Kim & Verrecchia (1991a and 1991b), McNichols & Trueman (1994), and Demski & Feltham (1994), provide the basis for identifying various factors argued to affect investors' incentives and ability to anticipate information, and react swiftly to it. These include the 'depth' of the market, the expected probability and expected precision of the forthcoming event, and the costs of accessing and analysing information. We select four firm specific variables to proxy for these costs and benefits associated with being informed, namely firm size, the age of the firm, the number of corporate disclosures and the volatility of prior stock returns. Relying on the assumption that these explanatory variables provide a link with the level of pre-disclosure information. These explanatory variables are used to model the anticipatory and impounding behaviour of five information types: the annual earnings report, the interim report, the AGM, notification of a board change and a change in shareholding.

4. DATA SOURCES AND DESCRIPTIVE STATISTICS

4.1 OBJECTIVES

The principal objective of chapter 4 is to describe the data used, and the separate sources from which it was obtained. The descriptive statistics, as well as identifying the correlation structure of the explanatory variables, serve to demonstrate that the data does not possess any special properties. The chapter also outlines the regulatory environment in which firms release information to the marketplace, as prescribed by the London Stock Exchange. This provides a background to the nature of the events investigated, but more importantly, shows how the institutional setting of corporate disclosure has important implications for market expectations.

4.2 INTRODUCTION

The chapter begins with a brief description of the data set employed, and the separate sources from which it was obtained. The primary data source, EXTEL Financial, provides the corporate announcement dates. However the coverage is limited, restricting the available sample of firms and time period examined. In addition, the chapter outlines the regulatory environment in which firms release information to the marketplace, as prescribed by the London Stock Exchange. To maintain a full listing, securities must abide by the regulations of the exchange, which include strict guidelines as to the release of price sensitive information. The discussion provides a background as to the nature of the events examined, and identifies how the institutional setting influences the market's expectations of corporate disclosure. The majority of market based accounting research is conducted in the United States, therefore the extent to which market reaction studies between the two countries (US and UK) are comparable, will in part reflect the respective disclosure practices of the two domiciles. To aid the comparison we report the findings of Frost & Pownall (1994) who surveyed the accounting disclosure practices of both US and UK securities.

Various descriptive statistics are reported for the explanatory variables, with the purpose of identifying any special properties that the data may possess. This includes details of the correlation structure of the explanatory variables, in order to identify any potential problems of multicollinearity. We also explicitly test the extent to which our chosen measures of the availability of pre-disclosure information (ie. the explanatory variables), overlap.

The chapter therefore proceeds with section 4.3 describing the data set. The regulatory framework of corporate disclosure is reviewed in section 4.4, detailing the continuing obligations of listed firms regarding the disclosure of information. Section 4.5 considers the disclosure practices of US firms and how this affects the comparison of market reaction studies between the US and UK. The various descriptive statistics of the explanatory variables are reported in section 4.6. Finally, section 4.7 concludes the chapter.

4.3 DATA SOURCES

The data set comprises a number of different datatypes: (i) corporate announcement dates, (ii) share price data, (iii) the age of the firm and (iv) the number of disclosures made by a firm. The data was collected from separate sources as detailed below. However, due to the large quantity of data, FORTRAN programming was employed to collate the individual data sets, to make all the preliminary calculations, and to organise the data into a readable format to enable further analysis.[1]

(i) Corporate announcement dates

EXTEL Financial produce a CD-ROM database, which among other things, includes a record of the news announcements made by fully listed firms to the London Stock Exchange (hereafter LSE), over the period January 1985 to June 1992.[2] During this

[1] See Appendix 1 for the program.

[2] An alternative source of corporate announcement dates is available from the McCarthy Information Service. The service reproduces newspaper and journal cuttings from approximately 60 broadsheets and specialist trade journals, and includes the forecasts and recommendations of third parties, as well as details of corporate releases. One of the problems of using this database, is that the coverage is by no means exhaustive and open to selection bias. More importantly, the exact release date is not known

period, the coverage of announcements has varied and consequently limited the available sample size.[3] Initially, only ex-dividend announcements and ex-capital changes were listed. In late 1989, the dates of interim and final earnings announcements were introduced. From January 1991 onwards, all announcements as requested by the LSE were catalogued. The entire range of announcements are categorised into 87 different news headings, ranging from the notification of a new contract the proposed name change of a company.

The announcement date given by EXTEL, is the release date of the Regulatory News Service (RNS) of the LSE, which is responsible for the public announcement of company news to the market via a computerised system. If the company adheres to the guidelines of the exchange with regard to the publication of information, the company announcement date and the announcement date of RNS are one of the same thing, with few exceptions. The coverage by EXTEL, from January 1991 onwards, can therefore be considered to contain all potentially 'price sensitive' announcements.

To examine the market reaction surrounding an announcement, one technique will involve using clear event windows; ie. where there is no other announcement, besides the event under examination, within the event window. This enables the isolation of the market reaction to individual events, and subsequently increases the power of the tests. So as not to introduce bias about what type of information investors are expected to respond to, all information types are treated equally regarding their price sensitivity. With this requirement, we are limited to examining the period between January 1991 to June 1992, the only period which EXTEL lists all news releases. A potential problem of examining a relatively short time period, may be the extent to which the results can be generalized across different time periods. For example, it is quite conceivable that during a period of rising expectations earnings announcements may tend to be, on average, good news. The market reaction to which, may be quite different to that experienced during a bad news or intermediate period.

---

and can only be inferred from when the article is published.

[3] The coverage may also vary between different versions of the CD-ROM.

For the purposes of this research all companies that were acquired, suspended, cancelled, or went into administration or receivership, during the sample period examined were disregarded. Their inclusion could potentially bias the results, since the market reaction may be biased to the announcements of companies not in a normal trading status. This yielded a final sample size of 1343 companies, who released a total of 24,204 various news announcements over the period 1 January 1991 to 30 June 1992.

(ii) Share price data

Daily closing share price data, market values, including the market index (FT-Actuaries All Share Index), were all collected from DATASTREAM International. The price data is already adjusted for capital changes, but no adjustment is made for dividends. This is in accordance with the market index which makes no specific allowance for dividends, and therefore to adjust individual returns accordingly may introduce a potential bias. Secondly, one plausible assumption is that the payment of dividends is already impounded into price. Security returns are therefore calculated as the proportional change in price. Accordingly, the volatility of prior stock returns (ie. $VOLPR_i$ and $VOLPR{+}A_i$) is measured as the standard deviation of stock returns over the relevant period; and not the standard deviation of excess returns.[4] Firm size (LN_MV_i) is measured as the natural log of market capitalisation, as at the beginning of the year, in the year of announcement.

(iii) The age of the firm

A firm's age (AGE_i) is calculated as the number of years the company has been registered as a private limited company on the LSE, or from the year of incorporation, as documented in the *London Stock Exchange Official Yearbook.*

(iv) The number of disclosures

The number of corporate disclosures (NUM_i) made by a firm, is determined by the

[4] Where $VOLPR_i$ measures the standard deviation of returns over the prior period (t=-20,...,-1) when used to model anticipation as measured by ANN_i, and $VOLPR{+}A_i$ includes the announcement period (t=-20,...,0) when used to model $POST_i$.

number of announcements listed by EXTEL over the sample period examined; from January 1991 until June 1992. Ideally, for reasons of accuracy, a longer time span would have been preferred to estimate the average disclosure rate of firms. Due to the unavailability of a reliable measure, and with no reason to expect the disclosure rate of firms over the sample period to differ greatly from other periods, we argue our estimate is fair. For descriptive statistics of these variables, see section 4.6 below.

4.4 THE PROCESS OF INFORMATION DISCLOSURE

When examining the market reaction to corporate announcements, it is important to have an understanding of the environment in which public disclosures are made. The institutional setting of corporate disclosure has important implications for market expectations. In the UK, the disclosure requirements of listed securities are regulated by the LSE. The LSE provides strict guidelines as to what information is required, its format, how it should be processed and the timing of its release. All securities are subject to producing annual and interim reports, and disclosing material information to the market in a timely manner, to maintain their listing. Assuming investors are also aware of these disclosure requirements, and know what they can expect from companies, the regulatory setting should help to improve the anticipation process of investors.

4.4.1 *What Information is Required by the LSE*

The "Listing Requirements" of the LSE are strict and extremely detailed, and must be adhered to for companies to maintain a listing. Once a company is listed, there exist a number of 'continuing obligations' which must be observed regarding the notification of information to the Company Announcements Office (CAO) of the exchange. One aim of the exchange is to maintain 'an orderly market' ensuring that all market participants have simultaneous access to the same information. To accomplish this there exists a general obligation of disclosure for all companies to notify the exchange 'without delay' of:

> (i) 'any information necessary to enable holders of its listed securities and the public to appraise the position of the company and avoid the creation of a false market in its listed securities; and

(ii) any major new developments in its sphere of activity which are not public knowledge which may lead to substantial movements in the price of its listed security.'

There is an exception to this rule if the directors of the company consider the disclosure to the public might prejudice the company's legitimate interests.

Information that is required to be notified to the CAO, must not be given to a third party prior to its announcement, except in certain circumstances. For example: negotiations with advisers in view of a future transaction or raising finance; information provided in strict confidence to the Bank of England, or say the Mergers and Monopolies Commission; or a proposal, subject to negotiations with employees or trade unions. In addition, if the announcement is to be made to a meeting of shareholders, and contains price sensitive information, arrangements must be made so that the announcement at the meeting is made no earlier than the time at which the information is published to the market.

With regards to financial information, a company must notify the CAO immediately after board approval of: a preliminary announcement of results, half-year or any other period; any decision to pay or make any dividend or other distribution; any proposed change in capital structure or decision to change the general character or nature of the business; any change in notifiable interests and directors' shareholdings. All board decisions must be relayed (if possible) to the CAO before 5.30pm the same day. The CAO must be notified at least 10 days in advance of the date fixed for any board meeting at which decisions on dividends, the annual results or half-yearly report. Other information requirements include notification of any major interest in the share capital of the company, any board change, plus information relating to the interests and dealings of directors and connected persons in any securities of the company. In addition to, the particulars of acquisitions or realisations of assets (within certain materiality criteria).

4.4.2 *The Format of the Information*

The CAO passes the news release to the Regulatory News Service (RNS), which provides guidelines regarding the content and method of disclosure. Upon the receipt of a news release, the RNS first validates the source of the announcement, then processes it before selling the information via a computer readable form to RNS subscribers. Subscribers include public quote vendors and information systems such as the Commercial Company News Service of the Stock Exchange, Telerate, Reuters and the Stock Exchange Automated Quotations System.

Each announcement has two elements:

(i) a headline, containing the company name and type of announcement, as prepared by the RNS; and,

(ii) the full text of the announcement as prepared by the company.

Companies are recommended to summarise the key points of any lengthy or detailed announcement at the beginning of the announcement, in order to assist 'rapid assimilation' of the information by the market. After validation, announcements are then prioritised for publication.

Issuers are encouraged to use the news release service of the LSE for all corporate releases, by the guarantee of the security of the information until its release, which cannot otherwise be guaranteed if delivered to any number of other parties. If the RNS is not the company's sole means of releasing price sensitive information, the RNS can issue an unvalidated announcement to subscribers in an attempt to lessen the possibility of a fragmented distribution of price sensitive news.

4.4.3 *The Timing of the Release*

The company can state a specific time of release to the RNS, which can only be guaranteed if not issued to a third party as well. Announcements can be delivered to the CAO 24 hours a day, but they will only be processed between the hours of 7am to 6pm, on each business day. The RNS releases information from 7.30am onwards, in the attempt to reduce the backlog of announcements at the beginning of each day, but also to enable the market to assimilate the news before the start of the trading day at 8.30am. Announcements delivered by 5.30pm, for publication that day, will be processed that evening to be released first thing the next morning. Any received after

5.30pm will not be processed until the next business day. If the company wishes to make an immediate announcement after 5.30pm, when the CAO is closed, the company must ensure adequate coverage by distributing it to at least two UK national newspapers and two newswire services where appropriate. Plus, also ensure a copy of the announcement is delivered to the CAO, for the RNS will process and publish the next day.

4.5 THE PROCESS OF INFORMATION DISCLOSURE OF US SECURITIES

The majority of market based accounting research is conducted in the US. Though the extent to which we can compare the findings of US studies, with this and other UK research, is limited by the differences in the regulatory environment of the two countries. If the minimum disclosure requirements of listed companies differ between the US and UK, so may the level of anticipation of the content of corporate disclosure differ between US and UK investors, ceteris paribus. The purpose of this section is therefore to highlight any differences in the disclosure practices of US and UK securities.

The Securities and Exchange Commission (SEC) is the LSE's American counterpart, and places very similar restrictions and disclosure requirements upon US firms. One distinguishable difference is, not all press releases need necessarily to be filed with the SEC. However, the SEC is considered to be a tough regulator in comparison to the LSE, and more stringent in the monitoring and enforcing of disclosure rules. An opinion that is consistent with the finding of greater compliance with disclosure rules in the US than the UK (Frost & Pownall 1994).

The regulations of both the US and UK, focus on the probability the information may change investors' valuation of, or market activity in, the firm's securities. The rules of the UK and the US appear to mandate the same sort of disclosure, but of course, if capital market differences in the two countries lead to different probabilities that information will cause price or volume changes, then disclosures to conform with the rules will differ between both countries.

A survey was conducted by Frost & Pownall (1994) into the accounting disclosure practices of both United States (US) and United Kingdom (UK) securities listed on the NYSE and LSE, during 1989. Frost and Pownall define an accounting disclosure as a release containing information about the firm's financial position; eg. both the annual and interim reports, plus selected media disclosures. The study reports that both mandatory and voluntary accounting disclosures are substantially more frequent in the US than the UK. US domestic firms released an average of 12.3 disclosures compared to 4.3 for UK domestic firms, during 1989. The median number of annual and interim reports for US and UK firms is 5.0 and 2.0 respectively, with median reporting lags of 45 and 86 days respectively. This variation reflects both differences in disclosure rules and significant differences in the frequency and timing of voluntary disclosures.[5] In both countries, the timely disclosure of earnings reports is found to be partially correlated with firm size. With a correlation of 23 per cent in the US, and 25 per cent in the UK. Furthermore, firms which are listed in both the US and UK, disclose twice as much in the US.

Higher voluntary disclosure by US firms may be explained by a stronger pressure to produce information in the US than the UK, by investors and analysts alike. Such a belief is consistent the higher trading volume observed in US exchanges, and the narrower bid-ask spreads of US securities reflecting a lower level of uncertainty possibly associated with the wider availability of information. However, the variation in disclosure policy has practical implications for the comparability of stock price responses to corporate announcements, between the US and the UK. The wider availability of pre-disclosure information, assuming public information is value relevant and precise, should enable investors to anticipate the content of corporate disclosures to a greater extent, in the US relative to the UK (Donnelly & Walker 1995). Consequently, this may lead to a smaller stock price response to disclosures in the US, and possibly less drift. Though this must be weighed against the

[5] For example, US firms must file annual reports within 90 days of the accounting year-end, and quarterly reports within 45 days of the ends of the first three quarters. Whereas, UK firms need only file annual reports within six months of the accounting year-end, and the half-yearly reports within four months of the accounting period.

complication of, isolating the impact of a single event when firms are so frequently issuing news.

4.6 DESCRIPTIVE STATISTICS

4.6.1 *The Distribution Properties of the Explanatory Variables*

Table 4.1 reports the descriptive statistics of each explanatory variable for each class of information, for both clear and unclear event windows. A clear event window is defined as, where no other announcement (as listed by EXTEL) occurs during the 20 trading days preceding, or following the event under examination. For unclear event windows, there is no restriction as to the number of announcements that may occur over the event window.[6] Using clear event windows therefore allows the isolation of the price impact of a single event. However, if for example firm size and the frequency of disclosure are correlated, examining clear windows will bias the sample towards smaller firms.

[6] However, in an unclear window no more than one announcement occurs on the event day itself.

Table 4.1a

Distribution Properties of the Explanatory Variables for Each Class of Information

Clear Event Window

	MV	LN_MV	AGE	NUM	VOLPR	VOLPR+A
Annual Earnings (n=116)						
Minimum	0.490	-0.713	1.000	3.000	0.000	0.000
Maximum	5452.000	8.604	123.000	51.000	0.103	0.101
Mean	274.400	3.737	38.612	19.957	0.019	0.023
Std.Dev.	702.120	2.099	31.786	9.861	0.017	0.019
Skewness	4.503	0.225	0.769	0.553	2.196	1.810
Kurtosis	27.817	2.263	2.537	2.697	9.560	6.727
Interim Earnings (n=152)						
Minimum	0.360	-1.022	2.000	3.000	0.000	0.000
Maximum	2875.000	7.964	122.000	40.000	0.374	0.369
Mean	61.326	2.144	44.796	13.408	0.019	0.023
Std.Dev.	270.880	1.612	32.673	8.365	0.034	0.034
Skewness	7.900	1.182	0.417	1.355	7.918	6.894
Kurtosis	78.847	4.570	2.026	4.448	82.269	67.676
AGMs (n=106)						
Minimum	1.000	0.482	1.000	7.000	0.000	0.000
Maximum	6042.000	8.706	111.000	41.000	0.045	0.055
Mean	198.380	3.734	40.462	17.953	0.013	0.014
Std.Dev.	631.450	1.540	26.534	6.382	0.010	0.011
Skewness	7.524	0.490	0.496	1.064	1.095	1.302
Kurtosis	67.148	3.139	2.481	4.168	3.776	4.726
Board Changes (n=387)						
Minimum	1.000	0.058	1.000	4.000	0.000	0.000
Maximum	15818.000	9.628	150.000	46.000	0.160	0.156
Mean	437.720	3.843	41.240	19.346	0.015	0.015
Std.Dev.	1360.300	2.055	32.725	7.512	0.015	0.015
Skewness	5.903	0.626	0.676	0.720	3.776	3.744
Kurtosis	48.198	2.673	2.501	3.172	27.728	27.232
Changes in Shareholdings (n=927)						
Minimum	0.390	-0.942	1.000	3.000	0.000	0.000
Maximum	3008.000	8.009	135.000	73.000	0.263	0.257
Mean	155.480	3.706	42.455	19.906	0.014	0.014
Std.Dev.	320.630	1.639	31.819	7.686	0.016	0.016
Skewness	4.023	0.110	0.516	0.973	6.083	5.835
Kurtosis	23.524	2.612	2.284	5.348	73.612	66.817

Notes: n represents the number of observations,
MV represents firm size as measured by market capitalisation (£m) as at 1st January in the year of announcement,
LN_MV is the natural log of MV,
AGE measures the number of years the firm has been in operation as at 1st January in the year of announcement,
NUM measures the number of disclosures made by the firm over the sample period,
VOLPR measures stock return volatility over the prior period, where (t=-20,...,-1),
VOLPR+A measures stock return volatility over the prior and announcement periods, where (t=-20,...,0).

Table 4.1b

Distribution Properties of the Explanatory Variables for Each Class of Information

Unclear Event Window

	MV	LN_MV	AGE	NUM	VOLPR	VOLPR+A
Annual Earnings (n=1830)						
Minimum	0.440	-0.821	1.000	3.000	0.000	0.000
Maximum	20230.000	9.915	263.000	87.000	0.178	0.197
Mean	388.840	3.865	44.624	20.407	0.014	0.018
Std.Dev.	1383.130	1.967	32.932	10.054	0.015	0.018
Skewness	8.021	0.471	0.632	1.517	3.339	3.052
Kurtosis	85.025	2.788	3.440	7.472	23.301	19.192
Interim Earnings (n=1452)						
Minimum	0.360	-1.022	1.000	3.000	0.000	0.000
Maximum	25620.000	10.150	264.000	87.000	0.374	0.369
Mean	495.580	3.805	43.914	20.295	0.014	0.017
Std.Dev.	1935.500	2.046	32.985	10.347	0.017	0.019
Skewness	7.141	0.617	0.826	1.439	8.994	6.678
Kurtosis	63.065	3.052	4.794	6.694	99.999	93.142
AGMs (n=481)						
Minimum	1.000	0.278	1.000	5.000	0.000	0.000
Maximum	15730.000	9.663	264.000	87.000	0.088	0.086
Mean	639.490	4.697	47.310	25.012	0.014	0.015
Std.Dev.	1592.300	1.931	32.891	10.692	0.010	0.011
Skewness	5.000	0.269	0.779	1.660	2.134	1.968
Kurtosis	34.308	2.423	5.553	8.509	11.790	8.971
Board Changes (n=1807)						
Minimum	0.540	-0.616	1.000	4.000	0.000	0.000
Maximum	17920.000	9.793	264.000	87.000	0.272	0.265
Mean	682.060	4.313	43.748	25.131	0.018	0.019
Std.Dev.	1890.800	2.219	33.304	11.310	0.020	0.021
Skewness	5.292	0.286	0.835	1.590	4.334	4.075
Kurtosis	37.688	2.321	4.956	7.316	34.352	29.633
Changes in Shareholdings (n=4354)						
Minimum	0.390	-0.942	1.000	3.000	0.540	0.000
Maximum	17440.000	9.766	264.000	87.000	0.304	0.297
Mean	260.230	4.048	42.644	25.243	0.018	0.018
Std.Dev.	761.300	1.749	33.314	10.044	0.020	0.020
Skewness	9.777	0.115	0.836	1.377	4.300	4.189
Kurtosis	99.999	2.782	4.584	8.090	34.829	32.672

Notes: n represents the number of observations,
MV represents firm size as measured by market capitalisation (£m) as at 1st January in the year of announcement,
LN_MV is the natural log of MV,
AGE measures the number of years the firm has been in operation as at 1st January in the year of announcement,
NUM measures the number of disclosures made by the firm over the sample period,
VOLPR measures stock return volatility over the prior period, where (t=-20,...,-1),
VOLPR+A measures stock return volatility over the prior and announcement period, where (t=-20,...,0).

As expected, by allowing the event window to contain other announcements vastly increases the available sample size. While using unclear windows may reduce the potential power of the tests, the restriction that the window be clear from other announcements, biases the sample towards both smaller, younger firms, and those who disclose less frequently. This relation also hints of possible correlation between the explanatory variables. For clear windows (see Table 4.1a), the age range varies between 1 to 150 years, compared to 1 to 264 years for unclear windows (see Table 4.1b). Likewise for the frequency of disclosure across firms, where for clear windows NUM ranges between 3 to 56 disclosures, with the exception of 73 disclosures for a change in shareholding. For unclear windows, NUM ranges from 3 to a maximum of 87 disclosures. A similar relationship holds for firm size, though there is greater variation between information types. So as an example, the range in firm size associated with annual earnings, increases from between £0.5M to £5452.0M for clear windows, to between £0.4M and £20230.0M for unclear windows. The volatility of prior stock returns is lower for clear windows, supporting the theory that price behaviour is a function of information, with the exception of interim earnings where the mean level of volatility increases under clear windows.

Each explanatory variable seems to emulate a symmetrical distribution more closely for clear event windows, from excluding the more extreme observations. The distribution properties (ie. the level of skewness and kurtosis) of the variables AGE and NUM, vary little across the different information types, suggesting these firm characteristics do not vary to a great extent according to the event. For example, older firms appear no more prone to board changes than younger firms, nor are frequent announcers any more associated with changes in shareholdings. On the other hand, the mean values indicate board changes are most likely to be associated with larger firms. Though the distribution properties of firm size vary greatly across information types depending on whether clear or unclear windows are examined. However, using the natural log of market value improves the symmetry of the distribution, indicated by a reduction in the level of skewness and kurtosis across information types.

A similar relationship holds true for the volatility of stock returns, with both VOLPR and VOLPR+A subject to a high degree of kurtosis. The extent of kurtosis may be interpreted as indicating the divergence in beliefs associated with a particular information type. Given this intuition, AGMs appear to generate the least volatility in prior stock returns as opposed to the forthcoming release of interim earnings. Furthermore, following the announcement the degree of kurtosis is reduced, implying the event partially reduces the divergence in beliefs across investors.

4.6.2 *The Correlation Structure of the Explanatory Variables*

The sign and level of (simple) correlation between the explanatory variables, for each information type, is reported in Table 4.2; again for clear and unclear event windows. The figures presented lend support to the expected relations implied previously in section 3.4, and are robust across all information types. Firm size appears to be an increasing function of a firm's age, however, the level of the correlation is relatively low, ranging between 5 to 12 per cent. So contrary to belief, the largest trading corporations are not necessarily always the oldest. The positive correlation between firm size and the number of disclosures is considerably stronger, ranging between 34 to 55 per cent. Implying, larger firms release information more often than their smaller counterparts. A firm's age on the otherhand is negatively related to the number of disclosures, although the relationship is only weak.

Tables 4.2a and 4.2b, also report a negative correlation between firm size and the volatility of prior stock returns, during the 20 trading days leading up to the announcement. Thus, smaller firms are associated with greater market activity before their disclosures than larger firms, an observation in agreement with Bamber (1987) and Dow & Gorton (1994). In turn this implies, a greater portion of the content of large firm disclosures is previously anticipated (Freeman 1987). This is consistent with the stronger price reaction to ~~small~~ large firm news, as indicated by the higher level of correlation between firm size and VOLPR+A, rather than VOLPR.

Table 4.2a

The Simple Correlation between Explanatory Variables for Each Class of Information

Clear Event Window

	LN_MV	AGE	NUM	VOLPR	VOLPR+A
Annual Earnings (n=116)					
LN_MV	1.000				
AGE	0.111	1.000			
NUM	0.539	0.077	1.000		
VOLPR	-0.077	-0.092	0.074	1.000	
VOLPR+A	-0.150	-0.155	-0.048	0.848	1.000
Interim Earnings (n=152)					
LN_MV	1.000				
AGE	0.085	1.000			
NUM	0.377	-0.075	1.000		
VOLPR	-0.141	-0.135	0.051	1.000	
VOLPR+A	-0.156	-0.162	0.029	0.963	1.000
AGMs (n=106)					
LN_MV	1.000				
AGE	0.068	1.000			
NUM	0.338	0.239	1.000		
VOLPR	-0.147	0.074	0.195	1.000	
VOLPR+A	-0.184	0.044	0.141	0.924	1.000
Board Changes (n=387)					
LN_MV	1.000				
AGE	0.099	1.000			
NUM	0.420	-0.050	1.000		
VOLPR	-0.075	-0.038	0.052	1.000	
VOLPR+A	-0.074	-0.037	0.056	0.998	1.000
Changes in Shareholdings (n=927)					
LN_MV	1.000				
AGE	0.069	1.000			
NUM	0.405	-0.048	1.000		
VOLPR	-0.189	-0.001	0.040	1.000	
VOLPR+A	-0.190	-0.006	0.045	0.987	1.000

Notes:
n represents the number of observations,
MV represents firm size as measured by market capitalisation (£m) as at 1st January in the year of announcement,
LN_MV is the natural log of MV,
AGE measures the number of years the firm has been in operation as at 1st January in the year of announcement,
NUM measures the number of disclosures made by the firm over the sample period,
VOLPR measures stock return volatility over the prior period, where (t=-20,...,-1),
VOLPR+A measures stock return volatility over the prior and announcement periods, where (t=-20,...,0).

Table 4.2b

The Simple Correlation between Explanatory Variables for Each Class of Information

Unclear Event Window

	LN_MV	AGE	NUM	VOLPR	VOLPR+A
Annual Earnings (n=1830)					
LN_MV	1.000				
AGE	0.050	1.000			
NUM	0.492	-0.014	1.000		
VOLPR	-0.057	-0.073	0.140	1.000	
VOLPR+A	-0.120	-0.075	0.080	0.855	1.000
Interim Earnings (n=1452)					
LN_MV	1.000				
AGE	0.072	1.000			
NUM	0.545	-0.018	1.000		
VOLPR	-0.074	-0.069	0.078	1.000	
VOLPR+A	-0.112	-0.070	0.037	0.883	1.000
AGMs (n=481)					
LN_MV	1.000				
AGE	0.119	1.000			
NUM	0.489	0.027	1.000		
VOLPR	-0.056	-0.061	0.182	1.000	
VOLPR+A	-0.090	-0.090	0.158	0.896	1.000
Board Changes (n=1807)					
LN_MV	1.000				
AGE	0.110	1.000			
NUM	0.427	-0.018	1.000		
VOLPR	-0.127	-0.039	0.131	1.000	
VOLPR+A	-0.148	-0.049	0.125	0.938	1.000
Changes in Shareholdings (n=4354)					
LN_MV	1.000				
AGE	0.106	1.000			
NUM	0.408	-0.028	1.000		
VOLPR	-0.180	-0.057	0.065	1.000	
VOLPR+A	-0.191	-0.062	0.061	0.983	1.000

Notes:
n represents the number of observations,
MV represents firm size as measured by market capitalisation (£m) as at 1st January in the year of announcement,
LN_MV is the natural log of MV,
AGE measures the number of years the firm has been in operation as at 1st January in the year of announcement,
NUM measures the number of disclosures made by the firm over the sample period,
VOLPR measures stock return volatility over the prior period, where (t=-20,...,-1),
VOLPR+A measures stock return volatility over the prior and announcement periods, where (t=-20,...,0).

Other observations from Table 4.2 include, the negative correlation between AGE and volatility (ie. both VOLPR and VOLPR+A). Higher volatility may reflect the greater uncertainty associated with younger firms due to the relative unavailability of information (Demski & Feltham 1994). The positive relation between volatility and disclosure frequency (NUM), suggests increasing corporate disclosure does not reduce the demand for private information, as argued in Diamond (1985) and Stickel (1989). Interim information may therefore be of little economic relevance as implied by Brookfield & Morris (1994), be of poor quality, or frequent disclosure may increase the expected probability of a future announcement.

The use of unclear event windows has a mixed effect upon the level of correlation between the variables. Though the use of unclear windows has no effect on sign, except for the relation between a firm's age (AGE) and how often it discloses (NUM). With the exception of the relation between firm size (LN_MV) and the number of disclosures (NUM), the overall level of correlation between the explanatory variables is no greater than 20 per cent. Therefore abating any potential problems of multicollinearity, and demonstrates each explanatory variable contains independent information.

4.6.3 *The Extent to which the Information Variables Overlap*

We hypothesised in section 3.4.4, that the volatility of stock returns measures the *extent* to which investors choose to be informed, and will therefore subsequently capture similar information contained in firm size, age and the number of disclosures. Although Table 4.2 indicates the level of correlation between the explanatory variables is no higher than 20 per cent. To test explicitly the extent to which these information variables overlap, we ran the following OLS regressions,

$$VOLPR_i = a_0 + a_1 LN\_MV_i + a_2 AGE_i + a_3 NUM_i + u_i \qquad (4.1)$$

and,

$$VOLPR{+}A_i = a_0 + a_1 LN\_MV_i + a_2 AGE_i + a_3 NUM_i + u_i \qquad (4.2)$$

The regression results are presented in Tables 4.3a and 4.3b below.

Table 4.3a

OLS Results of the Volatility of Prior Stock Returns Regressed Against Firm Size, Age and the Number of Corporate Disclosures, for Each Class of Information

$$VOLPR_i = a_0 + a_1 LN\_MV_i + a_2 AGE_i + a_3 NUM_i + u_i$$

and,

$$VOLPR{+}A_i = a_0 + a_1 LN\_MV_i + a_2 AGE_i + a_3 NUM_i + u_i$$

Clear Event Window

	Annual Earnings	**Interim Earnings**	**AGMs**	**Board Changes**	**Changes in Shareholdings**
$VOLPR_i$					
a_0	0.0202*** (4.930)	0.0264*** (3.937)	0.0112*** (3.538)	0.0146*** (6.140)	0.0167*** (10.457)
a_1	-0.0013 (-1.403)	-0.0036** (-1.969)	-0.0015*** (-2.390)	-0.0009** (-2.047)	-0.0024*** (-7.006)
a_2	-0.0000 (-0.931)	-0.0001 (-1.384)	0.0000 (0.269)	-0.0000 (-0.617)	0.0000 (0.301)
a_3	0.0003 (1.487)	0.0004 (1.231)	0.0004*** (2.612)	0.0002* (1.817)	0.0003*** (3.969)
	n=116 R^2=0.006 F[3,112]=1.235	n=152 R^2=0.026 F[3,148]=2.322	n=106 R^2=0.063 F[3,102]=3.350	n=387 R^2=0.007 F[3,383]=1.956	n=927 R^2=0.049 F[3,4350]=17.499
$VOLPR{+}A_i$					
a_0	0.0300*** (6.675)	0.0332*** (4.858)	0.0142*** (3.980)	0.0145*** (6.181)	0.0167*** (10.446)
a_1	-0.0014 (-1.463)	-0.0038** (-2.025)	-0.0018*** (-2.597)	-0.0008** (-2.055)	-0.0024*** (-7.103)
a_2	-0.0001 (-1.513)	-0.0001* (-1.736)	0.0000 (0.077)	-0.0000 (-0.606)	0.0000 (0.122)
a_3	0.0001 (0.448)	0.0004 (0.982)	0.0004** (2.202)	0.0002* (1.900)	0.0003*** (4.159)
	n=116 R^2=0.018 F[3,112]=1.702	n=152 R^2=0.034 F[3,148]=2.746	n=106 R^2=0.054 F[3,102]=2.994	n=387 R^2=0.008 F[3,383]=2.023	n=927 R^2=0.051 F[3,4350]=17.499

Notes: $VOLPR_i$ measures stock return volatility over the prior period, where (t=-20,...,-1),
$VOLPR{+}A_i$ measures stock return volatility over the prior and announcement periods, where (t=-20,...,0),
LN_MV_i represents firm size, ie. the natural log of market capitalisation (£m) as at 1st January in the year of announcement,
AGE_i measures the number of years the firm has been in operation as at 1st January in the year of announcement,
NUM_i measures the number of disclosures made by the firm over the sample period,
*,**,***, statistically significant at the 10, 5 and 1 per cent level, respectively,
Figures in parentheses are standard errors, n represents the number of observations, R^2 is adjusted for degrees of freedom.

Table 4.3b

OLS Results of the Volatility of Prior Stock Returns Regressed Against Firm Size, Age and the Number of Corporate Disclosures, for Each Class of Information

$$VOLPR_i = a_0 + a_1 LN\_MV_i + a_2 AGE_i + a_3 NUM_i + u_i$$

and,

$$VOLPR{+}A_i = a_0 + a_1 LN\_MV_i + a_2 AGE_i + a_3 NUM_i + u_i$$

Unclear Event Window

	Annual Earnings	Interim Earnings	AGMs	Board Changes	Changes in Shareholdings
$VOLPR_i$					
a_0	0.0138***	0.0146***	0.0128***	0.0165***	0.0212***
	(14.080)	(12.291)	(9.241)	(12.522)	(22.538)
a_1	-0.0012***	-0.0013***	-0.0009***	-0.0020***	-0.0027***
	(-6.151)	(-5.139)	(-3.592)	(-8.711)	(-15.007)
a_2	-0.0000***	-0.0000**	-0.0000	-0.0000	-0.0000*
	(-2.681)	(-2.112)	(-1.055)	(-0.459)	(-1.765)
a_3	0.0003***	0.0003***	0.0003***	0.0004***	0.0003***
	(8.308)	(5.287)	(5.388)	(8.920)	(10.138)
	n=1830	n=1452	n=481	n=1807	n=4354
	R^2=0.043	R^2=0.026	R^2=0.057	R^2=0.057	R^2=0.056
	F[3,1826]=28.225	F[3,1448]=14.106	F[3,477]=10.724	F[3,1803]=37.181	F[3,4350]=86.241
$VOLPR{+}A_i$					
a_0	0.0203***	0.0200***	0.0152***	0.0187***	0.0221***
	(17.725)	(14.725)	(9.846)	(13.301)	(23.335)
a_1	-0.0018***	-0.0017***	-0.0012***	-0.0023***	-0.0029***
	(-7.796)	(-5.886)	(-4.096)	(-9.600)	(-15.655)
a_2	-0.0000***	-0.0000**	-0.0000	-0.0000	-0.0000**
	(-2.693)	(-2.107)	(-1.625)	(-0.793)	(-2.040)
a_3	0.0003***	0.0003***	0.0003***	0.0004***	0.0003***
	(6.851)	(4.371)	(5.175)	(9.056)	(10.116)
	n=1830	n=1452	n=481	n=1807	n=4354
	R^2=0.042	R^2=0.027	R^2=0.061	R^2=0.064	R^2=0.060
	F[3,1826]=27.774	F[3,1448]=14.640	F[3,477]=11.390	F[3,1803]=42.161	F[3,4350]=92.934

Notes: $VOLPR_i$ measures stock return volatility over the prior period, where (t=-20,...,-1),
$VOLPR{+}A_i$ measures stock return volatility over the prior and announcement period, where (t=-20,...,0),
LN_MV_i represents firm size, ie. the natural log of market capitalisation (£m) as at 1st January in the year of announcement,
AGE_i measures the number of years the firm has been in operation as at 1st January in the year of announcement,
NUM_i measures the number of disclosures made by the firm over the sample period,
*,**,***, statistically significant at the 10, 5 and 1 per cent level, respectively,
Figures in parentheses are standard errors, n represents the number of observations,
R^2 is adjusted for degrees of freedom.

The overall joint explanatory power of the explanatory variables is very low, with an R^2 value no greater than 6.4 per cent.[7] From Table 4.3b, for unclear event windows, prior volatility is least explained for interim earnings, and increases in the order of annual earnings, changes in shareholdings, AGMs and finally board changes. For clear windows the relation is less clear cut (see Table 4.3a), though one noticeable effect is the relatively large reduction in the explanation of volatility around board changes. However, what is evident, if the volatility of prior stock returns (VOLPR and VOLPR+A) measures the extent to which investors choose to be informed, our remaining explanatory variables capture only a small portion of the incentives to be informed.

Consistent with Table 4.2, the relationships have the correct sign. The volatility of prior stock returns is negatively related to firm size, and positively related to number of disclosures. Firm size is statistically significant (at the 5 per cent level) in the explanation of the variability of stock returns prior to isolated announcements, with respect to all information types except annual earnings. By allowing other events in the window, increases the overall significance of the model (see Table 4.3b); though this maybe because there is more activity to explain. For example, the level of significance increases above the 1 per cent level for both firm size (LN_MV) and the number of disclosures (NUM), for all information types. Though the coefficient of NUM, a_2, is no greater than 0.0004.

4.7 CONCLUSIONS

To ability to evaluate the value relevance of a corporate disclosure, by measuring the impounding of information, relies heavily on the ability to control for noise in the price system. This means controlling for price movements unrelated to the event under investigation. The database produced by EXTEL Financial, records all (or at least the majority of) corporate disclosures released to the LSE, by all fully listed firms during the period January 1990 to July 1992. The database therefore enables us to exclude all event periods from the sample which include more than one

[7] Although the R^2 values are higher than those obtained by Pope & Inyangete (1992).

corporate disclosure. Assuming noise is a function of disclosure, this procedure thereby reduces the potential level of noise in security prices, and increases the power of the tests. Plus it allows a more accurate examination of the anticipation by investors of corporate disclosure. Whereas in previous research, it is the norm to assume non-earnings events are value irrelevant, and not exclude them from the event window.

However, investor anticipation may also be a function of the frequency of corporate disclosure. Increased disclosure over the event period could therefore either have a positive or negative impact upon the anticipation of the expected event. Thereby excluding event periods with more than one disclosure, will not only bias the sample towards smaller and younger firms (see Table 4.1), but also restricts the general applicability of the results. The analysis therefore examines security returns over both clear and unclear event windows.

Although the sample period is limited, the coverage of the EXTEL database allows us to examine a larger and broader sample of firms, than has been previously examined in UK. For example, recent work of Brookfield & Morris (1992) employed a sample of only 25 firms with a the minimum market capitalisation of £25M, over the period October 1983 until October 1984; in order to examine the variability of stock returns in response to corporate disclosure. Unfortunately, the available sample sizes of alternative disclosure types reported by EXTEL, were too small to produce efficient estimates. To overcome this limitation the approach of Brookfield & Morris (1992) could of been adopted, by grouping the different information types into portfolios. However, this technique was not employed so as not to introduce subjective bias as to what are considered like events.

Given the selected data set, the objective of this chapter was to examine both the properties of the data employed, and the level of correlation between the explanatory variables. Table 4.2 reports the correlation structure, and lends support to the hypothesised relationships stated in chapter 3. Firm size is an increasing function of age, and the number of disclosures. The negative correlation between firm size and stock return volatility observed prior to the announcement, suggests small firms are associated with greater market activity before their disclosures than large firms. This supports our earlier notion, that the information content of large firm announcements is largely anticipated beforehand, and therefore not captured by our event window. In addition, younger firms and more frequent disclosers are associated with higher volatility.

However, the overall level of correlation between the explanatory variables is no greater than 20 per cent, with the exception of the correlation between firm size and number of disclosures which is 55 per cent. This general low level of correlation abates any potential problems of multicollinearity, and illustrates that each explanatory variable contains independent information.

We argued previously in chapter 3, that the volatility of prior stock returns measures the extent to which investors choose to be informed. Although the level of correlation between explanatory variables is generally low, we explicitly test the extent to which the information variables overlap. Or in other words, the extent to which the volatility of stock returns captures the same information set as measured by firm size, age and the number of disclosures. However the joint explanatory power of firm size, age and disclosure frequency, for the volatility of prior stock returns, is found to be no greater than 6.4 per cent. Thus, the volatility of stock returns captures incentives to become informed not proxied by either firm size, a firm's age or the frequency of disclosure.

5. THE PATTERN OF ANTICIPATION AND INTERPRETATION

5.1 THE OBJECTIVE AND MAIN FINDING

Chapter 5 firstly examines the pattern of average stock returns over the event period, for each class of information, in order to identify the impounding behaviour of investors. The second objective of the chapter is to test the variables identified in chapter 3, hypothesised to explain the process of anticipation and interpretation for each information type. Several observations are made but the main finding, is that the volatility in stock returns, prior to the disclosure, is significant in explaining lagged impounding.

5.2 INTRODUCTION

The first objective of this chapter is to identify the behaviour of stock returns surrounding the selected information types, and to determine the rate at which the information released is disseminated and impounded into returns. This is an attempt to further our understanding of how market participants react to new information; and may uncover the possibility of significant investment opportunities. That is, our analysis may uncover patterns of impounding behaviour by investors surrounding corporate disclosure, which could possibly be incorporated into profitable trading strategies. Considerable evidence exists showing the value relevance (as measured by price reaction) of annual earnings reports (Ball & Brown 1968), interim reports (Beaver 1968, Firth 1981, Brookfield & Morris 1992), and to a lesser extent annual general meetings (AGMs) (Firth 1981, Rippington & Taffler 1995). In these studies, although earnings announcements are to a large extent anticipated by the market, the share price reaction to their announcement suggests their release conveys new information. However, relatively little market reaction is found following the AGM. Evidence relating to the value relevance of board changes and changes in shareholdings, is sparse and needs further investigation.

The second objective of this chapter, is to explain the level of market anticipation as a function of the costs and benefits of being informed; as identified by Kim & Verrechia (1994), McNichols & Trueman (1994) and Demski & Feltham (1994). Specifically, for each information type, we examine the relationship between the impounding of information and (1) firm size, measured by market capitalisation, (2) the number of years the firm has been trading, (3) the number of disclosures made by the firm, and (4) the volatility of stock returns during the pre-announcement period.

The results of this analysis will be discussed in two parts. Firstly, section 5.3 identifies the impounding behaviour of stock returns, for each information type. The results highlight the sensitivity of the information metric, API_t, to the model of expected returns employed. Although in general, the results indicate the market largely anticipates the event, but continues to adjust after its release as the full implications become known. The second part of the analysis, in section 5.4, attempts to explain the impounding behaviour described in section 5.3. It specifically provides an empirical test of the variables identified in chapter 3, hypothesised to explain the process of anticipation and interpretation, for each class of information. The volatility of stock returns, prior to the disclosure, materialises as the main driving force behind the explanation of lagged impounding. Section 5.5 concludes the chapter.

5.3 THE PATTERN OF STOCK RETURNS

To determine the impounding behaviour of stock returns, we observe the average value of the abnormal performance index (API) over the event window for the sample of firms for each event; annual earnings, interim earnings, the AGM, a board change or a change in shareholding. The measure of API used for this analysis is calculated as,

$$API_t = \frac{1}{n}\sum_{i=1}^{n} \prod_{t=-20}^{20} (1 + e_{it}) \qquad (5.1)$$

The API_t tracks the value of one pound invested equally in each of the n securities, over the event window (t=-20,...,+20); where day 0 is defined as the report date. The number of firms in the sample, n, varies according to the information type. The measure of excess return, e_{it}, is calculated using one of three expected returns models: market model adjusted returns (MM), market adjusted returns (MKT) or mean adjusted returns (MN). The rationale for employing alternative models, is to examine the sensitivity of different measures of expected returns (see section 3.7.1).

Initially we use clear event windows, examining stock return behaviour surrounding isolated events, to infer the relative anticipation (as measured by the level of abnormal returns) of the different information types.[1] However, in chapter 4 we found firm size and the frequency of disclosure are correlated (see Table 4.1). The use of clear event windows therefore biases the sample towards both smaller and younger firms, and those who disclose less frequently. If on the other hand, market anticipation is a function of the frequency of corporate disclosure, increased disclosure over the event period will therefore either positively or negatively affect anticipation of the expected event. The analysis therefore examines security returns over both clear and unclear event windows.

Figures 5.1 to 5.5 below, plot the changing value of API_t for isolated events, for each information type; annual earnings, interim earnings, AGMs, board changes and changes in shareholdings, respectively. More detailed information of the price reaction to these separate information types can be found in Tables 5.1a to 5.1b. Together with reporting the daily average abnormal return (AAR) for the sample of firms, the tables include the results of two-tailed t-tests used to evaluate their statistical significance. The figures illustrate the speed of price adjustment to new information, but we are unable to ascertain whether the direction or the magnitude of the adjustment is correct. At this stage we give no indication as to the nature of the news. The direction of the market effect for each information type is difficult to predict depending on the nature of the news, and the former expectations of investors. If the average event conveys new information, then one can expect to observe

[1] A clear event window is defined as, where no other announcement (as listed by EXTEL) occurs during the 20 trading days preceding, or following the event under examination. For unclear event windows, there is no restriction as the number of announcements that may occur over the event window. Using clear event windows therefore allows the isolation of the price impact of a single event.

abnormal returns. The basic null hypothesis of this investigation is therefore as follows: no event (on average) will generate stock returns significantly different from those expected. Briefly, the results show that:

The analysis distinguishes between event periods which exclude other disclosures from those that allow other disclosures.

Results applicable to both conditions:

The API_t metric is highly sensitive to the measure of expected returns.

The market appears to anticipate part of the information content of the average corporate disclosure, but continues to adjust after the report date, perhaps as the full implications become known.

A higher level of anticipation and a higher level of drift is associated with both interim and annual earnings reports, relative to other information types.

On the announcement day, there is a significantly larger price adjustment to the release of interim earnings, relative to the annual report.

Allowing other disclosures within the event period:

This notably reduces both the level of anticipation and drift, but also reduces the overall significance of daily abnormal returns. This reduction may in part reflect the small firm bias of analysing isolated events.

The significance of abnormal returns over many days of the event period surrounding a change in shareholding, is indicative of possible herding by investors.

Figure 5.1: The Abnormal Performance Index Around Annual Earnings Reports, Using Clear Event Windows

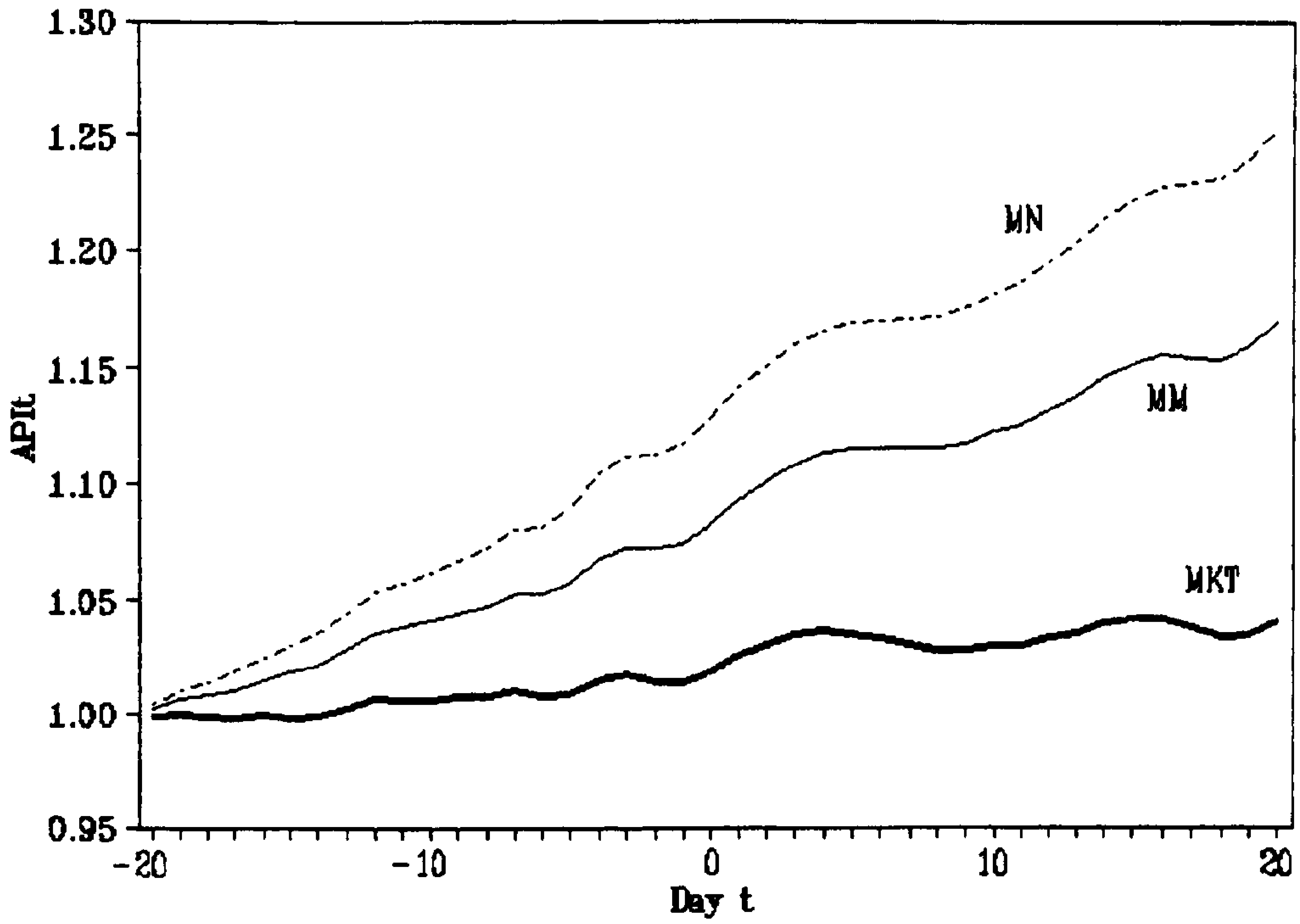


Figure 5.2: The Abnormal Performance Index Around Interim Earnings Reports, Using Clear Event Windows

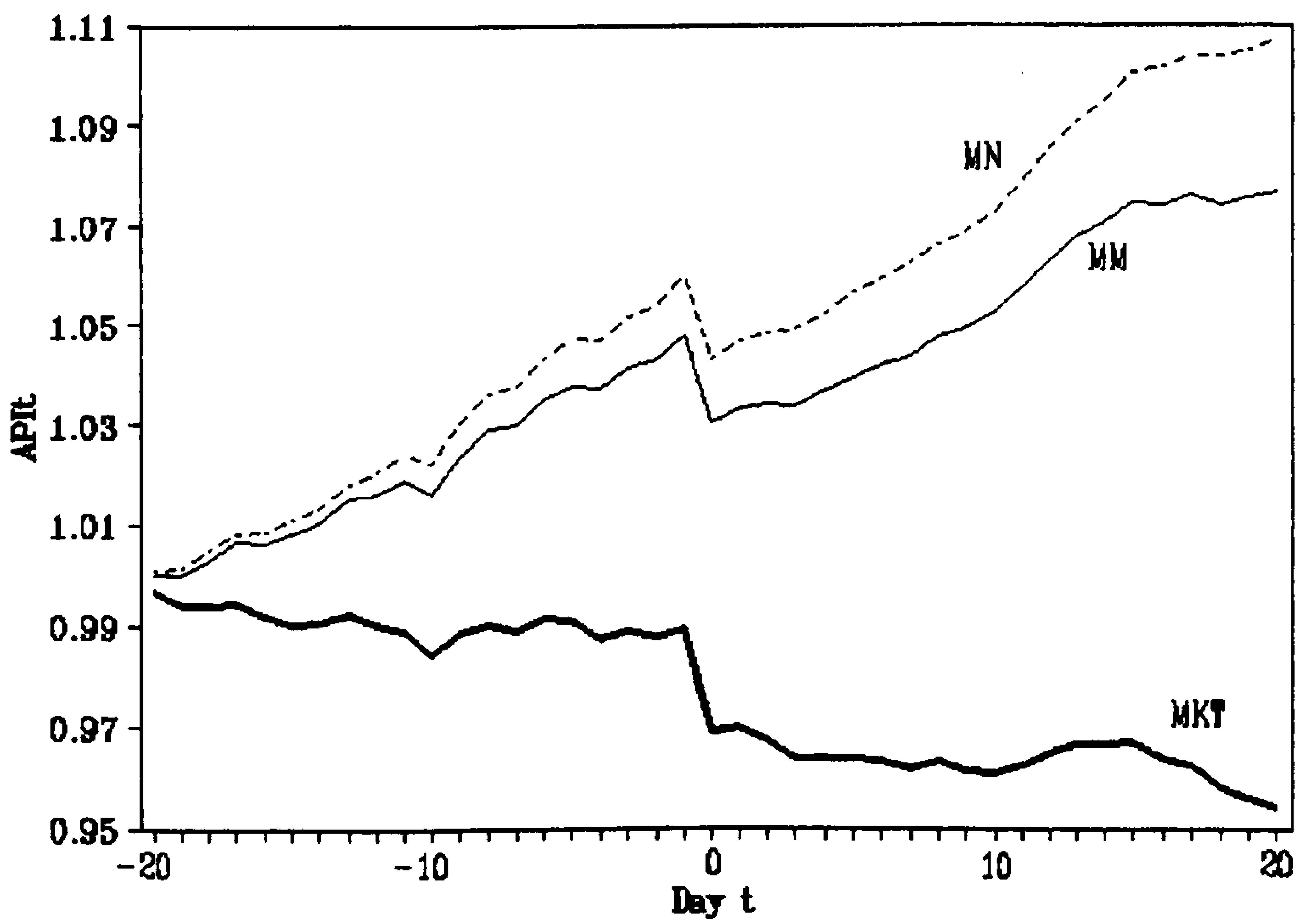


Figure 5.3: The Abnormal Performance Index Around AGMs, Using Clear Event Windows

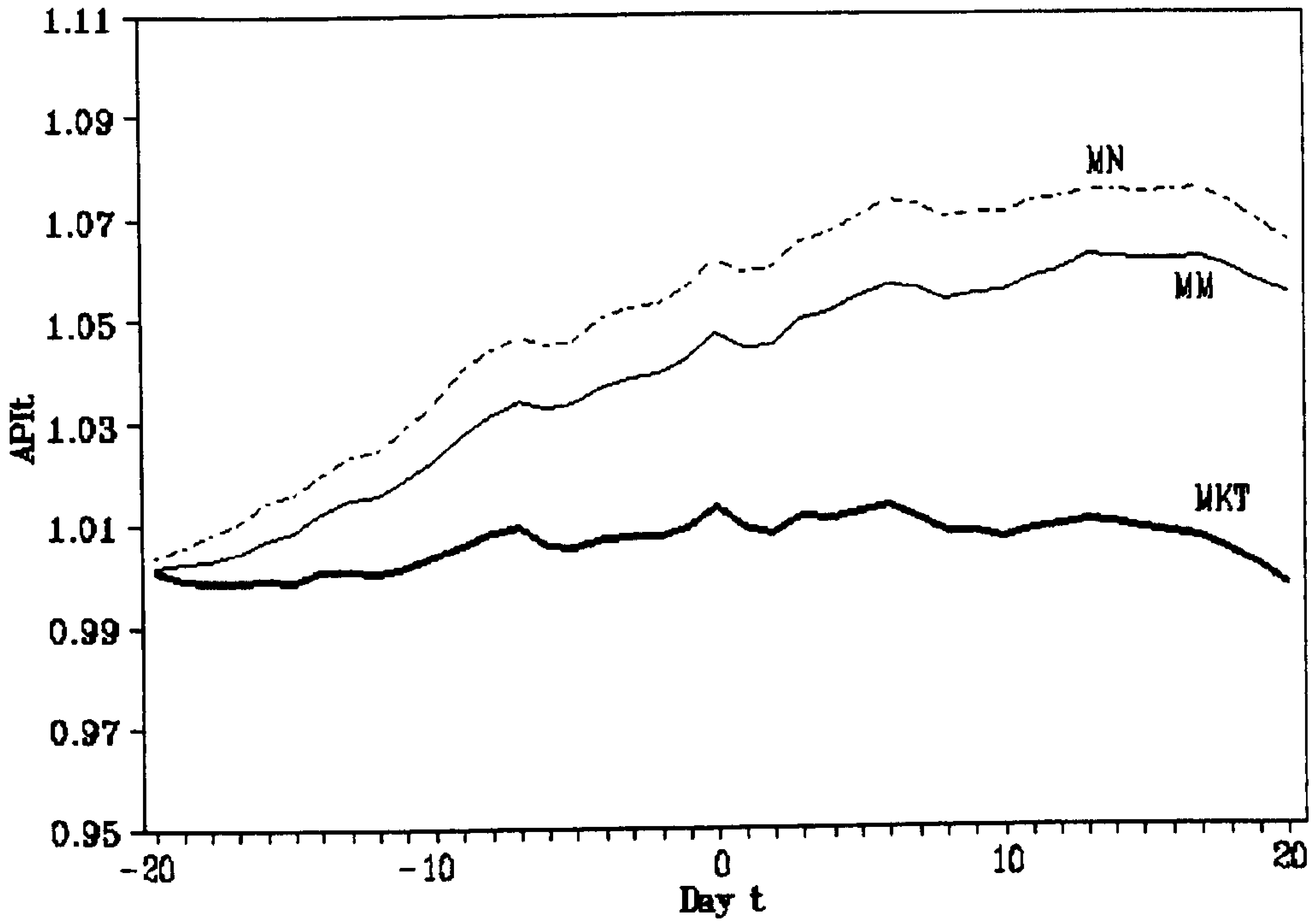


Figure 5.4: The Abnormal Performance Index Around Board Changes, Using Clear Event Windows

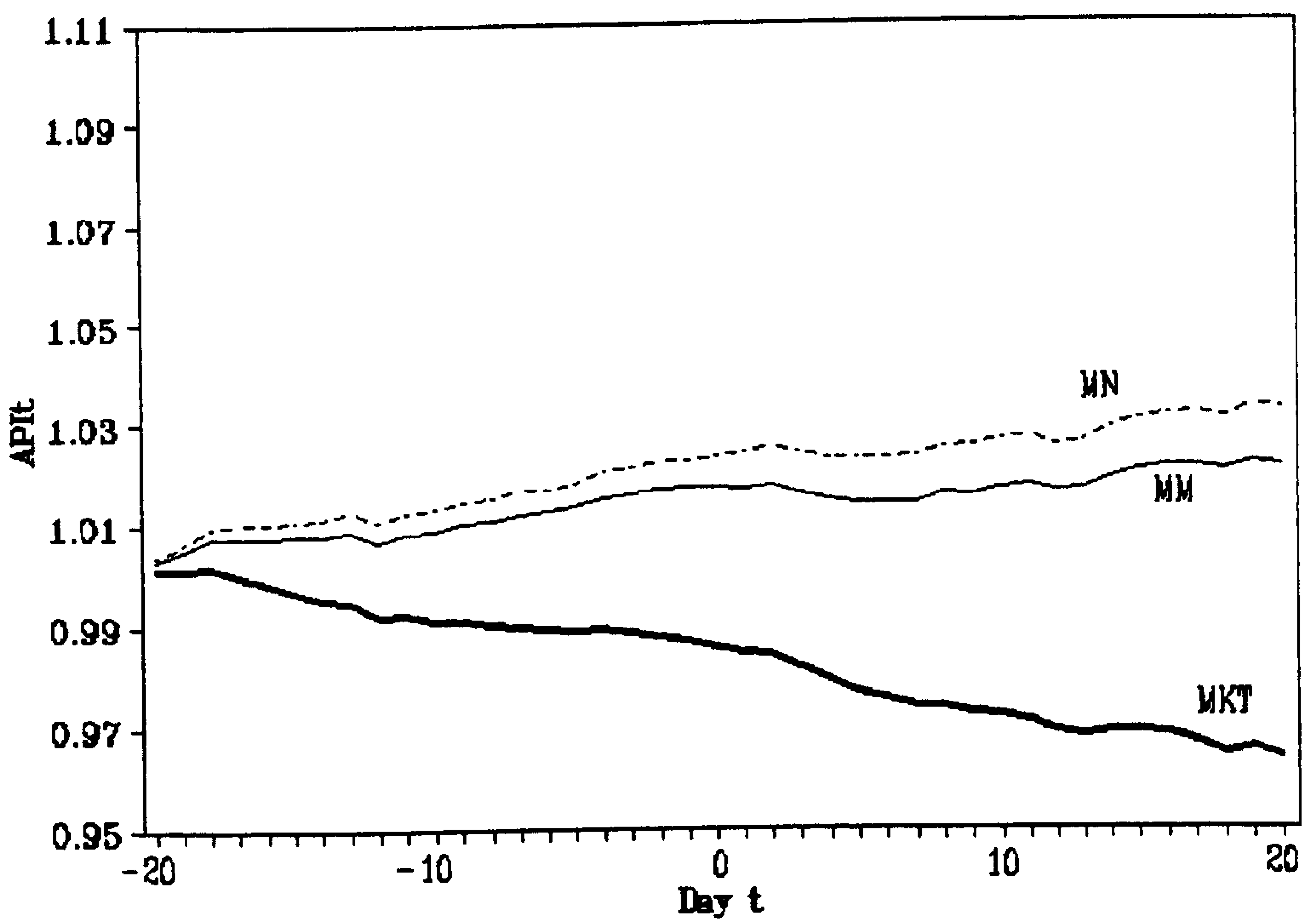
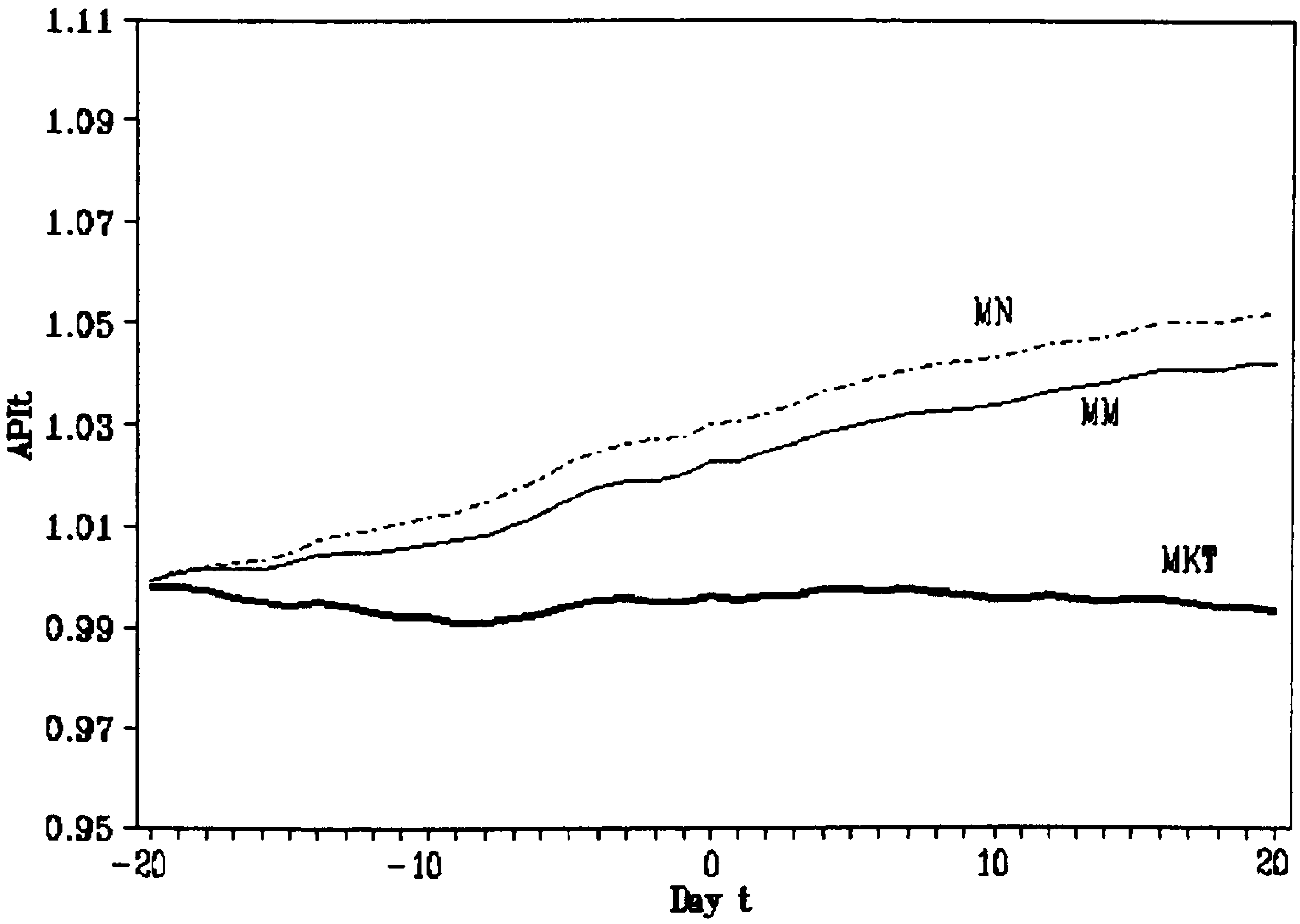


Figure 5.5: The Abnormal Performance Index Around Changes in Shareholdings, Using Clear Event Windows



5.3.1 *The Comparison of Expected Returns Models*

Figures 5.1 to 5.5 serve to demonstrate the API_t measure is sensitive to the measure of excess return employed, though the relative pattern between measures is uniform across information types. The pattern between mean adjusted (MN) and market model adjusted returns (MM), are most closely related, with MN always associated with a higher level of return. For both MN and MM, on average, events appear to contain 'good' news relative to prior expectations. However, using market adjusted returns (MKT) produces a mirror image, suggesting on average events contain 'bad' news relative to prior expectations. What explains this variation between the three measures of excess returns?

One possible explanation for the drift in market model adjusted returns (MM) is provided by Ball & Kothari (1991), of an increase in systematic risk over the event period. In constrast, use of the market model, implicitly assumes that the firm's systematic risk remains stationary over the event period. Measuring *ex post* excess returns from pre-estimated betas will not fully account for this increased risk and will subsequently over emphasise any drift. Using market adjusted returns (MKT), the level of API_t prior to the average event would suggest there is little (if any) anticipation prior to the average event. Or an alternative explanation may be that much of the anticipation has already occurred before the event period. While possible, this scenario would appear unlikely given the broad sample of firm size employed.

To explain why the market model (MM) produces consistently a higher return than a zero-one model (MKT), implies the average event time beta is less than one.[2] Thus, adjusting security returns using the market return may remove too much information, little security return activity left to be explained. The problem is further exacerbated if the level of market return has risen over the event window, relative to the estimation period. Thus, if we observe both an increase in the level of systematic risk and the level of market return, relative to *ex ante* expectations, the use of mean adjusted returns (MN) will further exaggerate the level of return investors can earn, over and above that claimed by using market model adjusted returns (MM).[3]

For example, between 01/01/91 to 31/12/91 the level of the market (as measured by the level of the FTA All Share price index) rose from 1032.25 to 1187.70, a 15 percent increase. Over the period 01/01/92 until 30/06/92, the market rose to the level of 1216.62, a further 2.44 per cent increase. An overall increase over the sample period of 17.86 per cent. However, this disguises the large increase of 34.32 per cent that arose over the period 16/01/91 to 11/05/92. Such high expectations may produce a further knock-on effect among investors in that exaggerate good news and underestimate relatively bad news.

---

[2] On further investigation, the average beta of the sample was found to be only 0.7, for the period concerned.

[3] See Appendix 2, which compares the distribution properties of API calculated over the different event windows, for each excess return metric. We find for the event period the value of API is very similar across return metrics, only when excess returns are cumulated over time does the similarity disappear.

The implications of this are not as significant as initially implied. Firstly, Figures 5.1 to 5.5 are only representative of the average reaction. Secondly, to complete our empirical analysis, the level of return is not as important as the magnitude of drift relative to the magnitude of anticipation, hence, a more accurate measure of beta is unnecessary. Which ever method is correct in the calculation of excess returns, it cannot successfully be determined, but the sensitivity of the results to the measure of expected returns furthers the need to use these different approaches in analysing the market reaction to events. However, this means the frequency and size of significant returns will vary across excess return metrics for each announcement type and consequently so will increase the probability of a Type I error. Given the above intuition, the true level of return that the average investor can expect to earn, most likely lies between the benchmark models MKT and MM. The following analysis will therefore concentrate on the interpretation of findings related o MKT and MM, but for reasons of comparison, will also report the results related to MN.

Table 5.1a

Daily Average Abnormal Returns (AAR) and the Abnormal Performance Index (API), Estimated using Market Model, Market and Mean Adjusted Expected Returns.

Clear Event Window (t=-20,...,+20)

Annual Earnings (n=116)

Day	Market Model		Market Adjusted		Mean Adjusted	
t	AAR	t-stat	AAR	t-stat	AAR	t-stat
-20	0.0027	1.5367	-0.0011	-0.6403	0.0043	2.4456***
-19	0.0041	1.9466*	0.0013	0.6160	0.0060	2.7125***
-18	0.0023	1.2703	-0.0011	-0.6307	0.0038	2.2020**
-17	0.0016	0.9688	-0.0015	-0.9282	0.0039	2.2721**
-16	0.0048	2.7918***	0.0017	0.9321	0.0066	3.7305***
-15	0.0026	1.5751	-0.0013	-0.7858	0.0053	3.0199***
-14	0.0035	2.1583**	0.0012	0.8084	0.0055	3.9562***
-13	0.0068	3.0615***	0.0039	1.7572*	0.0079	3.4669***
-12	0.0067	2.4791***	0.0039	1.4654	0.0094	3.4796***
-11	0.0026	1.2505	-0.0003	-0.1325	0.0031	1.5601
-10	0.0028	1.1203	-0.0002	-0.0759	0.0045	1.7409*
-9	0.0028	1.2632	0.0011	0.5334	0.0048	2.1908**
-8	0.0033	2.0132**	0.0005	0.3224	0.0055	3.2605***
-7	0.0050	1.6114	0.0027	0.9001	0.0066	2.1693**
-6	0.0002	0.0410	-0.0027	-0.7231	0.0011	0.2997
-5	0.0041	1.4719	0.0009	0.3506	0.0074	2.6768***
-4	0.0096	2.5993***	0.0062	1.7470	0.0138	3.7601***
-3	0.0052	1.5278	0.0025	0.7679	0.0067	2.0448**
-2	-0.0001	-0.0547	-0.0032	-1.3813	0.0009	0.3796
-1	0.0015	0.6847	-0.0011	-0.5369	0.0043	2.0138**
0	0.0076	1.0326	0.0052	0.7036	0.0095	1.2795
1	0.0101	2.3267***	0.0071	1.6629*	0.0113	2.6087***
2	0.0066	2.1591**	0.0043	1.4952	0.0080	2.7060***
3	0.0066	1.5886	0.0042	1.0176	0.0083	2.0187**
4	0.0050	1.8416*	0.0019	0.7061	0.0049	1.7324*
5	0.0016	0.5642	-0.0020	-0.6975	0.0031	1.0747
6	0.0002	0.0984	-0.0012	-0.5949	0.0010	0.4659
7	-0.0003	-0.1917	-0.0028	-1.5049	0.0011	0.6039
8	-0.0001	-0.0409	-0.0029	-1.1679	0.0005	0.1947
9	0.0023	0.9979	-0.0002	-0.0878	0.0029	1.3015
10	0.0042	1.6056	0.0020	0.7534	0.0053	2.0690**
11	0.0021	0.8805	0.0004	0.1679	0.0045	1.9898**
12	0.0057	2.8106***	0.0026	1.4540	0.0071	3.6739***
13	0.0061	2.8573***	0.0023	1.0820	0.0070	3.3333***
14	0.0064	2.3384***	0.0039	1.4252	0.0081	2.9403***
15	0.0051	1.8877*	0.0024	1.0011	0.0070	2.7848***
16	0.0034	2.1540**	0.0001	0.0616	0.0055	3.5553***
17	-0.0010	-0.5848	-0.0040	-2.3455***	0.0014	0.8332
18	-0.0008	-0.5416	-0.0043	-2.6833***	0.0009	0.6105
19	0.0051	1.8352*	0.0012	0.4642	0.0064	2.4376***
20	0.0087	2.2405**	0.0056	1.4796	0.0108	2.8155***

Notes: n represents the number of observations; *,**,*** statistically significant at the 10%, 5% and 1% critical level, respectively.

Table 5.1b

Daily Average Abnormal Returns (AAR) and the Abnormal Performance Index (API), Estimated using Market Model, Market and Mean Adjusted Expected Returns.

Clear Event Window (t=-20,...,+20)

Interim Earnings (n=152)

Day	Market Model		Market Adjusted		Mean Adjusted	
t	AAR	t-stat	AAR	t-stat	AAR	t-stat
-20	0.0014	0.7630	-0.0021	-1.1757	0.0020	1.1730
-19	-0.0001	-0.0441	-0.0027	-0.9366	0.0003	0.0926
-18	0.0029	1.1242	-0.0000	-0.0080	0.0041	1.5229
-17	0.0035	1.6186	0.0004	0.1835	0.0032	1.4385
-16	-0.0002	-0.1006	-0.0025	-1.5931	0.0004	0.2500
-15	0.0016	0.7909	-0.0015	-0.6597	0.0021	0.9993
-14	0.0022	1.0577	0.0003	0.1277	0.0023	1.1214
-13	0.0047	2.9967***	0.0014	0.8533	0.0047	3.1049***
-12	0.0011	0.9286	-0.0017	-1.4672	0.0026	2.2963**
-11	0.0025	1.0968	-0.0011	-0.4564	0.0032	1.4109
-10	-0.0027	-0.5614	-0.0052	-1.0579	-0.0017	-0.3455
-9	0.0075	1.1219	0.0043	0.6484	0.0081	1.2031
-8	0.0052	2.2319**	0.0020	0.8790	0.0056	2.4314***
-7	0.0011	0.7277	-0.0015	-0.9771	0.0015	1.0096
-6	0.0047	2.4076***	0.0024	1.1997	0.0053	2.7313***
-5	0.0029	1.3764	-0.0001	-0.0370	0.0037	1.7542*
-4	-0.0006	-0.2417	-0.0037	-1.4563	-0.0002	-0.0657
-3	0.0038	1.8774*	0.0014	0.7173	0.0044	2.1971**
-2	0.0016	0.8291	-0.0009	-0.4496	0.0022	1.0593
-1	0.0046	1.9182*	0.0014	0.6018	0.0061	2.4699***
0	-0.0167	-2.3526***	-0.0204	-2.8637***	-0.0163	-2.2882**
1	0.0028	0.6642	0.0006	0.1320	0.0036	0.8320
2	0.0010	0.2963	-0.0023	-0.7293	0.0017	0.5258
3	-0.0005	-0.1811	-0.0038	-1.4986	0.0008	0.3298
4	0.0031	1.0155	-0.0004	-0.1160	0.0028	0.9250
5	0.0025	1.5262	0.0002	0.1168	0.0043	2.7905***
6	0.0023	1.1042	-0.0002	-0.1104	0.0023	1.1399
7	0.0014	0.6180	-0.0017	-0.8151	0.0029	1.3600
8	0.0041	1.5642	0.0014	0.5218	0.0035	1.3728
9	0.0013	0.5476	-0.0018	-0.7477	0.0021	0.8683
10	0.0031	1.2681	-0.0002	-0.0760	0.0042	1.8180*
11	0.0049	2.7333***	0.0013	0.7204	0.0052	2.9137***
12	0.0051	2.4143***	0.0027	1.2220	0.0063	2.9513***
13	0.0043	1.8439*	0.0017	0.7015	0.0049	2.1583**
14	0.0026	1.0510	0.0001	0.0499	0.0038	1.5681
15	0.0041	1.9403*	0.0003	0.1546	0.0053	2.4826***
16	-0.0005	-0.1358	-0.0032	-0.9711	0.0009	0.2744
17	0.0020	1.1204	-0.0014	-0.7756	0.0020	1.1773
18	-0.0019	-0.4106	-0.0048	-1.0726	-0.0002	-0.0436
19	0.0013	0.3622	-0.0019	-0.4909	0.0014	0.3566
20	0.0010	0.3139	-0.0017	-0.5588	0.0018	0.5830

Notes: n represents the number of observations; *,**,*** statistically significant at the 10%, 5% and 1% critical level, respectively.

5.3.2 *Earnings Announcements*

Annual Earnings Reports

Figure 5.1 demonstrates a gradual upward trend of the API_t, preceding and following the average annual earnings report, for all expected returns models. In other words, the market gradually anticipates the event, but continues to adjust after its release as the full implications become known. In comparison, Figures 5.2 to 5.5 show a much lower level of anticipation and post-announcement drift, is associated with the release of other information types. We can only speculate at this stage, that greater anticipation of the annual earnings report is a function of the information's characteristics. For example, not only is the probability of release known with certainty, but the content of the annual report is more likely to be of greater precision and relevance for security valuation.

From Table 5.1a, we can see that the pattern, significance, and the level of return varies according to the measure of expected returns.[4] The highest average abnormal return occurs the day after the report's release. Table 5.1a reports a return on day +1 of 1.01 per cent and 0.71 for MM and MKT respectively, with corresponding t-statistics of 2.3267 and 1.6629. For MM, we also observe several significant positive returns on event days, -16, -14 through to -12, -8, -4, +2, +12 to +14, +16 and again on +20. Beyond this, any negative returns are rare and always statistically insignificant. In contrast, for the zero-one model (MKT), significant returns are few and always negative; occurring only on event days +17 and +18.

The most sizeable price movement occurs after the event date, though the overall returns pattern is one of an upward trend preceding and following the average annual earnings report. Given the general low significance of daily average abnormal returns, we are unable to confirm that the average annual earnings report conveys new information. However, the lagged impounding effect continuing at least until the day after the reports release, is consistent with other UK work by Firth (1981), Mitra & Owers (1995).

[4] For an abnormal return to be quoted as being significant, the level of significance must be at least 5 per cent, unless otherwise stated.

Interim Earnings Report

The API_t pattern for the average interim earnings report, depicted in Figure 5.2, is markedly different from the other figures. The returns series is considerably more volatile in anticipation of the release, relative to both the post-announcement period, and to the returns series of other information types. This behaviour of returns, implies there is possibly wider disagreement across investors' beliefs, concerning the implications of available information for the release, or the expected outcome, of the interim report. This impression of uncertainty is substantiated by an notable drop in price upon the report's release. The average interim earnings report therefore appears to convey, at least initially, 'bad' news relative to prior expectations.

The lowest return of the event period arises on the report date. Tables 5.1b reports a significant return equal to -1.67 per cent for MM, and -2.04 per cent for MKT; with respective t-values of -2.3526 and -2.8637. This price adjustment is stronger than that observed for annual earnings, a finding consistent with earlier studies (Atiase 1985).[5] Over and above this, the extent of significant returns are haphazard and less frequent than observed for the annual report, despite the more volatile nature of the returns series. For example, using the market model (MM), the null of no significant abnormal returns can be rejected only on event days: -13, -8, -6, the report date, +11 and +12. Overall the return series follows an upward trend, suggesting the average interim report bears favourable news. When beta is assumed to be one (MKT), then the overall pattern of drift is downward. This implies the opposing view to the market model, that the average interim earnings report bears disappointing news. However, the lowest and most significant return of the event period is similarly observed on the report date, of -2.04 per cent (t-value of -2.8637). Beyond this, we fail to reject the null on any of the other event days.

Therefore, due to the inconsistent results of MM and MKT, we provisionally conclude that the average interim earnings report stirs less investor interest than the annual report, perhaps a reflection of its lower information content. Not only is the overall

---

[5] The interim announcement therefore presents an opportunity to go short, although the position must be closed rapidly as the negative response only lasts a day.

level of return lower (as indicated by the level of drift), but interim reports appear to generate a smaller price response upon their release.

5.3.3 *Annual General Meetings*

The AGM is held some time after the preliminary earnings announcement, but is commonly used as a vehicle by the chairman to announce future plans, and we would therefore expect the event to signal new information. From Figure 5.3, the lower level of return seen over the event period suggests the AGM may reveal little new information relative to the earnings report, consistent with the earlier work of Firth (1981).

From Table 5.1c, the most sizeable price movement occurs over the pre-announcement period. For the market model (MM), the most significant returns are earned prior to the average meeting, on event days -14, -11 until -8, and -4, compared to +3 and +13 post the event. The day following the AGM, reports a negative though insignificant return. However, for the zero-one model (MKT) the only significant but negative return (-0.37 per cent), arises on day +1. Once again, use of the zero-one model implies the average AGM conveys disappointing news. The inconsistent results of MM and MKT, we tentatively conclude that the content of the average AGM is largely anticipated, but conveys little new information relative to earnings.

Table 5.1c

Daily Average Abnormal Returns (AAR) and the Abnormal Performance Index (API), Estimated using Market Model, Market and Mean Adjusted Expected Returns.

Clear Event Window (t=-20,...,+20)

AGMs (n=106)

Day	Market Model		Market Adjusted		Mean Adjusted	
t	AAR	t-stat	AAR	t-stat	AAR	t-stat
-20	0.0028	1.9749**	0.0020	1.2771	0.0047	2.6046***
-19	0.0009	0.4789	-0.0014	-0.6999	0.0025	1.4189
-18	0.0005	0.2948	-0.0006	-0.3468	0.0019	1.0696
-17	0.0016	0.8207	-0.0003	-0.1474	0.0024	1.2679
-16	0.0023	1.4595	0.0008	0.5263	0.0038	2.4956***
-15	0.0016	1.0279	-0.0004	-0.2545	0.0014	0.8710
-14	0.0036	2.6286***	0.0021	1.5109	0.0039	2.8344***
-13	0.0024	1.1447	-0.0001	-0.0600	0.0036	1.6974*
-12	0.0010	0.6893	-0.0006	-0.4025	0.0014	0.9500
-11	0.0034	1.9655**	0.0010	0.6273	0.0039	2.4274***
-10	0.0035	2.4450***	0.0022	1.5319	0.0048	3.2751***
-9	0.0048	2.0635**	0.0023	1.0783	0.0062	2.6940***
-8	0.0040	2.5302***	0.0023	1.4264	0.0036	2.3246***
-7	0.0022	1.4586	0.0009	0.5673	0.0025	1.6828*
-6	-0.0011	-0.6834	-0.0031	-1.8257*	-0.0014	-0.8434
-5	0.0008	0.5365	-0.0007	-0.4722	0.0008	0.5264
-4	0.0031	2.0151**	0.0017	1.1475	0.0041	2.6920***
-3	0.0015	1.4428	0.0005	0.4675	0.0016	1.4800
-2	0.0010	0.8154	-0.0002	-0.1302	0.0008	0.6729
-1	0.0026	1.3853	0.0018	0.9767	0.0033	1.7711*
0	0.0046	1.2997	0.0037	1.0361	0.0047	1.2988
1	-0.0027	-1.6958*	-0.0037	-2.2964**	-0.0022	-1.4116
2	0.0004	0.2233	-0.0015	-0.7575	0.0007	0.3614
3	0.0048	2.3309***	0.0031	1.5790	0.0048	2.3840***
4	0.0015	0.5968	-0.0002	-0.0833	0.0018	0.7235
5	0.0027	1.9396*	0.0012	0.8976	0.0030	2.1482**
6	0.0019	0.9345	0.0013	0.6172	0.0027	1.3274
7	-0.0005	-0.2343	-0.0024	-1.1970	-0.0010	-0.4604
8	-0.0022	-0.9157	-0.0028	-1.1405	-0.0018	-0.7524
9	0.0012	0.7824	-0.0002	-0.1051	0.0007	0.4571
10	0.0002	0.1952	-0.0011	-0.8345	-0.0003	-0.2275
11	0.0028	1.8236*	0.0016	1.0569	0.0021	1.3842
12	0.0013	0.8884	0.0007	0.4263	0.0007	0.4417
13	0.0024	2.0287**	0.0009	0.8058	0.0011	0.9803
14	-0.0001	-0.0837	-0.0006	-0.3971	0.0001	0.0892
15	-0.0002	-0.1954	-0.0012	-1.0363	-0.0003	-0.2603
16	0.0000	0.0097	-0.0009	-0.7184	0.0003	0.2213
17	0.0002	0.1583	-0.0005	-0.3478	0.0005	0.3066
18	-0.0021	-0.9069	-0.0029	-1.3797	-0.0027	-1.2936
19	-0.0024	-0.5994	-0.0032	-0.7973	-0.0037	-0.9141
20	-0.0021	-1.4015	-0.0033	-1.9889**	-0.0032	-2.0861**

Notes: n represents the number of observations; *,**,*** statistically significant at the 10%, 5% and 1% critical level, respectively.

Table 5.1d

Daily Average Abnormal Returns (AAR) and the Abnormal Performance Index (API), Estimated using Market Model, Market and Mean Adjusted Expected Returns.

Clear Event Window (t=-20,...,+20)

Board Changes (n=387)

Day	Market Model		Market Adjusted		Mean Adjusted	
t	AAR	t-stat	AAR	t-stat	AAR	t-stat
-20	0.0043	2.4526***	0.0025	1.4868	0.0051	2.9579***
-19	0.0018	1.1632	0.0000	0.0011	0.0022	1.5334
-18	0.0023	2.1388**	0.0003	0.3214	0.0033	3.1010***
-17	0.0004	0.3529	-0.0016	-1.3483	0.0006	0.5226
-16	-0.0001	-0.0701	-0.0018	-1.5995	0.0001	0.0689
-15	0.0003	0.3557	-0.0014	-1.8963*	0.0004	0.5523
-14	-0.0000	-0.0157	-0.0016	-1.6766*	0.0005	0.4704
-13	0.0011	1.0889	-0.0006	-0.5728	0.0017	1.6702*
-12	-0.0022	-1.6470*	-0.0030	-2.1943**	-0.0021	-1.5917
-11	0.0014	1.3929	0.0004	0.4101	0.0017	1.6261
-10	0.0004	0.3814	-0.0011	-0.9417	0.0005	0.4742
-9	0.0017	1.2449	-0.0001	-0.0781	0.0013	0.9421
-8	0.0006	0.6829	-0.0008	-0.9437	0.0008	0.9435
-7	0.0012	2.1438**	-0.0003	-0.5683	0.0015	2.5403***
-6	0.0007	0.7684	-0.0004	-0.5060	0.0003	0.3779
-5	0.0008	0.7564	-0.0005	-0.4855	0.0012	1.1544
-4	0.0019	2.2930**	0.0004	0.4517	0.0021	2.4855***
-3	0.0007	0.6932	-0.0005	-0.5616	0.0008	0.7981
-2	0.0006	0.6568	-0.0008	-0.8421	0.0013	1.3456
-1	0.0004	0.3907	-0.0012	-1.3176	0.0002	0.1833
0	0.0001	0.1386	-0.0009	-1.0661	0.0007	0.8329
1	-0.0005	-0.4839	-0.0014	-1.4523	0.0010	0.9789
2	0.0006	0.6304	-0.0003	-0.3590	0.0010	1.0359
3	-0.0011	-1.0071	-0.0026	-2.3692***	-0.0014	-1.2424
4	-0.0015	-1.1841	-0.0025	-2.0294**	-0.0008	-0.6330
5	-0.0006	-0.5505	-0.0024	-2.1961**	-0.0002	-0.1588
6	0.0001	0.0718	-0.0016	-1.6389	0.0001	0.0852
7	-0.0000	-0.0082	-0.0014	-1.3110	0.0004	0.3567
8	0.0016	1.3730	-0.0001	-0.0939	0.0016	1.3913
9	-0.0001	-0.0983	-0.0014	-1.4747	0.0004	0.3990
10	0.0012	1.3434	-0.0003	-0.2935	0.0013	1.4057
11	0.0006	0.6541	-0.0009	-1.0777	0.0007	0.7819
12	-0.0010	-0.7398	-0.0023	-1.6461*	-0.0017	-1.2088
13	0.0002	0.2534	-0.0010	-1.0891	0.0004	0.4543
14	0.0023	2.1819**	0.0008	0.8018	0.0030	2.9545***
15	0.0015	1.6648	0.0002	0.2220	0.0017	1.8382*
16	0.0009	0.7738	-0.0006	-0.5179	0.0007	0.6364
17	-0.0000	-0.0443	-0.0015	-1.6333	0.0003	0.2765
18	-0.0001	-0.8505	-0.0023	-1.9676**	-0.0010	-0.8340
19	0.0018	1.4889	0.0009	0.7155	0.0022	1.7454
20	-0.0008	-0.3428	-0.0018	-0.7514	-0.0005	-0.2321

Notes: n represents the number of observations; *,**,*** statistically significant at the 10%, 5% and 1% critical level, respectively.

Table 5.1e

Daily Average Abnormal Returns (AAR) and the Abnormal Performance Index (API), Estimated using Market Model, Market and Mean Adjusted Expected Returns.

Clear Event Window (t=-20,...,+20)

Changes in Shareholdings (n=927)

Day	Market Model		Market Adjusted		Mean Adjusted	
t	AAR	t-stat	AAR	t-stat	AAR	t-stat
-20	0.0004	0.5945	-0.0009	-1.4700	0.0003	0.5259
-19	0.0017	1.6166	0.0002	0.2314	0.0020	1.9085*
-18	0.0009	1.4788	-0.0006	-1.0455	0.0009	1.6065
-17	0.0000	0.0587	-0.0015	-2.0071**	0.0007	0.9362
-16	-0.0002	-0.1942	-0.0012	-1.4521	0.0005	0.5538
-15	0.0010	1.7964*	-0.0003	-0.5753	0.0018	3.1314***
-14	0.0018	2.6711***	0.0004	0.6345	0.0024	3.4090***
-13	0.0006	0.9831	-0.0008	-1.2644	0.0010	1.6200
-12	0.0000	0.0184	-0.0011	-1.6864*	0.0010	1.4732
-11	0.0005	0.7303	-0.0006	-0.9280	0.0011	1.7124
-10	0.0010	1.9958**	-0.0004	-0.7655	0.0013	2.4256***
-9	0.0004	0.4991	-0.0011	-1.4266	0.0009	1.2219
-8	0.0012	1.6131	0.0001	0.1972	0.0019	2.5328***
-7	0.0019	3.1552***	0.0008	1.3406	0.0023	3.7640***
-6	0.0022	3.1425***	0.0011	1.5776	0.0022	3.1480***
-5	0.0027	3.9690***	0.0016	2.3873***	0.0029	4.2500***
-4	0.0022	4.0671***	0.0010	1.7688*	0.0023	4.2826***
-3	0.0017	2.1982**	0.0005	0.6779	0.0018	2.3212**
-2	-0.0000	-0.0598	-0.0009	-1.4698	0.0002	0.3772
-1	0.0009	1.2963	-0.0002	-0.2464	0.0007	1.0757
0	0.0024	3.1604***	0.0013	1.8198*	0.0021	2.8165***
1	0.0004	0.4916	-0.0007	-0.8872	0.0006	0.8225
2	0.0017	2.7222***	0.0006	0.9401	0.0017	2.7035***
3	0.0015	2.6481***	0.0002	0.3832	0.0016	2.8922***
4	0.0023	3.2546***	0.0010	1.5265	0.0024	3.3974***
5	0.0012	2.5812***	0.0001	0.3062	0.0012	2.6514***
6	0.0008	1.6193	-0.0002	-0.4331	0.0016	3.0934***
7	0.0014	2.5050***	0.0002	0.4221	0.0016	2.9954***
8	0.0005	0.8504	-0.0007	-1.2416	0.0008	1.3689
9	0.0006	1.0510	-0.0007	-1.2229	0.0007	1.1501
10	0.0003	0.5674	-0.0006	-0.9996	0.0005	0.8531
11	0.0015	2.5877***	0.0002	0.3307	0.0014	2.2832**
12	0.0015	2.9253***	0.0006	1.0638	0.0013	2.4817***
13	0.0006	0.9699	-0.0006	-1.0111	0.0005	0.9386
14	0.0010	1.5186	-0.0005	-0.7285	0.0008	1.2170
15	0.0013	2.1534**	0.0002	0.3394	0.0013	2.2188**
16	0.0012	2.0961**	0.0004	0.7501	0.0015	2.5736***
17	0.0000	0.0279	-0.0012	-1.5200	0.0000	0.0019
18	-0.0001	-0.1727	-0.0009	-1.2704	-0.0000	-0.0017
19	0.0011	1.3648	0.0002	0.2338	0.0012	1.4759
20	0.0001	0.0530	-0.0009	-0.9514	0.0004	0.4189

Notes: n represents the number of observations; *,**,*** statistically significant at the 10%, 5% and 1% critical level, respectively.

5.3.4 *Board Changes*

A change of board member may prove critical in the running of the firm, and alter its long run operating strategy. Moreover, if the change has not arisen on rotation, uncertainty may temporarily increase until the market is fully acquainted with the capabilities of the new board member. The apparent importance of a board change varies substantially between the measure of expected returns used to calculate abnormal returns. Figure 5.4 depicts a much smoother trend in the returns series surrounding board changes than for either earnings or AGMS. Both the level of anticipation and the level of drift is lower than for the other events.

Similarly, for the market model (MM), both the level and the extent of significant returns reported in Table 5.1d for board changes, is much lower. The sizeable price movement arises over the prior period. With the most significant returns arising on event days -20, -18, -7, and -4, compared to the post period on day +14. This implies that either board changes are viewed with relatively little importance. Or alternatively, if the average board change occurs on rotation and therefore does not involve a new appointment, there may be little to anticipate.

Considering the results for the zero-one model (MKT), board changes would appear on average to convey 'bad' news relative to prior expectations. In contrast to MM, the implications of a board change appear largely unanticipated. Instead the most significant price movements are few, but mostly arise over the post-event period; i.e. on day -12 compared with days +3 to +5, and +18.

5.3.5 *Changes in Shareholdings*

The nature of this event is different from those examined above, in that a change in shareholding is mostly random and generally unexpected. Shareholding changes are therefore more likely to represent information that security markets must respond to, rather than anticipate. However, it may be possible to anticipate a shareholding change, if they coincide with patterns in market behaviour. Figure 5.5 shows the API_t follows a very smooth trend leading up to, and following the announcement, with drift of relatively low magnitude to the other information types. Little anticipation is consistent with there being no expectation of the event. However, a change in shareholding is generally executed by an important or large market player, whose actions may be interpreted as a response to privileged information and thereby act as a signal to the less well informed.[6] Therefore, we might expect to see a marked response to their action, and possibly initiating a run of transactions magnifying the drift. The smooth pattern depicted in Figure 5.5, implies the average change in shareholding is not regarded an important signal by the uninformed, unless many transactions go unobserved. The pattern is very similar as to the returns behaviour around board changes.

From Table 5.1e, the level and frequency of significant abnormal returns is considerably higher when estimated using the market model (MM), as opposed to the zero-one model (MKT). However, for both MM and MKT, the highest average abnormal return (AAR) is realized on the same day; 5 days prior to the announcement, with respective returns of 0.27 per cent and 0.16 per cent. The corresponding t-values of 3.97 and 2.39, suggest a significant delayed response to the shareholding change. Similar to the above event, use of the market model leads to greater rejection of the null hypothesis of no significant returns. For MM we can repeatedly reject the null on event days -14, -10, from -7 through to -3, 0, and days +2 to +5, +7, +11 to +12, and again on days +15 to +16. For MKT, there is only one other significant return beyond day +5, arising on day -17.

The market model, implies the likelihood of a change in shareholding increases after a period of active trading. The low but significant returns following the change, may be a delayed response of market participants mimicking the original shareholder's actions. The zero-one model, on the other hand, finds no indication of possible herding among investors.

5.3.6 *The Effect of Allowing Other Disclosures within the Event Window*

The above investigation is repeated, but this time allowing other disclosures alongside

[6] In a recent study, Gregory et al (1994) found once the size effect has been accounted for, the apparently significant abnormal returns that can be earned from mimicking director's trades diminishes.

the event under examination. In section 4.6 above, not surprisingly we found by allowing the event window to contain other disclosures vastly increased the available sample size. By not isolating the price behaviour associated with a particular event, we are unable to determine the relative importance of different information types. Therefore, while using unclear event windows may reduce the potential power of the tests, the restriction that the window be clear from other events, biases the sample towards both smaller, younger firms, and those who disclose less frequently.

If market anticipation is a function of the frequency of corporate disclosure, greater disclosure over the event period may either positively or negatively influence the level of anticipation associated with the event of interest. Thereby excluding event periods with more than one disclosure, may also restrict the general applicability and practicality of the results. The effect on the pattern of returns is illustrated in Figures 5.6 to 5.10, and documented in Tables 5.2a to 5.2e below.

Figure 5.6: The Abnormal Performance Index Around Annual Earnings Reports, Using Unclear Event Windows

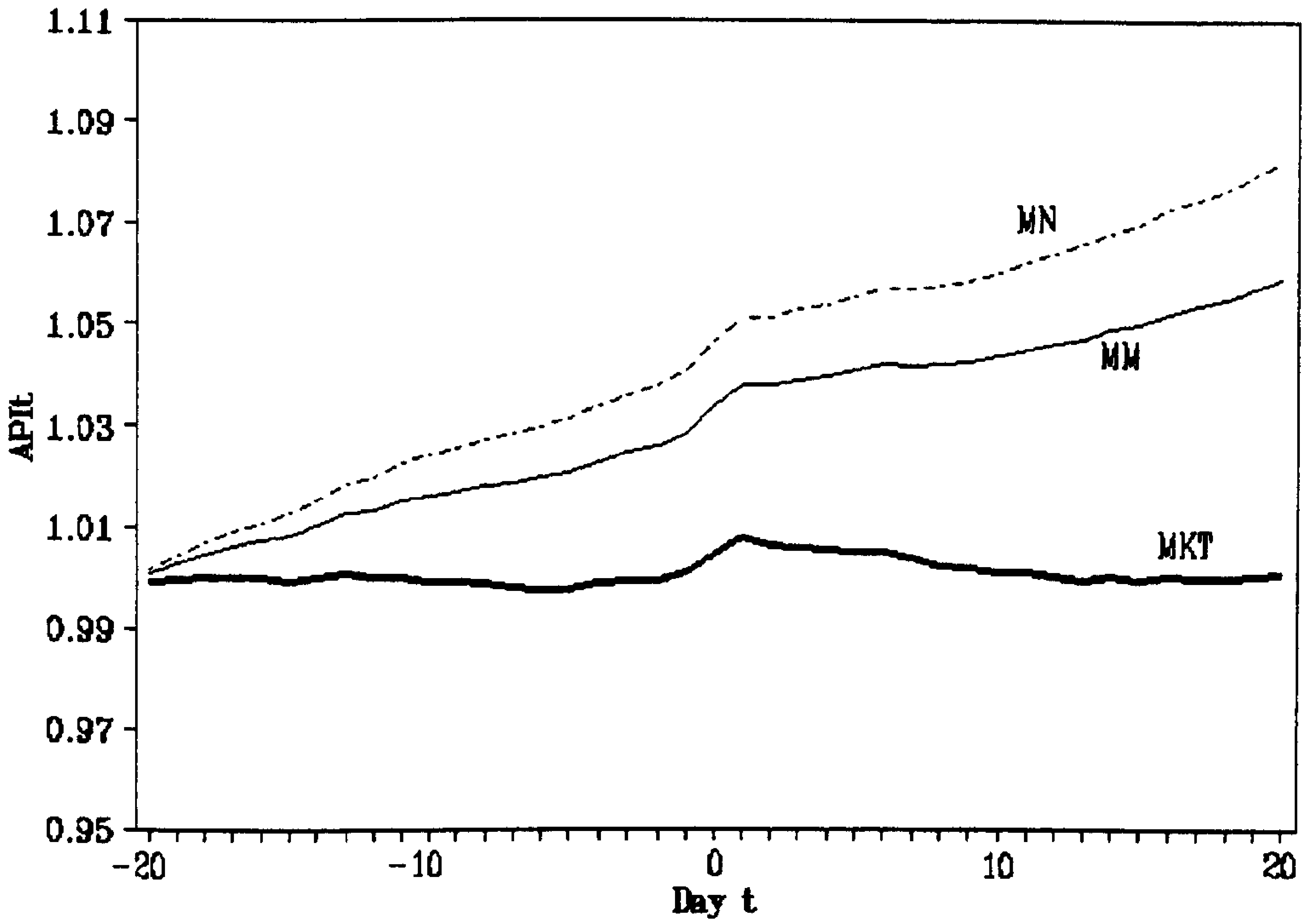


Figure 5.7: The Abnormal Performance Index Around Interim Earnings Reports, Using Unclear Event Windows

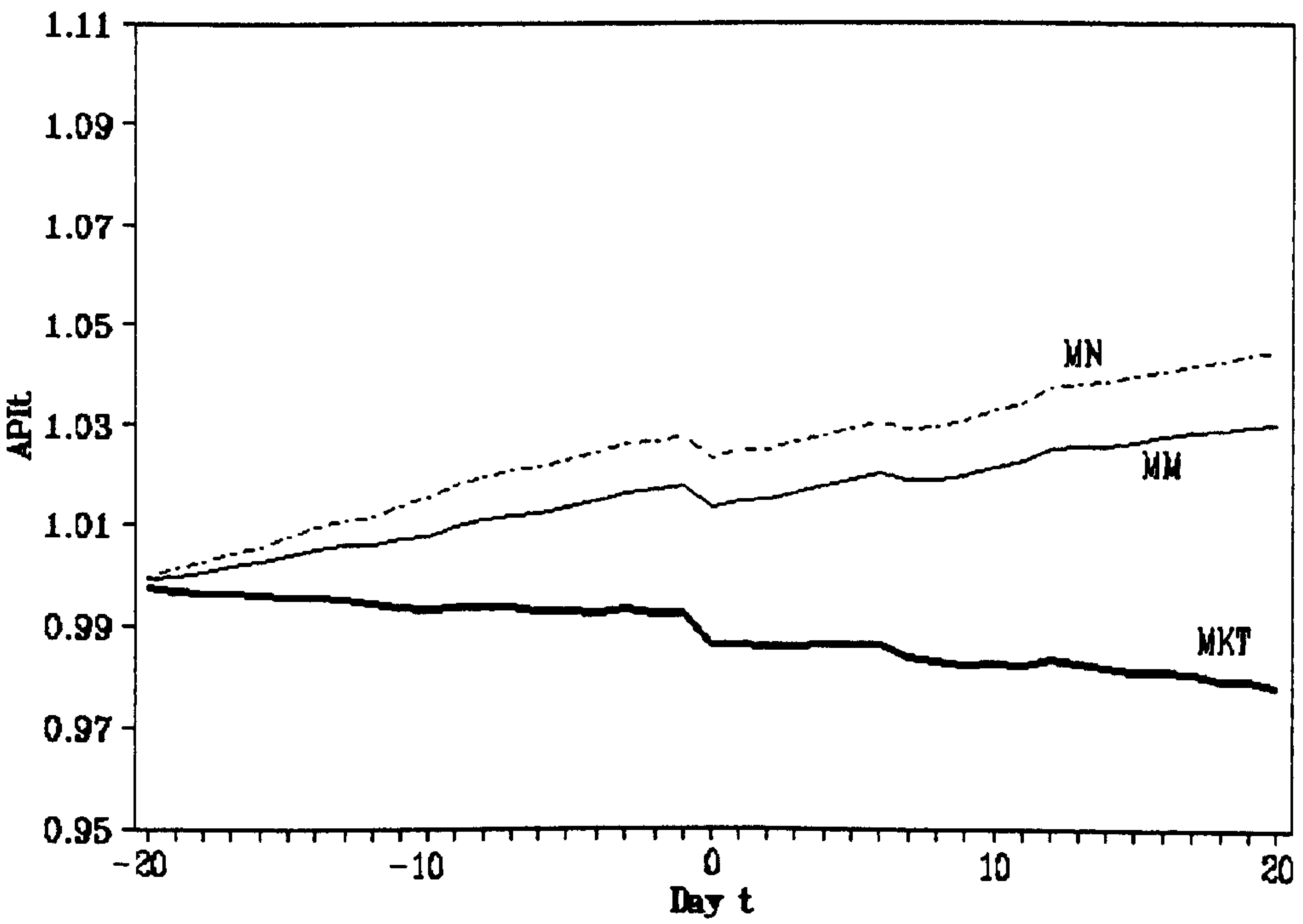


Figure 5.8: The Abnormal Performance Index Around AGMs, Using Unclear Event Windows

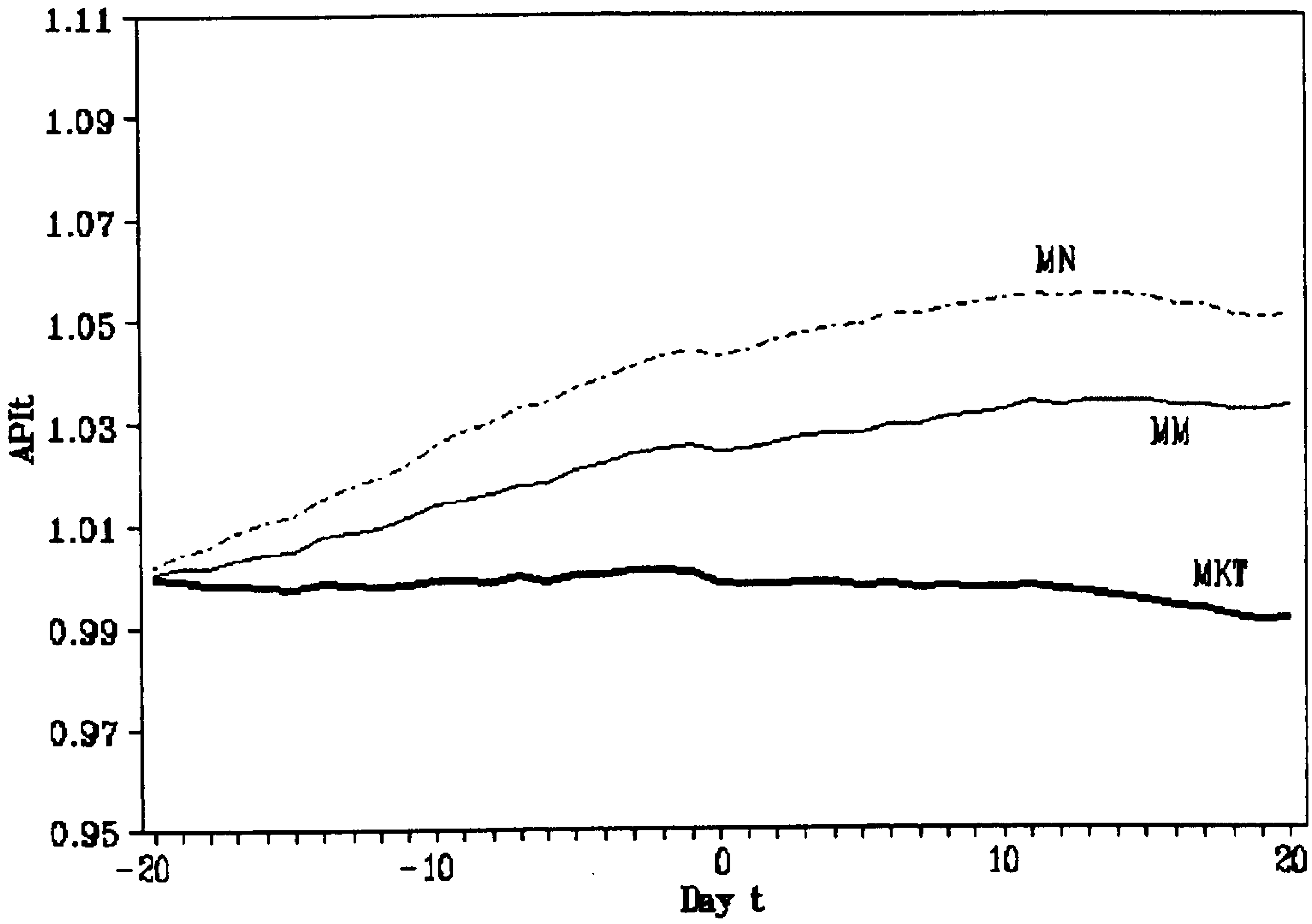


Figure 5.9: The Abnormal Performance Index Around Board Changes, Using Unclear Event Windows

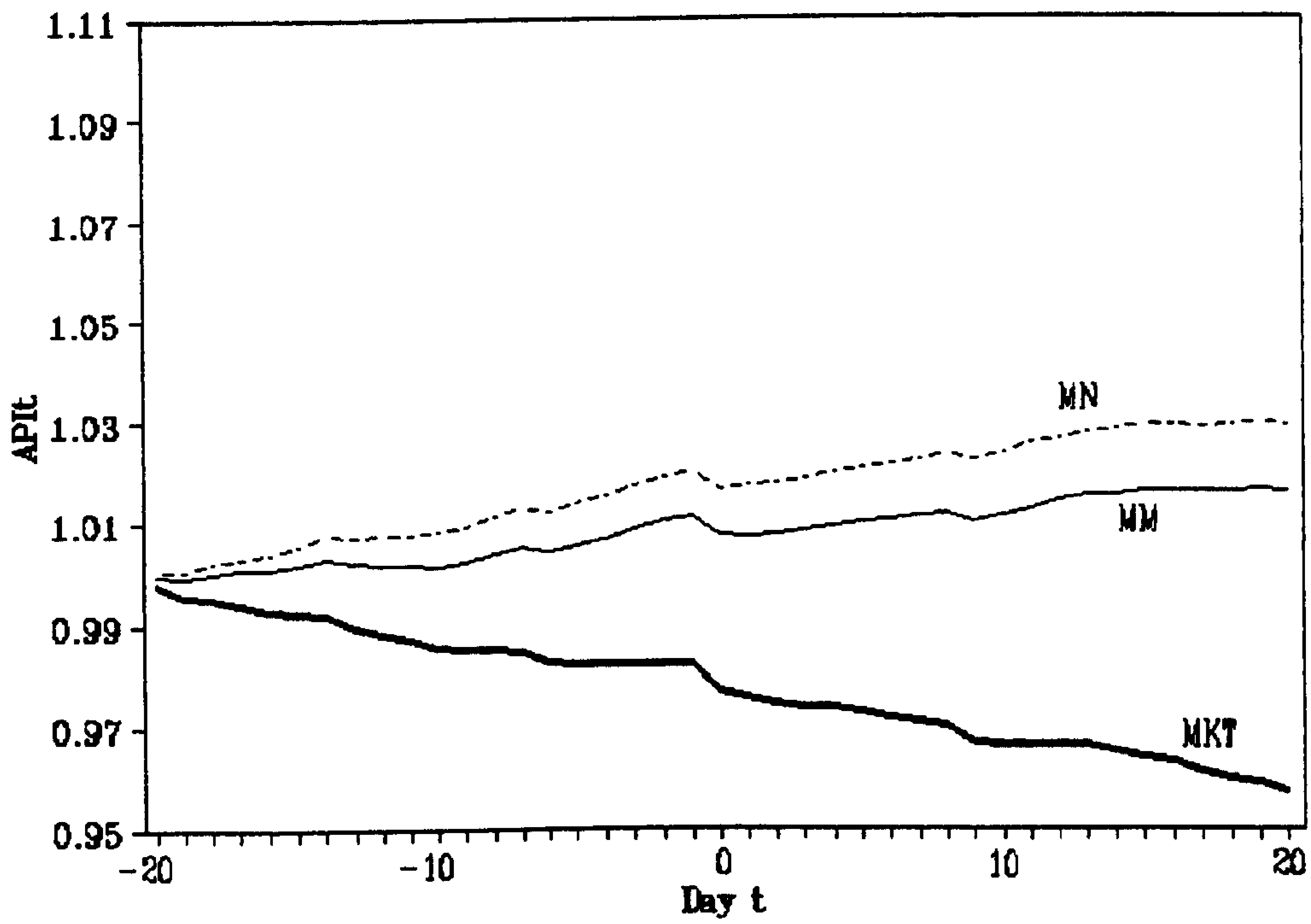
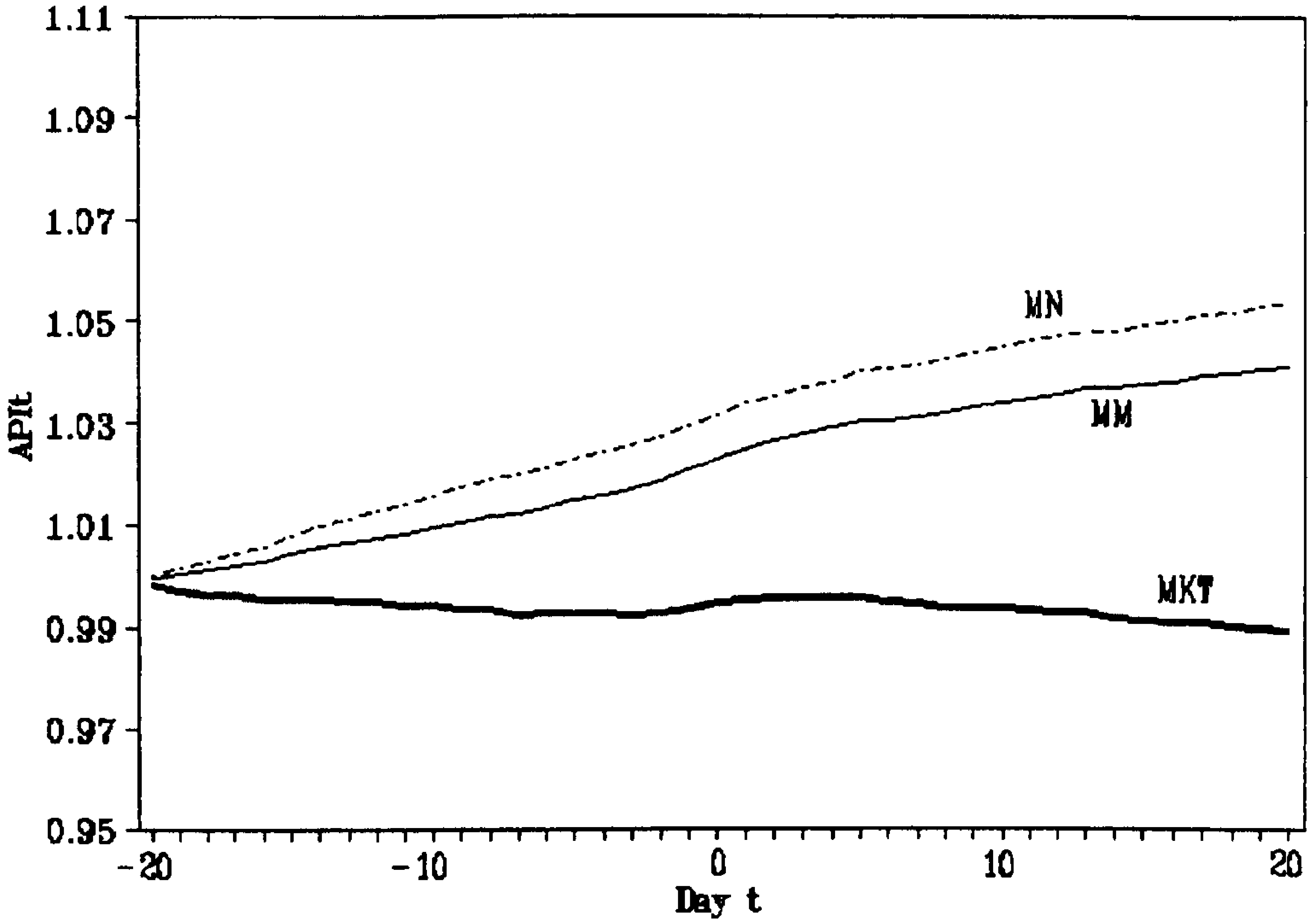


Figure 5.10: The Abnormal Performance Index Around Changes in Shareholdings, Using Unclear Event Windows



Inspection of Figures 5.6 to 5.10, shows a smoothing in the API pattern from the inclusion of other disclosures within the event window. Also, on comparing Figures 5.1 and 5.6, there is a noticeable reduction in the level of drift for annual earnings reports. To a lesser extent, this is also true of interim earnings reports and AGMs. However there is little notable alteration for board changes and a change in shareholding. This apparent reduction in both anticipation and post-announcement drift, may in part reflect the small firm bias of employing clear windows (see section 4.6).

If market anticipation increases with firm size, a higher proportion of large firms in the sample, will have the effect of reducing the overall significance of the returns, as displayed in Tables 5.6 to 5.10. Alternatively, reduced significance may reflect increased noise generated by the inclusion of confounding events within the window, making it more difficult to identify a clear market response to the event under scrutiny. For instance, if larger companies are more frequent disclosers, it is more difficult to separate the effect of individual events on security prices.

Table 5.2a

Daily Average Abnormal Returns (AAR) and the Abnormal Performance Index (API), Estimated using Market Model, Market and Mean Adjusted Expected Returns.

Unclear Event Window (t=-20,...,+20)

Annual Earnings (n=1830)

Day	Market Model		Market Adjusted		Mean Adjusted	
t	AAR	t-stat	AAR	t-stat	AAR	t-stat
-20	0.0020	0.1154	0.0005	0.0268	0.0029	0.1639
-19	0.0019	0.0933	0.0004	0.0213	0.0025	0.1214
-18	0.0019	0.1026	0.0003	0.0153	0.0026	0.1402
-17	0.0015	0.0869	0.0002	0.0085	0.0023	0.1304
-16	0.0012	0.0502	-0.0003	-0.0119	0.0016	0.0669
-15	0.0010	0.0536	-0.0006	-0.0305	0.0018	0.0986
-14	0.0019	0.0994	0.0005	0.0260	0.0025	0.1299
-13	0.0024	0.1108	0.0009	0.0422	0.0032	0.1468
-12	0.0005	0.0191	-0.0009	-0.0344	0.0015	0.0592
-11	0.0017	0.0549	0.0003	0.0097	0.0024	0.0765
-10	0.0008	0.0357	-0.0009	-0.0364	0.0015	0.0633
-9	0.0010	0.0509	-0.0001	-0.0070	0.0016	0.0753
-8	0.0011	0.0576	-0.0003	-0.0164	0.0016	0.0860
-7	0.0006	0.0291	-0.0009	-0.0411	0.0011	0.0504
-6	0.0009	0.0421	-0.0004	-0.0193	0.0012	0.0573
-5	0.0011	0.0520	0.0000	0.0018	0.0016	0.0729
-4	0.0020	0.0803	0.0009	0.0355	0.0024	0.0958
-3	0.0019	0.0803	0.0007	0.0288	0.0021	0.0897
-2	0.0012	0.0571	0.0003	0.0120	0.0019	0.0869
-1	0.0025	0.1008	0.0015	0.0579	0.0028	0.1110
0	0.0048	0.0614	0.0036	0.0456	0.0052	0.0669
1	0.0042	0.1057	0.0031	0.0780	0.0045	0.1129
2	-0.0001	-0.0039	-0.0014	-0.0413	-0.0000	-0.0002
3	0.0007	0.0269	-0.0005	-0.0205	0.0013	0.0492
4	0.0009	0.0414	-0.0004	-0.0169	0.0008	0.0398
5	0.0012	0.0492	-0.0003	-0.0109	0.0015	0.0621
6	0.0012	0.0532	0.0001	0.0044	0.0016	0.0682
7	-0.0001	-0.0066	-0.0015	-0.0680	0.0002	0.0090
8	0.0001	0.0037	-0.0015	-0.0693	0.0007	0.0318
9	0.0007	0.0288	-0.0008	-0.0336	0.0008	0.0350
10	0.0010	0.0379	-0.0003	-0.0129	0.0016	0.0634
11	0.0012	0.0586	-0.0003	-0.0165	0.0018	0.0908
12	0.0011	0.0431	-0.0005	-0.0196	0.0014	0.0563
13	0.0010	0.0575	-0.0008	-0.0448	0.0018	0.0989
14	0.0019	0.0904	0.0005	0.0251	0.0022	0.0999
15	0.0005	0.0286	-0.0007	-0.0349	0.0014	0.0736
16	0.0023	0.1222	0.0005	0.0285	0.0029	0.1530
17	0.0013	0.0710	-0.0002	-0.0107	0.0019	0.1006
18	0.0014	0.0857	-0.0001	-0.0084	0.0019	0.1130
19	0.0017	0.0786	0.0004	0.0171	0.0022	0.1034
20	0.0020	0.0871	0.0006	0.0263	0.0027	0.1168

Notes: n represents the number of observations; *,**,*** statistically significant at the 10%, 5% and 1% critical level, respectively.

Table 5.2b

Daily Average Abnormal Returns (AAR) and the Abnormal Performance Index (API), Estimated using Market Model, Market and Mean Adjusted Expected Returns.

Unclear Event Window (t=-20,....,+20)

Interim Earnings (n=1452)

Day	Market Model		Market Adjusted		Mean Adjusted	
t	AAR	t-stat	AAR	t-stat	AAR	t-stat
-20	0.0002	0.3708	-0.0013	-2.6816***	0.0009	1.8829*
-19	0.0006	1.2405	-0.0007	-1.3961	0.0016	3.0130***
-18	0.0007	1.2724	-0.0003	-0.6322	0.0012	2.2750**
-17	0.0014	3.4259***	-0.0001	-0.1482	0.0014	3.3666***
-16	0.0007	1.6573*	-0.0004	-0.9147	0.0014	3.1051***
-15	0.0010	2.0562**	-0.0004	-0.7916	0.0020	4.1298***
-14	0.0014	2.9560***	-0.0002	-0.3780	0.0020	4.1780***
-13	0.0010	2.2441**	-0.0003	-0.5647	0.0014	3.1132***
-12	0.0002	0.6626	-0.0011	-2.9628***	0.0007	2.0480**
-11	0.0010	2.0305**	-0.0003	-0.5951	0.0019	3.6227***
-10	0.0005	0.7358	-0.0007	-1.1708	0.0015	2.4238***
-9	0.0017	1.9915**	0.0004	0.4574	0.0025	2.8664***
-8	0.0013	2.7410***	0.0002	0.4104	0.0016	3.3807***
-7	0.0008	1.6159	-0.0003	-0.5376	0.0011	2.2969**
-6	0.0007	1.3565	-0.0005	-1.1010	0.0009	1.8357*
-5	0.0012	2.4949***	-0.0001	-0.2452	0.0013	2.7002***
-4	0.0010	1.7679*	-0.0002	-0.3707	0.0013	2.2251**
-3	0.0018	2.8301***	0.0007	1.0886	0.0019	2.9631***
-2	0.0006	0.6451	-0.0007	-0.7567	0.0004	0.3900
-1	0.0009	1.1585	-0.0003	-0.4124	0.0010	1.2735
0	-0.0046	-2.3501***	-0.0060	-3.0577***	-0.0042	-2.1626**
1	0.0013	1.2440	0.0002	0.2193	0.0015	1.4450
2	0.0002	0.2413	-0.0010	-1.1244	0.0001	0.0644
3	0.0015	1.9877**	0.0002	0.2451	0.0014	1.8253*
4	0.0014	2.1841**	0.0004	0.5500	0.0014	2.1935**
5	0.0015	2.6322***	0.0004	0.7045	0.0016	3.0011***
6	0.0009	1.7172*	-0.0003	-0.5003	0.0011	2.0105**
7	-0.0013	-2.1145**	-0.0024	-3.9524***	-0.0009	-1.5762
8	0.0003	0.6082	-0.0009	-1.7120	0.0003	0.5944
9	0.0007	1.1879	-0.0006	-0.9428	0.0011	1.8946*
10	0.0016	3.0296***	0.0002	0.3587	0.0020	3.8111***
11	0.0011	2.5577***	-0.0003	-0.6831	0.0014	3.1231***
12	0.0025	4.7109***	0.0014	2.5201***	0.0029	5.3826***
13	0.0004	0.7938	-0.0009	-1.7664*	0.0009	1.7068*
14	0.0001	0.1666	-0.0011	-1.4752	0.0003	0.4735
15	0.0007	1.1683	-0.0007	-1.2204	0.0011	1.9307*
16	0.0011	1.6929*	-0.0002	-0.2665	0.0012	1.8520*
17	0.0010	2.1536**	-0.0003	-0.6204	0.0011	2.1826**
18	0.0001	0.1565	-0.0012	-1.6060	0.0006	0.8372
19	0.0009	1.6504*	-0.0003	-0.4479	0.0011	1.8400*
20	0.0004	0.6229	-0.0010	-1.4585	0.0009	1.3133

Notes: n represents the number of observations; *,**,*** statistically significant at the 10%, 5% and 1% critical level, respectively.

Annual Earnings Report

Figure 5.6 depicts the API_t as an continuous upward trend over the event window, for all expected returns models. Once again, we see from Figures 5.6 to 5.10, the annual earnings report is associated with a higher level of anticipation, and post-announcement drift, than for other information types. Although, the overall level of drift is much reduced from the inclusion of other events within the window. In addition, the inclusion of other events results in the failure to reject the null of no significant abnormal returns, over the entire event window for each measure of expected returns; see Table 5.2a. For both the market model and the zero-one model, the highest return instead occurs on the report date, as opposed to t=1 previously using clear windows. Table 5.2a reports values of 0.48 per cent and 0.36, for MM and MKT respectively. Given the overall low significance of average daily abnormal returns, we cannot reliably conclude that an investor can earn a positive return from either anticipating, or trading upon, the information released by the average annual earnings report.

Interim Earnings Report

Figure 5.2b displays the inclusion of other disclosures within the event window, reduces the overall level of drift associated with the interim report. As before, use of the market model implies good news relative to prior expectations, whereas the zero-one model indicates bad news. Figure 5.2b also demonstrates a notable reduction in the volatile nature of stock returns. Table 5.2b, on the other hand, reports an overall increase in the level of significance of daily average abnormal returns. A significant, though diminished negative price adjustment is still observed upon the release of the report; with returns of -0.46 per cent and -0.60 per cent for MM and MKT, respectively. To illustrate the increase in overall significance, use of the market model increases the number of instances the null is rejected, from 6 to 18 instances. With respect to the zero-one model, from a single significant negative return on the report date, we now also observe significant negative returns on event days -20, -12 and +7, and a significant positive return on day +12.

Table 5.2c

Daily Average Abnormal Returns (AAR) and the Abnormal Performance Index (API), Estimated using Market Model, Market and Mean Adjusted Expected Returns.

Unclear Event Window (t=-20,...,+20)

AGMs (n=481)

Day	Market Model		Market Adjusted		Mean Adjusted	
t	AAR	t-stat	AAR	t-stat	AAR	t-stat
-20	0.0017	2.2685**	0.0008	0.9901	0.0033	3.9941***
-19	0.0010	1.2085	-0.0005	-0.5980	0.0023	2.8802***
-18	0.0002	0.2716	-0.0009	-1.1740	0.0012	1.4623
-17	0.0016	2.1315**	0.0002	0.3148	0.0028	3.6292***
-16	0.0010	1.1952	-0.0004	-0.4252	0.0021	2.4064***
-15	0.0008	0.8503	-0.0006	-0.6442	0.0014	1.4970
-14	0.0026	3.3766***	0.0015	1.9710**	0.0033	4.2535***
-13	0.0010	1.1690	-0.0005	-0.6355	0.0021	2.3376**
-12	0.0008	0.9105	-0.0003	-0.3124	0.0017	1.8891*
-11	0.0017	2.0881**	0.0001	0.1237	0.0023	2.7940***
-10	0.0022	3.1269***	0.0010	1.3730	0.0039	5.4827***
-9	0.0012	1.3669	-0.0001	-0.0883	0.0026	2.8502***
-8	0.0010	1.3436	-0.0003	-0.4361	0.0015	2.0159**
-7	0.0019	2.2887**	0.0009	1.1107	0.0028	3.2882***
-6	0.0002	0.3340	-0.0010	-1.4549	0.0010	1.4511
-5	0.0023	2.7913***	0.0010	1.2612	0.0026	3.0386***
-4	0.0015	2.0135**	0.0002	0.3024	0.0018	2.4502**
-3	0.0018	2.5832***	0.0008	1.2068	0.0024	3.3288***
-2	0.0011	1.7522*	-0.0001	-0.2365	0.0017	2.6391***
-1	0.0005	0.5684	-0.0003	-0.3488	0.0011	1.3149
0	-0.0013	-0.6801	-0.0022	-1.1507	-0.0009	-0.4935
1	0.0008	0.7779	-0.0002	-0.1938	0.0011	1.0811
2	0.0009	1.1330	0.0000	0.0442	0.0018	2.1357**
3	0.0010	1.0262	0.0003	0.2904	0.0015	1.3970
4	0.0008	0.8452	-0.0001	-0.0914	0.0010	1.0035
5	0.0001	0.0729	-0.0009	-1.0578	0.0005	0.5238
6	0.0014	1.4607	0.0005	0.5569	0.0016	1.6823
7	0.0001	0.0621	-0.0008	-0.9207	0.0000	0.0043
8	0.0012	1.1989	0.0003	0.3398	0.0014	1.4089
9	0.0005	0.6508	-0.0002	-0.2535	0.0007	1.0147
10	0.0009	0.9679	-0.0004	-0.4013	0.0006	0.6433
10	0.0013	1.8033*	0.0007	0.9465	0.0010	1.3906
12	-0.0003	-0.3180	-0.0008	-0.8783	-0.0003	-0.2849
13	0.0006	0.5001	-0.0003	-0.2310	0.0001	0.0529
14	-0.0002	-0.2112	-0.0009	-1.2010	0.0001	0.1715
15	-0.0000	-0.0157	-0.0009	-1.0728	-0.0004	-0.4201
16	-0.0004	-0.4403	-0.0012	-1.2170	-0.0015	-1.4879
17	0.0001	0.0859	-0.0005	-0.8001	-0.0003	-0.4025
18	-0.0010	-1.1766	-0.0018	-2.2553**	-0.0016	-1.9477*
19	-0.0001	-0.0576	-0.0006	-0.4893	-0.0004	-0.3791
20	0.0009	1.0187	0.0003	0.3660	0.0004	0.4673

Notes: n represents the number of observations; *,**,*** statistically significant at the 10%, 5% and 1% critical level, respectively.

Table 5.2d

Daily Average Abnormal Returns (AAR) and the Abnormal Performance Index (API), Estimated using Market Model, Market and Mean Adjusted Expected Returns.

Unclear Event Window (t=-20,...,+20)

Board Changes (n=1807)

Day	Market Model		Market Adjusted		Mean Adjusted	
t	AAR	t-stat	AAR	t-stat	AAR	t-stat
-20	0.0009	0.0274	-0.0007	-0.0220	0.0016	0.0485
-19	-0.0005	-0.0139	-0.0023	-0.0632	0.0001	0.0024
-18	0.0009	0.0284	-0.0007	-0.0236	0.0015	0.0485
-17	0.0006	0.0250	-0.0011	-0.0464	0.0011	0.0440
-16	0.0003	0.0131	-0.0014	-0.0575	0.0007	0.0286
-15	0.0008	0.0358	-0.0005	-0.0250	0.0015	0.0649
-14	0.0009	0.0394	-0.0003	-0.0136	0.0018	0.0736
-13	-0.0007	-0.0272	-0.0021	-0.0846	-0.0002	-0.0094
-12	-0.0005	-0.0137	-0.0015	-0.0433	0.0002	0.0049
-11	-0.0003	-0.0075	-0.0014	-0.0409	0.0004	0.0129
-10	-0.0001	-0.0028	-0.0015	-0.0413	0.0005	0.0139
-9	0.0008	0.0335	-0.0007	-0.0282	0.0011	0.0420
-8	0.0017	0.0787	0.0003	0.0125	0.0020	0.0907
-7	0.0011	0.0446	-0.0004	-0.0180	0.0015	0.0621
-6	-0.0008	-0.0266	-0.0021	-0.0685	-0.0007	-0.0224
-5	0.0013	0.0468	-0.0001	-0.0044	0.0015	0.0526
-4	0.0012	0.0506	-0.0005	-0.0188	0.0015	0.0598
-3	0.0019	0.0741	0.0004	0.0174	0.0021	0.0797
-2	0.0014	0.0538	-0.0001	-0.0029	0.0018	0.0677
-1	0.0009	0.0331	-0.0004	-0.0131	0.0011	0.0413
0	-0.0037	-0.0545	-0.0053	-0.0777	-0.0036	-0.0523
1	-0.0001	-0.0027	-0.0014	-0.0399	0.0008	0.0222
2	0.0002	0.0040	-0.0011	-0.0243	0.0003	0.0063
3	0.0007	0.0244	-0.0007	-0.0223	0.0009	0.0283
4	0.0011	0.0442	-0.0001	-0.0050	0.0013	0.0541
5	0.0007	0.0310	-0.0008	-0.0366	0.0008	0.0365
6	0.0002	0.0075	-0.0013	-0.0541	0.0005	0.0202
7	0.0009	0.0371	-0.0008	-0.0330	0.0011	0.0448
8	0.0007	0.0307	-0.0009	-0.0367	0.0010	0.0425
9	-0.0018	-0.0620	-0.0032	-0.1126	-0.0011	-0.0393
10	0.0010	0.0367	-0.0005	-0.0189	0.0012	0.0401
11	0.0015	0.0673	-0.0000	-0.0000	0.0018	0.0805
12	0.0014	0.0492	-0.0001	-0.0018	0.0011	0.0396
13	0.0012	0.0478	-0.0002	-0.0084	0.0012	0.0497
14	0.0002	0.0074	-0.0010	-0.0342	0.0007	0.0244
15	0.0005	0.0170	-0.0010	-0.0324	0.0005	0.0165
16	0.0004	0.0130	-0.0012	-0.0412	0.0003	0.0098
17	-0.0005	-0.0229	-0.0019	-0.0853	-0.0004	-0.0175
18	0.0003	0.0100	-0.0011	-0.0426	0.0003	0.0120
19	0.0005	0.0195	-0.0009	-0.0380	0.0006	0.0253
20	-0.0004	-0.0116	-0.0020	-0.0535	-0.0006	-0.0153

Notes: n represents the number of observations; *,**,*** statistically significant at the 10%, 5% and 1% critical level, respectively.

Table 5.2e

Daily Average Abnormal Returns (AAR) and the Abnormal Performance Index (API), Estimated using Market Model, Market and Mean Adjusted Expected Returns.

Unclear Event Window (t=-20,...,+20)

Changes in Shareholdings (n=4354)

Day	Market Model		Market Adjusted		Mean Adjusted	
t	AAR	t-stat	AAR	t-stat	AAR	t-stat
-20	0.0009	2.4253***	-0.0006	-0.0252	0.0014	3.7939***
-19	0.0006	1.1953	-0.0009	-0.0282	0.0013	2.6415***
-18	0.0008	1.8438*	-0.0008	-0.0267	0.0014	3.2097***
-17	0.0011	2.8031***	-0.0004	-0.0156	0.0018	4.6547***
-16	0.0009	2.1630**	-0.0004	-0.0157	0.0013	3.2573***
-15	0.0013	2.9132***	-0.0001	-0.0050	0.0018	4.1081***
-14	0.0012	2.9894***	-0.0001	-0.0034	0.0019	4.6050***
-13	0.0009	2.7013***	-0.0004	-0.0180	0.0013	3.8422***
-12	0.0010	2.2977**	-0.0003	-0.0094	0.0016	3.8587***
-11	0.0006	1.3153	-0.0007	-0.0236	0.0010	2.1098**
-10	0.0014	3.7887***	-0.0001	-0.0038	0.0018	4.9421***
-9	0.0009	2.0449**	-0.0004	-0.0147	0.0015	3.4081***
-8	0.0011	2.7049***	-0.0002	-0.0059	0.0017	4.0196***
-7	0.0003	0.5315	-0.0009	-0.0254	0.0006	1.0512
-6	0.0013	2.6050***	0.0001	0.0031	0.0014	2.8732***
-5	0.0015	3.5244***	0.0003	0.0110	0.0018	4.1772***
-4	0.0009	2.2254**	-0.0003	-0.0122	0.0012	2.7121***
-3	0.0010	2.5673***	-0.0002	-0.0084	0.0012	2.9664***
-2	0.0017	4.0489***	0.0006	0.0220	0.0018	4.2763***
-1	0.0019	4.0750***	0.0007	0.0239	0.0019	4.1046***
0	0.0022	4.6543***	0.0010	0.0315	0.0021	4.5162***
1	0.0018	4.6455***	0.0006	0.0244	0.0020	5.1610***
2	0.0015	4.1099***	0.0003	0.0127	0.0015	4.0710***
3	0.0012	3.5078***	-0.0001	-0.0039	0.0015	4.2685***
4	0.0013	3.3113***	0.0001	0.0030	0.0014	3.5881***
5	0.0014	4.3279***	0.0002	0.0109	0.0016	5.0834***
6	0.0001	0.1929	-0.0012	-0.0530	0.0005	1.3201
7	0.0008	2.0590**	-0.0004	-0.0166	0.0010	2.3928***
8	0.0007	2.0448**	-0.0005	-0.0232	0.0010	2.9584***
9	0.0011	3.1234***	-0.0001	-0.0041	0.0013	3.7757***
10	0.0011	3.5159***	0.0000	0.0002	0.0013	4.2444***
11	0.0007	2.0089**	-0.0005	-0.0215	0.0007	2.2399**
12	0.0007	2.0934**	-0.0004	-0.0172	0.0008	2.3500***
13	0.0010	3.0910***	-0.0002	-0.0088	0.0010	3.1544***
14	0.0000	0.0360	-0.0012	-0.0410	0.0001	0.2603
15	0.0007	1.8411*	-0.0004	-0.0169	0.0009	2.3273***
16	0.0009	2.4579***	-0.0002	-0.0072	0.0010	2.8481***
17	0.0011	3.0959***	-0.0001	-0.0051	0.0012	3.3993***
18	0.0002	0.5018	-0.0008	-0.0372	0.0005	1.3549
19	0.0008	2.3164**	-0.0004	-0.0186	0.0009	2.5978***
20	0.0005	1.4572	-0.0005	-0.0210	0.0008	2.2790**

Notes: n represents the number of observations; *,**,*** statistically significant at the 10%, 5% and 1% critical level, respectively.

Annual General Meetings

Figure 5.8 demonstrates a reduction in the level of anticipation and the level of drift, from the use of unclear event windows. However, the inclusion of other disclosures within the event window notably increases the significance of returns prior to the meeting, for the use of the market model (MM). From Table 5.2c, we can repeatedly reject the null at 5 per cent significance, on event days -20, -17, -14, -11 to -10, -7, and then on day -5 through to -3. Akin to interim earnings, the most sizeable price movement occurs prior to the meeting, although returns are generally insignificant. In contrast, for the zero-one model, only event days -14 and +18 are reported as being statistically significant (MKT). Again, a negative return is observed on the day of the meeting, for both MM and MKT.

Board Changes

There is little notable difference in the patterns of returns behaviour depicted for clear and unclear event windows, in figures 5.4 and 5.9 respectively. Other disclosures within the event window appear to have less of an effect upon the anticipation and the interpretation of board changes, relative to earnings or AGMs. The picture presented for board changes in Table 5.2d, is very similar to that of annual earnings, in that the overall significance of returns is much reduced. We again witness a slight upward (downward) trend of the API_t over the event window for MM (MKT), though none of the 41 daily returns prove to be significant.

Changes in Shareholdings

As for board changes, Figure 5.10 shows the pattern of returns behaviour little changes between using clear and unclear event windows. Other events appear to have little influence upon how investors react to a change in shareholding. Table 5.2e illustrates the sensitivity of the API metric, to the model of expected returns employed. However, allowing other disclosures in the same event window, little changes the overall return that investors may possibly earn, calculated using either the market model (MM) or the zero-one model (MKT). For MM, Table 5.2e reports a general increase in the level of significance of daily abnormal returns over the event window. For instance, we only fail to reject the null for 9 of the possible 41 event days examined. In the days leading up to the announcement, abnormal returns are positive (though no greater than 0.19 per cent) and often highly significant.

This supports the earlier notion of the likelihood of a change in shareholding, increasing after a period of active trading. The most significant returns occur prior to the announcement, from t=-2, and persist to t=+2. Although, abnormal returns are repeatedly significant over the remainder of the event window, this apparent lagged impounding suggests a change in shareholding is interpreted as an important signal, and mimicked by investors over the subsequent days. However, these observations greatly contrast with the API_t pattern depicted from using MKT. Daily abnormal returns are instead on average negative, but none are shown to be statistically significant.

5.3.7 *In Summary*

The information metric, API_t, is highly sensitive to the model of excess returns employed. The sensitivity of API_t therefore encourages the use of different approaches in analysing the market reaction to corporate disclosures. Consequently, both the frequency, size, and the statistical significance of daily average abnormal returns, varies across excess return metrics for each information type. Although the above analysis is representative only of the average reaction, to complete our empirical analysis it is not necessary to have a more accurate measure of systematic risk.

The pattern of the API_t, estimated using the market model (MM), follows a gradual upward trend over the event window for all information types. However using a zero-one model (MKT), produces almost a mirror image for all information types (except for annual earnings). Instead the API_t follows a gradual downward trend over the duration of the event window. Thus, the market model implies the information content of the average event conveys good news relative to prior expectations, whereas the zero-one model implies the average event contains bad news. In other words, the market gradually anticipates the event, but continues to adjust after its release as the full implications become known.

The level of anticipation and the level of drift, is noticeably higher for earnings reports than that reported for the other information types. However, these results must be viewed tentatively by the predominantly low significance of the abnormal returns. One cannot therefore reach a reliable conclusion that these events cause a persistent, positive or even negative impact on stock returns. The trend may therefore indicate possible model misspecification in the calculation of unexpected returns. Bear in mind, no price response to an announcement cannot be interpreted as the announcement being of little use to investors. As the price reaction may only reflect the actions of those who trade immediately on the information. Some investors may make use of the information, but not take immediate action (Bernard & Thomas 1989, 1990).

The inclusion of other disclosures in the event window, noticeably reduces the level and significance of returns, across all information types except for a change in shareholding. This apparent reduction of both the level of anticipation and post-announcement drift, may in part reflect the small firm bias of examining isolated events (see section 4.6). If market anticipation increases with firm size, a higher proportion of large firms in the sample will therefore reduce the general significance of the returns. Alternatively, reduced significance may reflect increased noise generated by the inclusion of confounding events within the window, making it more difficult to identify a clear market response to the event under scrutiny. The examination of stock returns surrounding isolated events, allows us to infer the relative information content of differing information types.

5.4 EXPLAINING THE PATTERN OF STOCK RETURNS

The purpose of this section is to explain the cross-sectional behaviour of security returns surrounding corporate disclosures, using the empirical model developed in chapter 3. To recap, the papers of Kim & Verrecchia (1991a,b), McNichols & Trueman (1994) and Demski & Feltham (1994), explain stock market behaviour in relation to the incentives facing investors deciding on whether to devote resources to being informed about a forthcoming disclosure. The idea is that a rational investor will only invest in the acquisition and processing of information, providing it is cost-effective. Chapter 3 identifies four firm-specific characteristics, presumed to be related to the availability of pre-disclosure information, to proxy for the expected costs and benefits of being informed. The underlying is that, increasing levels of pre-disclosure information improves the informativeness of price, and thereby the ability of the market to anticipate the content of forthcoming disclosures. The greater the level of anticipation, the lower the extent of drift, all things remaining equal.

More specifically, for each information type, we empirically test the relationship between the level of market anticipation and (1) firm size as measured by market capitalisation, LN_MV_i, (2) the number of years a firm has been trading, AGE_i, (3) the frequency of disclosure by a firm, NUM_i, and (4) the volatility of stock returns prior to the disclosure, $VOLPR_i$ or $VOLPR{+}A_i$.[7] Collectively modelled using a standard OLS multiple regression, the model takes the form of

$$ANN_i = a_0 + a_1 LN\_MV_i + a_2 AGE_i + a_3 NUM_i + a_4 VOLPR_i + u_i, \qquad (5.2)$$

and,

$$POST_i = a_0 + a_1 LN\_MV_i + a_2 AGE_i + a_3 NUM_i + a_4 VOLPR{+}A_i + u_i \qquad (5.3)$$

Where, ANN_i measures the price impact of information impounded over the announcement period (t=0), relative to the prior period (t=-20,...,-1). $POST_i$ measures the price impact of information impounded following the event (t=+1,...,+20), relative to both the prior and announcement periods (t=-20,...,0).

The dependent variables, ANN_i and $POST_i$, are both functions of the API metric (see section 3.7.2), where API is calculated

$$API_{i,window} = \prod_{t=\tau}^{T} (1 + e_{it}) \qquad (5.4)$$

Equation (5.4) estimates the value from investing one pound in security i over a given

---

[7] Where $VOLPR_i$ measures stock return volatility over the prior period (t=-20,...,-1), and used to model ANN_i. $VOLPR{+}A_i$ measures stock return volatility over the prior and announcement periods (t=-20,...,0), and used to model $POST_i$.

event *window*, which can be one of three periods (prior, ann, or post), where e_{it} represents the estimate of excess returns for company i, at period t. For any particular stock, the actions of investors and the sign of their information they are trading upon, will be offsetting over the event window. Equation (5.4) therefore provides an estimate of the net value of the information impounded over the event window. However, if we adapt equation (5.4) to

$$API_{i,window} = \prod_{t=\tau}^{T} (1 + |e_{it}|) \tag{5.5}$$

the API metric will capture the total value of the information impounded over the event window, by ignoring the sign of the information ie. the absolute abnormal return.

If lagged impounding is an inverse function of anticipation, and the level of market anticipation is an increasing function of the explanatory variables, the coefficient signs are expected to be negative. However, if the event window fails to capture the full anticipation process of larger firms, we expect firm size to be of positive sign (see section 3.7.3). Similarly, increasing disclosure can have either a positive or negative effect on anticipation. We further hypothesise, the variation in coefficient size between information types to proxy for the announcement's expected probability and expected precision. This is an idea similar to that of McNichols & Trueman (1994) and Demski & Feltham (1994). Holding all explanatory variables constant, the level of anticipation (ANN_i and $POST_i$) will vary across information types. Thus, the expected return to being informed, ie. the expected marginal benefit relative to the expected marginal cost, will vary across information types. This greater incentive to be informed, we hypothesise, will reflect the information's characteristics of expected probability, and the expected precision of its content.

During preliminary investigations, the dependent variables ANN_i and $POST_i$ (which take the form of ratios) were found to be highly skewed, giving rise to significant heteroscedasticity. Consider the case of large firms: if much of the information content of their forthcoming disclosure is anticipated in advance of the price movement captured by the event window, larger firms will be less actively traded in the days approaching the disclosure relative to smaller firms. If this is coupled with any sizeable price reaction to the announcement's release, or over the post-announcement period, then the measures ANN_i and $POST_i$ will be disproportionately large. Transforming the dependent variable, by taking the natural log of ANN_i or $POST_i$, (ie. LN_ANN_i or LN_POST_i) was successful in eliminating a substantial portion of the heteroscedasticity. However, in some cases the Breusch-Pagan Chi-Squared test of heteroscedasticity was still significant at the 5 per cent level (a critical value of 9.46). Any remaining heteroscedasticity in the model is assumed to arise from cross-correlation between the independent variables. Accordingly, all the standard errors were adjusted using White's (1980) consistent estimator.[8]

The regression results for each information type, using equation (5.4), are reported in Tables 5.3 to 5.6, for both clear and unclear windows. Likewise, the regression results using equation (5.5) are reported in Tables 5.7 to 5.10. The significance of the explanatory variables in the explanation of market anticipation, varies considerably according to the model of expected returns. Therefore, for reasons of clarity we shall only focus on the regression results found to be robust across all three return metrics.[9]

[8] The OLS standard errors are not reported, due to their similarity.

[9] Other variations to the above tests were conducted, excluding outliers and extending the event window to thirty trading days either side of the event. Neither procedure produced markedly different results, changing the significance of variables nor their sign in any meaningful way.

Briefly, the results show that:

The analysis distinguishes between event periods which exclude other disclosures from those that allow other disclosures.

Results applicable to both conditions:

Market anticipation is found to: i) increase with firm size, the number of years a firm has been trading, and the volatility of prior stock returns; and ii) decrease with the number of disclosures made by a firm. In addition, firm size explains announcement returns (ANN_i) better than post-announcement drift ($POST_i$).

The model explains post-announcement drift better than announcement returns. This may indicate investors initial reactions are not based on informed judgements.

The stock return behaviour surrounding the announcement of interim earnings is least explained, relative to the other information types. This is surprising given the higher level of drift observed for interim reports.

The volatility of prior stock returns is predominant in the explanation of post-announcement drift; in particular for a change in shareholding. This is also true when we model the total impact of information, by accumulating absolute returns.

Allowing other disclosures within the event period:

This increases the overall power of the model in the explanation of the behaviour of stock returns. However, the volatility of prior stock returns is still the main driving force behind the explanation of lagged impounding.

Table 5.3a

OLS Regression Results, of the Value of Net Information (LN_ANN_i) Estimated Using Market Model Adjusted Returns (MM), Against The Explanatory Variables

Clear Event Window (t=-20,...,0)

$$LN\_ANN_i = a_0 + a_1 LN\_MV_i + a_2 AGE_i + a_3 NUM_i + a_4 VOLPR_i + u_i$$

	a_0	a_1	a_2	a_3	a_4
Annual Earnings					
	-1.4868***	0.1937*	-0.0041	-0.0045	-15.8710*
	(0.5466)	(0.1017)	(0.0061)	(0.0207)	(8.1160)
n = 116, R^2 = 0.0245, F[4,111] = 1.7221, BP(4) = 6.6503					
Interim Earnings					
	-1.1216***	0.0360	-0.0055	-0.0215	-1.5846
	(0.4762)	(0.1154)	(0.0051)	(0.0221)	(3.8370)
n = 152, R^2 = -0.0150, F[4,147] = 0.4422, BP(4) = 2.2455					
AGMs					
	-2.4397***	0.0388	-0.0055	0.0453	-23.7380
	(0.7038)	(0.1355)	(0.0058)	(0.0298)	(18.8500)
n = 106, R^2 = 0.0005, F[4,101] = 1.0132, BP(4) = 12.1783					
Board Changes					
	-3.1410***	0.1362***	0.0032	0.0158	-9.0317*
	(0.2390)	(0.0437)	(0.0024)	(0.0109)	(5.4880)
n = 387, R^2 = 0.0516, F[4,382] = 6.2552, BP(4) = 10.5417					
Changes in Shareholdings					
	-3.1653***	0.1781***	-0.0015*	0.0105	-8.0470**
	(0.1770)	(0.0373)	(0.0008)	(0.0081)	(3.7640)
n = 927, R^2 = 0.0439, F[4,922] = 11.6223, BP(4) = 7.6069					

Notes:
LN_MV_i is the natural log of market capitalisation measuring firm size (£M), as at 1st January in the year of announcement,
AGE_i measures the number of years the firm has been in operation as at 1st January in the year of announcement,
NUM_i measures the number of disclosures made by the firm over the sample period,
$VOLPR_i$ measures stock return volatility over the prior period, where (t=-20,...,-1)
Figures in parentheses are White's standard errors,
*,**,*** statistically significant at the 10%, 5% and 1% critical level, respectively,
n represents the number of observations,
R^2 is adjusted for degrees of freedom,
F-stat is a joint test of statistical significance,
BP(4) is the Breusch-Pagan Chi-squared test for heteroscedasticity, with 4 degrees of freedom.

Table 5.3b

OLS Regression Results, of the Value of Net Information (LN_ANN_i) Estimated Using Market Adjusted Returns (MKT), Against The Explanatory Variables

Clear Event Window (t=-20,...,0)

$$LN\_ANN_i = a_0 + a_1 LN\_MV_i + a_2 AGE_i + a_3 NUM_i + a_4 VOLPR_i + u_i$$

	a_0	a_1	a_2	a_3	a_4
Annual Earnings					
	-1.0823**	-0.1043	-0.0022	0.0330	-10.2280
	(0.4715)	(0.0889)	(0.0040)	(0.0201)	(6.6150)
n = 116, R^2 = -0.0009, F[4,111] = 0.9742, BP(4) = 9.7950					
Interim Earnings					
	-0.8051**	0.0817	-0.0029	-0.0289	-4.6315
	(0.3782)	(0.1109)	(0.0044)	(0.0192)	(4.7220)
n = 152, R^2 = -0.0014, F[4,147] = 0.9467, BP(4) = 5.6523					
AGMs					
	-1.8645***	0.0799	-0.0047	0.0419	-42.8450***
	(0.5257)	(0.1070)	(0.0055)	(0.0245)	(17.5500)
n = 106, R^2 = 0.0509, F[4,101] = 2.4067, BP(4) = 1.7134					
Board Changes					
	-2.3747***	0.1472***	0.0008	0.0017	-19.5800
	(0.2437)	(0.0426)	(0.0024)	(0.0115)	(5.0080)
n = 387, R^2 = 0.0644, F[4,382] = 7.6382, BP(4) = 2.2127					
Changes in Shareholdings					
	-2.3687***	0.1076***	-0.0005	0.0158	-19.1250***
	(0.1750)	(0.0366)	(0.0006)	(0.0078)	(5.9980)
n = 927, R^2 = 0.0524, F[4,922] = 13.8108, BP(4) = 31.0835					

Notes:
LN_MV_i is the natural log of market capitalisation measuring firm size (£M), as at 1st January in the year of announcement,
AGE_i measures the number of years the firm has been in operation as at 1st January in the year of announcement,
NUM_i measures the number of disclosures made by the firm over the sample period,
$VOLPR_i$ measures stock return volatility over the prior period, where (t=-20,...,-1)
Figures in parentheses are White's standard errors,
*,**,*** statistically significant at the 10%, 5% and 1% critical level, respectively,
n represents the number of observations,
R^2 is adjusted for degrees of freedom,
F-stat is a joint test of statistical significance,
BP(4) is the Breusch-Pagan Chi-squared test for heteroscedasticity, with 4 degrees of freedom.

Table 5.3c

OLS Regression Results, of the Value of Net Information (LN_ANN_i) Estimated Using Mean Adjusted Returns (MN), Against The Explanatory Variables

Clear Event Window (t=-20,...,0)

$$LN\_ANN_i = a_0 + a_1 LN\_MV_i + a_2 AGE_i + a_3 NUM_i + a_4 VOLPR_i + u_i$$

	a_0	a_1	a_2	a_3	a_4
Annual Earnings					
	-1.0289**	-0.0363	-0.0072	0.0106	-23.6280***
	(0.4762)	(0.1154)	(0.0051)	(0.0221)	(3.8370)
n = 116, R^2 = 0.0225, F[4,111] = 1.6612, BP(4) = 11.1973					
Interim Earnings					
	-1.5927***	-0.0304	-0.0038	-0.0003	-1.9534
	(0.4907)	(0.1072)	(0.0049)	(0.0240)	(4.3630)
n = 152, R^2 = -0.0222, F[4,147] = 0.1815, BP(4) = 1.2418					
AGMs					
	-2.8981***	0.1872	-0.0024	0.0028	-4.4881
	(0.6715)	(0.1268)	(0.0077)	(0.0352)	(20.5700)
n = 106, R^2 = -0.0158, F[4,101] = 0.5922, BP(4) = 2.7534					
Board Changes					
	-3.4224***	0.1563***	0.0005	0.0141	-6.7959
	(0.2093)	(0.0420)	(0.0024)	(0.0112)	(4.7410)
n = 387, R^2 = 0.0494, F[4,382] = 6.0149, BP(4) = 6.2896					
Changes in Shareholdings					
	-3.3426***	0.0859**	-0.0031***	0.0164*	-7.2921**
	(0.1758)	(0.0384)	(0.0012)	(0.0084)	(3.4150)
n = 927, R^2 = 0.0263, F[4,922] = 7.2482, BP(4) = 18.8036					

Notes:
LN_MV_i is the natural log of market capitalisation measuring firm size (£M), as at 1st January in the year of announcement,
AGE_i measures the number of years the firm has been in operation as at 1st January in the year of announcement,
NUM_i measures the number of disclosures made by the firm over the sample period,
$VOLPR_i$ measures stock return volatility over the prior period, where (t=-20,...,-1)
Figures in parentheses are White's standard errors,
*,**,*** statistically significant at the 10%, 5% and 1% critical level, respectively,
n represents the number of observations,
R^2 is adjusted for degrees of freedom,
F-stat is a joint test of statistical significance,
BP(4) is the Breusch-Pagan Chi-squared test for heteroscedasticity, with 4 degrees of freedom.

5.4.1 *Market Anticipation and the Net Value of Information Impounded*

$\underline{LN\_ANN_i}$

Table 5.3 reports the regression results of the net value of information impounded over the announcement period, relative to the prior period. The coefficients are not always of their predicted sign, except when statistically significant, above the 5 per cent level.[10] Firm size (LN_MV_i) is significant at the 5 per cent level, and positive in sign, for both board changes and a change in shareholding. For both events, the joint explanatory power of the variables is highly significant, with the respective F-statistics exceeding the critical value of 3.12. The positive coefficient of LN_MV_i, is consistent with the hypothesis that the length of the prior period does not capture the full anticipation process of larger firms (see section 3.7.3). However, it does confirm anticipation is an increasing function of firm size.

The coefficient sign of the prior volatility of stock returns ($VOLPR_i$), is persistently negative for all information types and all expected return metrics. The negative sign of $VOLPR_i$ implies that larger values of prior volatility, leads to greater anticipation; ie. the benefits of being informed exceed the costs. However, $VOLPR_i$ is only robust in the explanation of LN_ANN_i for a change in shareholding. The reported coefficient signs for age (AGE_i) and the number of disclosures (NUM_i) are mixed, but due to their low significance we cannot reliably infer their correct sign. The high significance of the constant term for all information types, hints of possible model misspecification and hence of other explanations for the abnormal returns.

[10] Incorrect coefficient signs may be an indication of possible collinearity between explanatory variables, though this seems doubtful given the low level of correlation found in section 4.6.2.

Table 5.4a

OLS Regression Results, of the Value of Net Information (LN_POST_i) Estimated Using Market Model Adjusted Returns (MM), Against The Explanatory Variables

Clear Event Window (t=-20,...,+20)

$$LN\_POST_i = a_0 + a_1 LN\_MV_i + a_2 AGE_i + a_3 NUM_i + a_4 VOLPR{+}A_i + u_i$$

	a_0	a_1	a_2	a_3	a_4
Annual Earnings					
	0.4943	-0.1981***	-0.0035	0.0277**	-14.8430**
	(0.3739)	(0.0756)	(0.0040)	(0.0139)	(7.3090)
n = 116, R^2 = 0.0448, F[4,111] = 2.3493, BP(4) = 2.0286					
Interim Earnings					
	0.2940	-0.0017	-0.0025	0.0020	-6.1994
	(0.3048)	(0.0755)	(0.0039)	(0.0152)	(4.4530)
n = 152, R^2 = -0.0054, F[4,147] = 0.7958, BP(4) = 2.6588					
AGMs					
	0.0369	-0.0964	-0.0018	0.0294	-32.3050***
	(0.5147)	(0.0934)	(0.0051)	(0.0247)	(11.6900)
n = 106, R^2 = 0.0183, F[4,101] = 1.4902, BP(4) = 3.1845					
Board Changes					
	0.4227	0.0099	-0.0041*	-0.0125	-5.7521
	(0.2700)	(0.0423)	(0.0024)	(0.0110)	(6.2160)
n = 387, R^2 = 0.0037, F[4,382] = 1.3590, BP(4) = 3.2246					
Changes in Shareholdings					
	-0.0073	0.0173	0.0018	0.0055	-16.8700***
	(0.1669)	(0.0339)	(0.0007)	(0.0075)	(6.1870)
n = 927, R^2 = 0.0276, F[4,922] = 7.5793, BP(4) = 14.3105					

Notes:
LN_MV_i is the natural log of market capitalisation measuring firm size (£M), as at 1st January in the year of announcement,
AGE_i measures the number of years the firm has been in operation as at 1st January in the year of announcement,
NUM_i measures the number of disclosures made by the firm over the sample period,
$VOLPR{+}A_i$ measures stock return volatility over the prior and announcement period, where (t=-20,...,0)
Figures in parentheses are White's standard errors,
*,**,*** statistically significant at the 10%, 5% and 1% critical level, respectively,
n represents the number of observations,
R^2 is adjusted for degrees of freedom,
F-stat is a joint test of statistical significance,
BP(4) is the Breusch-Pagan Chi-squared test for heteroscedasticity, with 4 degrees of freedom.

Table 5.4b

OLS Regression Results, of the Value of Net Information (LN_POST_i) Estimated Using Market Adjusted Returns (MKT), Against The Explanatory Variables

Clear Event Window (t=-20,...,+20)

$$LN\_POST_i = a_0 + a_1 LN\_MV_i + a_2 AGE_i + a_3 NUM_i + a_4 VOLPR{+}A_i + u_i$$

	a_0	a_1	a_2	a_3	a_4
Annual Earnings					
	0.3076	-0.2326***	-0.0024	0.0412***	-9.2895
	(0.4553)	(0.0929)	(0.0047)	(0.0167)	(7.4530)
n = 116, R^2 = 0.0352, F[4,111] = 2.0485, BP(4) = 2.9019					
Interim Earnings					
	-0.1737	0.0478	0.0012	0.0054	-7.4427
	(0.2925)	(0.0885)	(0.0032)	(0.0151)	(5.5770)
n = 152, R^2 = 0.0140, F[4,147] = 1.5370, BP(4) = 7.3468					
AGMs					
	0.3295	-0.0462	-0.0054	0.0489**	-56.6170***
	(0.4056)	(0.0865)	(0.0053)	(0.0214)	(11.6300)
n = 106, R^2 = 0.1355, F[4,101] = 5.1135, BP(4) = 1.9585					
Board Changes					
	0.4567*	0.0218	-0.0030	-0.0092	-12.2790**
	(0.2482)	(0.0416)	(0.0024)	(0.0120)	(6.1940)
n = 387, R^2 = 0.0086, F[4,382] = 1.8415, BP(4) = 2.3917					
Changes in Shareholdings					
	-0.0255	0.0230	-0.0003	0.0084	-17.7500***
	(0.1740)	(0.0376)	(0.0008)	(0.0074)	(6.3120)
n = 927, R^2 = 0.0313, F[4,922] = 8.4868, BP(4) = 14.0415					

Notes:
LN_MV_i is the natural log of market capitalisation measuring firm size (£M), as at 1st January in the year of announcement,
AGE_i measures the number of years the firm has been in operation as at 1st January in the year of announcement,
NUM_i measures the number of disclosures made by the firm over the sample period,
$VOLPR{+}A_i$ measures stock return volatility over the prior and announcement period, where (t=-20,...,0)
Figures in parentheses are White's standard errors,
*,**,*** statistically significant at the 10%, 5% and 1% critical level, respectively,
n represents the number of observations,
R^2 is adjusted for degrees of freedom,
F-stat is a joint test of statistical significance,
BP(4) is the Breusch-Pagan Chi-squared test for heteroscedasticity, with 4 degrees of freedom.

Table 5.4c

OLS Regression Results, of the Value of Net Information (LN_POST$_i$) Estimated Using Mean Adjusted Returns (MN), Against The Explanatory Variables

Clear Event Window (t=-20,...,+20)

$$LN\_POST_i = a_0 + a_1 LN\_MV_i + a_2 AGE_i + a_3 NUM_i + a_4 VOL_{PR+A_i} + u_i$$

	a_0	a_1	a_2	a_3	a_4
Annual Earnings					
	0.3525	-0.1511*	0.0010	0.0146	-17.5230***
	(0.3787)	(0.0833)	(0.0042)	(0.0137)	(6.8860)
n = 116, R^2 = 0.0334, F[4,111] = 1.9949, BP(4) = 1.4276					
Interim Earnings					
	-0.0580	-0.0740	-0.0009	0.0343**	-8.0619
	(0.2871)	(0.0835)	(0.0037)	(0.0164)	(5.5120)
n = 152, R^2 = 0.0277, F[4,147] = 2.0743, BP(4) = 18.2521					
AGMs					
	0.1393	-0.0945	-0.0028	0.0305	-39.5880***
	(0.5952)	(0.1217)	(0.0055)	(0.0319)	(14.7100)
n = 106, R^2 = 0.0295, F[4,101] = 1.7978, BP(4) = 13.3726					
Board Changes					
	0.5703**	-0.0008	-0.0079***	-0.0046	-5.9127
	(0.2688)	(0.0400)	(0.0024)	(0.0113)	(6.0360)
n = 387, R^2 = 0.0233, F[4,382] = 3.3046, BP(4) = 10.9648					
Changes in Shareholdings					
	0.0578	0.0026	-0.0004	0.0062	-16.0780***
	(0.1553)	(0.0332)	(0.0007)	(0.0071)	(6.0060)
n = 927, R^2 = 0.0263, F[4,922] = 7.2637, BP(4) = 23.8057					

Notes:
LN_MV$_i$ is the natural log of market capitalisation measuring firm size (£M), as at 1st January in the year of announcement,
AGE$_i$ measures the number of years the firm has been in operation as at 1st January in the year of announcement,
NUM$_i$ measures the number of disclosures made by the firm over the sample period,
VOL$_{PR+A_i}$ measures stock return volatility over the prior and announcement period, where (t=-20,...,0)
Figures in parentheses are White's standard errors,
*,**,*** statistically significant at the 10%, 5% and 1% critical level, respectively,
n represents the number of observations,
R^2 is adjusted for degrees of freedom,
F-stat is a joint test of statistical significance,
BP(4) is the Breusch-Pagan Chi-squared test for heteroscedasticity, with 4 degrees of freedom.

LN_POST$_i$

Table 5.4 reports the regression results of the net value of information impounded over the post-announcement period, relative to the prior and announcement periods. As with LN_ANN$_i$, the coefficients are not always of their predicted sign, except when statistically significant. The volatility of prior stock returns (VOLPR+A$_i$) persists as a highly significant factor in the explanation of the reaction to a change in shareholding, and extends to AGMs. Beyond this, we find the significance of explanatory variables varied and haphazard, with a noticeable reduction in the importance of firm size over the post-announcement period. Nevertheless, relative to LN_ANN$_i$, we find the significance of the constant term greatly reduced, coupled with an overall increase in the R^2 values and F-statistics for annual earnings, interim earnings, and AGMs. Our model appears to explain post-announcement drift better than the price movement on the announcement day. This may indicate investors initial reactions are not based on informed judgements.

Unclear Event Windows

Allowing other disclosures within the event window, not only increases the available sample size and reduces the small firm bias, but also potentially increases the level of price activity in need of explanation (see section 4.6.1). In respect of LN_ANN$_i$, Table 5.5 documents a significant increase in the explanatory power of firm size. Firm size is highly significant and of positive sign, for all information types and robust across all expected return metrics, with one minor exception.[11] Prior volatility (VOLPR$_i$) is significant in the explanation of the initial reaction to the announcement of a board change, and the annual earnings report. The use of unclear windows, significantly increases the explanatory power of the number of disclosures made by a firm (NUM$_i$), to 1 per cent for board changes. The positive sign of NUM$_i$, implies increasing disclosure reduces the level of anticipation, perturbing the demand of information from alternative sources. The number of years a firm has been trading (AGE$_i$), remains insignificant in the explanation of anticipation.

[11] For AGMs, based upon using market adjusted returns (MKT).

Table 5.5a

OLS Regression Results, of the Value of Net Information (LN_ANN_i) Estimated Using Market Model Adjusted Returns (MM), Against The Explanatory Variables

Unclear Event Window (t=-20,....,0)

$$LN\_ANN_i = a_0 + a_1 LN\_MV_i + a_2 AGE_i + a_3 NUM_i + a_4 VOLPR_i + u_i$$

	a_0	a_1	a_2	a_3	a_4
Annual Earnings					
	-1.6437***	0.1203***	0.0016	0.0114**	-15.3580***
	(0.1326)	(0.0255)	(0.0012)	(0.0050)	(3.2140)
n = 1830, R^2 = 0.0405, F[4,1825] = 20.3184, BP(4) = 39.6397					
Interim Earnings					
	-1.7686***	0.1509***	0.0011	0.0028	-5.5883
	(0.1429)	(0.0291)	(0.0015)	(0.0059)	(3.5300)
n = 1452, R^2 = 0.0289, F[4,1447] = 11.8005, BP(4) = 17.7515					
AGMs					
	-2.8851***	0.1609***	0.0028	0.0163*	-13.7990
	(0.2925)	(0.0554)	(0.0024)	(0.0094)	(8.6740)
n = 481, R^2 = 0.0514, F[4,476] = 7.5022, BP(4) = 6.3891					
Board Changes					
	-2.6045***	0.0614***	0.0009	0.0197***	-9.6839***
	(0.1234)	(0.0219)	(0.0013)	(0.0040)	(2.3690)
n = 1807, R^2 = 0.0356, F[4,1802] = 17.6425, BP(4) = 10.7671					
Changes in Shareholdings					
	-2.9110***	0.1595***	-0.0010	0.0021	-8.1702***
	(0.0913)	(0.0175)	(0.0008)	(0.0030)	(1.5050)
n = 4354, R^2 = 0.0361, F[4,4349] = 41.7300, BP(4) = 14.7048					

Notes:
LN_MV_i is the natural log of market capitalisation measuring firm size (£M), as at 1st January in the year of announcement,
AGE_i measures the number of years the firm has been in operation as at 1st January in the year of announcement,
NUM_i measures the number of disclosures made by the firm over the sample period,
$VOLPR_i$ measures stock return volatility over the prior period, where (t=-20,....,-1)
Figures in parentheses are White's standard errors,
*,**,*** statistically significant at the 10%, 5% and 1% critical level, respectively,
n represents the number of observations,
R^2 is adjusted for degrees of freedom,
F-stat is a joint test of statistical significance,
BP(4) is the Breusch-Pagan Chi-squared test for heteroscedasticity, with 4 degrees of freedom.

Table 5.5b

OLS Regression Results, of the Value of Net Information (LN_ANN_i) Estimated Using Market Adjusted Returns (MKT), Against The Explanatory Variables

Unclear Event Window (t=-20,...,0)

$$LN\_ANNi = a0 + a1LN\_MVi + a2AGEi + a3NUMi + a4VOLPRi + ui$$

	a_0	a_1	a_2	a_3	a_4
Annual Earnings					
	-1.0459***	0.0789***	0.0012	0.0059	-18.2150***
	(0.1166)	(0.0235)	(0.0012)	(0.0044)	(3.1160)
n = 1830, R^2 = 0.0363, F[4,1825] = 18.2079, BP(4) = 27.9548					
Interim Earnings					
	-1.3350***	0.0864***	0.0022	0.0045	-10.4080***
	(0.1381)	(0.0258)	(0.0014)	(0.0050)	(4.3480)
n = 1452, R^2 = 0.0245, F[4,1447] = 10.0951, BP(4) = 10.8614					
AGMs					
	-2.2335***	0.0433	0.0050**	0.0222***	-23.8980***
	(0.2624)	(0.0466)	(0.0022)	(0.0076)	(7.7580)
n = 481, R^2 = 0.0449, F[4,476] = 6.6363, BP(4) = 8.3563					
Board Changes					
	-2.0161***	0.0483***	-0.0010	0.0147***	-14.2410***
	(0.1218)	(0.0207)	(0.0012)	(0.0039)	(2.4260)
n = 1807, R^2 = 0.0373, F[4,1802] = 18.4939, BP(4) = 15.7021					
Changes in Shareholdings					
	-2.2362***	0.1063***	-0.0007	-0.0010	-14.5620***
	(0.0933)	(0.0176)	(0.0008)	(0.0029)	(1.8930)
n = 4354, R^2 = 0.0411, F[4,4349] = 47.5985, BP(4) = 66.1243					

Notes:
LN_MV_i is the natural log of market capitalisation measuring firm size (£M), as at 1st January in the year of announcement,
AGE_i measures the number of years the firm has been in operation as at 1st January in the year of announcement,
NUM_i measures the number of disclosures made by the firm over the sample period,
$VOLPR_i$ measures stock return volatility over the prior period, where (t=-20,...,-1)
Figures in parentheses are White's standard errors,
*,**,*** statistically significant at the 10%, 5% and 1% critical level, respectively,
n represents the number of observations,
R^2 is adjusted for degrees of freedom,
F-stat is a joint test of statistical significance,
BP(4) is the Breusch-Pagan Chi-squared test for heteroscedasticity, with 4 degrees of freedom.

Table 5.5c

OLS Regression Results, of the Value of Net Information (LN_ANN_i) Estimated Using Mean Adjusted Returns (MN), Against The Explanatory Variables

Unclear Event Window (t=-20,...,0)

$$LN\_ANN_i = a_0 + a_1 LN\_MV_i + a_2 AGE_i + a_3 NUM_i + a_4 VOLPR_i + u_i$$

	a_0	a_1	a_2	a_3	a_4
Annual Earnings					
	-1.7609***	0.0890***	0.0011	0.0157***	-16.0950***
	(0.1303)	(0.0253)	(0.0013)	(0.0048)	(3.2480)
n = 1830, R^2 = 0.0346, F[4,1825] = 17.3927, BP(4) = 22.4759					
Interim Earnings					
	-1.9999***	0.1152***	0.0010	0.0112*	-5.9485
	(0.1533)	(0.0276)	(0.0018)	(0.0058)	(3.7800)
n = 1452, R^2 = 0.0256, F[4,1447] = 10.5292, BP(4) = 18.3446					
AGMs					
	-3.1507***	0.1597***	0.0017	0.0113	-2.4704
	(0.2897)	(0.0553)	(0.0027)	(0.0086)	(8.2670)
n = 481, R^2 = 0.0271, F[4,476] = 4.3470, BP(4) = 10.0046					
Board Changes					
	-3.0191***	0.0955***	0.0004	0.0201***	-6.6058***
	(0.1207)	(0.0212)	(0.0013)	(0.0040)	(2.3360)
n = 1807, R^2 = 0.0413, F[4,1802] = 20.4729, BP(4) = 2.5947					
Changes in Shareholdings					
	-3.4808***	0.1271***	-0.0005	0.0131***	-4.5462***
	(0.0904)	(0.0174)	(0.0009)	(0.0029)	(1.4030)
n = 4354, R^2 = 0.0286, F[4,4349] = 33.0750, BP(4) = 14.4134					

Notes:
LN_MV_i is the natural log of market capitalisation measuring firm size (£M), as at 1st January in the year of announcement,
AGE_i measures the number of years the firm has been in operation as at 1st January in the year of announcement,
NUM_i measures the number of disclosures made by the firm over the sample period,
$VOLPR_i$ measures stock return volatility over the prior period, where (t=-20,...,-1)
Figures in parentheses are White's standard errors,
*,**,*** statistically significant at the 10%, 5% and 1% critical level, respectively,
n represents the number of observations,
R^2 is adjusted for degrees of freedom,
F-stat is a joint test of statistical significance,
BP(4) is the Breusch-Pagan Chi-squared test for heteroscedasticity, with 4 degrees of freedom.

Table 5.6a

OLS Regression Results, of the Value of Net Information (LN_POST_i) Estimated Using Market Model Adjusted Returns (MM), Against The Explanatory Variables

Unclear Event Window (t=-20,...,+20)

$$LN\_POST_i = a_0 + a_1 LN\_MV_i + a_2 AGE_i + a_3 NUM_i + a_4 VOL_{PR+A_i} + u_i$$

	a_0	a_1	a_2	a_3	a_4
Annual Earnings					
	0.2334**	-0.0361	0.0004	0.0048	-17.5580***
	(0.1112)	(0.0213)	(0.0011)	(0.0040)	(2.2660)
n = 1830, R^2 = 0.0355, F[4,1825] = 17.8133, BP(4) = 1.6604					
Interim Earnings					
	0.2537**	-0.0389	0.0001	0.0028	-11.4840***
	(0.1222)	(0.0234)	(0.0012)	(0.0045)	(3.2000)
n = 1452, R^2 = 0.0163, F[4,1447] = 6.9976, BP(4) = 10.0421					
AGMs					
	0.2331	0.0185	-0.0013	-0.0049	-20.7730***
	(0.2514)	(0.0430)	(0.0021)	(0.0105)	(6.7030)
n = 481, R^2 = 0.0161, F[4,476] = 2.9657, BP(4) = 7.1481					
Board Changes					
	0.2749**	-0.0115	-0.0024*	0.0015	-13.1280***
	(0.1215)	(0.0197)	(0.0012)	(0.0037)	(2.2170)
n = 1807, R^2 = 0.0260, F[4,1802] = 13.0498, BP(4) = 5.4829					
Changes in Shareholdings					
	0.0095	-0.0080	-0.0005	0.0062**	-14.9800***
	(0.0850)	(0.0158)	(0.0007)	(0.0027)	(1.7430)
n = 4354, R^2 = 0.0308, F[4,4349] = 35.6404, BP(4) = 24.7031					

Notes:
LN_MV_i is the natural log of market capitalisation measuring firm size (£M), as at 1st January in the year of announcement,
AGE_i measures the number of years the firm has been in operation as at 1st January in the year of announcement,
NUM_i measures the number of disclosures made by the firm over the sample period,
VOL_{PR+A_i} measures stock return volatility over the prior and announcement period, where (t=-20,...,0)
Figures in parentheses are White's standard errors,
*,**,*** statistically significant at the 10%, 5% and 1% critical level, respectively,
n represents the number of observations,
R^2 is adjusted for degrees of freedom,
F-stat is a joint test of statistical significance,
BP(4) is the Breusch-Pagan Chi-squared test for heteroscedasticity, with 4 degrees of freedom.

Table 5.6b

OLS Regression Results, of the Value of Net Information (LN_POST_i) Estimated Using Market Adjusted Returns (MKT), Against The Explanatory Variables

Unclear Event Window (t=-20,...,+20)

$$LN\_POST_i = a_0 + a_1 LN\_MV_i + a_2 AGE_i + a_3 NUM_i + a_4 VOL_{PR+A_i} + u_i$$

	a_0	a_1	a_2	a_3	a_4
Annual Earnings					
	0.2958***	-0.0283	-0.0015	0.0065	-20.3220***
	(0.1241)	(0.0222)	(0.0011)	(0.0050)	(2.5240)
n = 1830, R^2 = 0.0438, F[4,1825] = 21.9609, BP(4) = 9.6159					
Interim Earnings					
	0.0521	-0.0350	0.0022*	0.0034	-11.4710***
	(0.1235)	(0.0245)	(0.0012)	(0.0050)	(3.2680)
n = 1452, R^2 = 0.0190, F[4,1447] = 8.0225, BP(4) = 13.7070					
AGMs					
	0.3784	-0.0380	-0.0013	0.0085	-30.1910***
	(0.2505)	(0.0494)	(0.0024)	(0.0086)	(6.6040)
n = 481, R^2 = 0.0314, F[4,476] = 4.8960, BP(4) = 7.2068					
Board Changes					
	0.3971***	-0.0158	-0.0030***	-0.0000	-14.7030***
	(0.1204)	(0.0200)	(0.0012)	(0.0040)	(2.3000)
n = 1807, R^2 = 0.0323, F[4,1802] = 16.0643, BP(4) = 4.1745					
Changes in Shareholdings					
	0.0317	0.0018	-0.0013	0.0044	-15.8960***
	(0.0866)	(0.0158)	(0.0008)	(0.0027)	(1.7710)
n = 4354, R^2 = 0.0370, F[4,4349] = 42.7554, BP(4) = 24.1150					

Notes:
LN_MV_i is the natural log of market capitalisation measuring firm size (£M), as at 1st January in the year of announcement,
AGE_i measures the number of years the firm has been in operation as at 1st January in the year of announcement,
NUM_i measures the number of disclosures made by the firm over the sample period,
VOL_{PR+A_i} measures stock return volatility over the prior and announcement period, where (t=-20,...,0)
Figures in parentheses are White's standard errors,
*,**,*** statistically significant at the 10%, 5% and 1% critical level, respectively,
n represents the number of observations,
R^2 is adjusted for degrees of freedom,
F-stat is a joint test of statistical significance,
BP(4) is the Breusch-Pagan Chi-squared test for heteroscedasticity, with 4 degrees of freedom.

Table 5.6c

OLS Regression Results, of the Value of Net Information (LN_POST_i) Estimated Using Mean Adjusted Returns (MN), Against The Explanatory Variables

Unclear Event Window (t=-20,...,+20)

$$LN\_POST_i = a_0 + a_1 LN\_MV_i + a_2 AGE_i + a_3 NUM_i + a_4 VOLPR{+}A_i + u_i$$

	a_0	a_1	a_2	a_3	a_4
Annual Earnings					
	0.2535**	-0.0337	0.0003	0.0040	-18.5330***
	(0.1121)	(0.0210)	(0.0011)	(0.0039)	(2.3270)
n = 1830, R^2 = 0.0410, F[4,1825] = 19.5211, BP(4) = 3.7709					
Interim Earnings					
	0.1567	-0.0324	0.0008	0.0015	-11.7950***
	(0.1225)	(0.0255)	(0.0012)	(0.0048)	(3.3830)
n = 1452, R^2 = 0.0177, F[4,1447] = 7.5181, BP(4) = 16.8644					
AGMs					
	0.0438	0.0429	-0.0007	0.0006	-25.6640***
	(0.2583)	(0.0440)	(0.0022)	(0.0085)	(7.3400)
n = 481, R^2 = 0.0225, F[4,476] = 3.7629, BP(4) = 2.8902					
Board Changes					
	0.3725***	-0.0146	-0.0027***	0.0021	-15.0870***
	(0.1149)	(0.0188)	(0.0011)	(0.0036)	(2.3610)
n = 1807, R^2 = 0.0355, F[4,1802] = 17.6313, BP(4) = 11.5325					
Changes in Shareholdings					
	-0.0794	0.0219	-0.0006	0.0054**	-14.5770***
	(0.0849)	(0.0159)	(0.0007)	(0.0027)	(1.6920)
n = 4354, R^2 = 0.0326, F[4,4349] = 37.6646, BP(4) = 15.3306					

Notes:
LN_MV_i is the natural log of market capitalisation measuring firm size (£M), as at 1st January in the year of announcement,
AGE_i measures the number of years the firm has been in operation as at 1st January in the year of announcement,
NUM_i measures the number of disclosures made by the firm over the sample period,
$VOLPR{+}A_i$ measures stock return volatility over the prior and announcement period, where (t=-20,...,0)
Figures in parentheses are White's standard errors,
*,**,*** statistically significant at the 10%, 5% and 1% critical level, respectively,
n represents the number of observations,
R^2 is adjusted for degrees of freedom,
F-stat is a joint test of statistical significance,
BP(4) is the Breusch-Pagan Chi-squared test for heteroscedasticity, with 4 degrees of freedom.

Table 5.6 reports the results for LN_POST_i for unclear windows. The tables clearly indicate the prior volatility of stock returns ($VOLPR+A_i$) to be the main driving force behind post-announcement drift, for all information types. In all cases, $VOLPR+A_i$ is highly significant. Other than this, remaining variables are generally insignificant, with the minor exception of AGE_i in the explanation of post-announcement activity of board changes. Using expected returns models market and mean adjusted (MKT and MN), AGE_i is of 1 per cent significance and of negative sign. If unclear event windows are associated with greater activity, then it is not surprising to find an increase in the explanatory power of the volatility of stock returns.

Previously, we hypothesised the variation in coefficient size between information types, proxies for the information characteristics of expected probability and expected precision (McNichols & Trueman 1994, and Demski & Feltham 1994). The high significance of $VOLPR+A_i$ across all five information types, allows one therefore (for the first time in this analysis) to reliably compare the relative coefficient sizes. For example, a high coefficient implies a given level of volatility gives rise to a smaller amount of post-announcement drift relative to other information types. The coefficient sizes reported in Table 5.6a, are decreasing in the order of AGMs (a_4=-20.7730), annual earnings (a_4=-17.5580), a change in shareholding (a_4=-14.9800), board changes (a_4=-13.1280), and finally interim earnings (a_4=-11.4840). This pattern is consistent across return metrics.

The expected probability of an AGM and the annual earnings report, are both equal to one. The difference in coefficient size between the two, therefore implies the AGM is of greater expected precision relative to the annual earnings report. The interim earnings report is also of the expected probability of one, therefore we can only infer the interim report is regarded to be of relatively low precision compared to the other information types examined. This results is in line with what we know about the importance of annual earnings in the determination of stock returns (Strong & Walker 1993). Similarly, it fits in with what we know about the poor quality of interim earnings reporting in the UK (Hussey & Wolfe 1994).

Table 5.7a

OLS Regression Results, of the Value of Total Information (LN_ANN_i) Estimated Using Market Model Adjusted Returns (MM), Against The Explanatory Variables

Clear Event Window (t=-20,...,0)

$$LN\_ANN_i = a_0 + a_1 LN\_MV_i + a_2 AGE_i + a_3 NUM_i + a_4 VOLPR_i + u_i$$

	a_0	a_1	a_2	a_3	a_4
Annual Earnings					
	-1.9322***	0.0188	-0.0055	0.0006	-24.4260***
	(0.4524)	(0.0799)	(0.0042)	(0.0164)	(8.0330)
n = 116, R^2 = 0.0359, F[4,111] = 2.0718, BP(4) = 15.7457					
Interim Earnings					
	-2.1201***	-0.0949	-0.0021	-0.0253	-4.4949
	(0.4057)	(0.1144)	(0.0043)	(0.0195)	(3.2150)
n = 152, R^2 = 0.0078, F[4,147] = 1.2958, BP(4) = 2.9247					
AGMs					
	-3.1104***	-0.0115	-0.0043	0.0032	-33.9910**
	(0.4502)	(0.0973)	(0.0046)	(0.0223)	(15.9100)
n = 106, R^2 = 0.0146, F[4,101] = 1.3895, BP(4) = 7.7781					
Board Changes					
	-3.7164***	0.0152	0.0022	0.0138*	-22.5690***
	(0.1698)	(0.0326)	(0.0018)	(0.0084)	(4.3560)
n = 387, R^2 = 0.0794, F[4,382] = 9.3197, BP(4) = 8.4797					
Changes in Shareholdings					
	-3.7188***	0.0350	-0.0007	0.0059	-17.4090***
	(0.1440)	(0.0305)	(0.0006)	(0.0067)	(3.1460)
n = 927, R^2 = 0.0439, F[4,922] = 11.6208, BP(4) = 7.3345					

Notes:
LN_MV_i is the natural log of market capitalisation measuring firm size (£M), as at 1st January in the year of announcement,
AGE_i measures the number of years the firm has been in operation as at 1st January in the year of announcement,
NUM_i measures the number of disclosures made by the firm over the sample period,
$VOLPR_i$ measures stock return volatility over the prior period, where (t=-20,...,-1)
Figures in parentheses are White's standard errors,
*,**,*** statistically significant at the 10%, 5% and 1% critical level, respectively,
n represents the number of observations,
R^2 is adjusted for degrees of freedom,
F-stat is a joint test of statistical significance,
BP(4) is the Breusch-Pagan Chi-squared test for heteroscedasticity, with 4 degrees of freedom.

Table 5.7b

OLS Regression Results, of the Value of Total Information (LN_ANN_i) Estimated Using Market Adjusted Returns (MKT), Against The Explanatory Variables

Clear Event Window (t=-20,...,0)

$$LN\_ANN_i = a_0 + a_1 LN\_MV_i + a_2 AGE_i + a_3 NUM_i + a_4 VOLPR_i + u_i$$

	a_0	a_1	a_2	a_3	a_4
Annual Earnings					
	-2.2898***	-0.1006	-0.0005	0.0194	-18.6260***
	(0.4640)	(0.0844)	(0.0039)	(0.0175)	(7.3650)
n = 116, R^2 = 0.0135, F[4,111] = 1.3937, BP(4) = 18.7751					
Interim Earnings					
	-1.9813***	-0.0047	-0.0032	-0.0350**	-5.6690
	(0.3529)	(0.0999)	(0.0037)	(0.0164)	(3.5770)
n = 152, R^2 = 0.0243, F[4,147] = 1.9403, BP(4) = 4.0031					
AGMs					
	-3.0432***	-0.0042	-0.0012	0.0151	-25.3590*
	(0.4344)	(0.0800)	(0.0036)	(0.0175)	(14.7800)
n = 106, R^2 = -0.0072, F[4,101] = 0.8136, BP(4) = 6.2695					
Board Changes					
	-3.6430***	0.0528*	0.0002	0.0089	-24.0080***
	(0.1912)	(0.0308)	(0.0019)	(0.0086)	(4.4240)
n = 387, R^2 = 0.0876, F[4,382] = 10.2632, BP(4) = 8.6958					
Changes in Shareholdings					
	-3.6143***	0.0328	0.0000	0.0063	-18.4800***
	(0.1202)	(0.0256)	(0.0004)	(0.0053)	(3.9220)
n = 927, R^2 = 0.0600, F[4,922] = 15.7741, BP(4) = 43.1510					

Notes:
LN_MV_i is the natural log of market capitalisation measuring firm size (£M), as at 1st January in the year of announcement,
AGE_i measures the number of years the firm has been in operation as at 1st January in the year of announcement,
NUM_i measures the number of disclosures made by the firm over the sample period,
$VOLPR_i$ measures stock return volatility over the prior period, where (t=-20,...,-1)
Figures in parentheses are White's standard errors,
*,**,*** statistically significant at the 10%, 5% and 1% critical level, respectively,
n represents the number of observations,
R^2 is adjusted for degrees of freedom,
F-stat is a joint test of statistical significance,
BP(4) is the Breusch-Pagan Chi-squared test for heteroscedasticity, with 4 degrees of freedom.

Table 5.7c

OLS Regression Results, of the Value of Total Information (LN_ANN_i) Estimated Using Mean Adjusted Returns (MN), Against The Explanatory Variables

Clear Event Window (t=-20,...,0)

$$LN\_ANN_i = a_0 + a_1 LN\_MV_i + a_2 AGE_i + a_3 NUM_i + a_4 VOLPR_i + u_i$$

	a_0	a_1	a_2	a_3	a_4
Annual Earnings					
	-1.4391***	-0.1102	-0.0055	0.0105	-31.8410***
	(0.4505)	(0.0848)	(0.0043)	(0.0178)	(8.5370)
n = 116, R^2 = 0.0892, F[4,111] = 3.8165, BP(4) = 7.8511					
Interim Earnings					
	-1.9274***	-0.0233	-0.0049	-0.0246	-7.6220
	(0.4193)	(0.1046)	(0.0044)	(0.0213)	(5.0140)
n = 152, R^2 = 0.0111, F[4,147] = 1.4233, BP(4) = 1.9466					
AGMs					
	-3.1279***	0.1060	-0.0001	-0.0114	-25.0351
	(0.4977)	(0.0869)	(0.0059)	(0.0294)	(15.8800)
n = 106, R^2 = -0.0034, F[4,101] = 0.9120, BP(4) = 6.0260					
Board Changes					
	-3.6059***	-0.0114	0.0021	0.0115	-27.3430***
	(0.1778)	(0.0356)	(0.0020)	(0.0100)	(4.7840)
n = 387, R^2 = 0.0838, F[4,382] = 9.8272, BP(4) = 4.9445					
Changes in Shareholdings					
	-3.6469***	-0.0304	-0.0005	0.0079	-20.4720***
	(0.1431)	(0.0317)	(0.0005)	(0.0072)	(3.3230)
n = 927, R^2 = 0.0414, F[4,922] = 10.9932, BP(4) = 27.9418					

Notes:
LN_MV_i is the natural log of market capitalisation measuring firm size (£M), as at 1st January in the year of announcement,
AGE_i measures the number of years the firm has been in operation as at 1st January in the year of announcement,
NUM_i measures the number of disclosures made by the firm over the sample period,
$VOLPR_i$ measures stock return volatility over the prior period, where (t=-20,...,-1)
Figures in parentheses are White's standard errors,
*,**,*** statistically significant at the 10%, 5% and 1% critical level, respectively,
n represents the number of observations,
R^2 is adjusted for degrees of freedom,
F-stat is a joint test of statistical significance,
BP(4) is the Breusch-Pagan Chi-squared test for heteroscedasticity, with 4 degrees of freedom.

5.4.2 *Market Anticipation and the Total Value of Information Impounded*

Measuring the value of information by the daily change in price only captures the net effect of information on security prices. This will occur if investors' beliefs are changing daily as to whether expectations are rising or falling. Therefore daily price movement over the event period will be offsetting when there is uncertainty in the market. To measure the total effect of information on security prices, we need to ignore the sign of daily price movement. The total value of the information is therefore estimated using the API metric by accumulating absolute abnormal returns.

$\underline{LN\_ANN_i}$

Table 5.7 reports the regression results of the total value of information impounded over the announcement period, relative to the prior period. As before, the coefficient signs are not always as predicted, except when statistically significant. The ability of firm size (LN_MV_i) in explaining the reaction to a board change or notification of a change in shareholding, is significantly reduced when compared to the net value of information impounded over the announcement period. Prior volatility of stock returns (VOL_{PR+A_i}) is shown to be the only driving force behind the anticipation of the annual earnings report, board changes and a change in shareholding. VOL_{PR+A_i} is highly significant for all three expected return models, and of negative sign. None of the explanatory variables are found to be significant in the explanation of either interim earnings reports or AGMs. The low explanatory power of the models is substantiated by the high significance of the constant term.

$\underline{LN\_POST_i}$

Table 5.8 reports the regression results of the total value of information impounded over the post-announcement period, relative to the prior and announcement periods. The significant explanatory power of the prior volatility of stock returns for the initial response (LN_ANN_i) to the annual earnings report, board changes and a change in shareholdings, extends to AGMs. VOL_{PR+A_i} persists as the main driving force behind the anticipation of all the information types examined, except interim earnings. For annual earnings however, firm size has incremental power in the explanation of drift; highly significant and of negative sign. Previously in section 3.7.3, we hypothesised

Table 5.8a

OLS Regression Results, of the Value of Total Information (LN_POST_i) Estimated Using Market Model Adjusted Returns (MM), Against The Explanatory Variables

Clear Event Window (t=-20,...,+20)

$$LN\_POST_i = a_0 + a_1 LN\_MV_i + a_2 AGE_i + a_3 NUM_i + a_4 VOLPR{+}A_i + u_i$$

	a_0	a_1	a_2	a_3	a_4
Annual Earnings					
	0.2569	-0.0833***	0.0004	0.0080	-13.5670**
	(0.1650)	(0.0287)	(0.0015)	(0.0058)	(3.9450)
n = 116, R^2 = 0.1473, F[4,111] = 5.9652, BP(4) = 15.5712					
Interim Earnings					
	0.1036	-0.0028	-0.0023	0.0027	-6.3279
	(0.1764)	(0.0324)	(0.0019)	(0.0064)	(4.1260)
n = 152, R^2 = 0.0528, F[4,147] = 3.1038, BP(4) = 13.9696					
AGMs					
	-0.0199	0.0254	0.0003	0.0001	-20.0380***
	(0.2114)	(0.0423)	(0.0020)	(0.0094)	(5.6370)
n = 106, R^2 = 0.0932, F[4,101] = 3.6964, BP(4) = 19.7482					
Board Changes					
	0.3038***	-0.0087	-0.0019**	-0.0014	-17.2261***
	(0.1241)	(0.0164)	(0.0009)	(0.0046)	(2.2790)
n = 387, R^2 = 0.1312, F[4,382] = 15.5673, BP(4) = 66.2679					
Changes in Shareholdings					
	-0.0318	0.0120	0.0006*	0.0048	-17.4010***
	(0.0750)	(0.0147)	(0.0003)	(0.0030)	(3.0830)
n = 927, R^2 = 0.1650, F[4,922] = 46.7574, BP(4) = 129.085					

Notes:
LN_MV_i is the natural log of market capitalisation measuring firm size (£M), as at 1st January in the year of announcement,
AGE_i measures the number of years the firm has been in operation as at 1st January in the year of announcement,
NUM_i measures the number of disclosures made by the firm over the sample period,
$VOLPR{+}A_i$ measures stock return volatility over the prior and announcement period, where (t=-20,...,0)
Figures in parentheses are White's standard errors,
*,**,*** statistically significant at the 10%, 5% and 1% critical level, respectively,
n represents the number of observations,
R^2 is adjusted for degrees of freedom,
F-stat is a joint test of statistical significance,
BP(4) is the Breusch-Pagan Chi-squared test for heteroscedasticity, with 4 degrees of freedom.

Table 5.8b

OLS Regression Results, of the Value of Total Information (LN_POST_i) Estimated Using Market Adjusted Returns (MKT), Against The Explanatory Variables

Clear Event Window (t=-20,...,+20)

$$LN\_POST_i = a_0 + a_1 LN\_MV_i + a_2 AGE_i + a_3 NUM_i + a_4 VOLPR{+}A_i + u_i$$

	a_0	a_1	a_2	a_3	a_4
Annual Earnings					
	0.2803*	-0.0902***	-0.0001	0.0089*	-13.2380***
	(0.1559)	(0.0267)	(0.0013)	(0.0053)	(3.9010)
n = 116, R^2 = 0.1766, F[4,111] = 7.1671, BP(4) = 27.3986					
Interim Earnings					
	0.1693	-0.0253	-0.0025	0.0051	-6.5855*
	(0.1663)	(0.0316)	(0.0017)	(0.0060)	(4.0150)
n = 152, R^2 = 0.0846, F[4,147] = 4.4906, BP(4) = 35.0173					
AGMs					
	-0.0402	-0.0051	0.0001	0.0090	-19.3910***
	(0.1830)	(0.0401)	(0.0019)	(0.0089)	(05.2330)
n = 106, R^2 = 0.1010, F[4,101] = 3.9490, BP(4) = 25.7884					
Board Changes					
	0.2701***	-0.0112	-0.0011	-0.0006	-15.5410***
	(0.0939)	(0.0129)	(0.0007)	(0.0037)	(1.9800)
n = 387, R^2 = 0.1637, F[4,101] = 19.8947, BP(4) = 55.8257					
Changes in Shareholdings					
	0.0289	0.0109	0.0004	0.0024	-15.6940***
	(0.0581)	(0.0121)	(0.0003)	(0.0025)	(2.8670)
n = 927, R^2 = 0.2017, F[4,922] = 59.4949, BP(4) = 170.1950					

Notes:
LN_MV_i is the natural log of market capitalisation measuring firm size (£M), as at 1st January in the year of announcement,
AGE_i measures the number of years the firm has been in operation as at 1st January in the year of announcement,
NUM_i measures the number of disclosures made by the firm over the sample period,
$VOLPR{+}A_i$ measures stock return volatility over the prior and announcement period, where (t=-20,...,0)
Figures in parentheses are White's standard errors,
*,**,*** statistically significant at the 10%, 5% and 1% critical level, respectively,
n represents the number of observations,
R^2 is adjusted for degrees of freedom,
F-stat is a joint test of statistical significance,
BP(4) is the Breusch-Pagan Chi-squared test for heteroscedasticity, with 4 degrees of freedom.

Table 5.8c

OLS Regression Results, of the Value of Total Information (LN_POST_i) Estimated Using Mean Adjusted Returns (MN), Against The Explanatory Variables

Clear Event Window (t=-20,...,+20)

$$LN\_POST_i = a_0 + a_1 LN\_MV_i + a_2 AGE_i + a_3 NUM_i + a_4 VOLPR{+}A_i + u_i$$

	a_0	a_1	a_2	a_3	a_4
Annual Earnings					
	0.3048	-0.0915***	0.0010	0.0072	-16.1120***
	(0.2126)	(0.0338)	(0.0020)	(0.0072)	(4.8210)
$n = 116$, $R^2 = 0.1375$, $F[4,111] = 5.5833$, $BP(4) = 8.6252$					
Interim Earnings					
	0.0870	0.0167	-0.0031	0.0022	-6.8466
	(0.1987)	(0.0372)	(0.0022)	(0.0077)	(4.5350)
$n = 152$, $R^2 = 0.0458$, $F[4,147] = 2.8135$, $BP(4) = 9.0757$					
AGMs					
	-0.0140	-0.0108	0.0008	0.0031	-21.1800***
	(0.2259)	(0.0462)	(0.0025)	(0.0110)	(5.9790)
$n = 106$, $R^2 = 0.0565$, $F[4,101] = 2.5713$, $BP(4) = 8.0987$					
Board Changes					
	0.3772***	-0.0213	-0.0024**	-0.0008	-19.1620***
	(0.1551)	(0.0191)	(0.0011)	(0.0058)	(2.8230)
$n = 387$, $R^2 = 0.1114$, $F[4,382] = 13.1012$, $BP(4) = 64.6198$					
Changes in Shareholdings					
	-0.0461	0.0116	0.0009**	0.0066*	-20.1980***
	(0.0927)	(0.0182)	(0.0004)	(0.0037)	(3.7720)
$n = 927$, $R^2 = 0.1473$, $F[4,922] = 40.9935$, $BP(4) = 92.0647$					

Notes:
LN_MV_i is the natural log of market capitalisation measuring firm size (£M), as at 1st January in the year of announcement,
AGE_i measures the number of years the firm has been in operation as at 1st January in the year of announcement,
NUM_i measures the number of disclosures made by the firm over the sample period,
$VOLPR{+}A_i$ measures stock return volatility over the prior and announcement period, where (t=-20,...,0)
Figures in parentheses are White's standard errors,
*,**,*** statistically significant at the 10%, 5% and 1% critical level, respectively,
n represents the number of observations,
R^2 is adjusted for degrees of freedom,
F-stat is a joint test of statistical significance,
BP(4) is the Breusch-Pagan Chi-squared test for heteroscedasticity, with 4 degrees of freedom.

Table 5.9a

OLS Regression Results, of the Value of Total Information (LN_ANN_i) Estimated Using Market Model Adjusted Returns (MM), Against The Explanatory Variables

Unclear Event Window (t=-20,...,0)

$$LN\_ANN_i = a_0 + a_1 LN\_MV_i + a_2 AGE_i + a_3 NUM_i + a_4 VOLPR_i + u_i$$

	a_0	a_1	a_2	a_3	a_4
Annual Earnings					
	-2.0310***	-0.0091	-0.0002	0.0035	-22.9160***
	(0.1123)	(0.0207)	(0.0010)	(0.0042)	(2.9400)
n = 1830, R^2 = 0.0443, F[4,1825] = 22.1942, BP(4) = 70.0661					
Interim Earnings					
	-2.4243***	0.0080	0.0004	0.0007	-10.3690***
	(0.1259)	(0.0244)	(0.0013)	(0.0049)	(3.7560)
n = 1452, R^2 = 0.0089, F[4,1447] = 4.2548, BP(4) = 37.7564					
AGMs					
	-3.4838***	0.0180	0.0024	0.0120	-16.1480**
	(0.2270)	(0.0463)	(0.0020)	(0.0077)	(7.5090)
n = 481, R^2 = 0.0123, F[4,476] = 2.4994, BP(4) = 15.6998					
Board Changes					
	-3.2672***	-0.0484***	0.0006	0.0135***	-15.5739***
	(0.1013)	(0.0173)	(0.0010)	(0.0032)	(2.3170)
n = 1807, R^2 = 0.0400, F[4,1802] = 19.8115, BP(4) = 30.5872					
Changes in Shareholdings					
	-3.5788***	0.0230	-0.0005	0.0010	-14.5870***
	(0.0721)	(0.0142)	(0.0007)	(0.0024)	(1.2540)
n = 4354, R^2 = 0.0394, F[4,4349] = 45.7112, BP(4) = 27.4138					

Notes:
LN_MV_i is the natural log of market capitalisation measuring firm size (£M), as at 1st January in the year of announcement,
AGE_i measures the number of years the firm has been in operation as at 1st January in the year of announcement,
NUM_i measures the number of disclosures made by the firm over the sample period,
$VOLPR_i$ measures stock return volatility over the prior period, where (t=-20,...,-1)
Figures in parentheses are White's standard errors,
*,**,*** statistically significant at the 10%, 5% and 1% critical level, respectively,
n represents the number of observations,
R^2 is adjusted for degrees of freedom,
F-stat is a joint test of statistical significance,
BP(4) is the Breusch-Pagan Chi-squared test for heteroscedasticity, with 4 degrees of freedom.

Table 5.9b

OLS Regression Results, of the Value of Total Information (LN_ANN_i) Estimated Using Market Adjusted Returns (MKT), Against The Explanatory Variables

Unclear Event Window (t=-20,...,0)

$$LN\_ANN_i = a_0 + a_1 LN\_MV_i + a_2 AGE_i + a_3 NUM_i + a_4 VOLPR_i + u_i$$

	a_0	a_1	a_2	a_3	a_4
Annual Earnings					
	-2.3136***	-0.0013	0.0004	0.0059*	-16.5140***
	(0.0984)	(0.0187)	(0.0009)	(0.0035)	(2.6080)
n = 1830, R^2 = 0.0297, F[4,1825] = 14.9719, BP(4) = 59.3156					
Interim Earnings					
	-2.5121***	0.0039	0.0007	0.0013	-7.1432***
	(0.1117)	(0.0217)	(0.0011)	(0.0042)	(2.9170)
n = 1452, R^2 = 0.0046, F[4,1447] = 2.6719, BP(4) = 27.5486					
AGMs					
	-3.4618***	-0.0212	0.0043***	0.0165***	-17.4480***
	(0.2073)	(0.0387)	(0.0018)	(0.0061)	(6.4790)
n = 481, R^2 = 0.0237, F[4,476] = 3.9174, BP(4) = 26.6409					
Board Changes					
	-3.2025***	-0.0300*	-0.0016	0.0123***	-14.5740***
	(0.0991)	(0.0161)	(0.0010)	(0.0029)	(2.2030)
n = 1807, R^2 = 0.0396, F[4,1802] = 19.6368, BP(4) = 50.7144					
Changes in Shareholdings					
	-3.4167***	0.0178	-0.0004	-0.0001	-16.2530***
	(0.0708)	(0.0134)	(0.0006)	(0.0023)	(1.4680)
n = 4354, R^2 = 0.0537, F[4,4349] = 62.7462, BP(4) = 115.539					

Notes:
LN_MV_i is the natural log of market capitalisation measuring firm size (£M), as at 1st January in the year of announcement,
AGE_i measures the number of years the firm has been in operation as at 1st January in the year of announcement,
NUM_i measures the number of disclosures made by the firm over the sample period,
$VOLPR_i$ measures stock return volatility over the prior period, where (t=-20,...,-1)
Figures in parentheses are White's standard errors,
*,**,*** statistically significant at the 10%, 5% and 1% critical level, respectively,
n represents the number of observations,
R^2 is adjusted for degrees of freedom,
F-stat is a joint test of statistical significance,
BP(4) is the Breusch-Pagan Chi-squared test for heteroscedasticity, with 4 degrees of freedom.

Table 5.9c

OLS Regression Results, of the Value of Total Information (LN_ANN_i) Estimated Using Mean Adjusted Returns (MN), Against The Explanatory Variables

Unclear Event Window (t=-20,...,0)

$$LN\_ANN_i = a_0 + a_1 LN\_MV_i + a_2 AGE_i + a_3 NUM_i + a_4 VOLPR_i + u_i$$

	a_0	a_1	a_2	a_3	a_4
Annual Earnings					
	-1.8341***	-0.0472**	-0.0000	0.0065	-27.2110***
	(0.1141)	(0.0214)	(0.0114)	(0.0041)	(3.2320)
n = 1830, R^2 = 0.0541, F[4,1825] = 27.1413, BP(4) = 52.3175					
Interim Earnings					
	-2.1381***	-0.0216	-0.0002	0.0003	-15.6420***
	(0.1328)	(0.0245)	(0.0013)	(0.0051)	(5.2650)
n = 1452, R^2 = 0.0201, F[4,1447] = 8.4560, BP(4) = 41.1307					
AGMs					
	-3.3368***	-0.0381	0.0031	0.0118	-16.1280**
	(0.2453)	(0.0440)	(0.0022)	(0.0068)	(7.1880)
n = 481, R^2 = 0.0053, F[4,476] = 1.6409, BP(4) = 13.0848					
Board Changes					
	-3.2859***	-0.0541***	0.0002	0.0146***	-16.5250***
	(0.1031)	(0.0172)	(0.0010)	(0.0033)	(2.3440)
n = 1807, R^2 = 0.0403, F[4,1802] = 19.9586, BP(4) = 23.0164					
Changes in Shareholdings					
	-3.7219***	-0.0170	0.0001	0.0057***	-14.0870***
	(0.0735)	(0.0141)	(0.0007)	(0.0024)	(1.2260)
n = 4354, R^2 = 0.0297, F[4,4349] = 34.3183, BP(4) = 28.3062					

Notes:
LN_MV_i is the natural log of market capitalisation measuring firm size (£M), as at 1st January in the year of announcement,
AGE_i measures the number of years the firm has been in operation as at 1st January in the year of announcement,
NUM_i measures the number of disclosures made by the firm over the sample period,
$VOLPR_i$ measures stock return volatility over the prior period, where (t=-20,...,-1)
Figures in parentheses are White's standard errors,
*,**,*** statistically significant at the 10%, 5% and 1% critical level, respectively,
n represents the number of observations,
R^2 is adjusted for degrees of freedom,
F-stat is a joint test of statistical significance,
BP(4) is the Breusch-Pagan Chi-squared test for heteroscedasticity, with 4 degrees of freedom.

firm size to be of positive sign. We hypothesised, the information content of large firm announcements to be largely anticipated well in advance of their release (Freeman 1987); ie. prior to (t=-20). Whereas, small firm stocks are more heavily traded as the release date approaches; ie. in this case, over the prior period. Any surprise, no matter how small, will appear disproportionately high for larger firms against a prior period of relatively little trade. Consequently, firm size (LN_MV$_i$) is expected to be positively related to the level of market anticipation, LN_ANN$_i$ and LN_POST$_i$. A negative sign implies, the stocks of larger firms are more heavily traded over the announcement period.

Unclear Event Windows

Table 5.9 reports the results for LN_ANN$_i$, for unclear event windows. The tables clearly demonstrate the ability of the volatility of prior stock returns (VOLPR$_i$) in the explanation of the total value of information impounded, in response to the average event. VOLPR$_i$ is of least 5 per cent significance and negative in sign. In addition, the number of disclosures made by a firm (NUM$_i$), is both positive and significant at the 1 per cent level, for board changes. The expected probability and precision of the individual events is less clearly determined than previously. Comparison between information types, shows the relative size of the coefficient (a_4) varies according to the return metric. However, it is possible to infer the annual earnings report is on average, of greater precision than the interim earnings report. The interim report appears most often to be of the least precision.

Table 5.10 reports the results for LN_POST$_i$ for unclear windows. The prior volatility of stock returns (VOLPR+A$_i$) is reported to be the dominant factor in explaining lagged impounding, for all information types. In all cases, VOLPR+A$_i$ is highly significant at the 1 per cent level. Firm size (LN_MVi) is also significant and of negative sign for annual earnings, interim earnings and board changes. The negative sign again implies, contrary to previous intuition, of greater activity in large firms stocks post event, relative to smaller stocks. The explanatory power of NUM$_i$, extends to the post-announcement period for board changes, but also for AGMs and a change in shareholding. For the first time, AGE$_i$ is significant across all return metrics, and

Table 5.10a

OLS Regression Results, of the Value of Total Information (LN_POST$_i$) Estimated Using Market Model Adjusted Returns (MM), Against The Explanatory Variables

Unclear Event Window (t=-20,...,+20)

$$LN\_POST_i = a_0 + a_1 LN\_MV_i + a_2 AGE_i + a_3 NUM_i + a_4 VOLPR{+}A_i + u_i$$

	a_0	a_1	a_2	a_3	a_4
Annual Earnings					
	0.3633***	-0.0283***	-0.0008*	0.0038**	-17.5360***
	(0.0500)	(0.0080)	(0.0004)	(0.0017)	(1.6460)
n = 1830, R^2 = 0.1907, F[4,1825] = 108.7757, BP(4) = 346.669					
Interim Earnings					
	0.1944***	-0.0294***	-0.0000	0.0016	-10.7800***
	(0.0622)	(0.0093)	(0.0005)	(0.0018)	(2.6960)
n = 1452, R^2 = 0.0909, F[4,1447] = 37.2607, BP(4) = 333.923					
AGMs					
	-0.0967	0.0077	-0.0005	0.0055**	-13.5660***
	(0.1090)	(0.0163)	(0.0007)	(0.0027)	(3.3550)
n = 481, R^2 = 0.0623, F[4,476] = 8.9739, BP(4) = 71.5172					
Board Changes					
	0.2773***	-0.0253***	-0.0019***	0.0040***	-13.6970***
	(0.0552)	(0.0076)	(0.0004)	(0.0015)	(1.6010)
n = 1807, R^2 = 0.1517, F[4,1802] = 81.7456, BP(4) = 377.207					
Changes in Shareholdings					
	0.0055	-0.0011	-0.0002	0.0033***	-15.1950***
	(0.0356)	(0.0061)	(0.0003)	(0.0010)	(0.7929)
n = 4354, R^2 = 0.1812, F[4,4349] = 241.7520, BP(4) = 379.207					

Notes:
LN_MV$_i$ is the natural log of market capitalisation measuring firm size (£M), as at 1st January in the year of announcement,
AGE$_i$ measures the number of years the firm has been in operation as at 1st January in the year of announcement,
NUM$_i$ measures the number of disclosures made by the firm over the sample period,
VOLPR+A$_i$ measures stock return volatility over the prior and announcement period, where (t=-20,...,0)
Figures in parentheses are White's standard errors,
*,**,*** statistically significant at the 10%, 5% and 1% critical level, respectively,
n represents the number of observations,
R^2 is adjusted for degrees of freedom,
F-stat is a joint test of statistical significance,
BP(4) is the Breusch-Pagan Chi-squared test for heteroscedasticity, with 4 degrees of freedom.

Table 5.10b

OLS Regression Results, of the Value of Total Information (LN_POST_i) Estimated Using Market Adjusted Returns (MKT), Against The Explanatory Variables

Unclear Event Window (t=-20,...,+20)

$$LN\_POST_i = a_0 + a_1 LN\_MV_i + a_2 AGE_i + a_3 NUM_i + a_4 VOL_{PR+A_i} + u_i$$

	a_0	a_1	a_2	a_3	a_4
Annual Earnings					
	0.2684***	-0.0229***	-0.0009***	0.0040***	-14.6070***
	(0.0398)	(0.0069)	(0.0003)	(0.0014)	(1.3740)
n = 1830, R^2 = 0.2021, F[4,1825] = 116.7843, BP(4) = 496.013					
Interim Earnings					
	0.1544***	-0.0255***	0.0001	0.0013	-9.4237***
	(0.0513)	(0.0082)	(0.0004)	(0.0016)	(2.3420)
n = 1452, R^2 = 0.1062, F[4,1447] = 44.1044, BP(4) = 579.030					
AGMs					
	-0.0247	-0.0034	-0.0008	0.0063***	-13.5940***
	(0.0972)	(0.0147)	(0.0006)	(0.0023)	(3.2020)
n = 481, R^2 = 0.0737, F[4,476] = 10.5440, BP(4) = 84.9989					
Board Changes					
	0.2620***	-0.0233***	-0.0015***	0.0031**	-12.7370***
	(0.0458)	(0.0068)	(0.0004)	(0.0014)	(1.5240)
n = 1807, R^2 = 0.1719, F[4,1802] = 94.6993, BP(4) = 506.302					
Changes in Shareholdings					
	0.0996***	-0.0048	-0.0002	0.0026***	-14.9640***
	(0.0290)	(0.0053)	(0.0002)	(0.0009)	(0.7513)
n = 4354, R^2 = 0.2336, F[4,4349] = 332.6701, BP(4) = 481.704					

Notes:
LN_MV_i is the natural log of market capitalisation measuring firm size (£M), as at 1st January in the year of announcement,
AGE_i measures the number of years the firm has been in operation as at 1st January in the year of announcement,
NUM_i measures the number of disclosures made by the firm over the sample period,
VOL_{PR+A_i} measures stock return volatility over the prior and announcement period, where (t=-20,...,0)
Figures in parentheses are White's standard errors,
*,**,*** statistically significant at the 10%, 5% and 1% critical level, respectively,
n represents the number of observations,
R^2 is adjusted for degrees of freedom,
F-stat is a joint test of statistical significance,
BP(4) is the Breusch-Pagan Chi-squared test for heteroscedasticity, with 4 degrees of freedom.

Table 5.10c

OLS Regression Results, of the Value of Total Information (LN_POST_i) Estimated Using Mean Adjusted Returns (MN), Against The Explanatory Variables

Unclear Event Window (t=-20,...,+20)

$$LN\_POST_i = a_0 + a_1 LN\_MV_i + a_2 AGE_i + a_3 NUM_i + a_4 VOLPR{+}A_i + u_i$$

	a_0	a_1	a_2	a_3	a_4
Annual Earnings					
	0.4440***	-0.0296***	-0.0005	0.0032*	-20.4270***
	(0.0604)	(0.0950)	(0.0005)	(0.0019)	(1.9340)
n = 1830, R^2 = 0.1820, F[4,1825] = 102.7600, BP(4) = 237.466					
Interim Earnings					
	0.2232***	-0.0330***	-0.0001	0.0015	-12.6000***
	(0.0744)	(0.0109)	(0.0006)	(0.0021)	(3.1790)
n = 1452, R^2 = 0.0848, F[4,1447] = 34.6092, BP(4) = 265.142					
AGMs					
	-0.0490	-0.0100	-0.0005	0.0093***	-18.5270***
	(0.1233)	(0.0181)	(0.0008)	(0.0033)	(3.8940)
n = 481, R^2 = 0.0783, F[4,476] = 11.1923, BP(4) = 54.0580					
Board Changes					
	0.2972***	-0.0336***	-0.0002***	0.0050***	-15.0230***
	(0.0656)	(0.0087)	(0.0005)	(0.0018)	(1.8600)
n = 1807, R^2 = 0.1318, F[4,1802] = 69.5713, BP(4) = 328.999					
Changes in Shareholdings					
	0.0416	0.0018	-0.0003	0.0041***	-16.8070***
	(0.0431)	(0.0073)	(0.0003)	(0.0012)	(0.9310)
n = 4354, R^2 = 0.1570, F[4,4349] = 103.7055, BP(4) = 375.900					

Notes:
LN_MV_i is the natural log of market capitalisation measuring firm size (£M), as at 1st January in the year of announcement,
AGE_i measures the number of years the firm has been in operation as at 1st January in the year of announcement,
NUM_i measures the number of disclosures made by the firm over the sample period,
$VOLPR{+}A_i$ measures stock return volatility over the prior and announcement period, where (t=-20,...,0)
Figures in parentheses are White's standard errors,
*,**,*** statistically significant at the 10%, 5% and 1% critical level, respectively,
n represents the number of observations,
R^2 is adjusted for degrees of freedom,
F-stat is a joint test of statistical significance,
BP(4) is the Breusch-Pagan Chi-squared test for heteroscedasticity, with 4 degrees of freedom.

negative in sign, for board changes. The negative sign implies, the older the firm the greater the anticipation of board changes. Supporting the notion, that there is less accessibility to information concerning younger firms (see section 3.4). Indeed, for board changes we find each of the explanatory variables have incremental power in the explanation of lagged impounding. A distinct feature of these three models reported in Table 5.10 is the notable increase in the R^2 values.

5.5 CONCLUSIONS

The Pattern of Stock Returns

The preliminary analysis identified the impounding behaviour of security returns for the average event, for each class of information (see section 5.3). Several observations were made, including the sensitivity of the information metric, API_t, to the expected returns model employed. However, the overall trend was one of gradual anticipation, with the market continuing to adjust after the event's release, perhaps as the full implications become known. A higher level of anticipation and a higher level of drift is associated with annual and interim earnings reports, relative to other information types. This possibly indicates the greater relevance and precision of earnings information for security valuation. The corresponding high level of drift in security returns following the earnings release, is consistent with the notion that earnings reports contain information not available from alternative more timely information sources (Chambers & Penman 1984). However, the results must be viewed tentatively by the predominantly low significance of the daily average abnormal returns. One cannot therefore be certain that the average event for any class of information, causes a persistent positive or even negative impact on stock returns. The apparent drift in security returns, may therefore indicate possible model mis-specification in the calculation of unexpected returns.

On the announcement day, there is a significantly larger price adjustment to the release of interim earnings, relative to the annual report. This implies the information content of interim earnings disclosures is less easy to anticipate. The significance of abnormal returns over many days of the event window surrounding a change in shareholding, is an indication of possible herding by investors. Over the prior period, this implies a change in shareholding is more likely to occur after pronounced trading activity. Over the post-announcement period, this implies a change in shareholding is interpreted as a signal by the uninformed traders.

The inclusion of other disclosures in the event window, noticeably reduces the overall significance of the daily abnormal returns. This reduction may in part reflect the small firm bias of examining isolated events, and in part reflect an increase in the level of noise present in prices from the inclusion of confounding events. Examining security returns around isolated events, allows one infer the relative information content of different information types. Whereas, examining security returns over event periods of more than one disclosure, allows one to observe the general market behaviour surrounding the average corporate disclosure; extending the general applicability of the results.

Explaining the Pattern of Stock Returns

The second part of the analysis tried to explain the cross-sectional variation in the pattern of stock returns for each class of information, and tested the robustness of these findings employing the same three models of expected returns (see section 5.4). The idea is that, the greater the anticipation of an announcement, the lower the expected level of drift, ceteris paribus. Here anticipation and interpretation, are a function of the expected costs and benefits of being informed. Overall, the results are consistent with our expectations. Market anticipation is found to be an increasing function of firm size, the number of years a firm has been trading, and the volatility of prior stock returns. This in turn implies the cost of being informed is a decreasing function of firm size, age and other factors as proxied by the volatility of stock returns. However, the positive coefficient of NUM_i, suggests increased voluntary disclosure by firms reduces the ability of investors to anticipate and interpret information. A possible explanation may be, increased disclosure by firms discourages investors from acquiring costly information, if they expect their expectations will soon again need to be revised on the release of new information (Trueman 1994). Or alternatively, increasing disclosure of imprecise information may confuse the expectations of investors.

However, the significance of these explanatory variables varies according to the information type, the event window under examination (ANN or POST), whether there is more than one event in the event window (clear or unclear windows), the measure of information (net or total value of information impounded), and the model of expected returns (MM, MKT or MN).

Our model explains post-announcement drift better than the price movement on the announcement day, which may indicate investors initial reactions are not always based on informed judgements. The initial market reaction on the announcement day to the disclosure of both earnings and non-earnings information is predominately a function of firm size. However, the volatility of stock returns (prior to the disclosure) is the main driving force behind the explanation of post-announcement drift. We also find the stock return behaviour surrounding the announcement of interim earnings is least explained, relative to the other information types. This is surprising given the higher level of drift observed for interim reports, and would suggest investors are less informed about the implications of interim earnings news. Although this is consistent with finding a larger price adjustment to interim earnings on the announcement day, relative to other information types.

Allowing other disclosures within the event window, noticeably reduces both the overall level of significance of the daily abnormal returns. This reduction may in part reflect the small firm bias of examining isolated events, and in part reflect an increase in the level of noise present in prices from the inclusion of confounding events. However, we assert the problem is one of small firm bias given the overall increase in the explanatory power of firm size for stock returns behaviour on the announcement day. Furthermore, allowing other events in the event window increases the explanatory power of the volatility of stock returns, which remains the main driving force behind the explanation of post-announcement drift.

Besides prior volatility, the remaining variables are generally insignificant in the explanation of the anticipation of interim earnings. AGE_i and NUM_i are only significant in the explanation of anticipation of board changes. On the whole the R^2

values are very low, though this is consistent with earlier UK evidence. The joint explanatory of the variables does not exceed 5 per cent, except in the explanation of the total value of information impounded over the post-announcement period, where the R^2 values are occassionally found to exceed 20 per cent. Although this may be indicative of a relatively efficient market, in which one cannot explain a large proportion of future movements in price with historical data.

6. THE PATTERN OF ANTICIPATION AND INTERPRETATION: GOOD NEWS AND BAD NEWS

6.1 THE OBJECTIVE AND MAIN FINDING

This chapter extends the results of the previous chapter by addressing the issue of good and bad news. This is prompted by growing evidence that the market reaction to corporate disclosure varies according to the sign of the news. The chapter proceeds by

- a brief review of the literature on the disclosure of good and bad news,
- examining the impounding behaviour of stock returns surrounding the release of each event type, distinguishing between the sign of the news,
- re-employing the model developed in chapter three, to examine whether the incentives to become informed varies between good and bad news.

The chapter finds several indications of differential price behaviour by investors towards the release of good and bad news.

6.2 INTRODUCTION

The market reaction to new information is assumed to be identical for good and bad news of equal size; the price adjustment is assumed to be a linear function of the size of the news, regardless of its sign. However, the empirical literature documents increasing evidence that the price process, or rather investor behaviour, is far more complex than originally thought. Unexpected bad news increases the volatility of stock returns more than unexpected good news (French, Schwert & Stambaugh 1987, Engle & Ng 1993). Campbell & Hertschel (1992) found volatility is greater following stock market falls, than after stock market rises.[1] Also, the papers of Chambers & Penman (1984), Brown, Harlow & Tinic (1988) and Skinner (1994), all reported a stronger price reaction to the release of bad news.

[1] This has been explained as a leverage effect, which occurs when the market value of a firm declines (see Campbell & Hertschel 1992).

There is reason to believe therefore, that the process of anticipation or interpretation is different for good and bad news. The more timely disclosure of good news by managers, and their apparent reluctance to disclose bad news, is well documented in the earnings literature (Chambers & Penman 1984, Penman 1984, McNichols 1988). Consequently, security prices in the pre-announcement period are argued to reflect more good news than bad news. Investors interpret the failure to report on time as a signal of bad news (Penman 1984), although they fail to anticipate the full extent of the bad news, from more timely information sources, until the late report finally arrives. Thus, by delaying bad news, managers prevent investors from inferring the worst (McNichols 1988).

The approach taken for this chapter is the same as for chapter five, but involves partitioning the events into good and bad news. The chapter starts with a brief review of the literature on the disclosure of information, in section 6.3. The section discusses: how the pattern of disclosure coincides with the sign of the news; the various incentives to disclose early; the attributes of early disclosers; and lastly, alternative explanations for the seeming earlier arrival of good news. Section 6.4 discusses the adjustment of prices to information. The empirical analysis commences with section 6.5, which identifies the impounding behaviour of average stock returns over the event period for each class of information, distinguishing between the sign of the news. In order to make initial inferences as to whether the rate of anticipation and interpretation differs according to the sign of the news. In section 6.6, the empirical model developed in chapter three, is re-applied to test whether the incentives to become informed varies between good and bad news. Section 6.7 concludes the chapter.

6.3 THE DISCLOSURE OF INFORMATION

6.3.1 *The Disclosure Pattern of Earnings Information*

There is evidence to suggest there is a weekly pattern in the disclosure of information, with coincides with the sign of the news. Patell & Wolfson (1982) report bad news is more likely to be disclosed after the market closes, and especially after the close of trade on a Friday. Penman (1984) similarly identifies more bad news arriving at the market on a Monday and, to a lesser extent, prior to the close on a Friday. The release of bad news after the market closes on a Friday, transpires in negative price movements when the market re-opens on Monday. Both studies suggest managers try to conceal bad news from investors. Or perhaps by allowing investors the weekend to absorb the shock, relieves the fears of managers of possible overreaction.

The tendency of managers to advance the announcement of favourable earnings news, while delaying unfavourable earnings news, is well documented (Beaver 1968, Givoly & Palmon 1982, Chambers & Penman 1984, Penman 1984). For instance, Penman (1984) finds earnings reports published in the first two weeks of calender quarters 2, 3 and 4, not only on average convey good news but also coincide with the announcement of increased earnings. Reports published later within the quarter, more often than not carry bad news.

Even when a disclosure is mandatory, there is still uncertainty associated with the exact timing of its release. The stock price reaction to an announcement is therefore also a function of the announcement's expected arrival. The longer the reporting lag (ie. the time from the end of the reporting period to the announcement date), the greater the opportunity for investors to anticipate the information content of the announcement from other more timely information sources. Consequently, the price reaction to earlier announcements (ie. those with shorter reporting lags), maybe significantly more pronounced than the reaction to later announcements. Chambers & Penman (1984) however, were unable to find a significant link between the reporting lag and the variability of stock returns associated with interim and annual earnings releases; with the exception of small firms bearing good news. Although, this is consistent with the notion that earnings reports contain information unavailable from alternative sources, regardless of the reporting lag.

Earnings reports published earlier than expected, are associated with larger price movements than those published on time, or later than expected. Unexpectedly early reports are associated with, on average, positive abnormal returns over the announcement period (days 0 and +1). This further confirms that firms publish good news early. The abnormal returns of firms reporting later than expected are, on average, negative; implying bad news is withheld. Although this relationship is significant, it is not overwhelming. Bad news is often released on time, or even earlier than expected, as good news is often announced later than expected.

Firms which fail to report by the expected date, are characterised by negative returns, indicating investors interpret the failure to report on time as a forecast of bad news. The extent to which the market anticipates the size of the news is reflected by the diminished (negative) price response to its arrival. However, Penman (1984) observed a further reduction in price when the late report finally arrived. This implies, although investors may interpret no news as bad news, they appear unaware of the full extent of the news until it is announced. Thus, by delaying bad news, managers prevent investors from inferring the worst (McNichols 1988).

6.3.2 *Attributes of Early Disclosers*

Givoly & Palmon (1984), Chambers & Penman (1984) and Penman (1984), all show larger firms tend to report earlier than smaller companies; although the relationship is often weak. One explanation being, larger firms are more widely held, and as such more susceptible to pressure from shareholders and analysts alike, to produce more timely reports. Additionally, larger firms have the resources available to them to 'purchase less delay' in the preparation of accounts (Givoly & Palmon 1982).

Overall, the behaviour is one of regular predictable reporting by individual firms, where the report date can be predicted, on average, within a few days with a reasonable level of accuracy (Chambers & Penman 1984). However, a pattern of regular reporting conflicts with evidence of good news being reported earlier than bad news. If both relations exist, it would imply firms can be categorised consistently as good news firms or bad news firms. Though no such link is found by Chambers and Penman.

Various incentives exist that encourage may managers to promptly disclose information.[2] Managers may lose reputation if they fail to disclose in a timely manner (Skinner 1994). Alternatively, managers may wish to mitigate large price declines on earnings announcement dates when issuing unexpected bad news, to protect investors against large price fluctuations. In the US, under the Securities Exchange Act (1934), firms are under a legal obligation to correct previous statements that they later learn were materially misleading. Similarly, there are reasons to explain the delay of (bad) news, such as the desire of managers to defer the repercussions from shareholders, or the wish to continue current obligations and negotiations in the best possible light. The greatest incentive is the avoidance of investor overreaction to the news (Kasznik & Lev 1995).

6.3.3 *The Voluntary Disclosure of Information*

The apparent reluctance of managers to voluntarily disclose bad news is substantiated by the work of McNichols (1988). She finds the returns distribution to be more negatively skewed during earnings announcement periods, compared to non-announcement periods. Greater negative price revision is caused more by earnings announcements, than by discretionary disclosure, or through investors' own private information acquisition. Hence, security prices in the pre-announcement period therefore reflect more good news than bad news.

Lev & Penman (1990) find managers release forecasts of good news more frequently than bad news. However, more recent papers find the likelihood of an early disclosure increases with the size of the news and the permanency of the earnings change, rather than the sign of the news (Skinner 1994, Kasznik & Lev 1995). Skinner (1994) provides evidence on the voluntary disclosure of earnings related news. In contrast, it is 'large' negative earnings surprises that are preempted by managers more frequently than other earnings releases, and more often than not, relate to quarterly earnings news. Although it is still the case that bad news is not preempted very often. Skinner finds the prospect of warning investors ahead of earnings surprise, increases with the existence of a previous forecast.

---

[2] See Lang & Lundholm (1993) for a more thorough analysis of the determinants of voluntary disclosure.

Kasznik & Lev (1995) examined the discretionary disclosure policy of management who are facing a large earnings surprise in their fourth quarter. They investigate the ways in which managers alert investors to the forthcoming surprise. The earnings surprise, relative to a recent analyst's forecast, is large if it provoked a greater than 1 per cent stock price adjustment. Over half the sample provided no disclosure, neither quantitative or qualitative. Of those who did, only 6 per cent of the positive surprise firms and 9 per cent of the negative surprise firms issued any quantitative information. Overall, the frequency of earnings disappointments was twice that of positive news.

The likelihood of issuing a warning statement increases with the size of the earnings surprise. The greater the surprise, the harsher the warning, ie. the more quantitative and earnings related the warning will be.[3] The harsher the warning the stronger the reaction by investors. After controlling for the size of news, the combined reaction to the warning and subsequent earnings announcement is significantly more negative for firms that warned investors, than the reaction to the earnings announcement of the no warning firms. On further investigation, warnings were found more likely to be issued by firms with permanent earnings disappointments. Hence, investors may interpret harsh warnings as a long term indicator of future competitiveness and viability. Although investor response may explain why so many firms remain silent, due to the fear of overreaction by investors.

6.3.4 *Alternative Explanations for the Seeming Earlier Arrival of Good News*

Alternative explanations exist that may part explain the seeming arrival of good news in the market place before bad news, besides the actions of managers. There is anecdotal evidence that analysts prefer to promote 'buy' recommendations rather than 'sell' recommendations (Schipper 1991). If they have greater incentive to issue these recommendations during the pre-announcement period, this would explain the relative

[3] The form of disclosure is found to vary between good and bad news according to various firm attributes (Skinner 1994). Overall, for bad news firms, the size of the earnings surprise, the existence of a prior prospective statement, membership in a high tech or regulated industry, and firm size appear to be the most consistent disclosure attributes. For good news firms, only firm size and a previous forecast are associated with disclosure form.

increase in the release of good news. Of course, this activity will be most pronounced for firms that are closely followed, and may explain the skewness effect in returns for smaller firms as observed by McNichols (1988). Diamond & Verrecchia (1986) offer a micro-structure explanation - short sell restrictions. They show when informed traders are precluded from going short, bad news is reflected in prices less rapidly than good news.

6.4 THE ADJUSTMENT OF STOCK PRICES TO INFORMATION

Previous sections discuss various factors which affect the anticipation of information. We also briefly commented on the stronger price reaction to the disclosure of bad news (Chambers & Penman 1984, Brown, Harlow & Tinic 1988 and Skinner 1994), and of possible overreaction to bad news (Kaszik & Lev 1995). Other studies have acknowledged unexpected bad news increases the volatility of stock returns more than unexpected good news (French, Schwert & Stambaugh 1987, Engle & Ng 1993). Campbell & Hentschel (1992) argue, if future volatility is expected to increase, the required rate of return will increase and subsequently lower the security's price. The volatility of stock returns thereby intensifies the negative impact of bad news.

Studies that examine the differential adjustment of security prices to good and bad are sparse. Woodruff & Senchack (1988) studied the intraday adjustment of stock prices to the information content of earnings reports. Stocks with negative earnings surprises are found to experience the largest overall adjustment. Stocks declaring favourable earnings news had the quickest price adjustment, with ninety-one per cent of the adjustment completed within three hours. The adjustment to unfavourable earnings news was notably slower but similar, with the adjustment slower still to less extreme news. Lee (1992) similarly found 'large' traders take longer to impound bad news, although with the adjustment completed within 90 minutes.

A recent UK study by Sharkarway & Garrod (1995) found unfavourable earnings news to be largely ignored, while the reaction to favourable earnings news is representative of an overreaction. This response is argued to reflect the level of sophistication of the investors dealing in the company's securities. Unsophisticated investors are found not to respond to bad news, whilst they react more than sophisticated investors to good news.

6.5 THE PATTERN OF STOCK RETURNS FOR GOOD AND BAD NEWS

The approach taken in this chapter is unchanged from chapter five, but involves partitioning the events into good and bad news. Various definitions have been employed by the empirical literature to classify disclosures as good or bad news. Simple expectation models are often used to determine the nature of earnings news, where for instance the announced figure is simply compared to the previous quarter's (see Patell & Wolfson 1982, Penman 1984). Expectation models based on the past time series of earnings, fail to consider the expectations of investors, and subsequently may overestimate the true information content of a news item. Furthermore, it is an inappropriate manner to determine the nature of qualitative announcements. An alternative specification is to use a price-based model which can take various forms. For instance, both Chambers & Penman (1984), and Penman (1984), identified the sign of the news by the sign of the residual return over the announcement period (days 0 and +1). Alternatively, Skinner (1994) identified the sign of earnings news by the direction of the price change to its release.

We adopt the price-based method, where the nature of the news is determined by the final value of API over the duration of the event window; i.e. twenty days after the report date, API_{20}. The nature of the news is therefore conditioned on prior expectations. Announcements convey good news in the sense that they affect stock prices of reporting firms positively, and have an API_{20} value greater than 1.0. Announcements with an API_{20} value less than 1.0 are classified as bad news, and those with an API_{20} value equal to 1.0 contain no news.[4] By observing price changes to signals, avoids the problem of the misspecification of investors' expectations. In addition, determining the nature of the news by the sign of the return over the duration of the event window, rather than the announcement period, reduces any potential bias of mis-classification. The return over the announcement period may capture an initial

[4] Here no news is interpreted as having been wholly anticipated, or containing information of little importance.

under or overreaction to the news, which maybe later corrected.

Figures 6.1 to 6.2 below, trace the value of API_t over the event period (t=-20,...,+20) for each class of information, distinguishing between the average market response to both good and bad news. More detailed information of the price reaction to these separate events can be found in Tables 6.1 (a,b) to 6.5 (a,b); where the suffix a and b refers to good and bad news events, respectively. Together with reporting the daily average abnormal return (AAR) for the sample of firms, the tables also report the results of two-tailed t-tests used to evaluate the statistical significance of the daily AAR. If the average announcement conveys new information, then we can expect to observe abnormal returns in the direction of the sign of the news.

Briefly, the results show:

The pattern of the API_t illustrates investors are able to anticipate the sign of the news by at least twenty days in advance.

Both the level of anticipation and the level of drift is higher for good news events than bad. Possible explanations are that either (i) good news is more informative, or (ii) that bad news is more difficult to interpret.

For both annual and interim earnings reports, the absolute size of the price adjustment on the announcement day, is greater for unfavourable earnings news than favourable news. This suggests that bad news is not as easily anticipated as good news.

Greater daily sign reversal in the abnormal returns over the event period, for bad news. A possible explanation may be bad news is associated with greater uncertainty.

As in chapter 5, a higher level of anticipation and post-announcement drift is associated with interim and annual earnings reports.

The significance of abnormal returns over many days of the event window, surrounding a change in shareholding, is indicative of possible herding by investors.

Figure 6.1: The Abnormal Performance Index Around Annual Earnings Reports for Good and Bad News, Using Clear Event Windows

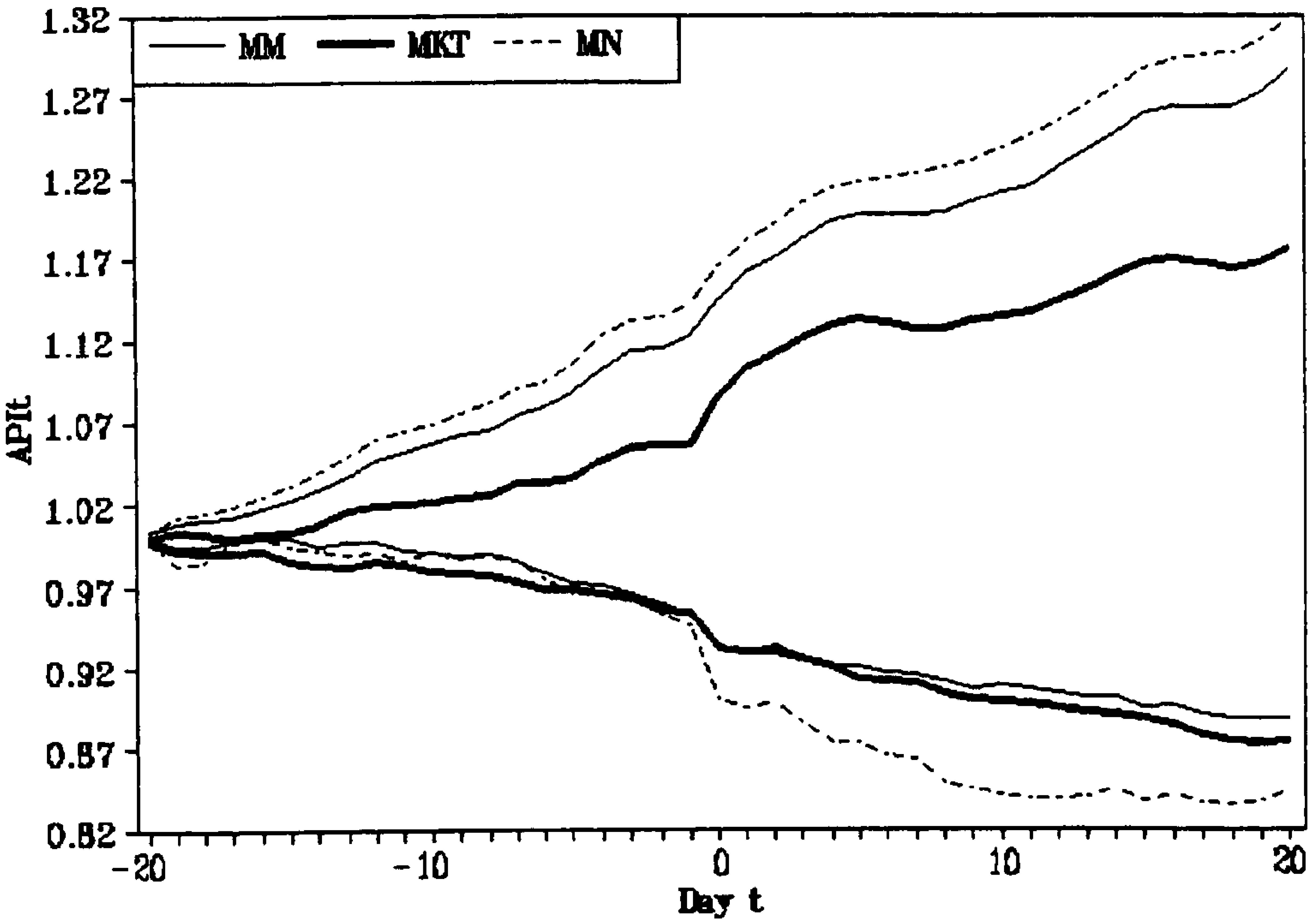


Figure 6.2: The Abnormal Performance Index Around Interim Earnings Reports for Good and Bad News, Using Clear Event Windows

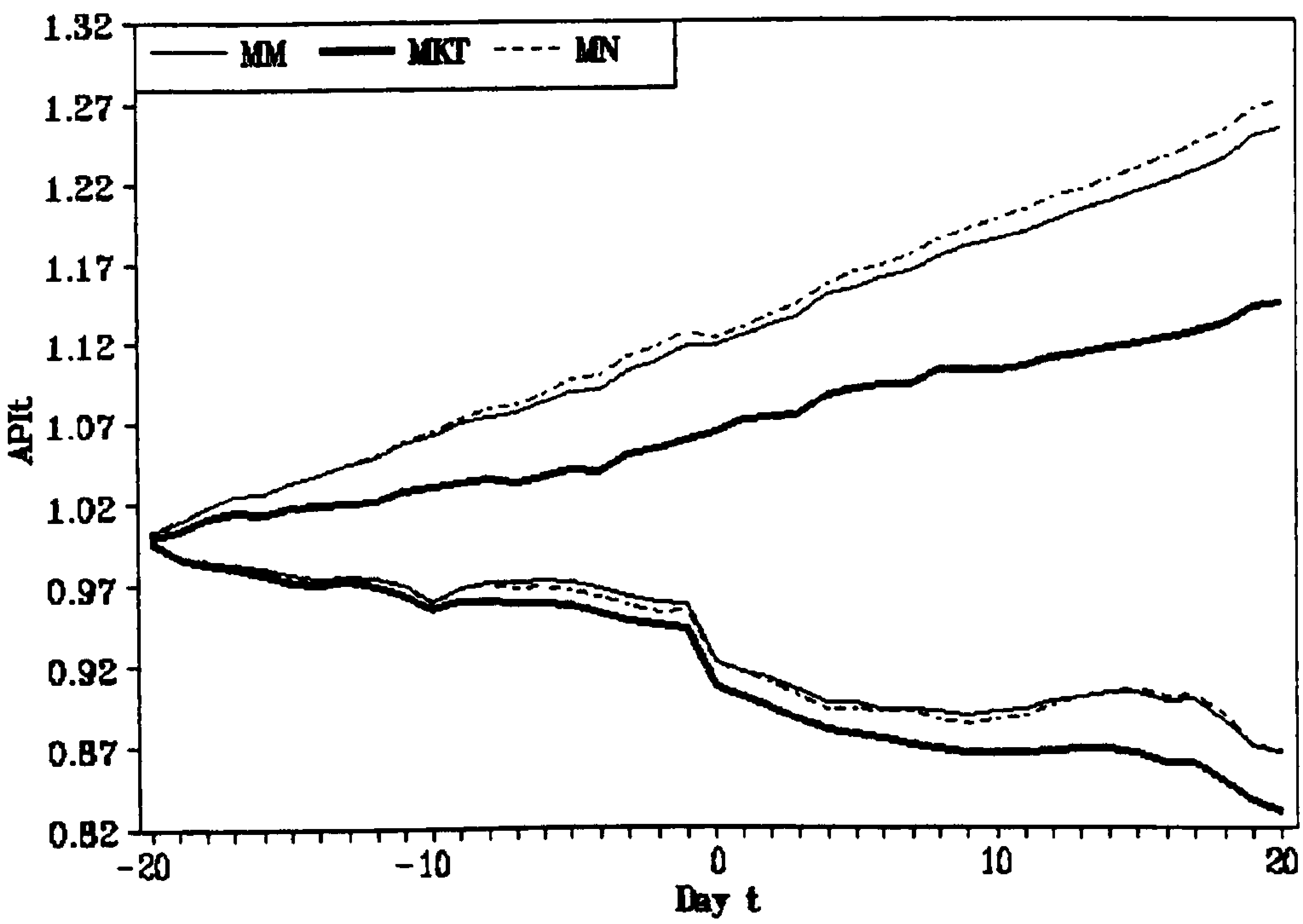


Figure 6.3: The Abnormal Performance Index Around AGMs for Good and Bad News, Using Clear Event Windows

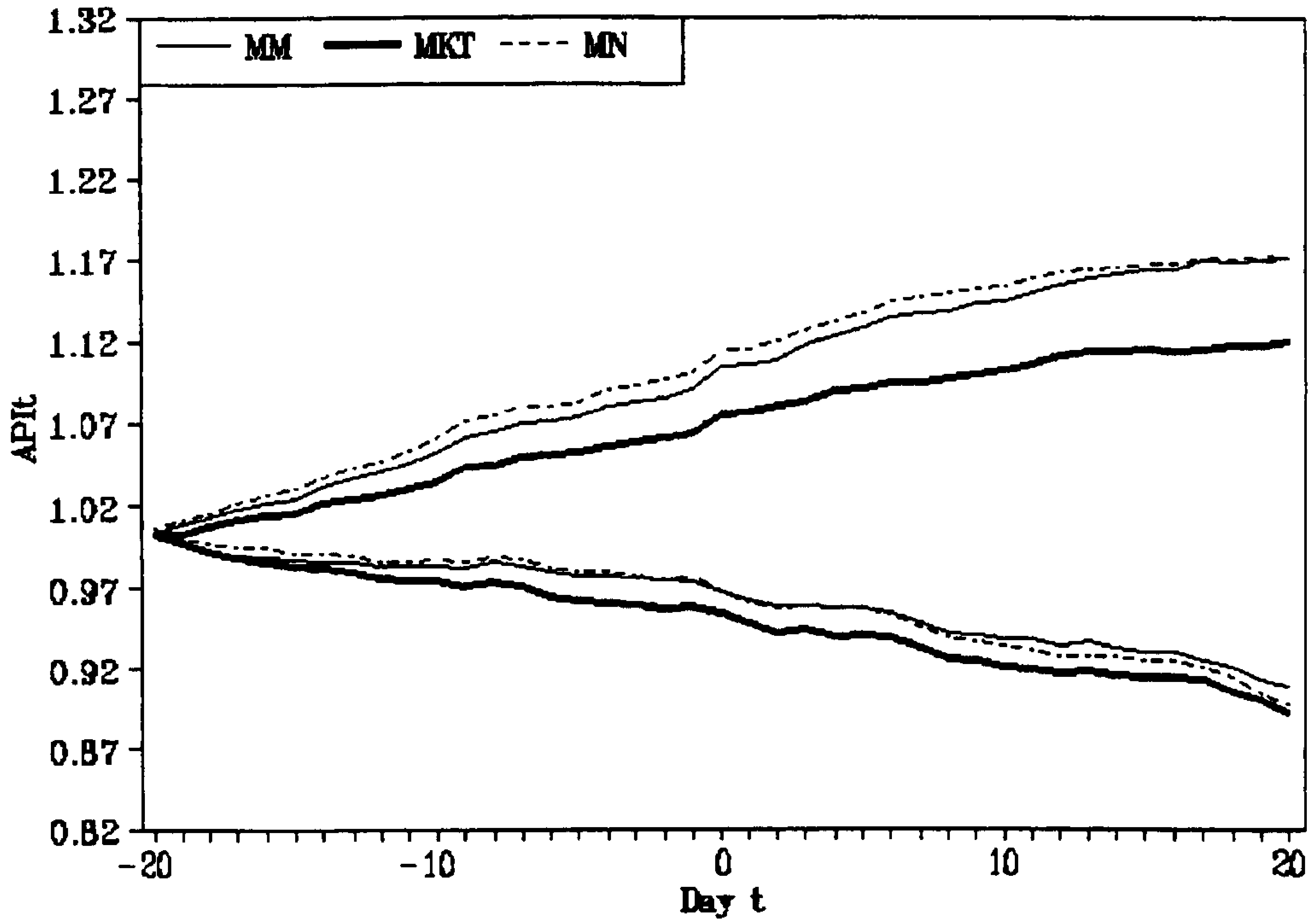


Figure 6.4: The Abnormal Performance Index Around Board Changes for Good and Bad News, Using Clear Event Windows

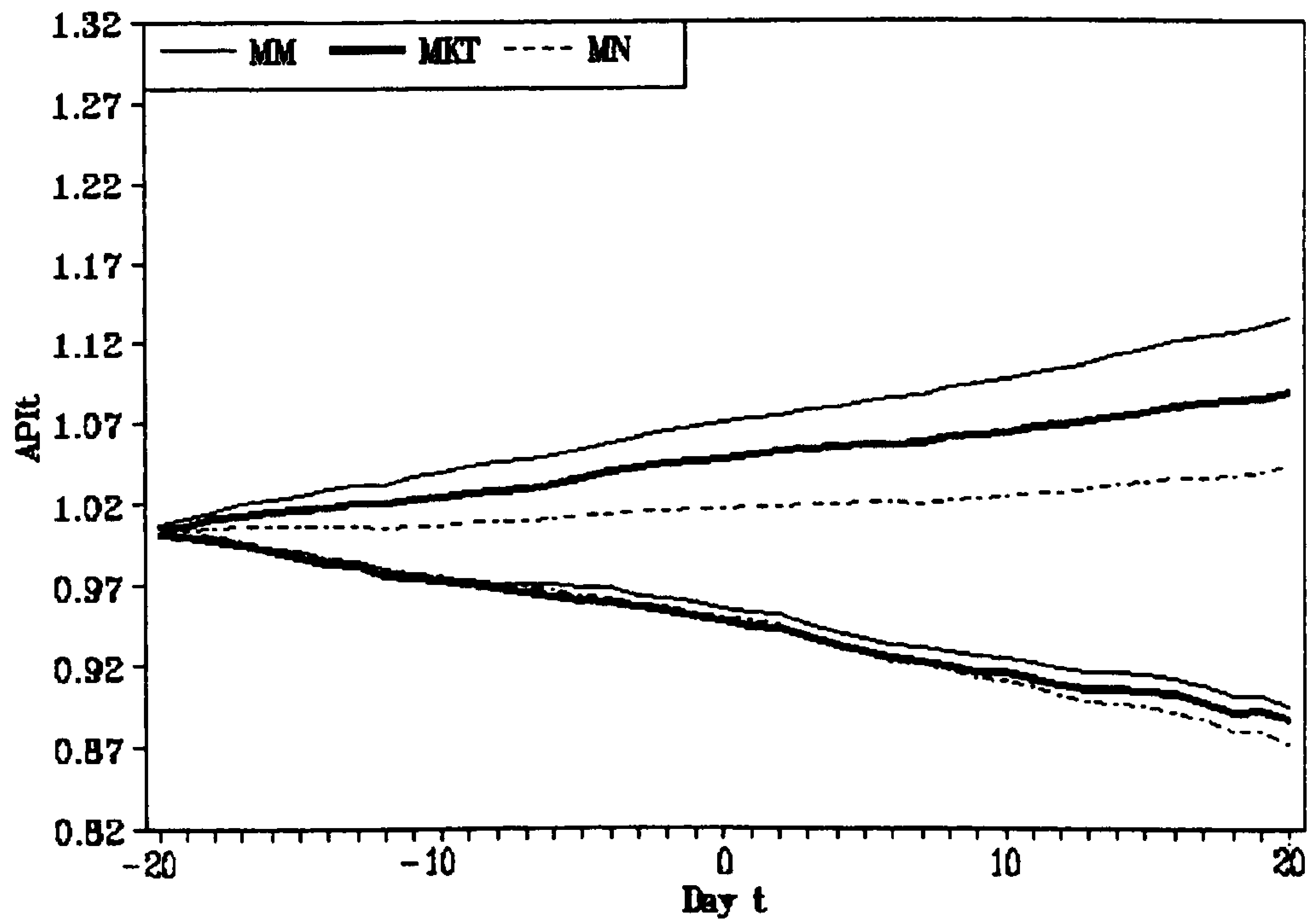
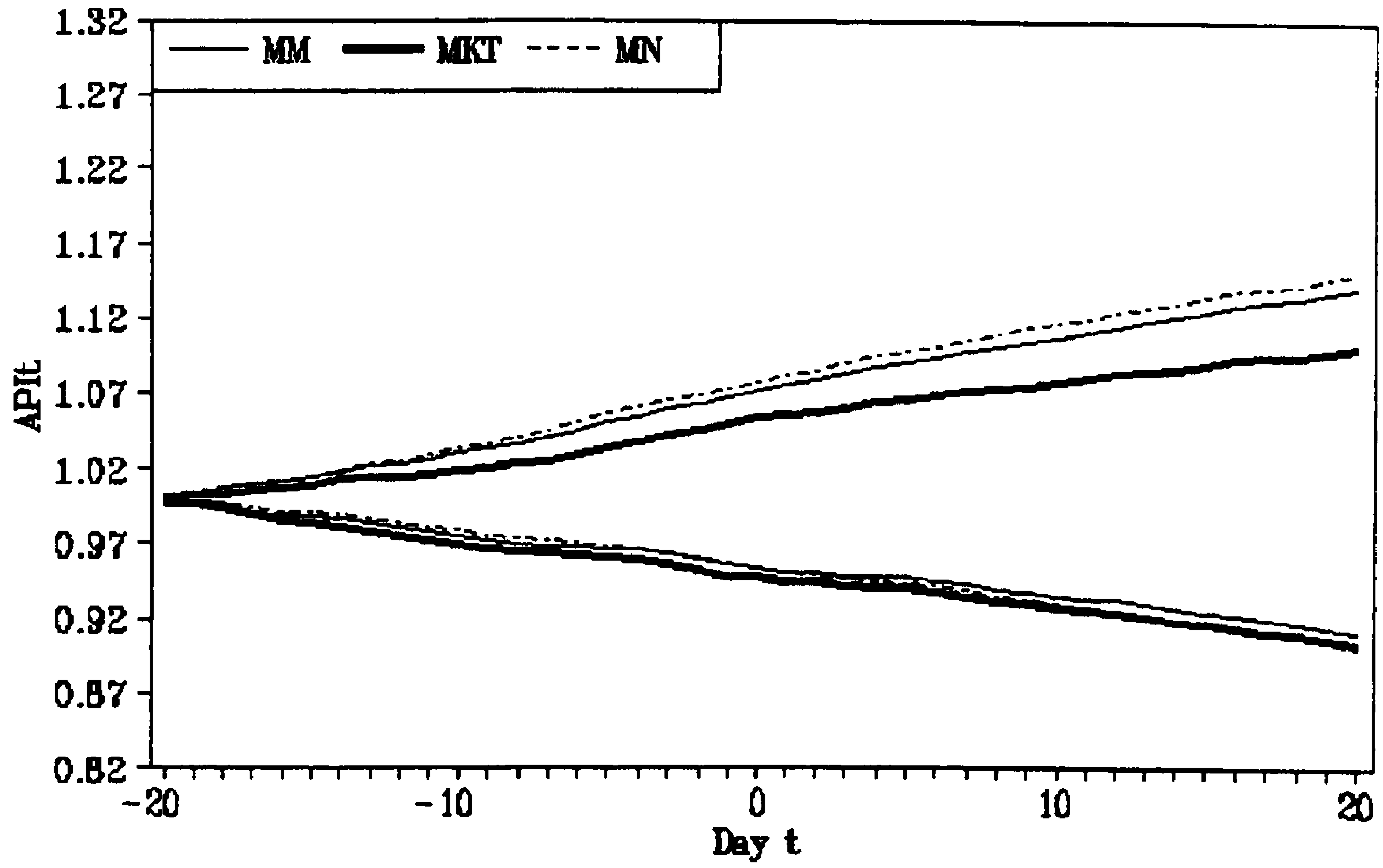


Figure 6.5: The Abnormal Performance Index Around Changes in Shareholdings for Good and Bad News, Using Clear Event Windows



6.5.1 *The Comparison of Expected Return Models*

Figures 6.1 to 6.5 show a gradual anticipation of the information content of the average corporate disclosure by up to twenty trading days in advance of its release, for all expected return models. The pattern of abnormal returns follows in the direction of the sign of the news, and persists over the post-announcement period. The drift in returns is evidence of continued underreaction to new information, irrespective of its sign. An alternative explanation for the drift, maybe possible misspecification of unexpected returns. In contrast to Figures 5.1 to 5.5, which did not distinguish between the sign of the news, the partitioning of events notably reduces the divergence between the three return measures, with there being a noticeable increase in the level of drift associated with each event. As before, much greater anticipation and a higher level of drift is observed for earnings news, rather than non-earnings information. On closer inspection, the level of drift is greater for good news than for bad news. Without controlling for the size of the news however, we can not make any definite assertions. What is evident, it that not distinguishing between the sign of the news, disguises the 'true' behaviour of stock returns over event time.

Table 6.1a

Daily Average Abnormal Returns (AAR) and the Abnormal Performance Index (API), Estimated using Market Model, Market and Mean Adjusted Expected Returns.

Good News - Clear Event Window (t=-20,...,+20)

Annual Earnings

Day	Market Model (n=84)		Market Adjusted (n=67)		Mean Adjusted (n=101)	
	t-stat	AAR	t-stat	AAR	t-stat	AAR
-20	0.0034	1.7207*	0.0005	0.2801	0.0045	2.3030**
-19	0.0051	2.9281***	0.0028	1.4943	0.0077	3.2985***
-18	0.0027	1.2126	-0.0011	-0.4327	0.0036	1.9770**
-17	0.0010	0.6883	-0.0024	-1.3148	0.0027	1.8250*
-16	0.0057	2.6555***	0.0015	0.6010	0.0069	3.5269***
-15	0.0039	1.9356*	0.0020	0.8480	0.0067	3.6701***
-14	0.0062	1.0284	0.0043	2.1758**	0.0065	4.4953***
-13	0.0085	3.2679***	0.0083	2.5649***	0.0096	3.9241***
-12	0.0090	1.0465	0.0028	1.1005	0.0101	3.5484***
-11	0.0052	2.2822**	0.0008	0.3430	0.0044	2.1145**
-10	0.0049	1.6787*	0.0018	0.4866	0.0043	1.6025
-9	0.0046	1.6356	0.0030	0.9286	0.0058	2.4957***
-8	0.0037	1.8599*	0.0010	0.5020	0.0060	3.2608***
-7	0.0078	2.0062**	0.0068	1.5159	0.0074	2.1935**
-6	0.0048	1.1802	0.0007	0.1384	0.0041	1.1895
-5	0.0079	2.6794***	0.0022	0.8037	0.0099	4.1067***
-4	0.0132	1.1022	0.0116	2.0499**	0.0153	3.8710***
-3	0.0096	2.2348**	0.0073	1.3964	0.0077	2.1033**
-2	0.0023	0.8299	0.0006	0.1872	0.0032	1.3980
-1	0.0057	2.0637**	0.0007	0.2448	0.0067	2.9085***
0	0.0195	2.5450***	0.0282	3.1939***	0.0199	3.0383***
1	0.0154	2.7483***	0.0149	2.3906***	0.0135	2.8297***
2	0.0067	1.7070*	0.0070	0.5949	0.0083	2.5861***
3	0.0110	2.1652**	0.0091	1.4514	0.0114	2.6627***
4	0.0097	3.0986***	0.0080	2.2124**	0.0079	2.8197***
5	0.0024	0.6223	0.0026	0.6446	0.0034	1.0362
6	0.0006	0.2318	-0.0020	-0.6578	0.0017	0.7221
7	0.0004	0.1822	-0.0031	-1.1065	0.0019	1.0458
8	0.0007	0.2114	0.0000	0.0113	0.0032	1.7283*
9	0.0051	1.9600**	0.0036	1.1855	0.0036	1.5607
10	0.0051	2.6536***	0.0034	1.4761	0.0070	3.7084***
11	0.0036	1.4013	0.0020	0.6728	0.0055	2.2910**
12	0.0088	3.3690***	0.0063	2.1810**	0.0076	3.5138***
13	0.0090	3.2753***	0.0055	1.6898*	0.0076	3.2163***
14	0.0087	2.4673***	0.0077	1.7891*	0.0081	2.6907***
15	0.0096	2.9717***	0.0075	2.2879**	0.0091	3.5231***
16	0.0033	1.9181*	0.0014	0.7070	0.0048	3.0670***
17	-0.0001	-0.0417	-0.0015	-0.5945	0.0021	1.2375
18	-0.0004	-0.2277	-0.0044	-1.7000*	0.0006	0.3810
19	0.0074	2.0243**	0.0037	0.8987	0.0066	2.2607**
20	0.0110	2.1963**	0.0082	1.3486	0.0104	2.4839***

Notes: n represents the number of observations; *,**,*** statistically significant at the 10%, 5% and 1% critical level, respectively.

Table 6.1b

Daily Average Abnormal Returns (AAR) and the Abnormal Performance Index (API), Estimated using Market Model, Market and Mean Adjusted Expected Returns.

Bad News - Clear Event Window (t=-20,...,+20)

Annual Earnings

Day	Market Model (n=33)		Market Adjusted (n=50)		Mean Adjusted (n=15)	
	t-stat	AAR	t-stat	AAR	t-stat	AAR
-20	-0.0003	-0.0798	-0.0029	-1.0199	0.0005	0.2040
-19	-0.0055	-0.6798	-0.0049	-0.9057	-0.0177	-1.3790
-18	0.0008	0.3721	-0.0017	-0.8259	0.0034	1.0356
-17	0.0033	0.8359	-0.0001	-0.0328	0.0109	1.5463
-16	0.0018	0.8731	0.0017	0.8014	0.0026	1.9895**
-15	-0.0010	-0.4437	-0.0057	-2.8450***	-0.0043	-1.1448
-14	-0.0038	-1.2342	-0.0031	-1.6576*	-0.0026	-0.7968
-13	0.0022	0.6415	-0.0021	-1.0235	-0.0027	-0.7622
-12	-0.0003	-0.1094	0.0041	0.9198	0.0017	0.3233
-11	-0.0044	-1.3092	-0.0020	-0.6568	-0.0053	-1.1961
-10	-0.0027	-0.6958	-0.0038	-1.3076	0.0039	0.7066
-9	-0.0020	-0.8612	-0.0017	-0.8271	-0.0029	-0.7889
-8	0.0016	0.7452	-0.0008	-0.3372	0.0005	0.3155
-7	-0.0034	-0.9979	-0.0044	-1.5243	-0.0017	-0.7776
-6	-0.0084	-1.1933	-0.0047	-1.0547	-0.0114	-0.8139
-5	-0.0062	-1.2026	-0.0007	-0.1592	-0.0100	-0.9360
-4	-0.0012	-0.4110	-0.0020	-0.9730	0.0000	-0.0068
-3	-0.0062	-2.3354**	-0.0035	-2.2251**	-0.0002	-0.1646
-2	-0.0059	-1.5811	-0.0075	-2.9081***	-0.0127	-1.9733**
-1	-0.0066	-2.1805**	-0.0014	-0.4910	-0.0066	-1.4059
0	-0.0205	-1.3087	-0.0226	-2.1475**	-0.0494	-1.6734*
1	-0.0045	0.9290	-0.0036	-0.9184	-0.0044	-1.2397
2	0.0051	1.8277*	0.0004	0.1532	0.0037	0.7857
3	-0.0065	-1.3773	-0.0040	-1.1920	-0.0139	-1.5350
4	-0.0079	-2.1691**	-0.0058	-1.8376*	-0.0149	-2.0104**
5	-0.0005	-0.3991	-0.0074	-2.4598***	0.0008	0.5400
6	-0.0035	-1.1066	-0.0016	-0.6821	-0.0086	-1.4032
7	-0.0020	-0.8540	-0.0020	-1.2396	-0.0041	-0.9289
8	-0.0028	-1.7952*	-0.0072	-1.7588*	-0.0166	-1.3599
9	-0.0054	-1.5172	-0.0050	-1.9019*	-0.0032	-0.7303
10	0.0013	0.1815	-0.0007	-0.1617	-0.0059	-0.4721
11	-0.0020	-0.4699	-0.0014	-0.5034	-0.0028	-0.6457
12	-0.0036	-3.0397***	-0.0030	-2.9150***	0.0004	0.4161
13	-0.0021	-1.6212	-0.0021	-1.3133	0.0015	2.9872***
14	-0.0004	-0.1535	-0.0013	-0.6733	0.0053	1.3168
15	-0.0070	-2.0763**	-0.0042	-1.5082	-0.0082	-1.5331
16	0.0012	0.3460	-0.0033	-1.5019	0.0041	0.7536
17	-0.0047	-1.4828	-0.0072	-3.7905***	-0.0062	-1.1895
18	-0.0031	-2.1139**	-0.0045	-3.6356***	-0.0009	-0.5005
19	-0.0013	-0.7727	-0.0017	-1.0985	0.0031	1.8207*
20	0.0007	0.2233	0.0007	0.2771	0.0080	1.3305

Notes: n represents the number of observations; *,**,*** statistically significant at the 10%, 5% and 1% critical level, respectively.

The sample sizes in Tables 6.1 to 6.5, show wide variation between the return models in determining the sign of the news. Mean returns (MN) measures the highest proportion of good news, then the market model (MM) and market (MKT) adjusted returns. Although this variation in sample sizes points to problems of mis-classification it also highlights the problem of relying on a single returns model. Unfortunately the available sample sizes do not allow us to partition the sample further into the size of the signal. As before, the frequency and size of significant returns varies across return metrics, and therefore, so will the probability of a Type I error. For reasons of clarity, only the results for the market model (MM) will be discussed, unless otherwise stated.

6.5.2 *Earnings Announcements*

Annual Earnings Reports

By categorising the news according to its sign, the abnormal returns series is far more volatile, although the general trend is upward for good news, and downward for bad. The Tables 6.1a and 6.1b, show the frequency and size of significant returns is much higher for favourable annual earnings news than unfavourable news. Investors are able to anticipate the sign of the news up to twenty days in advance, but act less strongly towards prospective bad news.

For favourable earnings news, we find the highest returns can be earned on event days -4, 0 and +1, for each return metric. With respective excess returns of 0.0132, 0.0195 and 0.0154 (using the market model, MM); all are highly significant at the 1 per cent level. For MM, the null hypothesis of no abnormal returns, can also be rejected on event days -19, -16, -14 to -11, -7, -5 to -3, -1 to +1, +3, +4, +9, +10, +12 to +15, and on days +19 to +20; all above 5 per cent significance. The number of significant returns on days after the average release, is supportive of lagged impounding.

Similarly, for unfavourable news, the lowest return occurs on day 0 across all three return metrics. With a return of -0.0205 (t-value of -1.3087), although insignificant, its size exceeds that for favourable earnings news. For unfavourable news, the general size and significance of the daily abnormal returns is much lower. In comparison, for

Table 6.2a

Daily Average Abnormal Returns (AAR) and the Abnormal Performance Index (API), Estimated using Market Model, Market and Mean Adjusted Expected Returns.

Good News - Clear Event Window (t=-20,....,+20)

Interim Earnings

Day	Market Model (n=92)		Market Adjusted (n=69)		Mean Adjusted (n=48)	
	t-stat	AAR	t-stat	AAR	t-stat	AAR
-20	0.0028	1.1705	0.0005	0.2073	0.0035	1.5288
-19	0.0058	1.9460**	0.0039	1.0178	0.0063	2.2705**
-18	0.0085	2.2158**	0.0064	1.3240	0.0080	2.1254**
-17	0.0079	2.9853***	0.0046	1.3858	0.0071	2.8354***
-16	0.0010	0.8146	-0.0016	-1.0546	0.0017	1.4844
-15	0.0062	2.7758***	0.0042	1.5104	0.0064	3.0521***
-14	0.0050	2.5982***	0.0006	0.2980	0.0052	3.0328***
-13	0.0058	2.3370***	0.0015	0.5390	0.0057	2.4363***
-12	0.0039	2.2311**	0.0014	0.7259	0.0046	3.0181***
-11	0.0086	2.5994***	0.0060	1.5025	0.0087	2.8853***
-10	0.0053	2.4006***	0.0029	1.1595	0.0060	2.7145***
-9	0.0067	2.1650**	0.0027	0.7991	0.0072	2.4454***
-8	0.0043	1.7443*	0.0029	1.2086	0.0056	2.2328**
-7	0.0015	0.7640	-0.0031	-1.2970	0.0027	1.4353
-6	0.0059	2.2324**	0.0038	1.1707	0.0064	2.6419***
-5	0.0061	1.9169*	0.0037	1.1938	0.0080	2.5667***
-4	0.0012	0.5429	-0.0014	-0.5188	0.0017	0.7914
-3	0.0103	3.6142***	0.0103	2.9358***	0.0105	3.9308***
-2	0.0059	2.3231**	0.0029	0.9876	0.0064	2.5355***
-1	0.0077	3.0476***	0.0049	1.5350	0.0078	2.9605***
0	0.0005	0.0758	0.0052	0.7991	-0.0035	-0.5260
1	0.0068	1.1321	0.0071	0.9235	0.0060	1.0594
2	0.0047	1.2595	0.0016	0.3378	0.0063	1.7607*
3	0.0044	2.5917***	0.0014	0.7103	0.0061	3.6656***
4	0.0124	3.6486***	0.0112	2.6684***	0.0114	3.6196***
5	0.0042	2.4537***	0.0032	1.5506	0.0054	3.7453***
6	0.0047	1.7978*	0.0023	0.7572	0.0039	1.5847
7	0.0035	2.1913**	-0.0001	-0.0719	0.0053	3.7680***
8	0.0076	2.2107**	0.0078	1.7755*	0.0078	2.3646***
9	0.0051	1.5522	0.0002	0.0408	0.0054	1.7685*
10	0.0033	2.2133**	0.0008	0.4774	0.0055	3.0007***
11	0.0053	2.5890***	0.0026	0.9986	0.0054	2.7858***
12	0.0055	2.5628***	0.0043	1.6412	0.0063	3.0159***
13	0.0053	2.8507***	0.0023	1.1296	0.0046	2.8411***
14	0.0044	1.2627	0.0031	0.7568	0.0048	1.4943
15	0.0049	1.7842*	0.0023	0.6586	0.0052	2.0179**
16	0.0054	1.5112	0.0033	0.8941	0.0067	2.0724**
17	0.0060	1.6579*	0.0040	0.9553	0.0059	1.7497*
18	0.0061	2.6838***	0.0035	1.2856	0.0065	3.2627***
19	0.0117	2.5095***	0.0095	1.6073	0.0107	2.3408***
20	0.0039	1.1005	0.0031	0.6924	0.0042	1.1796

Notes: n represents the number of observations; *,**,*** statistically significant at the 10%, 5% and 1% critical level, respectively.

Table 6.2b

Daily Average Abnormal Returns (AAR) and the Abnormal Performance Index (API), Estimated using Market Model, Market and Mean Adjusted Expected Returns.

Bad News - Clear Event Window (t=-20,...,+20)

Interim Earnings

Day	Market Model (n=62)		Market Adjusted (n=85)		Mean Adjusted (n=54)	
	t-stat	AAR	t-stat	AAR	t-stat	AAR
-20	-0.0013	-0.6705	-0.0043	-1.8711*	-0.0013	-0.8216
-19	-0.0097	-2.0493**	-0.0090	-2.5307***	-0.0115	-2.2274**
-18	-0.0041	-2.1114**	-0.0041	-2.4433***	-0.0018	-0.8129
-17	-0.0021	-0.6622	-0.0025	-1.0143	-0.0028	-0.7603
-16	-0.0027	-0.8510	-0.0034	-1.3923	-0.0029	-0.8457
-15	-0.0042	-1.2305	-0.0056	-1.9500*	-0.0047	-1.2444
-14	-0.0025	-0.6402	-0.0006	-0.1892	-0.0035	-0.8553
-13	0.0024	1.4721	0.0012	0.6411	0.0023	1.5583
-12	-0.0014	-0.7217	-0.0031	-1.8971*	0.0004	0.2084
-11	-0.0044	-1.5811	-0.0051	-2.0291**	-0.0046	-1.5499
-10	-0.0107	-1.0149	-0.0093	-1.1561	-0.0113	-0.9702
-9	0.0080	0.5470	0.0055	0.5058	0.0087	0.5453
-8	0.0037	0.8812	-0.0005	-0.1590	0.0026	0.6081
-7	0.0000	0.0063	-0.0005	-0.2655	-0.0013	-0.8469
-6	0.0008	0.3425	0.0002	0.0968	0.0007	0.2683
-5	-0.0007	-0.2533	-0.0024	-0.8247	-0.0030	-1.3730
-4	-0.0034	-0.6982	-0.0052	-1.4246	-0.0036	-0.6906
-3	-0.0049	-1.9205*	-0.0051	-2.6218***	-0.0057	-2.3020**
-2	-0.0041	-1.6259	-0.0029	-1.3683	-0.0048	-1.7734
-1	-0.0016	-0.4166	-0.0028	-0.9282	0.0008	0.2002
0	-0.0372	-2.8580***	-0.0379	-3.6689***	-0.0342	-2.4998***
1	-0.0069	-1.4996	-0.0072	-2.0710**	-0.0053	-1.1009
2	-0.0056	-1.1680	-0.0067	-1.7977*	-0.0079	-1.5653
3	-0.0079	-1.5750	-0.0083	-2.1315**	-0.0092	-1.7267*
4	-0.0082	-1.4289	-0.0081	-1.8218*	-0.0096	-1.5195
5	-0.0002	-0.0604	-0.0023	-1.0194	0.0017	0.5378
6	-0.0030	-1.0912	-0.0039	-1.7453*	-0.0023	-0.7710
7	-0.0011	-0.2379	-0.0030	-0.9116	-0.0010	-0.2003
8	-0.0014	-0.4367	-0.0033	-1.3165	-0.0041	-1.3210
9	-0.0035	-1.1983	-0.0026	-0.9627	-0.0031	-0.9465
10	0.0036	0.6960	0.0001	0.0187	0.0028	0.5482
11	0.0024	0.7988	-0.0009	-0.3889	0.0026	0.8250
12	0.0046	1.1733	0.0015	0.4911	0.0062	1.4611
13	0.0036	0.7387	0.0020	0.5310	0.0064	1.1910
14	0.0015	0.4917	-0.0008	-0.3074	0.0034	1.1396
15	0.0008	0.2513	-0.0033	-1.4298	0.0028	0.8032
16	-0.0064	-1.0226	-0.0058	-1.1486	-0.0068	-1.0013
17	0.0017	0.8267	-0.0013	-0.5216	0.0016	0.7536
18	-0.0148	-1.4539	-0.0124	-1.6519*	-0.0140	-1.2891
19	-0.0176	-1.8588*	-0.0142	-1.9581*	-0.0195	-1.8589*
20	-0.0052	-0.9484	-0.0068	-1.6410	-0.0047	-0.8051

Notes: n represents the number of observations; *,**,*** statistically significant at the 10%, 5% and 1% critical level, respectively.

MM, the null can only be rejected on event days -15, -3 to -2, 0, +5, +12, and +17 to +18. In addition, there is greater sign reversal in daily returns over the event period for bad news. The figures demonstrate both the level of anticipation and the level of drift is much lower for bad news. However, for both favourable and unfavourable news, the most sizeable price movement occurs over the post-announcement period.

So although the initial reaction to bad news is greater than for good news on the report date, bad news is associated with less anticipatory behaviour and lower drift. Without controlling for the size of the news, it is not possible to say whether this behaviour represents an initial overreaction but general underreaction to bad news, or if the average bad news event is of lower information content.

Interim Earnings Reports

From Tables 6.2a and 6.2b, the pattern for interim earnings is similar for annual earnings, though less pronounced. For good news, the API_t follows a continuous upward trend. The event days -3, +4 and +19 see the highest returns of 0.0103, 0.0124 and 0.0117 respectively, and all are highly significant and robust across all return models. However, the return on day 0 is relatively small (0.0005) though insignificant. As for annual earnings, the null can be rejected several times over the event window: on days -19 to -17, -15 until -9, -6, -3 to -1, +3 to +5, +7, +8, +10 to +13, and again on days +18 and +19. The announcement of disappointing interim news, on day 0, is met with a highly significant negative return of -0.0372 (t-value of 2.8580). Much greater than that observed for good news. Beyond this, excess returns are generally insignificant, with the exception of event days -19 and -18.

Table 6.3a

Daily Average Abnormal Returns (AAR) and the Abnormal Performance Index (API), Estimated using Market Model, Market and Mean Adjusted Expected Returns.

Good News - Clear Event Window (t=-20,....,+20)

AGMs

Day	Market Model (n=60)		Market Adjusted (n=52)		Mean Adjusted (n=66)	
	t-stat	AAR	t-stat	AAR	t-stat	AAR
-20	0.0043	2.3156**	0.0020	0.8183	0.0065	2.6246***
-19	0.0043	1.8555*	0.0009	0.3018	0.0048	2.1814**
-18	0.0036	1.4794	0.0045	2.1058**	0.0043	1.7937*
-17	0.0053	2.1826**	0.0041	1.9248*	0.0055	2.3223**
-16	0.0038	1.9243*	0.0024	1.2812	0.0050	2.8807***
-15	0.0033	1.8200*	0.0019	0.9405	0.0036	2.0263**
-14	0.0067	3.5467***	0.0057	2.6090***	0.0064	3.6193***
-13	0.0048	2.0458**	0.0024	1.0945	0.0065	2.6530***
-12	0.0039	2.1939**	0.0026	1.3647	0.0041	2.2946**
-11	0.0048	1.9806**	0.0035	1.2700	0.0058	2.5890***
-10	0.0063	3.1757***	0.0040	1.7659*	0.0070	3.6891***
-9	0.0084	2.7158***	0.0083	2.5517***	0.0094	3.0914***
-8	0.0040	1.7142*	0.0018	0.6583	0.0040	1.8737*
-7	0.0043	2.1633**	0.0043	2.1090**	0.0043	2.1237**
-6	0.0014	0.7275	0.0007	0.3166	0.0004	0.1966
-5	0.0028	1.4925	0.0020	1.1542	0.0028	1.6130
-4	0.0053	2.3904***	0.0039	1.6626	0.0063	3.0537***
-3	0.0030	2.1819**	0.0019	1.1963	0.0029	2.0135**
-2	0.0022	1.5320	0.0022	1.4782	0.0026	1.6513*
-1	0.0046	1.6901*	0.0024	0.9142	0.0038	1.4248
0	0.0131	2.6641***	0.0111	1.9819**	0.0128	2.8390***
1	0.0002	0.0982	0.0007	0.3905	0.0010	0.6363
2	0.0035	1.4414	0.0039	1.6967*	0.0031	1.3308
3	0.0076	2.4796***	0.0033	1.9635**	0.0071	2.5102***
4	0.0038	0.9471	0.0053	1.5518	0.0038	1.0539
5	0.0048	2.3606***	0.0013	0.8231	0.0044	2.3330***
6	0.0059	1.9084*	0.0036	1.9382*	0.0070	2.4868***
7	0.0027	1.1598	0.0004	0.1830	0.0024	1.0993
8	0.0014	0.9419	0.0019	1.4354	0.0012	0.8525
9	0.0034	2.1971**	0.0016	1.2160	0.0029	1.9919**
10	0.0019	1.1885	0.0020	1.4184	0.0012	0.8967
11	0.0046	2.0559**	0.0049	1.8902*	0.0041	2.0632**
12	0.0045	3.0098***	0.0045	2.4853***	0.0033	2.3523***
13	0.0028	2.1481**	0.0012	0.7750	0.0015	1.3401
14	0.0022	1.4271	0.0009	0.5462	0.0007	0.5124
15	0.0023	1.3722	0.0006	0.3255	0.0018	1.2628
16	0.0005	0.2845	-0.0010	-0.5513	0.0006	0.3969
17	0.0048	2.4676***	0.0015	0.8093	0.0034	1.6923*
18	-0.0006	-0.2279	0.0019	1.6432	-0.0010	-0.4361
19	0.0009	0.4690	0.0002	0.1422	0.0010	0.6245
20	0.0010	0.6223	0.0017	0.9514	-0.0004	-0.2698

Notes: n represents the number of observations; *,**,*** statistically significant at the 10%, 5% and 1% critical level, respectively.

Table 6.3b

Daily Average Abnormal Returns (AAR) and the Abnormal Performance Index (API), Estimated using Market Model, Market and Mean Adjusted Expected Returns.

Bad News - Clear Event Window (t=-20,...,+20)

AGMs

Day	Market Model (n=46)		Market Adjusted (n=54)		Mean Adjusted (n=40)	
	t-stat	AAR	t-stat	AAR	t-stat	AAR
-20	0.0007	0.3653	0.0014	0.7678	0.0012	0.6595
-19	-0.0035	-1.2853	-0.0038	-1.6094	-0.0013	-0.4757
-18	-0.0035	-1.7508*	-0.0055	-2.4118***	-0.0020	-0.9133
-17	-0.0041	-1.5424	-0.0045	-1.5186	-0.0034	-1.2197
-16	-0.0011	-0.4635	-0.0017	-0.7845	0.0000	0.0069
-15	-0.0013	-0.5000	-0.0032	-1.4250	-0.0031	-1.1670
-14	-0.0012	-0.8009	-0.0015	-1.0657	-0.0011	-0.6539
-13	-0.0007	-0.1933	-0.0024	-0.8159	-0.0010	-0.2818
-12	-0.0030	-1.4328	-0.0037	-2.0151**	-0.0035	-1.6865*
-11	0.0013	0.6419	-0.0014	-1.0036	0.0004	0.2587
-10	-0.0001	-0.0475	0.0011	0.6641	0.0011	0.5709
-9	-0.0016	-0.5048	-0.0048	-2.1692**	-0.0011	-0.3669
-8	0.0033	1.9740**	0.0025	1.7326*	0.0022	1.2602
-7	-0.0012	-0.6281	-0.0023	-1.0795	-0.0013	-0.9463
-6	-0.0049	-1.9228*	-0.0064	-2.8149***	-0.0047	-1.8113*
-5	-0.0019	-0.8759	-0.0034	-1.5405	-0.0028	-1.2235
-4	-0.0005	-0.2941	-0.0006	-0.3669	-0.0007	-0.4418
-3	-0.0014	-0.9100	-0.0013	-1.0036	-0.0016	-1.1706
-2	-0.0015	-0.7948	-0.0026	-1.4155	-0.0031	-1.7000*
-1	-0.0008	-0.4711	0.0006	0.2741	0.0018	1.1128
0	-0.0071	-1.8321*	-0.0035	-0.9679	-0.0096	-2.1853**
1	-0.0058	-2.1927**	-0.0075	-3.3120***	-0.0070	-2.4890***
2	-0.0035	-1.4426	-0.0063	-2.3153**	-0.0031	-1.1548
3	0.0004	0.2543	0.0029	0.8432	0.0005	0.2854
4	-0.0019	-1.0137	-0.0059	-1.7022*	-0.0020	-1.0649
5	0.0003	0.2002	0.0014	0.6707	0.0009	0.5811
6	-0.0031	-1.9780**	-0.0006	-0.1700	-0.0042	-2.2542**
7	-0.0061	-1.8090*	-0.0066	-1.9497*	-0.0082	-2.1495**
8	-0.0068	-1.3031	-0.0069	-1.5674	-0.0066	-1.1012
9	-0.0015	-0.5377	-0.0014	-0.5300	-0.0027	-0.9348
10	-0.0023	-1.3748	-0.0040	-2.0105**	-0.0031	-1.5947
11	-0.0007	-0.4219	-0.0021	-1.6357	-0.0025	-1.5713
12	-0.0035	-1.4073	-0.0029	-1.1892	-0.0042	-1.2077
13	0.0017	0.8269	0.0012	0.7306	0.0005	0.1948
14	-0.0029	-1.1390	-0.0016	-0.7198	-0.0005	-0.1924
15	-0.0028	-1.5672	-0.0021	-1.3555	-0.0028	-1.4786
16	-0.0005	-0.2605	0.0001	0.0829	-0.0001	-0.0727
17	-0.0055	-2.6174***	-0.0021	-0.9431	-0.0039	-1.9584*
18	-0.0047	-1.1713	-0.0079	-2.1130**	-0.0063	-1.5776
19	-0.0070	-0.7951	-0.0065	-0.8758	-0.0118	-1.1460
20	-0.0059	-2.1359**	-0.0077	-3.0039***	-0.0074	-2.3127**

Notes: n represents the number of observations; *,**,*** statistically significant at the 10%, 5% and 1% critical level, respectively.

Table 6.4a

Daily Average Abnormal Returns (AAR) and the Abnormal Performance Index (API), Estimated using Market Model, Market and Mean Adjusted Expected Returns.

Good News - Clear Event Window (t=-20,...,+20)

Board Changes

Day	Market Model (n=219)		Market Adjusted (n=163)		Mean Adjusted (n=227)	
	t-stat	AAR	t-stat	AAR	t-stat	AAR
-20	0.0078	3.1039***	0.0058	1.9289*	0.0041	1.7815*
-19	0.0035	1.7160*	0.0006	0.2528	0.0004	0.1846
-18	0.0046	4.3532***	0.0043	2.3962***	0.0006	0.5601
-17	0.0043	3.3525***	0.0025	1.6100	0.0007	0.5721
-16	0.0024	1.8592*	0.0018	1.5198	0.0001	0.0427
-15	0.0025	2.3490***	0.0017	1.4144	-0.0002	-0.2219
-14	0.0030	1.0284	0.0012	0.8856	0.0005	0.4215
-13	0.0033	2.7757***	0.0015	1.1888	-0.0001	-0.0897
-12	0.0006	0.3421	0.0005	0.2776	-0.0013	-0.7684
-11	0.0041	3.2064***	0.0023	1.5673	0.0020	1.5536
-10	0.0023	2.2889**	0.0012	1.3267	0.0001	0.0471
-9	0.0043	2.3305***	0.0025	1.0403	0.0018	0.9977
-8	0.0021	1.7526*	0.0015	1.0144	0.0004	0.3054
-7	0.0021	2.9905***	0.0015	1.9427*	0.0001	0.1775
-6	0.0021	1.7046*	0.0032	3.1562***	0.0011	1.0189
-5	0.0033	2.6298***	0.0033	2.2079**	0.0021	1.6789*
-4	0.0033	4.4391***	0.0032	3.8033***	0.0013	1.7414*
-3	0.0042	4.0878***	0.0027	2.2836**	0.0022	2.2518**
-2	0.0029	2.3817***	0.0019	1.1854	0.0001	0.1159
-1	0.0033	2.7505***	0.0019	1.3087	0.0007	0.5668
0	0.0022	1.9448*	0.0015	1.4475	-0.0000	-0.0284
1	0.0022	1.6017	0.0024	1.7088*	0.0003	0.2286
2	0.0015	1.2082	0.0016	1.2302	0.0007	0.5768
3	0.0032	2.8027***	0.0015	1.0570	0.0015	1.3288
4	0.0017	1.2886	0.0017	1.2217	0.0000	0.0232
5	0.0028	2.9982***	0.0008	0.8013	0.0004	0.4038
6	0.0026	2.5158***	0.0003	0.2851	0.0006	0.5955
7	0.0009	0.7600	0.0009	0.6737	-0.0011	-0.8898
8	0.0046	2.9633***	0.0031	2.0797**	0.0026	1.7490*
9	0.0026	2.6273***	0.0015	1.1776	0.0013	1.3756
10	0.0023	2.5312***	0.0017	1.4169	0.0013	1.4210
11	0.0036	3.8818***	0.0028	2.5348***	0.0015	1.5568
12	0.0026	3.1434***	0.0020	2.0049**	0.0011	1.3396
13	0.0033	2.7871***	0.0021	1.5561	0.0018	1.4540
14	0.0040	2.5188***	0.0026	1.4093	0.0022	1.5081
15	0.0039	3.1694***	0.0031	2.0323**	0.0019	1.4809
16	0.0043	3.9819***	0.0024	1.9909**	0.0021	2.0064**
17	0.0022	2.7001***	0.0027	2.7853***	0.0002	0.1923
18	0.0026	3.6537***	0.0014	1.5359	0.0012	1.6583*
19	0.0036	3.4657***	0.0016	1.5871	0.0024	2.3611***
20	0.0039	3.1024***	0.0031	2.4418***	0.0031	2.7315***

Notes: n represents the number of observations; *,**,*** statistically significant at the 10%, 5% and 1% critical level, respectively.

Table 6.4b

Daily Average Abnormal Returns (AAR) and the Abnormal Performance Index (API), Estimated using Market Model, Market and Mean Adjusted Expected Returns.

Bad News - Clear Event Window (t=-20,...,+20)

Board Changes

Day	Market Model (n=171)		Market Adjusted (n=227)		Mean Adjusted (n=162)	
	t-stat	AAR	t-stat	AAR	t-stat	AAR
-20	0.0002	0.0795	0.0006	0.3260	0.0008	0.3431
-19	-0.0009	-0.4478	-0.0004	-0.2627	-0.0006	-0.3105
-18	-0.0000	-0.0155	-0.0022	-1.8735*	0.0004	0.2207
-17	-0.0033	-1.7121*	-0.0032	-1.9862**	-0.0031	-1.4891
-16	-0.0030	-1.5816	-0.0043	-2.5975***	-0.0042	-2.1928**
-15	-0.0029	-2.8536***	-0.0037	-4.0222***	-0.0033	-3.1828***
-14	-0.0038	-2.5664***	-0.0038	-2.9998***	-0.0046	-3.0197***
-13	-0.0019	-1.2764	-0.0021	-1.5492	-0.0013	-0.8593
-12	-0.0055	-2.8776***	-0.0052	-3.1552***	-0.0049	-2.4239***
-11	-0.0025	-1.7177*	-0.0012	-0.9738	-0.0022	-1.5384
-10	-0.0018	-0.8585	-0.0022	-1.2830	-0.0020	-0.9459
-9	-0.0025	-1.3181	-0.0026	-1.6931*	-0.0036	-1.7595*
-8	-0.0014	-1.4467	-0.0023	-2.8458***	-0.0022	-2.2370**
-7	0.0000	0.0524	-0.0016	-1.9894**	-0.0009	-1.0537
-6	-0.0014	-1.3801	-0.0030	-2.4460***	-0.0025	-1.8526*
-5	-0.0027	-1.9359*	-0.0032	-2.6414***	-0.0040	-2.7006***
-4	-0.0000	-0.0307	-0.0015	-1.2654	-0.0008	-0.4789
-3	-0.0039	-2.5021***	-0.0027	-2.1360**	-0.0041	-2.4859***
-2	-0.0024	-1.8352*	-0.0027	-2.5461***	-0.0023	-1.6691*
-1	-0.0030	-2.4368***	-0.0030	-2.7204***	-0.0033	-2.4804***
0	-0.0029	-2.7056***	-0.0030	-2.7683***	-0.0023	-2.0538**
1	-0.0039	-3.6291***	-0.0040	-3.4129***	-0.0036	-3.2313***
2	-0.0008	-0.6460	-0.0017	-1.5005	-0.0018	-1.5551
3	-0.0068	-3.2621***	-0.0054	-3.4242***	-0.0081	-3.9060***
4	-0.0051	-2.5275***	-0.0053	-3.1426***	-0.0056	-2.6764***
5	-0.0049	-2.5034***	-0.0047	-3.0440***	-0.0061	-3.0217***
6	-0.0032	-1.9016*	-0.0031	-2.1954**	-0.0047	-2.6804***
7	-0.0013	-0.7710	-0.0030	-2.1048**	-0.0018	-1.0270
8	-0.0029	-1.9579*	-0.0031	-1.9589*	-0.0045	-2.7230***
9	-0.0030	-2.0955**	-0.0033	-2.7155***	-0.0050	-3.1985***
10	-0.0002	-0.1009	-0.0014	-1.1587	-0.0022	-1.3349
11	-0.0034	-2.3673***	-0.0032	-2.7547***	-0.0038	-2.6982***
12	-0.0049	-1.7826*	-0.0047	-2.1903**	-0.0060	-2.0492**
13	-0.0031	-2.4962***	-0.0027	-2.2478**	-0.0042	-3.1350***
14	0.0002	0.2244	-0.0003	-0.3143	-0.0010	-0.8746
15	-0.0011	-0.9041	-0.0015	-1.2972	-0.0016	-1.2904
16	-0.0030	-1.4910	-0.0023	-1.4540	-0.0036	-1.7366*
17	-0.0041	-1.9688**	-0.0053	-3.2763***	-0.0048	-2.2357**
18	-0.0070	-2.5930***	-0.0057	-2.7679***	-0.0082	-2.9184***
19	-0.0002	-0.0812	0.0007	0.3805	-0.0007	-0.2816
20	-0.0070	-1.5195	-0.0053	-1.4615	-0.0086	-1.7415*

Notes: n represents the number of observations; *,**,*** statistically significant at the 10%, 5% and 1% critical level, respectively.

6.5.3 *Annual General Meetings*

Table 6.3a reports a persistent upward trend in security returns for good news, and a more volatile downward trend in security returns for bad news. For favourable meetings (see Table 6.3a), the highest return of the event period follows the meeting on day 0. For MM, we observe a return of 0.0131 which is highly significant at the 1 per cent level. Event days -20, -17, -14 to -9, -7, -4, -3, 0, +3, +5, +9, +11 to +13, and +17 all witness significant positive returns. The most significant price movement is observed in the prior period, earned before the AGM.

Similarly, for a disappointing AGM, the lowest return of the event period is reported in Table 6.3b on day 0, of -0.0071, which is much smaller than for good news and insignificant. Significant returns are few, arising only on days -8, +1, +6, +17 and +20. In comparison with earnings news, a lower level of anticipation and drift is observed for unfavourable news relative to favourable news (0.1050 and 0.1710, respectively).

6.5.4 *Board Changes*

The magnitude of the average daily return over the entirety of the event period, is noticeably lower for board changes, than those reported for either earnings or AGMs. However, for good news, the overall significance of the daily returns is considerably higher. Table 6.4a records significant returns for days -20, -18, -17, -15 to -13, -11 to -9, -7, -5 to -1, +3, +5, +6, and from day +8 through to +20. This behaviour indicates significant anticipation of the forthcoming board change, but investors continue to adjust after the event. For bad news, the overall level of significance is much lower. Table 6.4b records significant negative returns for event days -15, -14, -12, -3, -1 to +1, +3 to +5, +9, +11, +13, and lastly +17 to +18. The most sizeable price movement occurs over the post-announcement period.

Table 6.5a

Daily Average Abnormal Returns (AAR) and the Abnormal Performance Index (API), Estimated using Market Model, Market and Mean Adjusted Expected Returns.

Good News - Clear Event Window (t=-20,...,+20)

Changes in Shareholdings

Day	Market Model (n=553)		Market Adjusted (n=451)		Mean Adjusted (n=584)	
	t-stat	AAR	t-stat	AAR	t-stat	AAR
-20	0.0025	3.8662***	0.0014	2.1946**	0.0013	1.9649**
-19	0.0028	3.4774***	0.0011	1.2042	0.0028	3.5889***
-18	0.0022	3.1022***	0.0009	1.3587	0.0023	3.3329***
-17	0.0027	2.8928***	0.0022	2.5977***	0.0032	3.5368***
-16	0.0016	1.6862*	0.0017	1.7878*	0.0020	2.1122**
-15	0.0023	2.8721***	0.0015	1.8531*	0.0030	3.7263***
-14	0.0040	4.1047***	0.0033	3.0926***	0.0044	4.6314***
-13	0.0033	4.7444***	0.0019	2.7219***	0.0034	4.7922***
-12	0.0020	3.1003***	0.0006	0.7586	0.0030	4.5588***
-11	0.0029	4.6137***	0.0019	2.9608***	0.0036	6.4350***
-10	0.0037	6.0613***	0.0025	4.0091***	0.0037	5.7373***
-9	0.0029	4.2394***	0.0014	1.8675*	0.0035	5.2055***
-8	0.0030	3.4989***	0.0021	2.6407***	0.0040	4.7071***
-7	0.0039	5.5349***	0.0025	3.7328***	0.0043	6.1904***
-6	0.0048	5.0324***	0.0042	3.9014***	0.0047	5.0152***
-5	0.0047	5.8929***	0.0042	4.8116***	0.0056	6.6190***
-4	0.0039	6.0860***	0.0038	5.3197***	0.0045	7.0760***
-3	0.0043	4.6081***	0.0046	4.8186***	0.0043	4.8222***
-2	0.0033	4.3889***	0.0024	3.0435***	0.0030	3.9549***
-1	0.0049	5.8523***	0.0044	5.1151***	0.0041	5.0014***
0	0.0043	5.3611***	0.0034	3.7773***	0.0043	5.5494***
1	0.0033	4.2993***	0.0022	2.6713***	0.0033	4.5816***
2	0.0027	3.9283***	0.0014	1.7124*	0.0034	4.4796***
3	0.0042	5.8416***	0.0033	4.0877***	0.0044	6.5631***
4	0.0040	4.6117***	0.0031	3.1595***	0.0047	5.5381***
5	0.0029	4.9066***	0.0020	3.3589***	0.0029	5.2059***
6	0.0027	4.4749***	0.0020	2.9181***	0.0032	5.0752***
7	0.0039	5.6508***	0.0030	4.0621***	0.0042	6.6917***
8	0.0029	4.1962***	0.0021	2.7506***	0.0033	4.8422***
9	0.0026	3.4318***	0.0014	1.6199*	0.0028	3.8377***
10	0.0025	3.9231***	0.0017	2.4417***	0.0030	4.8828***
11	0.0035	4.6749***	0.0023	2.7163***	0.0031	4.3041***
12	0.0032	5.5565***	0.0029	4.7711***	0.0033	5.6741***
13	0.0031	4.9981***	0.0022	3.0601***	0.0026	4.0816***
14	0.0032	5.5748***	0.0018	2.8631***	0.0033	5.1370***
15	0.0034	4.4630***	0.0023	2.5752***	0.0033	4.3591***
16	0.0039	6.4354***	0.0031	4.4173***	0.0039	6.7767***
17	0.0018	3.2839***	0.0017	2.8633***	0.0018	3.2821***
18	0.0011	1.4579	0.0002	0.2232	0.0016	2.0882**
19	0.0043	4.3288***	0.0031	3.9459***	0.0043	4.3499***
20	0.0019	2.5612***	0.0017	2.2073**	0.0026	3.2391***

Notes: n represents the number of observations; *,**,*** statistically significant at the 10%, 5% and 1% critical level, respectively.

Table 6.5b

Daily Average Abnormal Returns (AAR) and the Abnormal Performance Index (API), Estimated using Market Model, Market and Mean Adjusted Expected Returns.

Bad News - Clear Event Window (t=-20,...,+20)

Changes in Shareholdings

Day	Market Model (n=376)		Market Adjusted (n=478)		Mean Adjusted (n=345)	
	t-stat	AAR	t-stat	AAR	t-stat	AAR
-20	-0.0030	-2.6371***	-0.0034	-3.4569***	-0.0017	-1.5169
-19	0.0001	0.0545	-0.0005	-0.2522	0.0006	0.2689
-18	-0.0011	-1.1112	-0.0019	-2.0363**	-0.0014	-1.5595
-17	-0.0040	-3.7037***	-0.0048	-4.2453***	-0.0037	-3.2338***
-16	-0.0028	-2.0142**	-0.0039	-3.0295***	-0.0022	-1.4938
-15	-0.0011	-1.8124*	-0.0023	-3.2841***	-0.0005	-0.8483
-14	-0.0014	-2.0432**	-0.0023	-3.1345***	-0.0012	-1.5731
-13	-0.0033	-2.9635***	-0.0032	-3.2384***	-0.0029	-2.5850***
-12	-0.0031	-2.5248***	-0.0028	-2.8470***	-0.0028	-2.2883**
-11	-0.0030	-2.3781***	-0.0030	-2.8542***	-0.0032	-2.3309***
-10	-0.0030	-3.6342***	-0.0032	-4.1077***	-0.0029	-3.4016***
-9	-0.0029	-1.9621**	-0.0032	-2.6078***	-0.0030	-1.9100*
-8	-0.0021	-1.6842*	-0.0020	-1.7368*	-0.0025	-1.9499*
-7	-0.0012	-1.2552	-0.0008	-0.9134	-0.0012	-1.1644
-6	-0.0016	-1.8928*	-0.0018	-2.2505**	-0.0021	-2.3838***
-5	-0.0007	-0.6011	-0.0011	-1.2272	-0.0021	-2.1295**
-4	-0.0006	-0.7500	-0.0019	-2.5767***	-0.0017	-1.8921*
-3	-0.0022	-1.9023*	-0.0033	-3.1765***	-0.0025	-2.0631**
-2	-0.0047	-4.5981***	-0.0038	-4.1843***	-0.0042	-4.3077***
-1	-0.0046	-4.0544***	-0.0041	-4.0951***	-0.0045	-3.9531***
0	-0.0012	-0.8679	-0.0010	-0.9308	-0.0022	-1.5291
1	-0.0033	-2.1919**	0.9506	-2.3621***	-0.0033	-2.0055**
2	0.0001	0.0693	-0.0002	-0.2397	-0.0012	-1.1906
3	-0.0026	-3.3979***	-0.0028	-4.0656***	-0.0033	-3.9378***
4	-0.0003	-0.2289	-0.0007	-0.7709	-0.0014	-1.1948
5	-0.0015	-1.9884**	-0.0019	-2.6661***	-0.0019	-2.4764***
6	-0.0021	-2.5526***	-0.0025	-3.2746***	-0.0014	-1.8699*
7	-0.0025	-3.2683***	-0.0023	-3.2191***	-0.0029	-3.6040***
8	-0.0037	-4.5215***	-0.0036	-4.7976***	-0.0040	-4.6569***
9	-0.0022	-2.3154**	-0.0027	-3.4557***	-0.0029	-2.8909***
10	-0.0026	-2.7455***	-0.0023	-2.8263***	-0.0034	-3.3986***
11	-0.0014	-1.5898	-0.0017	-2.2221**	-0.0017	-1.9026*
12	-0.0012	-1.3496	-0.0016	-2.0436**	-0.0022	-2.4775***
13	-0.0035	-3.2716***	-0.0033	-3.8245***	-0.0034	-3.2963***
14	-0.0030	-2.1902**	-0.0031	-2.7350***	-0.0042	-3.1422***
15	-0.0019	-2.2517**	-0.0017	-2.4762***	-0.0021	-2.4192***
16	-0.0029	-2.9019***	-0.0019	-2.2730**	-0.0028	-2.5145***
17	-0.0031	-1.8295*	-0.0041	-2.9890***	-0.0035	-1.8672*
18	-0.0016	-1.3144	-0.0014	-1.3366	-0.0024	-1.9764**
19	-0.0037	-3.1224***	-0.0026	-2.0180**	-0.0041	-3.1610***
20	-0.0035	-1.7640*	-0.0040	-2.4381***	-0.0043	-2.0441**

Notes: n represents the number of observations; *,**,*** statistically significant at the 10%, 5% and 1% critical level, respectively.

6.5.5 *Changes in Shareholdings*

As for board changes, the size of the average daily return for a change in shareholding, is below that of earnings or AGMs. The notable distinction from other event types, is the overwhelming significance of daily abnormal returns for good news (see Table 6.5a). For good news, with 1 per cent significance, we only fail to reject the null hypothesis on two occasions out of a possible 41 event days. The pattern of significant returns supports our earlier notion, that a large transaction is more likely after a period of pronounced activity. For instance, the likelihood of an investor of buying (or increasing) a large stockholding increases after a period of positive returns. The significant positive returns continue after the announcement, suggesting a larger shareholding change acts as an important signal to other, and perhaps less informed, investors.

For bad news, ie. an investor selling or reducing a large stockholding, the overall significance of daily abnormal returns is lower than for good news. Table 6.5b reports significant returns on event days -20, -17, -16, -14 to -9, -2, -1, +1, +3, +5 to +10, days +13 to +16, and +19. Similarly, the likelihood of selling (or reducing) a large stockholding increases after a period of negative returns. The less significant returns for bad news after the announcement, suggest selling by large traders possibly acts as a less important signal than buying, unless selling is seen as a liquidity trade, as opposed to an informed trade. The nature of a change in shareholding, is different from the other event types examined, in that it represents information investors must respond to rather than anticipate. The pattern of significant returns suggests a mimicking behaviour and possible herding of actions by investors (Bikhchandani, Hirshleifer & Welch 1992).

6.5.6 *In Summary*

Overall, the Tables 6.1 to Tables 6.5 display how dissimilar investor behaviour is towards good and bad news. Emphasising the need to partition events according to their sign, to more fully appreciate the impounding of information. More interesting is the ability of investors to anticipate the sign of the news by twenty trading days in advance of its release. The general pattern of the API_t over the event period, is upward for good news and downward for bad. Although there is gradual anticipation of the information content of the average event, investors only partially anticipate the event, as evidenced by the lagged impounding over the succeeding twenty days. The persistence of post-announcement drift is also indicative of underreaction as opposed to instant adjustment to the new information, irrespective of its sign.

There is greater anticipation of earnings information relative to AGMs, board changes and a change in shareholding (Strong & Walker 1992, Brookfield & Morris 1994). This is perhaps indicative of the greater relevance and precision of earnings information for security valuation. The corresponding high level of drift in security returns following the earnings release, is consistent with the notion that earnings reports contain information not available from alternative more timely information sources (Chambers & Penman 1984).

For each class of information, the overall level and significance of the daily abnormal returns for good news exceeds those of bad news. Without controlling for the size of the news, it is not possible to say whether the average bad news event contains less information than the average good news event. Or whether bad news is more difficult to anticipate and interpret. An alternative explanation maybe bad news is ignored by investors (Sharkarway & Garrod 1995). Maybe what we have captured is the liquidity trades of investors, rather than investors selling due to information; thereby giving the appearance that bad news is being ignored. Of course, it may also indicate bad news is anticipated well in advance of good news, from the actions of managers warning investors ahead of the bad news (Skinner 1994).

However, for both annual and interim earnings, the absolute size of the market response to the average announcement of bad news on day 0, exceeds that of good news. Once again, we need to control for the size of the news before any assertions of under or overreaction can be made. Tables 6.1 to 6.5 also show greater sign reversal in the daily abnormal returns of bad news, indicative of possible daily overreaction to bad news, or increased volatility of stock returns (Engle & Ng 1993). Again, this suggests that bad news is more difficult to interpret than good news.

Although given the low significance of returns any inferences must be made with care.

The pattern of significant returns witnessed for a change in shareholding, in Tables 6.5a and 6.5b, is suggestive of possible herding by investors (Bikhchandani, Hirshleifer & Welch 1992). A large transaction is more likely after a period of pronounced activity. However, the significant returns continue after the announcement, suggesting a large transaction acts as an important signal to other, and perhaps less informed, investors.

6.6 EXPLAINING THE PATTERN OF STOCK RETURNS

The preliminary analysis of the pattern of average stock returns surrounding the release of the five information types, displayed several differences in investor behaviour towards good and bad news. There is no reason to doubt therefore, that the incentives for investors to become informed also vary according to the sign of the news.

The approach taken is the same as for chapter five, but involves partitioning the events into good and bad news, as defined above. The model takes the form of

$$ANN_i = a_0 + a_1 LN\_MV_i + a_2 AGE_i + a_3 NUM_i + a_4 VOLPR_i + u_i \qquad (6.1)$$

and,

$$POST_i = a_0 + a_1 LN\_MV_i + a_2 AGE_i + a_3 NUM_i + a_4 VOLPR{+}A_i + u_i \qquad (6.2)$$

For each class of information, we empirically test the relationship between the level of market anticipation (ANN_i or $POST_i$) and (1) firm size as measured by market capitalisation, LN_MV_i, (2) the number of years a firm has been trading, AGE_i, (3) the number of disclosures made by a firm, NUM_i, and (4) the volatility of stock returns prior to the disclosure, $VOLPR_i$ or $VOLPR{+}A_i$.[5] Where, ANN_i measures the

[5] Where $VOLPR_i$ measures stock return volatility over the prior period, where (t=-20,...,-1) used to model ANN_i. $VOLPR{+}A_i$ measures stock return volatility over the prior and announcement periods, where (t=-20,...,0) used to model $POST_i$.

price impact of information impounded over the announcement period (t=0), relative to the prior period (t=-20,...,-1). $POST_i$ measures the price impact of information impounded following the event (t=+1,...,+20), relative to both the prior and announcement periods (t=-20,...,0).

The dependent variables, ANN_i and $POST_i$, are both functions of the API metric (see section 3.7.2), where API is calculated

$$API_{i,window} = \prod_{t=\tau}^{T} (1 + e_{it}) \tag{6.3}$$

Equation (6.3) estimates the value from investing one pound in security i over a given event *window*, which can be one of three periods (prior, ann, or post). Where e_{it} represents the estimate of excess returns for company i, at period t. For each information type the sample of events are categorised into good news and bad news events according to the value of API_{20}. Announcements convey good news in the sense that they affect stock prices of reporting firms positively, and have an API_{20} value greater than 1.0. Announcements with an API_{20} value less than 1.0 are classified as bad news, and those with an API_{20} value equal to 1.0 contain no news.

The expected signs of the coefficients are the same as in chapter 5. Specifically, if lagged impounding is an inverse function of anticipation, and the level of market anticipation is an increasing function of the explanatory variables, the coefficient signs are expected to be negative. However, if the event window fails to capture the full anticipation process of larger firms, we expect firm size to be of positive sign (see section 3.7.3 for an explanation). Similarly, increasing disclosure (NUM) can have either a positive or negative effect on anticipation.

As before, the dependent variables ANN_i and $POST_i$ (which take the form of ratios) were found to be highly skewed, giving rise to significant heteroscedasticity (see section 5.4). Transforming the dependent variable, by taking the natural log of ANN_i or $POST_i$, (ie. LN_ANN_i or LN_POST_i) was successful in eliminating a substantial portion of the heteroscedasticity. However, in some cases the Breusch-Pagan

Chi-Squared test of heteroscedasticity was still significant at the 5 per cent level. Any remaining heteroscedasticity in the model is assumed to arise from cross-correlation between the independent variables. Accordingly, all the standard errors were adjusted using White's (1980) consistent estimator.[6]

The regression results of estimating equations (6.1) and (6.2), for each information type, are reported in Tables 6.6 to 6.9 for clear event windows. The analysis is then repeated, for unclear event windows, ie. examining the effect of other disclosures in the event window, on the pattern of investor anticipation and interpretation. For unclear event windows, the regression results of estimating equations (6.1) and (6.2), are reported in Tables 6.10 to 6.13. The significance of the explanatory variables in the explanation of market anticipation, varies considerably according to the model of expected returns. Therefore, for reasons of clarity we shall only focus on the regression results found to be robust across all three return metrics.[7]

---

[6] The OLS standard errors are not reported, due to their similarity.

[7] Other variations to the above tests were conducted, excluding outliers and extending the event window to thirty trading days either side of the event. Neither procedure produced markedly different results, changing the significance of variables nor their sign, in any meaningful way.

Briefly, the results show that:

The analysis distinguishes between event periods which exclude other disclosures from those that allow other disclosures.

Results applicable to both conditions:

As in chapter 5, the model explains post-announcement drift better than announcement returns. This may indicate investors initial reactions are not based on informed judgements.

The model explains the behaviour of stock returns surrounding good news events better than for bad news events. A possible explanation may be that investors reactions to bad news are less informed.

Allowing other disclosures within the event period:

This increases the overall power of the model in the explanation of the behaviour of stock returns. The volatility of prior stock returns persists as the main driving force behind the explanation of post-announcement drift.

Firm size explains announcement returns (ANN_i) for good news, but less so for bad news. However firm size does not explain post-announcement drift. A potential explanation is that bad news is difficult to anticipate and to interpret, for all classes of information.

Table 6.6a

OLS Regression Results, of the Value of Information (LN_ANN_i) Estimated Using Market Model Adjusted Returns (MM), Against The Explanatory Variables

Good News - Clear Event Window (t=-20,...,0)

$$LN\_ANN_i = a_0 + a_1 LN\_MV_i + a_2 AGE_i + a_3 NUM_i + a_4 VOLPR_i + u_i$$

	a_0	a_1	a_2	a_3	a_4
Annual Earnings					
	-1.0603	0.1243	-0.0038	-0.0022	-23.9310***
	(0.6755)	(0.1027)	(0.0068)	(0.0217)	(9.0210)
n = 78, R^2 = 0.0342, F[4,73] = 1.6822, BP(4) = 8.3946					
Interim Earnings					
	-1.7323***	-0.0427	0.0005	-0.0000	-10.8570
	(0.5727)	(0.1229)	(0.0056)	(0.0248)	(10.4700)
n = 95, R^2 = -0.0332, F[4,90] = 0.2441, BP(4) = 0.6919					
AGMs					
	-2.2099**	-0.0543	-0.0121	0.0498	-16.5680
	(0.9880)	(0.2282)	(0.0084)	(0.0416)	(22.8700)
n = 71, R^2 = -0.0200, F[4,66] = 0.6575, BP(4) = 6.9938					
Board Changes					
	-3.1093***	0.0670	0.0042	0.0207	-13.5030
	(0.2824)	(0.0637)	(0.0032)	(0.0127)	(12.4300)
n = 226, R^2 = 0.0251, F[4,221] = 2.4483, BP(4) = 38.4150					
Changes in Shareholdings					
	-3.4227***	0.1912***	-0.0016*	0.0168	-11.4770**
	(0.2243)	(0.0498)	(0.0008)	(0.0110)	(5.8000)
n = 551, R^2 = 0.0644, F[4,546] = 10.4698, BP(4) = 11.4056					

Notes:
LN_MV_i is the natural log of market capitalisation measuring firm size (£M), as at 1st January in the year of announcement,
AGE_i measures the number of years the firm has been in operation as at 1st January in the year of announcement,
NUM_i measures the number of disclosures made by the firm over the sample period,
$VOLPR_i$ measures stock return volatility over the prior period, where (t=-20,...,-1),
Figures in parentheses are White's standard errors,
*,**,*** statistically significant at the 10%, 5% and 1% critical level, respectively,
n represents the number of observations,
R^2 is adjusted for degrees of freedom,
F-stat is a joint test of statistical significance,
BP(4) is the Breusch-Pagan Chi-squared test for heteroscedasticity, with 4 degrees of freedom.

Table 6.6b

OLS Regression Results, of the Value of Information (LN_ANN_i) Estimated Using Market Adjusted Returns (MKT), Against The Explanatory Variables

Good News - Clear Event Window (t=-20,...,0)

$$LN\_ANN_i = a_0 + a_1 LN\_MV_i + a_2 AGE_i + a_3 NUM_i + a_4 VOLPR_i + u_i$$

	a_0	a_1	a_2	a_3	a_4
Annual Earnings					
	-1.5075***	-0.1187	0.0012	0.0126	-16.3890***
	(0.6370)	(0.1052)	(0.0057)	(0.0230)	(5.9990)
n = 67, R^2 = -0.0158, F[4,62] = 0.7430, BP(4) = 16.4501					
Interim Earnings					
	-0.4230	-0.1169	-0.0090	0.0076	-28.2060***
	(0.5201)	(0.1747)	(0.0069)	(0.0283)	(9.9680)
n = 64, R^2 = 0.0532, F[4,59] = 1.8865, BP(4) = 12.2781					
AGMs					
	-0.5706	-0.1085	-0.0093	0.0287	-56.6260***
	(0.7921)	(0.1615)	(0.0083)	(0.0323)	(20.5100)
n = 58, R^2 = 0.0523, F[4,53] = 1.7861, BP(4) = 1.1222					
Board Changes					
	-2.2218***	0.0648	-0.0006	0.0180	-28.2200***
	(0.3467)	(0.0655)	(0.0035)	(0.0160)	(8.9860)
n = 164, R^2 = 0.0325, F[4,159] = 2.3696, BP(4) = 2.5922					
Changes in Shareholdings					
	-2.1901***	0.0605	-0.0005	0.0126	-18.0310**
	(0.2656)	(0.0548)	(0.0007)	(0.0116)	(8.2260)
n = 467, R^2 = 0.0389, F[4,462] = 5.7208, BP(4) = 14.1474					

Notes:
LN_MV_i is the natural log of market capitalisation measuring firm size (£M), as at 1st January in the year of announcement,
AGE_i measures the number of years the firm has been in operation as at 1st January in the year of announcement,
NUM_i measures the number of disclosures made by the firm over the sample period,
$VOLPR_i$ measures stock return volatility over the prior period, where (t=-20,...,-1)
Figures in parentheses are White's standard errors,
*,**,*** statistically significant at the 10%, 5% and 1% critical level, respectively,
n represents the number of observations,
R^2 is adjusted for degrees of freedom,
F-stat is a joint test of statistical significance,
BP(4) is the Breusch-Pagan Chi-squared test for heteroscedasticity, with 4 degrees of freedom.

Table 6.6c

OLS Regression Results, of the Value of Information (LN_ANN_i) Estimated Using Mean Adjusted Returns (MN), Against The Explanatory Variables

Good News - Clear Event Window (t=-20,...,0)

$$LN\_ANN_i = a_0 + a_1 LN\_MV_i + a_2 AGE_i + a_3 NUM_i + a_4 VOLPR_i + u_i$$

	a_0	a_1	a_2	a_3	a_4
Annual Earnings					
	-1.2935***	-0.0712	-0.0062	0.0146	-21.4150**
	(0.5115)	(0.1052)	(0.0048)	(0.0215)	(8.4480)
n = 85, R^2 = 0.0234, F[4,80] = 1.5024, BP(4) = 6.9805					
Interim Earnings					
	-2.0292***	-0.1088	0.0010	0.0095	-20.6590**
	(0.5657)	(0.1219)	(0.0053)	(0.0274)	(10.1800)
n = 90, R^2 = 0.0019, F[4,85] = 1.0429, BP(4) = 5.9855					
AGMs					
	-2.0590***	-0.0349	-0.0081	-0.0054	-3.4692
	(0.7438)	(0.1842)	(0.0088)	(0.0427)	(22.5700)
n = 71, R^2 = -0.0443, F[4,66] = 0.2573, BP(4) = 8.6048					
Board Changes					
	-3.4351***	0.1504***	-0.0011	0.0231*	-19.9220***
	(0.2391)	(0.0505)	(0.0029)	(0.0127)	(8.4390)
n = 236, R^2 = 0.0630, F[4,231] = 4.9523, BP(4) = 8.4538					
Changes in Shareholdings					
	-3.1759***	0.0159	-0.0032***	0.0150	-11.0840***
	(0.1993)	(0.0484)	(0.0013)	(0.0103)	(4.4370)
n = 568, R^2 = 0.0283, F[4,563] = 5.1263, BP(4) = 41.1392					

Notes:
LN_MV_i is the natural log of market capitalisation measuring firm size (£M), as at 1st January in the year of announcement,
AGE_i measures the number of years the firm has been in operation as at 1st January in the year of announcement,
NUM_i measures the number of disclosures made by the firm over the sample period,
$VOLPR_i$ measures stock return volatility over the prior period, where (t=-20,...,-1)
Figures in parentheses are White's standard errors,
*,**,*** statistically significant at the 10%, 5% and 1% critical level, respectively,
n represents the number of observations,
R^2 is adjusted for degrees of freedom,
F-stat is a joint test of statistical significance,
BP(4) is the Breusch-Pagan Chi-squared test for heteroscedasticity, with 4 degrees of freedom.

Table 6.7a

OLS Regression Results, of the Value of Information (LN_POST_i) Estimated Using Market Model Adjusted Returns (MM), Against The Explanatory Variables

Good News - Clear Event Window (t=-20,...,+20)

$$LN\_POST_i = a_0 + a_1 LN\_MV_i + a_2 AGE_i + a_3 NUM_i + a_4 VOLPR{+}A_i + u_i$$

	a_0	a_1	a_2	a_3	a_4
Annual Earnings					
	0.3712	-0.1869**	-0.0026	0.0275	-10.9120
	(0.3908)	(0.0975)	(0.0046)	(0.0178)	(8.1680)
n = 84, R^2 = 0.0028, F[4,79] = 1.0577, BP(4) = 8.0037					
Interim Earnings					
	0.2234	-0.0671	-0.0004	0.0193	-17.2660**
	(0.3811)	(0.0997)	(0.0054)	(0.0152)	(7.9380)
n = 92, R^2 = 0.0062, F[4,87] = 1.1416, BP(4) = 0.8876					
AGMs					
	-0.8748	0.0869	0.0095	0.0037	-30.9080***
	(0.6824)	(0.1448)	(0.0067)	(0.0307)	(12.6500)
n = 60, R^2 = 0.0447, F[4,55] = 1.6897, BP(4) = 1.2506					
Board Changes					
	0.3503	-0.0015	-0.0071**	-0.0067	-2.3167
	(0.3543)	(0.0640)	(0.0034)	(0.0154)	(8.3410)
n = 219, R^2 = 0.0016, F[4,214] = 1.0883, BP(4) = 4.8999					
Changes in Shareholdings					
	0.1873	-0.0399	-0.0001	0.0065	-22.8160***
	(0.1929)	(0.0405)	(0.0005)	(0.0085)	(4.9120)
n = 553, R^2 = 0.0318, F[4,548] = 5.5382, BP(4) = 2.9722					

Notes:
LN_MV_i is the natural log of market capitalisation measuring firm size (£M), as at 1st January in the year of announcement,
AGE_i measures the number of years the firm has been in operation as at 1st January in the year of announcement,
NUM_i measures the number of disclosures made by the firm over the sample period,
$VOLPR{+}A_i$ measures stock return volatility over the prior and announcement period, where (t=-20,...,0)
Figures in parentheses are White's standard errors,
*,**,*** statistically significant at the 10%, 5% and 1% critical level, respectively,
n represents the number of observations,
R^2 is adjusted for degrees of freedom,
F-stat is a joint test of statistical significance,
BP(4) is the Breusch-Pagan Chi-squared test for heteroscedasticity, with 4 degrees of freedom.

Table 6.7b

OLS Regression Results, of the Value of Information (LN_POST_i) Estimated Using Market Adjusted Returns (MKT), Against The Explanatory Variables

Good News - Clear Event Window (t=-20,...,+20)

$$LN\_POST_i = a_0 + a_1 LN\_MV_i + a_2 AGE_i + a_3 NUM_i + a_4 VOLPR{+}A_i + u_i$$

	a_0	a_1	a_2	a_3	a_4
Annual Earnings					
	0.8533	-0.3494***	0.0011	0.0351	-7.6390
	(0.6196)	(0.1362)	(0.0054)	(0.0234)	(9.2670)
n = 67, R^2 = 0.0625, F[4,62] = 2.1008, BP(4) = 3.7631					
Interim Earnings					
	-0.3200	0.0265	0.0060	0.0101	-13.5290***
	(0.3709)	(0.0991)	(0.0048)	(0.0171)	(5.3330)
n = 69, R^2 = 0.0135, F[4,64] = 1.2333, BP(4) = 3.7890					
AGMs					
	0.4315	0.0771	0.0026	-0.0041	-59.4870***
	(0.6911)	(0.0980)	(0.0073)	(0.0266)	(13.6500)
n = 52, R^2 = 0.1858, F[4,47] = 3.9103, BP(4) = 4.4251					
Board Changes					
	1.0393***	0.0157	-0.0083**	-0.0021	-14.4450
	(0.4219)	(0.0608)	(0.0039)	(0.0186)	(11.1300)
n = 163, R^2 = 0.0232, F[4,158] = 1.9625, BP(4) = 1.4102					
Changes in Shareholdings					
	0.7268***	-0.0693	-0.0008	0.0003	-40.0920***
	(0.2395)	(0.0489)	(0.0009)	(0.0098)	(5.6440)
n = 451, R^2 = 0.0907, F[4,446] = 12.2183, BP(4) = 3.2407					

Notes:
LN_MV_i is the natural log of market capitalisation measuring firm size (£M), as at 1st January in the year of announcement,
AGE_i measures the number of years the firm has been in operation as at 1st January in the year of announcement,
NUM_i measures the number of disclosures made by the firm over the sample period,
$VOLPR{+}A_i$ measures stock return volatility over the prior and announcement period, where (t=-20,...,0)
Figures in parentheses are White's standard errors,
*,**,*** statistically significant at the 10%, 5% and 1% critical level, respectively,
n represents the number of observations,
R^2 is adjusted for degrees of freedom,
F-stat is a joint test of statistical significance,
BP(4) is the Breusch-Pagan Chi-squared test for heteroscedasticity, with 4 degrees of freedom.

Table 6.7c

OLS Regression Results, of the Value of Information (LN_POST_i) Estimated Using Mean Adjusted Returns (MN), Against The Explanatory Variables

Good News - Clear Event Window (t=-20,...,+20)

$$LN\_POST_i = a_0 + a_1 LN\_MV_i + a_2 AGE_i + a_3 NUM_i + a_4 VOLPR{+}A_i + u_i$$

	a_0	a_1	a_2	a_3	a_4
Annual Earnings					
	0.2483	-0.1677*	0.0004	0.0193	-14.6490*
	(0.4351)	(0.0903)	(0.0043)	(0.0153)	(7.9520)
n = 101, R^2 = 0.0154, F[4,96] = 1.3899, BP(4) = 3.8013					
Interim Earnings					
	0.4259	-0.1465	-0.0018	0.0394*	-26.6930***
	(0.4426)	(0.1109)	(0.0059)	(0.0232)	(10.8100)
n = 98, R^2 = 0.0531, F[4,93] = 2.3588, BP(4) = 10.2776					
AGMs					
	-0.7775	0.0861	0.0063	0.0073	-42.3650***
	(0.6940)	(0.1238)	(0.0052)	(0.0292)	(14.6400)
n = 66, R^2 = 0.1026, F[4,61] = 2.8573, BP(4) = 6.3490					
Board Changes					
	0.5215	-0.0404	-0.0095***	-0.0010	-0.7863
	(0.3327)	(0.0566)	(0.0033)	(0.0159)	(7.5370)
n = 227, R^2 = 0.0271, F[4,222] = 2.5712, BP(4) = 14.7758					
Changes in Shareholdings					
	0.2067	-0.0309	-0.0008	0.0029	-20.0330***
	(0.1794)	(0.0440)	(0.0006)	(0.0084)	(5.1720)
n = 584, R^2 = 0.0247, F[4,579] = 4.6955, BP(4) = 6.9763					

Notes:
LN_MV_i is the natural log of market capitalisation measuring firm size (£M), as at 1st January in the year of announcement,
AGE_i measures the number of years the firm has been in operation as at 1st January in the year of announcement,
NUM_i measures the number of disclosures made by the firm over the sample period,
$VOLPR{+}A_i$ measures stock return volatility over the prior and announcement period, where (t=-20,...,0)
Figures in parentheses are White's standard errors,
*,**,*** statistically significant at the 10%, 5% and 1% critical level, respectively,
n represents the number of observations,
R^2 is adjusted for degrees of freedom,
F-stat is a joint test of statistical significance,
BP(4) is the Breusch-Pagan Chi-squared test for heteroscedasticity, with 4 degrees of freedom.

6.6.1 *Good News Events*

LN_ANN$_i$

Table 6.6 reports the regression results of the value of the information impounded over the announcement period, relative to the prior period, for good news events. The reported coefficient signs for firm size (LN_MV$_i$), age (AGE$_i$) and the number of disclosures (NUM$_i$) are mixed, and not always of their predicted sign.[8] However, due to their low significance we can neither reliably infer their correct sign. Only the volatility of prior stock returns (VOLPR$_i$), is found to be significant in the explanation of the initial reaction on day 0, to the release of good news. The coefficient sign of prior volatility (VOLPR$_i$), is consistently negative for all information types, and across all expected return metrics. The negative sign of VOLPR$_i$ implies that larger values of prior volatility, leads to greater anticipation. However, VOLPR$_i$ is only significant in the explanation of the anticipation of favourable annual reports, and preceding an increase in shareholding. Beyond this, only the constant term is significant. This hints of possible model mis-specification, and hence of explanations other than that captured by the above explanatory variables, for market anticipation.

LN_POST$_i$

Table 6.7 reports the regression results of the value of information impounded over the post-announcement period, relative to the prior and announcement periods, for good news events. As for LN_ANN$_i$, the coefficients are not always of their predicted sign, except when statistically significant. However there is a slight shift in the significance of the explanatory variables. The volatility of prior stock returns (VOLPR+A$_i$) persists as a highly significant factor in the explanation of the post-announcement reaction to an increase in shareholding. Though the explanation of VOLPR+A$_i$ for annual earnings, shifts to favourable interim news and AGMs.

Firm size (LN_MV$_i$) is significant and negative in sign for annual earnings; although the expected sign is positive (see section 3.7). We hypothesised, the information content of large firm announcements to be largely anticipated well in advance of their

[8] Incorrect coefficient signs may be an indication of possible collinearity between explanatory variables, though this seems doubtful given the low level of correlation found in section 4.6.2.

release (Freeman 1987); ie. prior to (t=-20). Whereas, small firm stocks are more heavily traded as the release date approaches; ie. in this case, over the prior period. Any surprise, no matter how small, will appear disproportionately high for larger firms against a prior period of relatively little trade. Consequently, firm size (LN_MV_i) is expected to be positively related to the level of market anticipation, LN_ANN_i and LN_POST_i. A negative sign therefore implies, the stocks of larger firms are more heavily traded over the announcement period.

The number of years a firm has been trading (AGE_i), is significant in the explanation of post-announcement drift following a welcomed board change. The negative sign is consistent with expectations, that the accessibility of information is an increasing function of a firm's age. Beyond this, the significance of the constant term is greatly reduced, suggestive of improved model specification. In short, we are able to partially explain the drift following the average announcement for each event type. Depending on the returns models, we explain between 0.3(MM) to 6.3(MKT) per cent of the drift following the average annual earnings report, as measured by the R^2 value. And similarly, between 0.6(MM) to 5.3(MN) per cent for interim earnings, 4.5(MM) to 18.5(MKT) per cent for AGMs, and between 2.5(MN) to 9.1(MKT) per cent for a change in shareholding.

Table 6.8a

OLS Regression Results, of the Value of Information (LN_ANN_i) Estimated Using Market Model Adjusted Returns (MM), Against The Explanatory Variables

Bad News - Clear Event Window (t=-20,...,0)

$$LN\_ANN_i = a_0 + a_1 LN\_MV_i + a_2 AGE_i + a_3 NUM_i + a_4 VOLPR_i + u_i$$

	a_0	a_1	a_2	a_3	a_4
Annual Earnings					
	-2.4674***	0.3055	-0.0060	-0.0103	14.9010
	(0.9396)	(0.2432)	(0.0122)	(0.0547)	(22.2300)
n = 39, R^2 = -0.0231, F[4,34] = 0.7851, BP(4) = 2.3191					
Interim Earnings					
	0.1532	0.07566	-0.0169**	-0.0412	-2.1344
	(0.7780)	(0.2194)	(0.0085)	(0.0446)	(3.0440)
n = 59, R^2 = -0.0035, F[4,54] = 0.9489, BP(4) = 1.5418					
AGMs					
	-2.5033***	0.0700	0.0042	0.0523*	-47.9740***
	(0.7299)	(0.1017)	(0.0067)	(0.0304)	(19.8600)
n = 35, R^2 = 0.0159, F[4,30] = 1.1372, BP(4) = 2.11203					
Board Changes					
	-2.8609***	0.1697***	0.0024	0.0063	-9.1847*
	(0.4309)	(0.0660)	(0.0038)	(0.0203)	(4.7510)
n = 164, R^2 = 0.0550, F[4,159] = 3.3705, BP(4) = 4.0544					
Changes in Shareholdings					
	-2.7031***	0.1343***	-0.0017	0.0032	-4.4022***
	(0.0913)	(0.0175)	(0.0008)	(0.0030)	(6.3890)
n = 373, R^2 = 0.0103, F[4,373] = 1.9794, BP(4) = 3.2523					

Notes:
LN_MV_i is the natural log of market capitalisation measuring firm size (£M), as at 1st January in the year of announcement,
AGE_i measures the number of years the firm has been in operation as at 1st January in the year of announcement,
NUM_i measures the number of disclosures made by the firm over the sample period,
$VOLPR_i$ measures stock return volatility over the prior period, where (t=-20,....,-1)
Figures in parentheses are White's standard errors,
*,**,*** statistically significant at the 10%, 5% and 1% critical level, respectively,
n represents the number of observations,
R^2 is adjusted for degrees of freedom,
F-stat is a joint test of statistical significance,
BP(4) is the Breusch-Pagan Chi-squared test for heteroscedasticity, with 4 degrees of freedom.

Table 6.8b

OLS Regression Results, of the Value of Information (LN_ANN_i) Estimated Using Market Adjusted Returns (MKT), Against The Explanatory Variables

Bad News - Clear Event Window (t=-20,...,0)

$$LN\_ANN_i = a_0 + a_1 LN\_MV_i + a_2 AGE_i + a_3 NUM_i + a_4 VOLPR_i + u_i$$

	a_0	a_1	a_2	a_3	a_4
Annual Earnings					
	-1.8875***	-0.0977	-0.0115*	0.0793***	-1.4126
	(0.6891)	(0.1541)	(0.0070)	(0.0337)	(12.3900)
n = 50, R^2 = 0.0582, F[4,45] = 1.7573, BP(4) = 3.1827					
Interim Earnings					
	-0.6503	0.1359	-0.0011	-0.0519**	-0.1559
	(0.5333)	(0.1312)	(0.0055)	(0.0259)	(2.2210)
n = 90, R^2 = 0.0023, F[4,85] = 1.0507, BP(4) = 2.2426					
AGMs					
	-3.3733***	0.4130***	-0.0064**	0.0393	-7.8132
	(0.6198)	(0.1347)	(0.0075)	(0.0381)	(30.9000)
n = 48, R^2 = 0.1179, F[4,43] = 2.5709, BP(4) = 2.7427					
Board Changes					
	-2.4121***	0.2038***	0.0021	-0.0106	-17.1380***
	(0.3460)	(0.0558)	(0.0032)	(0.0164)	(5.6310)
n = 226, R^2 = 0.0860, F[4,221] = 6.2913, BP(4) = 1.3389					
Changes in Shareholdings					
	-2.5352***	0.1503***	-0.0005	0.0099	-21.2340***
	(0.2266)	(0.0485)	(0.0009)	(0.0102)	(7.2330)
n = 462, R^2 = 0.0623, F[4,457] = 8.6619, BP(4) = 15.3028					

Notes:
LN_MV_i is the natural log of market capitalisation measuring firm size (£M), as at 1st January in the year of announcement,
AGE_i measures the number of years the firm has been in operation as at 1st January in the year of announcement,
NUM_i measures the number of disclosures made by the firm over the sample period,
$VOLPR_i$ measures stock return volatility over the prior period, where (t=-20,...,-1)
Figures in parentheses are White's standard errors,
*,**,*** statistically significant at the 10%, 5% and 1% critical level, respectively,
n represents the number of observations,
R^2 is adjusted for degrees of freedom,
F-stat is a joint test of statistical significance,
BP(4) is the Breusch-Pagan Chi-squared test for heteroscedasticity, with 4 degrees of freedom.

Table 6.8c

OLS Regression Results, of the Value of Information (LN_ANN_i) Estimated Using Mean Adjusted Returns (MN), Against The Explanatory Variables

Bad News - Clear Event Window (t=-20,...,0)

$$LN\_ANN_i = a_0 + a_1 LN\_MV_i + a_2 AGE_i + a_3 NUM_i + a_4 VOLPR_i + u_i$$

	a_0	a_1	a_2	a_3	a_4
Annual Earnings					
	-1.2323	0.1045	-0.0026	0.0310	-31.9330
	(1.2810)	(0.2324)	(0.0122)	(0.0580)	(29.2800)
n = 31, R^2 = -0.0863, F[4,26] = 0.4040, BP(4) = 3.9614					
Interim Earnings					
	-0.6084	0.0215	-0.0086	-0.0076	-1.3035
	(0.7516)	(0.1552)	(0.0084)	(0.0383)	(2.5790)
n = 62, R^2 = -0.0521, F[4,57] = 0.2450, BP(4) = 1.3720					
AGMs					
	-3.5589***	0.3234***	0.0010	0.0234***	5.0677
	(0.2897)	(0.0553)	(0.0027)	(0.0086)	(8.2670)
n = 35, R^2 = -0.0488, F[4,30] = 0.6046, BP(4) = 2.4416					
Board Changes					
	-3.2313***	0.1547**	0.0025	0.0043	-2.5279
	(0.3856)	(0.0724)	(0.0041)	(0.0213)	(5.4930)
n = 151, R^2 = 0.0218, F[4,146] = 1.8369, BP(4) = 1.5258					
Changes in Shareholdings					
	-3.6623***	0.1708***	-0.0023	0.0229	-1.0305
	(0.3458)	(0.0647)	(0.0029)	(0.0141)	(6.5490)
n = 359, R^2 = 0.0297, F[4,354] = 3.7375, BP(4) = 2.5932					

Notes:
LN_MV_i is the natural log of market capitalisation measuring firm size (£M), as at 1st January in the year of announcement,
AGE_i measures the number of years the firm has been in operation as at 1st January in the year of announcement,
NUM_i measures the number of disclosures made by the firm over the sample period,
$VOLPR_i$ measures stock return volatility over the prior period, where (t=-20,...,-1)
Figures in parentheses are White's standard errors,
*,**,*** statistically significant at the 10%, 5% and 1% critical level, respectively,
n represents the number of observations,
R^2 is adjusted for degrees of freedom,
F-stat is a joint test of statistical significance,
BP(4) is the Breusch-Pagan Chi-squared test for heteroscedasticity, with 4 degrees of freedom.

Table 6.9a

OLS Regression Results, of the Value of Information (LN_POST_i) Estimated Using Market Model Adjusted Returns (MM), Against The Explanatory Variables

Bad News - Clear Event Window (t=-20,...,+20)

$$LN\_POST_i = a_0 + a_1 LN\_MV_i + a_2 AGE_i + a_3 NUM_i + a_4 VOL_{PR+A_i} + u_i$$

	a_0	a_1	a_2	a_3	a_4
Annual Earnings					
	0.7987	-0.1738	-0.0076	0.0184	-25.7160*
	(0.7943)	(0.1245)	(0.0078)	(0.0260)	(15.1400)
n = 33, R^2 = 0.0389, F[4,28] = 1.3242, BP(4) = 4.8732					
Interim Earnings					
	0.7540	0.0496	-0.0060	-0.0224***	-4.4821
	(0.4920)	(0.1163)	(0.0050)	(0.0029)	(3.6250)
n = 62, R^2 = -0.0170, F[4,57] = 0.7454, BP(4) = 4.2947					
AGMs					
	1.2349	-0.3088***	-0.0150***	0.0420	-0.9614
	(0.6249)	(0.1282)	(0.0052)	(0.0295)	(17.2600)
n = 46, R^2 = 0.1508, F[4,41] = 2.9985, BP(4) = 1.2192					
Board Changes					
	0.8333*	0.0141	-0.0004	-0.0295*	-15.1150***
	(0.1215)	(0.0197)	(0.0012)	(0.0037)	(2.2170)
n = 171, R^2 = 0.0155, F[4,166] = 1.6687, BP(4) = 0.5616					
Changes in Shareholdings					
	-0.3147	0.0757	0.0021	0.0069	-12.1120
	(0.3196)	(0.0580)	(0.0025)	(0.0133)	(8.4840)
n = 376, R^2 = 0.0266, F[4,371] = 3.5658, BP(4) = 6.2407					

Notes:
LN_MV_i is the natural log of market capitalisation measuring firm size (£M), as at 1st January in the year of announcement,
AGE_i measures the number of years the firm has been in operation as at 1st January in the year of announcement,
NUM_i measures the number of disclosures made by the firm over the sample period,
VOL_{PR+A_i} measures stock return volatility over the prior and announcement period, where (t=-20,...,0)
Figures in parentheses are White's standard errors,
*,**,*** statistically significant at the 10%, 5% and 1% critical level, respectively,
n represents the number of observations,
R^2 is adjusted for degrees of freedom,
F-stat is a joint test of statistical significance,
BP(4) is the Breusch-Pagan Chi-squared test for heteroscedasticity, with 4 degrees of freedom.

Table 6.9b

OLS Regression Results, of the Value of Information (LN_POST_i) Estimated Using Market Adjusted Returns (MKT), Against The Explanatory Variables

Bad News - Clear Event Window (t=-20,....,+20)

$$LN\_POST_i = a_0 + a_1 LN\_MV_i + a_2 AGE_i + a_3 NUM_i + a_4 VOLPR{+}A_i + u_i$$

	a_0	a_1	a_2	a_3	a_4
Annual Earnings					
	-0.0555	-0.0688	-0.0070	0.0461**	-18.9550*
	(0.7053)	(0.1245)	(0.0077)	(0.0228)	(11.4500)
n = 50, R^2 = 0.0183, F[4,45] = 1.2287, BP(4) = 1.6138					
Interim Earnings					
	0.0848	0.0471	-0.0021	0.0007	-7.0498
	(0.3995)	(0.1297)	(0.0041)	(0.0213)	(5.7650)
n = 85, R^2 = -0.0064, F[4,80] = 0.8660, BP(4) = 4.8061					
AGMs					
	0.4396	-0.1873	-0.0153***	0.0948***	-49.9510**
	(0.5045)	(0.1410)	(0.0063)	(0.0367)	(24.0400)
n = 54, R^2 = 0.1181, F[4,49] = 2.7736, BP(4) = 3.3404					
Board Changes					
	0.0985	0.0192	0.0009	-0.0013	-12.0930**
	(0.3064)	(0.0567)	(0.0029)	(0.0157)	(6.0070)
n = 227, R^2 = -0.0032, F[4,222] = 0.8200, BP(4) = 4.6158					
Changes in Shareholdings					
	-0.5444	0.1011	0.0008	0.0149	-7.5855
	(0.2244)	(0.0538)	(0.0009)	(0.0105)	(5.9290)
n = 478, R^2 = 0.0258, F[4,473] = 4.1578, BP(4) = 6.8550					

Notes:
LN_MV_i is the natural log of market capitalisation measuring firm size (£M), as at 1st January in the year of announcement,
AGE_i measures the number of years the firm has been in operation as at 1st January in the year of announcement,
NUM_i measures the number of disclosures made by the firm over the sample period,
$VOLPR{+}A_i$ measures stock return volatility over the prior and announcement period, where (t=-20,...,0)
Figures in parentheses are White's standard errors,
*,**,*** statistically significant at the 10%, 5% and 1% critical level, respectively,
n represents the number of observations,
R^2 is adjusted for degrees of freedom,
F-stat is a joint test of statistical significance,
BP(4) is the Breusch-Pagan Chi-squared test for heteroscedasticity, with 4 degrees of freedom.

Table 6.9c

OLS Regression Results, of the Value of Information (LN_POST_i) Estimated Using Mean Adjusted Returns (MN), Against The Explanatory Variables

Bad News - Clear Event Window (t=-20,...,+20)

$$LN\_POST_i = a_0 + a_1 LN\_MV_i + a_2 AGE_i + a_3 NUM_i + a_4 VOLPR{+}A_i + u_i$$

	a_0	a_1	a_2	a_3	a_4
Annual Earnings					
	-0.1376	0.3190**	0.0200	-0.0385	-38.0610***
	(0.3979)	(0.1506)	(0.0146)	(0.0326)	(10.6400)
n = 15, R^2 = 0.2394, F[4,10] = 2.2903, BP(4) = 7.0353					
Interim Earnings					
	-0.1934	0.0280	-0.0022	0.0235	-3.4331
	(0.3158)	(0.0918)	(0.0037)	(0.0181)	(2.8310)
n = 54, R^2 = 0.0272, F[4,49] = 1.3707, BP(4) = 1.4437					
AGMs					
	1.3216	-0.3630	-0.0188*	0.0472	23.1920
	(0.8882)	(0.2269)	(0.0101)	(0.0478)	(29.6200)
n = 40, R^2 = 0.1141, F[4,35] = 2.2554, BP(4) = 3.5147					
Board Changes					
	0.6320	0.0478	-0.0055*	-0.0078	-14.5880*
	(0.4232)	(0.0528)	(0.0032)	(0.0136)	(7.8290)
n = 162, R^2 = 0.0240, F[4,157] = 1.9898, BP(4) = 2.5424					
Changes in Shareholdings					
	-0.2660	0.0182	0.0020	0.0201***	-12.6590
	(0.2832)	(0.0514)	(0.0023)	(0.0012)	(12.6590)
n = 345, R^2 = 0.0373, F[4,345] = 4.3298, BP(4) = 16.2072					

Notes:
LN_MV_i is the natural log of market capitalisation measuring firm size (£M), as at 1st January in the year of announcement,
AGE_i measures the number of years the firm has been in operation as at 1st January in the year of announcement,
NUM_i measures the number of disclosures made by the firm over the sample period,
$VOLPR{+}A_i$ measures stock return volatility over the prior and announcement period, where (t=-20,...,0)
Figures in parentheses are White's standard errors,
*,**,*** statistically significant at the 10%, 5% and 1% critical level, respectively,
n represents the number of observations,
R^2 is adjusted for degrees of freedom,
F-stat is a joint test of statistical significance,
BP(4) is the Breusch-Pagan Chi-squared test for heteroscedasticity, with 4 degrees of freedom.

6.6.2 *Bad News Events*

LN_ANN_i

Table 6.8 reports the regression results of the value of the information impounded over the announcement period, relative to the prior period, for bad news events. The significance of the explanatory variables is varied and haphazard, with little consistency in the results across the return metrics. In contrast to good news, firm size (LN_MV_i) is found to be robust across return metrics with 5 per cent significance, for both unpopular board changes and a reduction in shareholding. Depending on the returns model, the model explains between 2.2(MN) and 8.6(MKT) per cent of the response on day 0 to the release of the average board change, and between 1.0(MM) and 6.2(MKT) for a change in shareholding. The positive coefficient of LN_MV_i, is consistent with the idea that the length of the prior period does not capture the full anticipation process of larger firms (see section 3.7.3). Thereby confirming anticipation is an increasing function of firm size. Beyond this, only the constant term is significant and negative for AGMs, board changes and a change in shareholding.

LN_POST_i

Table 6.9 reports the regression results of the value of the information impounded over the post-announcement period, relative to the prior and announcement periods, for bad news events. The tables show a further reduction in the significance of the explanatory variables for bad news over the post-announcement period. However, with 10 per cent significance, the prior volatility of stock returns is robust across return measures, in the explanation of post-announcement drift after disappointing annual results and unpopular board changes. Similarly, age is significant (above 10 per cent) and negative, in the explanation of drift ensuing the average board change.

Table 6.10a

OLS Regression Results, of the Value of Information (LN_ANN_i) Estimated Using Market Model Adjusted Returns (MM), Against The Explanatory Variables

Good News - Unclear Event Window (t=-20,...,0)

$$LN\_ANN_i = a_0 + a_1 LN\_MV_i + a_2 AGE_i + a_3 NUM_i + a_4 VOLPR_i + u_i$$

	a_0	a_1	a_2	a_3	a_4
Annual Earnings					
	-1.7676***	0.1942***	0.0010	0.0066	-18.8660***
	(0.1634)	(0.0320)	(0.0015)	(0.0061)	(4.2510)
n = 1118, R^2 = 0.0643, F[4,1113] = 20.1903, BP(4) = 21.6259					
Interim Earnings					
	-2.2152***	0.2675***	0.0007	-0.0045	-3.3142
	(0.1824)	(0.0366)	(0.0021)	(0.0079)	(5.1970)
n = 810, R^2 = 0.0646, F[4,805] = 14.9690, BP(4) = 1.2992					
AGMs					
	-2.8310***	0.1212	0.0019	0.0191	-22.0210*
	(0.4048)	(0.0861)	(0.0038)	(0.0135)	(12.3300)
n = 265, R^2 = 0.0328, F[4,260] = 3.2350, BP(4) = 4.1540					
Board Changes					
	-2.7407***	0.1066***	-0.0005	0.0159***	-10.5300***
	(0.1634)	(0.0294)	(0.0016)	(0.0060)	(4.3050)
n = 1002, R^2 = 0.0419, F[4,997] = 11.9471, BP(4) = 22.3264					
Changes in Shareholdings					
	-3.0451***	0.1915***	-0.0012	-0.0005	-8.5366***
	(0.1200)	(0.0234)	(0.0011)	(0.0043)	(2.4200)
n = 2502, R^2 = 0.0422, F[4,2497] = 28.5482, BP(4) = 17.1101					

Notes:
LN_MV_i is the natural log of market capitalisation measuring firm size (£M), as at 1st January in the year of announcement,
AGE_i measures the number of years the firm has been in operation as at 1st January in the year of announcement,
NUM_i measures the number of disclosures made by the firm over the sample period,
$VOLPR_i$ measures stock return volatility over the prior and announcement period, where (t=-20,...,0)
Figures in parentheses are White's standard errors,
*,**,*** statistically significant at the 10%, 5% and 1% critical level, respectively,
n represents the number of observations,
R^2 is adjusted for degrees of freedom,
F-stat is a joint test of statistical significance,
BP(4) is the Breusch-Pagan Chi-squared test for heteroscedasticity, with 4 degrees of freedom.

Table 6.10b

OLS Regression Results, of the Value of Information (LN_ANN_i) Estimated Using Market Adjusted Returns (MKT), Against The Explanatory Variables

Good News - Unclear Event Window (t=-20,...,0)

$$LN\_ANN_i = a_0 + a_1 LN\_MV_i + a_2 AGE_i + a_3 NUM_i + a_4 VOLPR_i + u_i$$

	a_0	a_1	a_2	a_3	a_4
Annual Earnings					
	-0.6924***	0.0612*	0.0018	0.0010	-25.9240***
	(0.1659)	(0.0330)	(0.0017)	(0.0062)	(3.8460)
n = 987, R^2 = 0.0471, F[4,982] = 13.1873, BP(4) = 10.6310					
Interim Earnings					
	-1.2831***	0.1412***	0.0009	-0.0022	-16.8740***
	(0.2023)	(0.0414)	(0.0021)	(0.0082)	(5.7640)
n = 668, R^2 = 0.0339, F[4,663] = 6.8537, BP(4) = 8.3588					
AGMs					
	-2.0822***	-0.0102	0.0047	0.0277***	-34.2660***
	(0.3922)	(0.0678)	(0.0031)	(0.0104)	(11.5600)
n = 231, R^2 = 0.0484, F[4,226] = 3.9242, BP(4) = 10.1984					
Board Changes					
	-1.9151***	0.0532*	-0.0020	0.0131**	-16.0170***
	(0.1991)	(0.0295)	(0.0018)	(0.0058)	(5.1090)
n = 834, R^2 = 0.0290, F[4,829] = 7.2260, BP(4) = 13.7682					
Changes in Shareholdings					
	-2.0144***	0.0893***	-0.0014*	-0.0026	-19.1370***
	(0.2656)	(0.0548)	(0.0007)	(0.0116)	(8.2260)
n = 2176, R^2 = 0.0407, F[4,2171] = 24.0652, BP(4) = 24.7394					

Notes:
LN_MV_i is the natural log of market capitalisation measuring firm size (£M), as at 1st January in the year of announcement,
AGE_i measures the number of years the firm has been in operation as at 1st January in the year of announcement,
NUM_i measures the number of disclosures made by the firm over the sample period,
$VOLPR_i$ measures stock return volatility over the prior and announcement period, where (t=-20,...,0)
Figures in parentheses are White's standard errors,
*,**,*** statistically significant at the 10%, 5% and 1% critical level, respectively,
n represents the number of observations,
R^2 is adjusted for degrees of freedom,
F-stat is a joint test of statistical significance,
BP(4) is the Breusch-Pagan Chi-squared test for heteroscedasticity, with 4 degrees of freedom.

Table 6.10c

OLS Regression Results, of the Value of Information (LN_ANN_i) Estimated Using Mean Adjusted Returns (MN), Against The Explanatory Variables

Good News - Unclear Event Window (t=-20,...,0)

$$LN\_ANN_i = a_0 + a_1 LN\_MV_i + a_2 AGE_i + a_3 NUM_i + a_4 VOLPR_i + u_i$$

	a_0	a_1	a_2	a_3	a_4
Annual Earnings					
	-1.7328***	0.1188***	0.0002	0.0094*	-19.4170***
	(0.1540)	(0.0298)	(0.0016)	(0.0057)	(3.5700)
n = 1163, R^2 = 0.0419, F[4,1158] = 13.7148, BP(4) = 17.3160					
Interim Earnings					
	-2.3086***	0.1825***	-0.0005	0.0062	-7.3706
	(0.1615)	(0.0331)	(0.0019)	(0.0075)	(5.1240)
n = 845, R^2 = 0.0475, F[4,840] = 11.5174, BP(4) = 3.2338					
AGMs					
	-3.1925***	0.1067	0.0029	0.0089	-3.0984
	(0.3499)	(0.0675)	(0.0030)	(0.0102)	(10.5000)
n = 291, R^2 = 0.0105, F[4,286] = 1.7686, BP(4) = 4.4620					
Board Changes					
	-2.9638***	0.1060***	-0.0009	0.0138***	-8.0434**
	(0.1523)	(0.0259)	(0.0016)	(0.0054)	(3.9500)
n = 1059, R^2 = 0.0342, F[4,1054] = 10.3793, BP(4) = 6.3858					
Changes in Shareholdings					
	-3.4216***	0.0915***	-0.0005	0.0140***	-6.9129***
	(0.1086)	(0.0223)	(0.0011)	(0.0038)	(2.0590)
n = 2633, R^2 = 0.0221, F[4,2628] = 15.8992, BP(4) = 19.8776					

Notes:
LN_MV_i is the natural log of market capitalisation measuring firm size (£M), as at 1st January in the year of announcement,
AGE_i measures the number of years the firm has been in operation as at 1st January in the year of announcement,
NUM_i measures the number of disclosures made by the firm over the sample period,
$VOLPR_i$ measures stock return volatility over the prior and announcement period, where (t=-20,...,0)
Figures in parentheses are White's standard errors,
*,**,*** statistically significant at the 10%, 5% and 1% critical level, respectively,
n represents the number of observations,
R^2 is adjusted for degrees of freedom,
F-stat is a joint test of statistical significance,
BP(4) is the Breusch-Pagan Chi-squared test for heteroscedasticity, with 4 degrees of freedom.

Table 6.11a

OLS Regression Results, of the Value of Information (LN_POST_i) Estimated Using Market Model Adjusted Returns (MM), Against The Explanatory Variables

Good News - Unclear Event Window (t=-20,...,+20)

$$LN\_POST_i = a_0 + a_1 LN\_MV_i + a_2 AGE_i + a_3 NUM_i + a_4 VOLPR{+}A_i + u_i$$

	a_0	a_1	a_2	a_3	a_4
Annual Earnings					
	0.0399	-0.0579	0.0009	0.0081	-15.6790***
	(0.3908)	(0.0975)	(0.0046)	(0.0178)	(8.1680)
n = 1098, R^2 = 0.0219, F[4,1093] = 7.1315, BP(4) = 1.7278					
Interim Earnings					
	0.0142	-0.0489	0.0023	0.0098	-14.3710***
	(0.1596)	(0.0337)	(0.0017)	(0.0065)	(3.5600)
n = 811, R^2 = 0.0154, F[4,806] = 4.1579, BP(4) = 4.4154					
AGMs					
	-0.0837	0.1050*	-0.0007	-0.0178	-15.4200
	(0.3745)	(0.0630)	(0.0030)	(0.0161)	(9.7750)
n = 256, R^2 = 0.0166, F[4,251] = 2.0729, BP(4) = 9.9783					
Board Changes					
	0.3766**	-0.0271	-0.0040**	0.0013	-15.2190***
	(0.1724)	(0.0272)	(0.0017)	(0.0053)	(3.9860)
n = 991, R^2 = 0.0193, F[4,986] = 5.8624, BP(4) = 5.8838					
Changes in Shareholdings					
	0.1443	-0.0527***	-0.0019*	0.0104***	-20.3560***
	(0.1112)	(0.0207)	(0.0010)	(0.0037)	(2.2820)
n = 2541, R^2 = 0.0341, F[4,2536] = 2.3439, BP(4) = 8.6891					

Notes:
LN_MV_i is the natural log of market capitalisation measuring firm size (£M), as at 1st January in the year of announcement,
AGE_i measures the number of years the firm has been in operation as at 1st January in the year of announcement,
NUM_i measures the number of disclosures made by the firm over the sample period,
$VOLPR{+}A_i$ measures stock return volatility over the prior and announcement period, where (t=-20,...,0)
Figures in parentheses are White's standard errors,
*,**,*** statistically significant at the 10%, 5% and 1% critical level, respectively,
n represents the number of observations,
R^2 is adjusted for degrees of freedom,
F-stat is a joint test of statistical significance,
BP(4) is the Breusch-Pagan Chi-squared test for heteroscedasticity, with 4 degrees of freedom.

Table 6.11b

OLS Regression Results, of the Value of Information (LN_POST_i) Estimated Using Market Adjusted Returns (MKT), Against The Explanatory Variables

Good News - Unclear Event Window (t=-20,...,+20)

$$LN\_POST_i = a_0 + a_1 LN\_MV_i + a_2 AGE_i + a_3 NUM_i + a_4 VOL_{PR+A_i} + u_i$$

	a_0	a_1	a_2	a_3	a_4
Annual Earnings					
	0.5463***	-0.0794***	-0.0015	-0.0000	-24.2130***
	(0.1760)	(0.0341)	(0.0016)	(0.0064)	(3.6810)
$n = 889$, $R^2 = 0.0484$, $F[4,884] = 12.2841$, $BP(4) = 6.3607$					
Interim Earnings					
	0.0354	-0.0656*	0.0052***	0.0072	-19.3830***
	(0.1964)	(0.0389)	(0.0019)	(0.0075)	(4.1970)
$n = 666$, $R^2 = 0.0344$, $F[4,661] = 6.9233$, $BP(4) = 4.7847$					
AGMs					
	0.4694	0.0245	-0.0001	-0.0051	-42.6320***
	(0.4194)	(0.0705)	(0.0034)	(0.0129)	(10.1200)
$n = 243$, $R^2 = 0.0516$, $F[4,238] = 4.2884$, $BP(4) = 11.6145$					
Board Changes					
	0.8402***	-0.0271	-0.0057***	-0.0085	-22.8880***
	(0.4219)	(0.0608)	(0.0039)	(0.0186)	(11.1300)
$n = 796$, $R^2 = 0.0439$, $F[4,791] = 10.1295$, $BP(4) = 3.1549$					
Changes in Shareholdings					
	0.4075***	-0.0568***	-0.0022**	0.0056	-28.0650***
	(0.1264)	(0.0227)	(0.0010)	(0.0039)	(2.4900)
$n = 2146$, $R^2 = 0.0646$, $F[4,2141] = 38.0133$, $BP(4) = 6.2456$					

Notes:
LN_MV_i is the natural log of market capitalisation measuring firm size (£M), as at 1st January in the year of announcement,
AGE_i measures the number of years the firm has been in operation as at 1st January in the year of announcement,
NUM_i measures the number of disclosures made by the firm over the sample period,
VOL_{PR+A_i} measures stock return volatility over the prior and announcement period, where (t=-20,...,0)
Figures in parentheses are White's standard errors,
*,**,*** statistically significant at the 10%, 5% and 1% critical level, respectively,
n represents the number of observations,
R^2 is adjusted for degrees of freedom,
F-stat is a joint test of statistical significance,
BP(4) is the Breusch-Pagan Chi-squared test for heteroscedasticity, with 4 degrees of freedom.

Table 6.11c

OLS Regression Results, of the Value of Information (LN_POST_i) Estimated Using Mean Adjusted Returns (MN), Against The Explanatory Variables

Good News - Unclear Event Window (t=-20,...,+20)

$$LN\_POST_i = a_0 + a_1 LN\_MV_i + a_2 AGE_i + a_3 NUM_i + a_4 VOL_{PR+A_i} + u_i$$

	a_0	a_1	a_2	a_3	a_4
Annual Earnings					
	0.1676	-0.0827***	0.0008	0.0072	-17.8980***
	(0.1371)	(0.0258)	(0.0014)	(0.0046)	(2.7920)
n = 1195, R^2 = 0.0321, F[4,1190] = 10.8973, BP(4) = 2.7630					
Interim Earnings					
	0.0427	-0.0789**	0.0028	0.0087	-15.9930***
	(0.1574)	(0.0344)	(0.0172)	(0.0668)	(3.9030)
n = 861, R^2 = 0.0217, F[4,856] = 5.7592, BP(4) = 8.6150					
AGMs					
	-0.1234	0.0560	-0.0010	-0.0044	-27.0420***
	(0.3755)	(0.0572)	(0.0028)	(0.0123)	(10.9100)
n = 286, R^2 = 0.0222, F[4,281] = 2.6186, BP(4) = 8.4522					
Board Changes					
	0.5940***	-0.0479*	-0.0036**	-0.0020	-18.0940***
	(0.1552)	(0.0254)	(0.0016)	(0.0050)	(4.1080)
n = 1044, R^2 = 0.0306, F[4,1039] = 9.2345, BP(4) = 9.7338					
Changes in Shareholdings					
	0.0340	-0.0118	-0.0018*	0.0060	-18.0110***
	(0.1110)	(0.0219)	(0.0010)	(0.0039)	(2.1670)
n = 2697, R^2 = 0.0272, F[4,2692] = 19.8479, BP(4) = 3.4392					

Notes:
LN_MV_i is the natural log of market capitalisation measuring firm size (£M), as at 1st January in the year of announcement,
AGE_i measures the number of years the firm has been in operation as at 1st January in the year of announcement,
NUM_i measures the number of disclosures made by the firm over the sample period,
VOL_{PR+A_i} measures stock return volatility over the prior and announcement period, where (t=-20,...,0)
Figures in parentheses are White's standard errors,
*,**,*** statistically significant at the 10%, 5% and 1% critical level, respectively,
n represents the number of observations,
R^2 is adjusted for degrees of freedom,
F-stat is a joint test of statistical significance,
BP(4) is the Breusch-Pagan Chi-squared test for heteroscedasticity, with 4 degrees of freedom.

6.6.3 *Unclear Event Windows*

Good News

Table 6.10 reports the regression results of the value of the information impounded over the announcement period, relative to the prior period, for good news events. The use of unclear windows results in a significant increase in the explanatory power of firm size (LN_MV_i). The tables report firm size as an important factor in the anticipation of favourable annual and interim earnings news, welcomed board changes and a the purchase of a large stockholding. This increase more than likely reflects the small firm bias of examining isolated events. The volatility of prior stock returns ($VOLPR_i$) persists as an important factor in the explanation of the response to good news events. In comparison to Table 6.6, $VOLPR_i$ is significant in the explanation of annual earnings and a change in shareholding, and extends to board changes for unclear windows. Furthermore, the use of unclear windows significantly increases the explanatory power of the number of disclosures made by a firm (NUM_i), for board changes. The positive sign of NUM_i, implies increasing disclosure reduces the demand investors for information by investors from alternative sources. The constant term persists as highly significant and negative, across all event types.

Table 6.11 reports the regression results of the value of the information impounded over the post-announcement period, relative to the prior and announcement periods, for good news events. Prior volatility ($VOLPR{+}A_i$) persists as the main driving force behind post-announcement drift, for all information types. In all cases, $VOLPR{+}A_i$ is high significantly with one minor exception. Other than this, AGE_i is above 5 per cent significance in the explanation of the average board change.

We hypothesised the variation in coefficient size between information types, proxies for the information characteristics of expected probability and expected precision (McNichols & Trueman 1994, and Demski & Feltham 1994). The high significance of $VOLPR{+}A_i$ across all five information types, allows us to reliably compare the relative coefficient sizes. A high coefficient implies a given level of volatility gives

Table 6.12a

OLS Regression Results, of the Value of Information (LN_ANN_i) Estimated Using Market Model Adjusted Returns (MM), Against The Explanatory Variables

Bad News - Unclear Event Window (t=-20,...,0)

$$LN\_ANN_i = a_0 + a_1 LN\_MV_i + a_2 AGE_i + a_3 NUM_i + a_4 VOLPR_i + u_i$$

	a_0	a_1	a_2	a_3	a_4
Annual Earnings					
	-1.4694***	0.0167	0.0028	0.0201***	-12.3960***
	(0.2259)	(0.0415)	(0.0020)	(0.0082)	(4.7010)
n = 718, R^2 = 0.0201, F[4,713] = 4.6833, BP(4) = 24.7138					
Interim Earnings					
	-1.0414***	-0.0215	0.0010	0.0016	-9.3952*
	(0.2276)	(0.0467)	(0.0021)	(0.0083)	(5.2170)
n = 644, R^2 = 0.0080, F[4,639] = 2.2933, BP(4) = 28.6439					
AGMs					
	-2.5425***	0.1326*	0.0029	0.0111	0.5210
	(0.4249)	(0.0726)	(0.0028)	(0.0117)	(10.7700)
n = 217, R^2 = 0.0228, F[4,212] = 2.2585, BP(4) = 6.6046					
Board Changes					
	-2.3143***	-0.0076	0.0024	0.0247***	-11.3370***
	(0.1972)	(0.0336)	(0.0019)	(0.0055)	(2.9640)
n = 812, R^2 = 0.0324, F[4,807] = 7.7925, BP(4) = 11.7931					
Changes in Shareholdings					
	-2.6315***	0.0985***	-0.0003	0.0055	-8.9422***
	(0.1419)	(0.0264)	(0.0013)	(0.0041)	(1.9550)
n = 1863, R^2 = 0.0262, F[4,1858] = 13.5140, BP(4) = 6.5055					

Notes:
LN_MV_i is the natural log of market capitalisation measuring firm size (£M), as at 1st January in the year of announcement,
AGE_i measures the number of years the firm has been in operation as at 1st January in the year of announcement,
NUM_i measures the number of disclosures made by the firm over the sample period,
$VOLPR_i$ measures stock return volatility over the prior and announcement period, where (t=-20,...,0)
Figures in parentheses are White's standard errors,
*,**,*** statistically significant at the 10%, 5% and 1% critical level, respectively,
n represents the number of observations,
R^2 is adjusted for degrees of freedom,
F-stat is a joint test of statistical significance,
BP(4) is the Breusch-Pagan Chi-squared test for heteroscedasticity, with 4 degrees of freedom.

Table 6.12b

OLS Regression Results, of the Value of Information (LN_ANN_i) Estimated Using Market Adjusted Returns (MKT), Against The Explanatory Variables

Bad News - Unclear Event Window (t=-20,...,0)

$$LN\_ANN_i = a_0 + a_1 LN\_MV_i + a_2 AGE_i + a_3 NUM_i + a_4 VOLPR_i + u_i$$

	a_0	a_1	a_2	a_3	a_4
Annual Earnings					
	-1.3774***	0.0879***	0.0011	0.0106*	-12.0410***
	(0.1576)	(0.0327)	(0.0016)	(0.0061)	(4.4520)
n = 849, R^2 = 0.0289, F[4,844] = 7.3184, BP(4) = 20.0628					
Interim Earnings					
	-1.3541***	0.0465	0.0033*	0.0097	-8.2163*
	(0.1817)	(0.0323)	(0.0019)	(0.0062)	(4.4980)
n = 786, R^2 = 0.0188, F[4,781] = 4.7647, BP(4) = 10.0090					
AGMs					
	-2.3003***	0.0965	0.0049	0.0129	-10.9300
	(0.3500)	(0.0649)	(0.0031)	(0.0106)	(9.5150)
n = 251, R^2 = 0.0276, F[4,246] = 2.7718, BP(4) = 3.4078					
Board Changes					
	-2.0857***	0.0426	-0.0000	0.0162***	-13.6840***
	(0.1555)	(0.0283)	(0.0017)	(0.0053)	(2.7780)
n = 980, R^2 = 0.0409, F[4,975] = 11.4376, BP(4) = 11.8674					
Changes in Shareholdings					
	-2.6315***	0.0985***	-0.0003	0.0055	-8.9422***
	(0.1419)	(0.0264)	(0.0013)	(0.0041)	(1.9550)
n = 462, R^2 = 0.0623, F[4,457] = 8.6619, BP(4) = 15.3028					

Notes:
LN_MV_i is the natural log of market capitalisation measuring firm size (£M), as at 1st January in the year of announcement,
AGE_i measures the number of years the firm has been in operation as at 1st January in the year of announcement,
NUM_i measures the number of disclosures made by the firm over the sample period,
$VOLPR_i$ measures stock return volatility over the prior and announcement period, where (t=-20,...,0)
Figures in parentheses are White's standard errors,
*,**,*** statistically significant at the 10%, 5% and 1% critical level, respectively,
n represents the number of observations,
R^2 is adjusted for degrees of freedom,
F-stat is a joint test of statistical significance,
BP(4) is the Breusch-Pagan Chi-squared test for heteroscedasticity, with 4 degrees of freedom.

Table 6.12c

OLS Regression Results, of the Value of Information (LN_ANN_i) Estimated Using Mean Adjusted Returns (MN), Against The Explanatory Variables

Bad News - Unclear Event Window (t=-20,....,0)

$$LN\_ANN_i = a_0 + a_1 LN\_MV_i + a_2 AGE_i + a_3 NUM_i + a_4 VOLPR_i + u_i$$

	a_0	a_1	a_2	a_3	a_4
Annual Earnings					
	-1.7317***	0.0239	0.0024	0.0284***	-13.4500***
	(0.2392)	(0.0463)	(0.0024)	(0.0086)	(5.4500)
n = 667, R^2 = 0.0264, F[4,662] = 5.5111, BP(4) = 13.6055					
Interim Earnings					
	-1.3510***	-0.0233	0.0026	0.0221***	-8.5263***
	(0.7516)	(0.1552)	(0.0084)	(0.0383)	(2.5790)
n = 607, R^2 = 0.0109, F[4,602] = 2.6638, BP(4) = 25.6563					
AGMs					
	-2.7668***	0.1495	0.0004	0.0149	3.5527
	(0.5017)	(0.0937)	(0.0052)	(0.0142)	(12.9400)
n = 190, R^2 = 0.0074, F[4,185] = 1.3518, BP(4) = 8.3526					
Board Changes					
	-2.9517***	0.0641*	0.0021	0.0029***	-8.1494***
	(0.2057)	(0.0368)	(0.0020)	(0.0061)	(3.0570)
n = 748, R^2 = 0.0488, F[4,743] = 10.5755, BP(4) = 8.0637					
Changes in Shareholdings					
	-2.3998***	0.1162***	0.0001	0.0007	-12.3010***
	(0.1217)	(0.0234)	(0.0011)	(0.0039)	(2.4080)
n = 2189, R^2 = 0.0428, F[4,2189] = 25.4732, BP(4) = 48.7792					

Notes:
LN_MV_i is the natural log of market capitalisation measuring firm size (£M), as at 1st January in the year of announcement,
AGE_i measures the number of years the firm has been in operation as at 1st January in the year of announcement,
NUM_i measures the number of disclosures made by the firm over the sample period,
$VOLPR_i$ measures stock return volatility over the prior and announcement period, where (t=-20,...,0)
Figures in parentheses are White's standard errors,
*,**,*** statistically significant at the 10%, 5% and 1% critical level, respectively,
n represents the number of observations,
R^2 is adjusted for degrees of freedom,
F-stat is a joint test of statistical significance,
BP(4) is the Breusch-Pagan Chi-squared test for heteroscedasticity, with 4 degrees of freedom.

Table 6.13a

OLS Regression Results, of the Value of Information (LN_POST_i) Estimated Using Market Model Adjusted Returns (MM), Against The Explanatory Variables

Bad News - Unclear Event Window (t=-20,...,+20)

$$LN\_POST_i = a_0 + a_1 LN\_MV_i + a_2 AGE_i + a_3 NUM_i + a_4 VOLPR{+}A_i + u_i$$

	a_0	a_1	a_2	a_3	a_4
Annual Earnings					
	0.6084***	-0.0450	-0.0006	0.0039	-20.1160***
	(0.1675)	(0.0319)	(0.0015)	(0.0059)	(3.7100)
n = 738, R^2 = 0.0632, F[4,733] = 13.4251, BP(4) = 7.4439					
Interim Earnings					
	0.6699***	-0.0505	-0.0026	-0.0042	-10.7680***
	(0.1748)	(0.0323)	(0.0016)	(0.0062)	(3.9280)
n = 643, R^2 = 0.0284, F[4,638] = 5.6956, BP(4) = 5.4200					
AGMs					
	0.7222***	-0.1153**	-0.0020**	0.0118	-22.4530***
	(0.2904)	(0.0551)	(0.0028)	(0.0086)	(9.5060)
n = 226, R^2 = 2.5878, F[4,221] = 2.4943, BP(4) = 11.6162					
Board Changes					
	0.2916*	-0.0097	-0.0009	0.0018	-13.2610***
	(0.1747)	(0.0287)	(0.0016)	(0.0052)	(2.7390)
n = 823, R^2 = 0.0373, F[4,818] = 8.9691, BP(4) = 7.6901					
Changes in Shareholdings					
	0.0025	0.0144	0.0011	0.0025	-12.2450***
	(0.1320)	(0.0245)	(0.0010)	(0.0039)	(2.2200)
n = 1824, R^2 = 0.0354, F[4,1819] = 17.7466, BP(4) = 17.3002					

Notes:
LN_MV_i is the natural log of market capitalisation measuring firm size (£M), as at 1st January in the year of announcement,
AGE_i measures the number of years the firm has been in operation as at 1st January in the year of announcement,
NUM_i measures the number of disclosures made by the firm over the sample period,
$VOLPR{+}A_i$ measures stock return volatility over the prior and announcement period, where (t=-20,...,0)
Figures in parentheses are White's standard errors,
*,**,*** statistically significant at the 10%, 5% and 1% critical level, respectively,
n represents the number of observations,
R^2 is adjusted for degrees of freedom,
F-stat is a joint test of statistical significance,
BP(4) is the Breusch-Pagan Chi-squared test for heteroscedasticity, with 4 degrees of freedom.

Table 6.13b

OLS Regression Results, of the Value of Information (LN_POST_i) Estimated Using Market Adjusted Returns (MKT), Against The Explanatory Variables

Bad News - Unclear Event Window (t=-20,....,+20)

$$LN\_POST_i = a_0 + a_1 LN\_MV_i + a_2 AGE_i + a_3 NUM_i + a_4 VOL_{PR+A_i} + u_i$$

	a_0	a_1	a_2	a_3	a_4
Annual Earnings					
	0.0837	0.0237	-0.0017	0.0135^{***}	-18.1900^{***}
	(0.1738)	(0.0288)	(0.0015)	(0.0074)	(3.0750)
$n = 947$, $R^2 = 0.0502$, $F[4,942] = 13.5006$, $BP(4) = 10.0916$					
Interim Earnings					
	0.1595	-0.0125	-0.0004	-0.0006	-8.8374^{***}
	(0.1504)	(0.0312)	(0.0014)	(0.0066)	(3.3120)
$n = 788$, $R^2 = 0.0122$, $F[4,783] = 3.4351$, $BP(4) = 7.2813$					
AGMs					
	0.5170^{*}	-0.1134^{*}	-0.0024	0.0173^{*}	-20.9710^{***}
	(0.2876)	(0.0673)	(0.0032)	(0.0105)	(7.7970)
$n = 239$, $R^2 = 0.0197$, $F[4,234] = 2.1941$, $BP(4) = 14.5781$					
Board Changes					
	0.1582	-0.0060	-0.0009	0.0056	-13.1590^{***}
	(0.1481)	(0.0258)	(0.0015)	(0.0051)	(2.5890)
$n = 1018$, $R^2 = 0.0335$, $F[4,1013] = 9.8017$, $BP(4) = 3.7594$					
Changes in Shareholdings					
	-0.1478	0.0372^{*}	-0.0003	0.0037	-11.1090^{***}
	(0.1157)	(0.0220)	(0.0011)	(0.0037)	(2.0150)
$n = 2219$, $R^2 = 0.0283$, $F[4,2214] = 17.1412$, $BP(4) = 11.2503$					

Notes:
LN_MV_i is the natural log of market capitalisation measuring firm size (£M), as at 1st January in the year of announcement,
AGE_i measures the number of years the firm has been in operation as at 1st January in the year of announcement,
NUM_i measures the number of disclosures made by the firm over the sample period,
VOL_{PR+A_i} measures stock return volatility over the prior and announcement period, where (t=-20,...,0)
Figures in parentheses are White's standard errors,
*, **, *** statistically significant at the 10%, 5% and 1% critical level, respectively,
n represents the number of observations,
R^2 is adjusted for degrees of freedom,
F-stat is a joint test of statistical significance,
BP(4) is the Breusch-Pagan Chi-squared test for heteroscedasticity, with 4 degrees of freedom.

Table 6.13c

OLS Regression Results, of the Value of Information (LN_POST_i) Estimated Using Mean Adjusted Returns (MN), Against The Explanatory Variables

Bad News - Unclear Event Window (t=-20,...,+20)

$$LN\_POST_i = a_0 + a_1 LN\_MV_i + a_2 AGE_i + a_3 NUM_i + a_4 VOL_{PR+A_i} + u_i$$

	a_0	a_1	a_2	a_3	a_4
Annual Earnings					
	0.4363***	0.0195	-0.0005	0.0024	-19.1390***
	(0.1875)	(0.0336)	(0.0017)	(0.0072)	(3.5880)
n = 636, R^2 = 0.0592, F[4,631] = 10.9924, BP(4) = 3.8254					
Interim Earnings					
	0.4257***	0.0075	-0.0019	-0.0071	-9.9397***
	(0.1758)	(0.0365)	(0.0017)	(0.0067)	(3.9210)
n = 591, R^2 = 0.0241, F[4,586] = 4.6439, BP(4) = 11.7463					
AGMs					
	0.5135	-0.0320	0.0001	0.0072	-20.3210**
	(0.3384)	(0.0634)	(0.0333)	(0.0954)	(8.9020)
n = 196, R^2 = -0.0023, F[4,191] = 0.8903, BP(4) = 2.2564					
Board Changes					
	0.1666	0.0255	-0.0012	0.0066	-14.6690***
	(0.1713)	(0.0273)	(0.0016)	(0.0051)	(2.9540)
n = 769, R^2 = 0.0611, F[4,764] = 13.4874, BP(4) = 6.3228					
Changes in Shareholdings					
	-0.1056	0.0345	0.0015	0.0066*	-12.8610***
	(0.1298)	(0.0227)	(0.0010)	(0.0036)	(2.2470)
n = 1668, R^2 = 0.0501, F[4,1663] = 22.9858, BP(4) = 16.3720					

Notes:
LN_MV_i is the natural log of market capitalisation measuring firm size (£M), as at 1st January in the year of announcement,
AGE_i measures the number of years the firm has been in operation as at 1st January in the year of announcement,
NUM_i measures the number of disclosures made by the firm over the sample period,
VOL_{PR+A_i} measures stock return volatility over the prior and announcement period, where (t=-20,...,0)
Figures in parentheses are White's standard errors,
*,**,*** statistically significant at the 10%, 5% and 1% critical level, respectively,
n represents the number of observations,
R^2 is adjusted for degrees of freedom,
F-stat is a joint test of statistical significance,
BP(4) is the Breusch-Pagan Chi-squared test for heteroscedasticity, with 4 degrees of freedom.

rise to a smaller amount of post-announcement drift relative to other information types. For example, the coefficient sizes reported in Table 6.11b, are decreasing in the order of AGMs (a_4=-42.6320), a change in shareholding (a_4=-28.0650), board changes (a_4=-22.8880), annual earnings (a_4=-21.4130), and finally interim earnings (a_4=-19.3830).

The expected probability of an AGM and earnings announcements, are all equal to one. The difference in coefficient sizes therefore implies the average AGM is of greater precision relative to earnings announcements. However it also appears non-earnings information is of greater precision than earnings information, with respect to good news events. Though consistent with previous evidence, is the average annual report is of greater precision than the average interim report (Hussey & Wolfe 1994).

Bad News

Table 6.12 reports the regression results of the value of the information impounded over the announcement period, relative to the prior period, for bad news events. As for good news events, the volatility of prior stock returns (VOL_{PR+A_i}) is highly significant in the explanation of the response on day 0, to the announcement of unfavourable annual earnings news, disappointing board changes, and a reduction in shareholding. Unlike good news, firm size is only important in the explanation of selling large stockholdings. Age remains highly significant in the anticipation of disappointing board changes.

Table 6.13 reports the regression results of the value of the information impounded over the post-announcement period, relative to the prior and announcement period, for bad news events. The volatility of prior stock returns (VOL_{PR+A_i}) is the main driving force behind post-announcement drift. VOL_{PR+A_i} explains partially the post-announcement drift following the announcement of all the information types. Other than this, the other variables have no incremental power in the explanation of drift.

6.7 CONCLUSIONS

The Pattern of Stock Returns for Good and Bad News

The preliminary analysis of section 6.5, identified the impounding behaviour of security returns for the average event, for each class of information, distinguishing between the reaction to good and bad news. The pattern of security returns highlighted several differences in investor behaviour, in the anticipation and interpretation of good and bad news. The findings emphasise the need to partition events according to their sign, to more fully appreciate the process of impounding information by investors. The analysis demonstrates the ability of investors to anticipate the sign of the news by up to twenty trading days in advance of its release.

The general pattern of security returns, is upward for good news and downward for bad, a pattern suggestive of underreaction. For each class of information, the overall level and significance of the daily abnormal returns for good news exceeds those of bad news. Without controlling for the size of the news, it is not possible to say whether the average bad news event is less informative than good news, or that bad news is generally more difficult to anticipate and interpret. An alternative explanation maybe that bad news is ignored by investors (Sharkarway & Garrod 1995). Or maybe what we have captured is not investors selling due to information, but instead the liquidity trades of investors, and ~~and~~ thereby giving the appearance of bad news being ignored. Of course, it may also indicate bad news is anticipated well in advance of good news, from the actions of managers warning investors ahead of the bad news (Skinner 1994).

On the other hand, the initial market reaction on the announcement day to unfavourable earnings news exceeds the response to favourable earnings news, suggestive of possible under or overreaction. The finding of greater anticipation for earnings information relative to AGMs, board changes and a change in shareholding, is consistent with previous evidence (Strong & Walker 1992, Brookfield & Morris 1994). This may indicative of the greater relevance and precision of earnings information relative to other information types, for security valuation.

Explaining the Pattern of Stock Returns

In section 6.7, we re-employed the model previously used in chapter 5. Though this time, we examine whether the incentives to become informed vary according to the sign of the news. Collectively, the results reported in Tables 6.6 to 6.13 are very similar to those reported in chapter 5 (see Tables 5.3 to 5.6). The results are highly sensitive to the information type, the event window under examination, whether there is more than one disclosure in the event window, and the model of expected returns employed.

As in chapter 5, the model explains post-announcement drift better than announcement returns. This further suggests investors' initial reactions are neither informed for good or bad news events. Our model also explains the behaviour of stock returns surrounding good news events better than for bad news events. A possible explanation may be that investors reactions to bad news are less informed in general, and supports our earlier notion that bad news is more difficult to interpret.

Allowing other disclosures within the event period, increases the overall power of the model in the explanation of the behaviour of stock returns. Firm size explains announcement returns (ANN_i) for good news, but less so for bad news. A potential explanation for this is that bad news is difficult to anticipate and to interpret for all classes of information, regardless the sign of the news. In particular, firm size is significant in the explanation of price movement on the release of annual and interim earnings, board changes and a change in shareholding. However firm size does not explain post-announcement drift. The volatility of prior stock returns persists as the most prominent explanation of post-announcement drift.

The number of disclosures reduces the ability to interpret information regarding both welcome and unwelcome board changes, and similarly for disappointing earnings news. Beyond this, only age has any incremental explanation for drift after the announcement of favourable board changes, and the buying of a large stockholding. The number of years a firm has been trading (AGE) is significant in the anticipation of welcome board changes and disappointing AGMs. Firm size only has partial explanation for the drift following favourable AGMs.

Finally, the joint explanatory power of the variables for market anticipation, is very low. Generally, the R^2 values do not exceed 9 per cent, with exception for AGMs. This may be indicative of a relatively efficient market, in which one cannot explain a large proportion of future movements in price with historic information. Or alternatively, it may reflect the use of inappropriate proxies for the information environment.

7. IS PRICE MOVEMENT A RESPONSE TO INFORMATION ?

7.1 THE OBJECTIVE AND MAIN FINDING

In chapter 6, we made a number of inferences regarding investor behaviour, in regard to the possible differential anticipation of, and differential response to, the announcement of good and bad news. It has thus far been assumed the market response is equivalent towards good and bad news, ceteris paribus. It has similarly been assumed, that all price movement is in response to information; whether this be in response to investors' own information, or information inferred from the actions of others. The objective of this chapter is to determine the validity of these observations and underlying assumptions. Although the results are unable to statistically support a differential price response towards good and bad news, post-event volatility of stock returns is found to be more pronounced for bad news. We infer from the trade-off between prior and post-event volatility of stock returns, that market anticipation is largely based on information as opposed to uninformed trading.

7.2 INTRODUCTION

Chapter 6 examined the issue of good and bad news, and made a number of tentative observations as to the differential price behaviour surrounding the release of both good and bad news events. Figures 6.1 to 6.5 show the market appears to anticipate part of the information content of the average corporate disclosure, but continues to adjust after the report date. This suggests that the market is unable to fully anticipate the information content of both earnings and non-earnings news, from more timely information sources. More important is the observation that investors are able to determine the sign of the news by at least twenty days in advance of its release. However, the market continues to adjust to the news over the post-event period, indicating possible market underreaction to public information.

Both the level of anticipation and the level of drift is higher for good news events than bad. Without controlling for the size of the news, it is not possible to say whether the good news is more informative than the bad news. Or alternatively, whether the implications of bad news are more difficult to determine. Sharkarway & Garrod (1995) suggest that bad news is ignored by investors. Of course, it may also indicate that bad news is anticipated well in advance of good news, from the actions of managers warning investors in advance (Skinner 1994).

For both annual and interim earnings reports, the absolute size of the price adjustment on the announcement day, is greater for unfavourable earnings news than for favourable news. For example, using market model adjusted returns, on the release of disappointing annual results we observe a negative return of 2.05 per cent. This compares to a positive return of 1.95 per cent on the release of favourable annual results. The divergence in the price response to good and bad news is even greater for interim results. The release of unfavourable interim results is associated with a negative return of 3.72 per cent compared to 0.05 per cent for favourable news. This suggests that bad news is not as readily anticipated as good news, and consequently the market is surprised by the content of bad news events.

Tables 6.1 to 6.5 show greater daily sign reversal in the abnormal returns over the event period, for bad news. A possible explanation maybe that bad news is associated with greater uncertainty than good news (Engle & Ng 1993). However it also suggests, that on a daily basis there is overreaction to both earnings and non-earnings news; in particular for bad news. If this is the case, it would also explain why a lower level of anticipation and drift is associated with bad news.

Throughout this thesis, all price movement is presumed to be in response to information, whether this be the investors' own information, or information inferred from the actions of others. However in chapters 5 and 6, the model explains post-announcement drift far better than price movement on the announcement day. This may indicate that investors' initial reactions to all classes of information, are not based on informed judgements. The financial markets literature certainly implies stock return volatility captures more than information (Roll 1988, Cutler, Poterba & Summers 1989). The actions of liquidity traders is one example. For instance, the average returns behaviour surrounding a change in shareholding, reported in Table 6.5, is suggestive of possible herding by investors (Bikhchandani, Hirshleifer & Welch 1992). This implies a shareholding change is more likely to occur after a period of pronounced trading activity. For example, the likelihood of an investor buying (selling) a large stockholding, increases after a period of positive (negative) returns. The significant positive returns continue after the announcement, suggesting that a larger shareholding change acts as an important signal to other, and perhaps less informed investors.

If investors are informed traders, for expected events, we expect to see a trade-off between prior and post-event uncertainty; as measured by the volatility of stock returns. An increase in post-event uncertainty would suggest prior anticipation was uninformed. However, the extent of the trade-off between prior and post-event volatility is also dependent on the actual precision of the announcement (Kim & Verrecchia 1991a and 1991b, Demski & Feltham 1994, and McNichols & Trueman 1994).

These observations provide the basis for further investigation into the differential market reaction between good and bad news. The analysis begins with a brief discussion of the literature in section 7.3, which documents conflicting evidence of both under and overreaction to information. Section 7.4 evaluates the price response to the announcement of both good and bad news. The average pattern appears to be one of underreaction to both good and bad news. However, on a daily basis we also question the possibility of overreaction to information. Section 7.5 investigates the ideas of previous studies, that unfavourable news increases post-event volatility of stock returns to a greater extent than favourable news (see French, Schwert & Stambaugh 1987, Engle & Ng 1993). Section 7.6 examines the extent to which uncertainty is resolved by the disclosure. This will in part depend on the precision of the information released. Section 7.7 concludes the chapter.

7.3 EVIDENCE OF UNDER AND OVERREACTION TO INFORMATION

Brown, Harlow & Tinic (1988) (hereafter BHT) develop and test the uncertain information hypothesis (UIH), in a bid to explain the response of investors to unanticipated information. BHT argue, that with incomplete information the market reaction to new information is unlikely to be instantaneous. UIH assumes rational investors will initially set stock prices below their expected values, before the full implications of the event are known. Security prices will gradually adjust as the full effects of the event are resolved with time. In the aftermath of the event, while uncertainty remains, the UIH predicts both the expected return and risk of the security will systematically increase.[1]

More specifically, they examine the price reaction to 'major' surprises. To qualify as a major surprise, the residual return for any given day, must be at least 2.5 per cent; i.e. events dates are defined numerically by the size of the residual return rather than using specific event days. Market model parameters are used to calculate the day 0 residual return, which are estimated using the 200 day period directly preceding this arbitrary date. This procedure is repeated for each day, for the 200 largest firms in the S&P 500 index, and produces more than 9100 'events' over the period July 1962 to December 1985. BHT argue the advantage of defining an event in this manner, numerically rather than using specific event dates, allows the UIH to be tested without the introduction of bias as to what type of information should cause investors to respond. The events are further divided into good and bad news depending on the sign of the residual on the event day, producing 4788 positive events and 4319 negative events.

The test of UIH relies on a number of assumptions. However the hypothesis remains that a market comprised of risk averse investors will lead to prices being set below

[1] The UIH is in similar vein to the uncertainty resolution hypothesis of Ball & Kothari (1991). Routine announcements are assumed to resolve uncertainty about a security's future cash flows. Though the increased flow of information will initially increase the variability of returns, risk and therefore expected return, during the announcement period.

their expected values in anticipation of the event.[2] As the uncertainty is resolved, price changes will tend to be positive, on average, regardless the sign of the news. The theory works on the premise that price will continue to adjust after the event, only if the news affects the security's unsystematic risk. For example, on the arrival of bad news when the full extent of the news is certain (i.e. systematic risk remains unchanged), price will immediately adjust downwards to its pre-event expected rate of return, reflecting the definite known decrease in the stock's expected future cash-flows. The adjustment is completed on the event day and with no abnormal price response after day 0. Alternatively, if the news effects the security's systematic risk as well as its expected future cash flows, the additional uncertainty will cause price to adjust accordingly to compensate for the increased risk. The price will adjust back to its pre-event expected rate of return on k days after the event, as and when the uncertainty is resolved.

In short, in response to an unfavourable surprise the initial price change will therefore resemble an overreaction; i.e. the initial price decrease is reversed. To a favourable surprise, the price pattern would give the appearance of an underreaction; i.e. the initial price increase is followed by a further increase. Thus, the UIH predicts the price response following an event will on average always be positive, regardless of whether the news is favourable or not.

The described price behaviour is contrary to that implied by alternative evidence. DeBondt & Thaler (1985) found extreme price movement in one direction is followed by extreme price movement in the opposite direction; i.e. investor overreaction. So in the event of extreme good news, the overreaction theory of DeBondt and Thaler predicts a price response in the opposite direction to that predicted by the UIH. For extreme bad news, both theories predict a price response in the same direction; i.e. upwards. However, the work of BHT and DeBondt and Thaler, both fail to differentiate between the type of information the market either under or overreacts to.

[2] The assumptions being: (i) investors are utility maximisers and form rational expectations; (ii) they are risk-averse; (iii) all available information is impounded into stock prices quickly; and (iv) major surprises can be distinguished as good or bad news, but the full extent of their impact is uncertain.

Many authors report findings of either under or overreaction to earnings information. Both Ou & Penman (1989a) and Bernard & Thomas (1989) find investors impound the full implications of financial statement information for future earnings only with a lag; i.e. investors underreact to financial statements. More recent work has studied the pattern of analyst forecast revisions to earnings news, and found conflicting results. DeBondt & Thaler (1990) noticed analysts were prone to overreaction, by being excessively optimistic in the face of price declines. Whereas, Butler & Lang (1990) found analysts were either persistently optimistic or persistently pessimistic. In contrast, the papers of Abarbanell (1991), Mendenhall (1991) and Abarbanell & Bernard (1992), all reported examples of analyst underreaction to earnings information, when revising their forecasts.[3] UK evidence is inconclusive, finding both overreaction (Lonie, Lonie & Powers 1989) and underreaction (O'Hanlon & Whiddett 1991) by analysts.

Other studies distinguish between the sign of the news, and point towards both a stronger price reaction to the release of bad news (Chambers & Penman 1984, Skinner 1994), and even possible overreaction (Kasznik & Lev 1995). In contrast, a recent UK study by Sharkarway & Garrod (1995) suggests that bad news is ignored, whilst good news results in an overreaction. Nevertheless, the finding of either investor overreaction or underreaction, has different implications for investor behaviour. Both patterns of behaviour show investors are unable to learn from past mistakes, and are therefore irrational in their evaluation of new information. But underreaction also implies investor behaviour is rational in the sense that, investors can correctly deduce the sign of the news, with the price adjustment being a gradual process rather than an instantaneous reaction. Nevertheless, evidence of one does not negate the existence of the other. The two effects may reflect different reactions to different types of information.

[3] Stock prices appear to underreact to even a greater extent (Mendenhall 1991, Abarbanell & Bernard 1992).

7.4 EVALUATION OF THE POST-EVENT PRICE RESPONSE

In chapter 6, the pattern of security return behaviour displayed in Figures 6.1 to 6.5, seems to challenge the uncertainty information hypothesis (UIH), that prices are on average positive after an event, regardless the sign of the news. Over the duration of the event period, prices continue on an upward drift for good news, and downward for bad news. This implies although there is gradual anticipation of the event, the market continues to underreact to the information even after its release. The level of drift is greatest for earnings, a possible interpretation may be the market underreacts to earnings information to a greater extent than non-earnings information. Or perhaps, the market ignores non-earnings information (Brookfield & Morris 1992).

The conflicting results of Brown, Harlow & Tinic (1988) (BHT), may in part reflect the techniques they employed. Defining events numerically may have advantages, but could also introduce certain biases. Firstly, the price movement may capture increased volatility or excess returns unrelated to an event or piece of news, (see Roll 1988, Cutler, Poterba & Summers 1989). We can only allege investors over or underreact, if its in response to information. BHT try to control for this by only looking at major price movements. Secondly, by not distinguishing between expected from unexpected events, will increase the probability of a Type I error. Their findings may also be subject to sample bias, applicable only to major information surprises of relatively large companies. Furthermore, by grouping all events we learn little about how the market responds to differential information, and hence lose potential information. It tells us little, and policymakers alike, as to the type of information investors either over or underreact to.

To gain more of an understanding of how the release of new information alters investors' expectations, we firstly examine the changing returns profile over the event window, for each class of information. We then measure the degree of sign reversal in security returns, as an indicator of possible overreaction. Finally, we test the relationship between the pattern of post-event stock returns and the initial price response to the announcement.

Briefly, the results show that:

The prior period is associated with more positive returns than negative, possibly indicating the greater anticipation of good news than bad news by investors.
The announcement of interim and annual earnings information is associated with the release of more bad news than good news.
The sign of the post-event pattern of stock returns cannot be predicted by the sign of the initial price change on the announcement day.
We are unable to find supporting evidence of a differential price response over the post-event period, between good and bad news.

7.4.1 *The Descriptive Statistics of Security Returns*

Table 7.1 below, reports the descriptive statistics of the changing returns performance over the duration of the event period, for all announcing securities. Returns performance is measured as the net return earned from investing £1 over the relevant event window (i.e. $API_{i,window}$ -1). For example, ($API_{i,prior}$ -1) measures the returns performance of the ith security over the prior period; where the prior period covers the event days (t=-20,...,-1).

Table 7.1a

Descriptive Statistics of the Changing Returns Performance ($API_{i,window}$-1) of Announcing Securities, Estimated using Market Model Adjusted Returns (MM)

Clear Event Window

Event Window	Mean	Std.Dev	Skewness	Kurtosis	Minimum	Maximum
Annual Earnings (n=116)						
Prior	0.0495	0.1658	0.699	6.617	-0.5215	0.6876
Ann	-0.0117	0.0772	-2.030	18.246	-0.5158	0.2526
Prior+Ann	0.0375	0.1884	0.839	6.808	-0.5626	0.7531
Post	0.0501	0.2208	1.031	7.872	-0.6209	0.9525
Total	0.0942	0.3127	1.362	11.240	-0.7733	1.8950
Interim Earnings (n=152)						
Prior	0.0514	0.1742	0.884	6.442	-0.5215	0.6876
Ann	-0.0146	0.0843	-2.071	15.511	-0.5158	0.2526
Prior+Ann	0.0385	0.2054	0.764	6.768	-0.7030	0.7943
Post	0.0477	0.2036	1.108	8.486	-0.6209	0.9526
Total	0.0916	0.3156	1.446	10.165	-0.7733	1.8950
AGMs (n=106)						
Prior	0.0425	0.1078	1.360	6.778	-0.1604	0.5486
Ann	0.0047	0.0358	2.347	19.076	-0.1026	0.2308
Prior+Ann	0.0481	0.1226	1.504	6.973	-0.1613	0.5683
Post	0.0108	0.1053	-1.275	11.402	-0.5885	0.2826
Total	0.0636	0.1921	0.584	4.958	-0.6288	0.6774
Board Changes (n=387)						
Prior	0.0186	0.1140	2.573	27.894	-0.4172	1.1640
Ann	-0.0001	0.0159	-2.544	28.399	-0.1574	0.6939
Prior+Ann	0.0187	0.1180	2.934	34.317	-0.4337	1.2760
Post	0.0048	0.1190	-0.640	9.707	-0.7157	0.4938
Total	0.0253	0.1754	0.470	8.265	-0.7542	1.1100
Changes in Shareholdings (n=927)						
Prior	0.0227	0.1169	1.248	15.587	-0.6434	1.0730
Ann	0.0021	0.0226	5.187	77.985	-0.1377	0.3501
Prior+Ann	0.0249	0.1204	1.333	14.176	-0.5418	1.0820
Post	0.0200	0.1128	0.706	10.655	-0.7342	0.6247
Total	0.0460	0.1707	0.642	6.144	-0.7635	0.7983

Notes:

n represents the number of observations,

Prior window - the value of ($API_{i,prior}$-1), where (t=-20,....,-1),

Ann window - the value of ($API_{i,ann}$-1), where (t=0),

Prior+Ann window - the value of ($API_{i,pr+ann}$-1), where (t=-20,...,0),

Post window - the value of ($API_{i,post}$-1), where (t=+1,...,+20),

Total window - the value of ($API_{i,pr+ann+post}$-1), where (t=-20,...,+20),

Table 7.1b

Descriptive Statistics of the Changing Returns Performance ($API_{i,window}$-1) of Announcing Securities, Estimated using Market Adjusted Returns (MKT)

Clear Event Window

Event Window	Mean	Std.Dev	Skewness	Kurtosis	Minimum	Maximum
Annual Earnings (n=116)						
Prior	0.0100	0.1247	1.083	7.020	-0.2870	0.5721
Ann	0.0052	0.0799	-1.702	15.886	-0.5003	0.2417
Prior+Ann	0.0164	0.1558	0.558	6.949	-0.5464	0.7173
Post	0.0186	0.1661	2.142	10.028	-0.2804	0.8417
Total	0.0326	0.2164	1.245	7.655	-0.5738	1.0700
Interim Earnings (n=152)						
Prior	-0.0053	0.1498	0.010	7.502	-0.6474	0.5704
Ann	-0.0183	0.0846	-2.118	15.243	-0.5181	0.2353
Prior+Ann	-0.0213	0.1775	-0.059	6.939	-0.7453	0.5820
Post	-0.0104	0.1830	0.883	9.256	-0.6864	0.8109
Total	-0.0320	0.2275	-0.276	6.127	-0.8243	0.7364
AGMs (n=106)						
Prior	0.0102	0.0904	0.693	4.708	-0.2081	0.3386
Ann	0.0038	0.0358	2.285	18.826	-0.1083	0.2296
Prior+Ann	0.0145	0.1042	1.238	6.631	-0.2050	0.4929
Post	-0.0109	0.0993	-1.830	13.011	-0.5920	0.2532
Total	0.0058	0.1576	-0.090	5.436	-0.6241	0.5057
Board Changes (n=387)						
Prior	-0.0106	0.0993	1.358	18.327	-0.4263	0.8585
Ann	-0.0010	0.0159	-2.459	28.119	-0.1598	0.0697
Prior+Ann	-0.0115	0.1014	1.652	22.600	-0.4431	0.9425
Post	-0.0203	0.1114	-1.297	11.657	-0.7729	0.3916
Total	-0.0310	0.1432	-0.874	8.144	-0.7861	0.5869
Changes in Shareholding (n=927)						
Prior	-0.0017	0.1057	0.078	12.184	-0.7028	0.7687
Ann	0.0011	0.0222	4.792	74.812	-0.1478	0.3382
Prior+Ann	-0.0007	0.1084	0.237	11.090	-0.6023	0.7737
Post	-0.0014	0.1004	0.044	10.649	-0.7186	0.5521
Total	-0.0029	0.1366	-0.640	6.464	-0.7407	0.4728

Notes:
n represents the number of observations,
Prior window - the value of ($API_{i,prior}$-1), where (t=-20,...,-1),
Ann window - the value of ($API_{i,ann}$-1), where (t=0),
Prior+Ann window - the value of ($API_{i,pr+ann}$-1), where (t=-20,...,0),
Post window - the value of ($API_{i,post}$-1), where (t=+1,...,+20),
Total window - the value of ($API_{i,pr+ann+post}$-1), where (t=-20,...,+20).

Table 7.1c

Descriptive Statistics of the Changing Returns Performance ($API_{i,window}$-1) of Announcing Securities, Estimated using Mean Adjusted Returns (MN)

Clear Event Window

Event Window	Mean	Std.Dev	Skewness	Kurtosis	Minimum	Maximum
Annual Earnings (n=116)						
Prior	0.1137	0.1859	1.799	9.215	-0.2231	1.1000
Ann	0.0094	0.0800	-1.759	16.563	-0.5045	0.2596
Prior+Ann	0.1263	0.2203	1.393	8.972	-0.5323	1.2970
Post	0.1083	0.2338	2.692	11.529	-0.2071	1.2030
Total	0.2553	0.4066	2.337	10.554	-0.5126	2.3670
Interim Earnings (n=152)						
Prior	0.0644	0.1895	1.160	7.359	-0.5472	0.9622
Ann	-0.0142	0.0844	-2.029	14.951	-0.5039	0.2472
Prior+Ann	0.0517	0.2211	1.062	7.053	-0.6797	0.9726
Post	0.0652	0.2277	1.958	12.965	-0.6198	1.4470
Total	0.1201	0.3269	1.264	7.399	-0.7537	1.6350
AGMs (n=106)						
Prior	0.0566	0.1170	1.661	8.611	-0.1452	0.6635
Ann	0.0047	0.0360	2.254	18.201	-0.1015	0.2290
Prior+Ann	0.0624	0.1333	1.800	8.550	-0.1638	0.6778
Post	0.0075	0.1097	-0.959	9.047	-0.5725	0.2671
Total	0.0742	0.2037	0.923	5.427	-0.5747	0.8631
Board Changes (n=387)						
Prior	0.0239	0.1162	2.166	23.061	-0.4080	1.1240
Ann	0.0005	0.0162	-2.246	29.103	-0.1604	0.0700
Prior+Ann	0.0245	0.1192	2.557	28.591	-0.4241	1.2330
Post	0.0099	0.1258	-0.311	9.503	-0.7202	0.7120
Total	0.0360	0.1794	0.360	7.137	-0.7218	1.0460
Changes in Shareholding (n=927)						
Prior	0.0306	0.1244	1.322	14.286	-0.6234	1.1100
Ann	0.0019	0.0228	5.003	76.387	-0.1495	0.3468
Prior+Ann	0.0326	0.1285	1.392	13.196	-0.5336	1.1180
Post	0.0230	0.1204	0.712	10.762	-0.7406	0.7907
Total	0.0576	0.1845	0.616	6.342	-0.7719	0.9381

Notes:
n represents the number of observations,
Prior window - the value of ($API_{i,prior}$-1), where (t=-20,...,-1),
Ann window - the value of ($API_{i,ann}$-1), where (t=0),
Prior+Ann window - the value of ($API_{i,pr+ann}$-1), where (t=-20,...,0),
Post window - the value of ($API_{i,post}$-1), where (t=+1,...,+20),
Total window - the value of ($API_{i,pr+ann+post}$-1), where (t=-20,...,+20),

The table highlights the sensitivity of the API metric to the model of expected returns applied, nevertheless a pattern emerges. The expected return models are inconsistent regarding the sign of the mean return for the separate event windows. Though the findings are consistent with the API patterns depicted in chapter 5 (see Figures 5.1 to 5.5). For mean adjusted returns (MN), the average return is always positive regardless of the event window or the information type examined; apart from one exception. The announcement of interim earnings, on average bears bad news (a negative return -0.0142), however this initial reaction is offset by mean return of 0.0652 earned over the post-announcement period. Similarly, for market model adjusted returns (MM), the initial response to the announcement of annual earnings, interim earnings and a board change is on average negative, which then reverses over the post-event period. Otherwise, returns performance is always positive. In contrast, for market adjusted returns (MKT), returns performance is on average negative, with the exception of annual earnings and AGMs. Here the dissimilarity ends, though for reasons of clarity we will only discuss market model estimations (MM).

An important finding is that, all the return distributions are positively skewed in the prior period, indicating positive returns are more frequent than negative returns. This possibly indicates greater anticipation of good news than bad news by investors. However, the price adjustment on day 0 on the announcement of annual earnings, interim earnings and board changes, is generally negatively. This implies the announcement of earnings information or a change in board members, conveys more bad news than good news relative to prior expectations. A higher proportion of bad news released in earnings reports is consistent with McNichols (1988). After the event day, returns performance remains negatively skewed for board changes, but is positive for earnings. Sign reversal is also reported for AGMs. This hints at possible overreaction to earnings information, board changes and AGMs, while an underreaction to a change in shareholding.

The level of kurtosis indicates the number of extreme observations in the tails of the returns distribution. Therefore, the higher the level of kurtosis, the higher the proportion of extreme returns performance. One possible interpretation is, that the higher the return associated with a certain information type, the greater the uncertainty of its implications for security valuation, due to its relative imprecision. The highest level of kurtosis in the prior period is reported for board changes (27.894), followed by a change in shareholding (15.587), AGMs (6.778), annual earnings (6.617) and lastly interim earnings (6.442). The most extreme returns performance of the event period, is witnessed on the report day, regardless the type of information. This is consistent with the event releasing new information, previously unexpected. Suitably, the most extreme behaviour is associated with a change in shareholding, with a level of kurtosis of 77.985. This is followed by board changes, AGMs, annual earnings and lastly interim earnings. The level of uncertainty is resolved to pre-announcement levels for both board changes (9.707) and a change in shareholding (10.655). The greatest consensus of opinion, is associated with earnings news.

7.4.2 *The Pattern of Sign Reversal in Security Returns*

In chapter 6, Figures 6.1 to 6.5 illustrate that the market responds positively to good news, and negatively to bad news, over the duration of the event period, regardless the type of information. This implies, that on average investors underreact to information. Whereas sign reversal in security returns (e.g. a price decrease followed by a price increase), is an indication of possible investor overreaction. Tables 6.1 to 6.5, report daily sign reversal for both good and bad news events. The sign reversal is greater however for bad news. On a daily basis investors generally overreact to information, whereas over the duration of the event period, investors tend to underreact.

Table 7.2 below, documents the number of instances of under and overreaction, over the event period, for each class of information. Table 7.2 abbreviates for the sign of the return by: a positive sign (+) to depict good news, a negative sign (-) to depict bad news, and zero (0) to depict no news. In all, seven different scenarios were identified, which can be broadly categorised as an overreaction, underreaction or no reaction. An overreaction is identified as a change in the sign of the return between two event windows. For example, where a security earns positive return in the prior period, which is reversed on the report day to a negative return; i.e. (+ -). In addition, where a security earns a negative on the announcement day, which is reversed over the post-

Table 7.2

The Number of Under or Overreactions, Estimated using Market Model Adjusted (MM), Market Adjusted (MKT) and Mean Adjusted (MN) Expected Returns.

Clear Event Window (t=-20,...,+20)

Event Window			MM	MKT	MN	MM	MKT	MN
			Change from Prior to Ann			Change from Ann to Post		
Annual Earnings								
0	0	no reaction	7	0	8	4	0	5
0	-	over	0	0	0	1	0	1
0	+	under	0	0	0	0	0	0
-	-	under	19	25	12	17	29	11
+	+	under	46	39	63	53	33	65
-	+	over	25	29	16	23	26	21
+	-	over	28	32	26	27	37	22
Under/Over			1.23	1.05	1.79	1.37	0.98	1.73
Interim Earnings								
0	0	no reaction	8	0	9	2	0	3
0	-	over	1	0	1	1	0	1
0	+	under	1	0	0	1	0	2
-	-	under	30	57	25	33	52	29
+	+	under	53	37	64	64	26	67
-	+	over	26	29	30	30	47	37
+	-	over	48	44	38	36	42	28
Under/Over			1.12	1.29	1.29	1.46	0.88	1.46
AGMs								
0	0	no reaction	1	0	1	1	0	1
0	-	over	0	0	0	0	0	0
0	+	under	0	0	0	0	0	0
-	-	under	16	17	16	24	33	25
+	+	under	52	34	62	43	36	43
-	+	over	22	35	18	12	16	11
+	-	over	21	26	15	32	27	32
Under/Over			1.58	0.84	2.36	1.52	1.60	1.58
Board Changes								
0	0	no reaction	16	0	19	5	0	5
0	-	over	1	0	1	3	0	3
0	+	under	0	0	0	0	0	1
-	-	under	77	117	58	93	125	80
+	+	under	154	91	178	142	72	155
-	+	over	86	115	97	79	115	79
+	-	over	80	91	61	92	91	91
Under/Over			1.38	1.01	1.48	1.35	0.91	1.38

Notes: see over

Table 7.2 contd.

			MM	MKT	MN	MM	MKT	MN
			Change from Prior to Ann			Change from Ann to Post		
Changes in Shareholdings								
0	0	no reaction	25	0	26	7	0	7
0	-	over	0	0	0	1	0	1
0	+	under	0	0	0	1	0	1
-	-	under	168	221	152	205	259	185
+	+	under	379	259	441	353	249	375
-	+	over	228	272	217	190	228	192
+	-	over	178	226	142	221	242	217
Under/Over			1.35	0.96	1.65	1.36	1.08	1.37
Total Sample								
Under/Over			1.34	1.00	1.61	1.38	1.04	1.41

Notes:
0 represents no news, + represents good news, - represents bad news,
Under/Over represents the ratio of the total number of underreactions relative to the number of overreactions.

announcement period to earn a positive return; i.e. (- +). An underreaction is therefore identified as a continuation in the sign of return between two event windows; i.e. (- -) or (+ +). The sign of the return is determined by the sign of the net return earned from investing £1 over the relevant event window ($API_{i,window}$-1).

Due to the high level of inconsistency between the expected return models, only tentative observations can be made. Few events cause no change in investors' expectations, either in anticipation of, or after their release; i.e. (0 0). Rarer still are periods of activity, preceded by periods of no activity; i.e. (0 -) and (0 +). The number of instances of each scenario vary across each event window, indicating investors' initial response may occasionally be incorrect. The relative number of overreactions to underreactions varies noticeably between expected return models, where the market model (MM) and mean adjusted (MN) returns classifies the majority of responses as overreactions. However, for market adjusted returns (MKT), the number of over and underreactions are nearly equivalent.

7.4.3 *The Relation Between the Post-event Response and the Initial Price Change*

Irrespective of the sign of the news, the size of the response is generally assumed to be a linear function of the size of the news, if investors' preferences display constant absolute risk aversion. However, in chapter 6 we observed a stronger price response, on day 0, to unfavourable news. This instead implies, investors' preferences display decreasing absolute risk aversion, and therefore we predict the average price change to be larger following bad news than good news. To evaluate the pattern of post-event returns we employ a dummy variable regression,

$$(API_{i,post} - 1) = a_0 + a_1 (DG_i \, . \, AR_0) + a_2 (DB_i \, . \, AR_0) + u_i \qquad (7.1)$$

Where

$(API_{i,post} - 1)$ = the net return from investing £1 in the ith security over the post-event period (t=+1,...,+20),

AR_0 = the residual return on the event day, day 0,

DG_i = 1 for good news, if the residual return on the event day is positive, and zero otherwise,

DB_i = 1 for bad news, if the residual return on the event day is negative, and zero otherwise.

The dummy variables, DG and DB, separate the price responses to good news from bad news, respectively. In contrast to chapter 6, the sign of the news is instead determined by the sign of the event day residual; as opposed to the sign of $(API_{i,20}-1)$. To control for the size of the news, the dummy variables in effect adopt both the magnitude and sign of the residual return on the event day. Hence, the coefficient a_1 measures the impact on post-event returns of the release of good news, and similarly a_2 measures the impact of bad news. This regression is applied to each information type, whereby residual returns are estimated using the same three expected return models as previously defined.

In the absence of the release of new information (i.e. where $(API_{i,post} - 1)$ is equal to zero), investors' expectations should not change, and therefore nor should price. Thus, the intercept is hypothesised to be zero. In addition, the sign of the coefficients a_1 and a_2, will all depend on whether investors under or overreact to information. If investors underreact, and the same sign of return continues over the event window, we predict a positive coefficient for a_1. If however investors overreact, and there is sign reversal, we predict a negative coefficient for a_2. A Wald test is employed to test the null hypothesis, that for a given size of news, the price response is equivalent between good and bad news; i.e. that the coefficients are of equal size ($a_1=a_2$). The results are presented in Table 7.3 below. The analysis is then repeated for 'major' news events, where the dummy variables only take the value of one, when the event day residual if at least of the magnitude of 1 per cent. This is to control for potential misclassification of the sign of the news. It also allows us to infer whether the relationship between the size of the news and the price response, is non-linear. This may be implied if the size of the coefficient, a_1 or a_2, varies between regressions according to the size of the news. These results are presented in Table 7.4 below.

Table 7.3a

The Relation between Post-event Stock Returns and the Residual Return on the Event Day, Estimated Using Market Model Adjusted Returns (MM)

Clear Event Window

$$(API_{i,post} - 1) = a_0 + a_1 (DG_i \, . \, AR_0) + a_2 (DB_i \, . \, AR_0) + u_t$$

	a_0	a_1	a_2	Wald $X^2(1)$ $a_1=a_2$
Annual Earnings				
	0.0682***	-0.8524*	0.2865	0.8057
	(3.079)	(-1.722)	(0.593)	
n = 116, R^2 = 0.0089, F[2,113] = 1.5660, BP(2) = 4.6937				
Interim Earnings				
	0.0569***	-0.6951*	-0.0100	0.0018
	(3.060)	(-1.783)	(-0.025)	
n = 152, R^2 = 0.0061, F[2,149] = 1.5131, BP(2) = 10.5525				
AGMs				
	0.0065	0.4804*	0.1709	0.0931
	(0.556)	(1.780)	(0.245)	
n = 106, R^2 = 0.0008, F[2,103] = 1.0423, BP(2) = 0.3916				
Board Changes				
	0.0020	0.9356	0.2961	0.3507
	(0.300)	(1.404)	(0.525)	
n = 387, R^2 = 0.0011, F[2,384] = 1.2269, BP(2) = 5.0203				
Changes in Shareholdings				
	0.0193***	0.3656	0.3634	1.2339
	(4.813)	(1.560)	(0.756)	
n = 927, R^2 = 0.0033, F[2,924] = 2.6161, BP(2) = 20.2996				

Notes:
($API_{i,post}$-1) measures the net return of £1 invested in ith security, over the post period where (t=+1,...,+20),
DG_i equals the event day residual, if the residual is positive, and zero otherwise,
DB_i equals the event day residual, if the residual is negative, and zero otherwise,
Figures in parentheses are t statistics,
*,**,*** statistically significant at the 10%, 5% and 1% critical level, respectively,
Wald $X^2(1)$ tests the statistical equivalence of coefficients a_1 and a_2,
n represents the number of observations,
R^2 is adjusted for degrees of freedom,
F-stat is a joint test of statistical significance,
BP(2) is the Breusch-Pagan Chi-squared test for heteroscedasticity, with 2 degrees of freedom.

Table 7.3b

The Relation between Post-event Stock Returns and the Residual Return on the Event Day, Estimated Using Market Adjusted Returns (MKT)

Clear Event Window

$$(API_{i,post} - 1) = a_0 + a_1 (DG_i . AR_0) + a_2 (DB_i . AR_0) + u_i$$

	a_0	a_1	a_2	Wald $X^2(1)$ $a_1=a_2$
Annual Earnings				
	0.0047	0.3788	-0.2305	0.7388
	(0.273)	(0.796)	(-0.481)	
n = 116, R^2 = -0.0015, F[2,113] = 0.9070, BP(2) = 40.3159				
Interim Earnings				
	0.0071	-0.9619***	0.1668	0.6845
	(0.408)	(-2.817)	(0.495)	
n = 152, R^2 = 0.0276, F[2,149] = 3.3565, BP(2) = 8.9265				
AGMs				
	-0.0148	0.3861*	0.0388	0.0055
	(-1.283)	(1.663)	(0.081)	
n = 106, R^2 = -0.0061, F[2,103] = 0.6652, BP(2) = 2.9982				
Board Changes				
	-0.0194***	-0.0477	0.1213	0.0645
	(-2.756)	(-0.061)	(0.308)	
n = 387, R^2 = -0.0047, F[2,384] = 0.0323, BP(2) = 0.5049				
Changes in Shareholdings				
	0.0018	-0.2220	0.4332	2.3320
	(0.486)	(-1.473)	(1.294)	
n = 927, R^2 = 0.0014, F[2,924] = 1.6964, BP(2) = 2.5963				

Notes:
($API_{i,post}$-1) measures the net return of £1 invested in ith security, over the post period where (t=+1,...,+20),
DG_i equals the event day residual, if the residual is positive, and zero otherwise,
DB_i equals the event day residual, if the residual is negative, and zero otherwise,
Figures in parentheses are t statistics,
*,**,*** statistically significant at the 10%, 5% and 1% critical level, respectively,
Wald $X^2(1)$ tests the statistical equivalence of coefficients a_1 and a_2,
n represents the number of observations,
R^2 is adjusted for degrees of freedom,
F-stat is a joint test of statistical significance,
BP(2) is the Breusch-Pagan Chi-squared test for heteroscedasticity, with 2 degrees of freedom.

Table 7.3c

The Relation between Post-event Stock Returns and the Residual Return on the Event Day, Estimated Using Mean Adjusted Returns (MN)

Clear Event Window

$$(API_{i,post} - 1) = a_0 + a_1 (DG_i \,.\, AR_0) + a_2 (DB_i \,.\, AR_0) + u_i$$

	a_0	a_1	a_2	Wald $X^2(1)$ $a_1 = a_2$
Annual Earnings				
	0.0846***	0.5929	-0.4392	1.3408
	(3.427)	(0.934)	(-0.701)	
n = 116, R^2 = 0.0056, F[2,113] = 1.3514, BP(2) = 23.9411				
Interim Earnings				
	0.0738***	-0.8010**	-0.0892	0.1209
	(3.542)	(-2.201)	(-0.201)	
n = 152, R^2 = 0.0090, F[2,149] = 1.7536, BP(2) = 7.7321				
AGMs				
	0.0044	0.4074	0.2253	0.1529
	(0.358)	(1.281)	(0.318)	
n = 106, R^2 = -0.0043, F[2,103] = 0.7623, BP(2) = 0.1302				
Board Changes				
	0.0073	0.6862	0.0809	0.0234
	(0.991)	(0.769)	(0.165)	
n = 387, R^2 = -0.0021, F[2,384] = 0.5693, BP(2) = 6.7113				
Changes in Shareholdings				
	0.0023***	0.5017*	0.6530	3.8882**
	(5.473)	(1.894)	(1.241)	
n = 927, R^2 = 0.0088, F[2,924] = 5.3387, BP(2) = 30.2076				

Notes:
($API_{i,post}$-1) measures the net return of £1 invested in ith security, over the post period where (t=+1,...,+20),
DG_i equals the event day residual, if the residual is positive, and zero otherwise,
DB_i equals the event day residual, if the residual is negative, and zero otherwise,
Figures in parentheses are t statistics,
*,**,*** statistically significant at the 10%, 5% and 1% critical level, respectively,
Wald $X^2(1)$ tests the statistical equivalence of coefficients a_1 and a_2,
n represents the number of observations,
R^2 is adjusted for degrees of freedom,
F-stat is a joint test of statistical significance,
BP(2) is the Breusch-Pagan Chi-squared test for heteroscedasticity, with 2 degrees of freedom.

Table 7.4a

The Relation between Post-event Stock Returns and the Residual Return on the Event Day, for Major News Events, Estimated Using Market Model Adjusted Returns (MM)

Clear Event Window

$$(API_{i,post} - 1) = a_0 + a_1 (DG_i . AR_0) + a_2 (DB_i . AR_0) + u_i$$

	a_0	a_1	a_2	Wald $X^2(1)$ $a_1=a_2$
Annual Earnings				
	0.0665***	-0.8182*	0.2642	0.6911
	(3.037)	(-1.645)	(0.541)	
n = 116, R^2 = 0.0071, F[2,113] = 1.4449, BP(2) = 4.7643				
Interim Earnings				
	0.0559***	-0.6818*	-0.0225	0.0097
	(3.058)	(-1.760)	(-0.056)	
n = 152, R^2 = 0.0058, F[2,149] = 1.4849, BP(2) = 10.4323				
AGMs				
	0.0076	0.4574*	0.1980	0.1276
	(0.672)	(1.747)	(0.288)	
n = 106, R^2 = -0.0002, F[2,103] = 0.9892, BP(2) = 0.8559				
Board Changes				
	0.0038	0.8374	0.3977	0.6614
	(0.595)	(1.280)	(0.685)	
n = 387, R^2 = 0.0008, F[2,384] = 1.1174, BP(2) = 1.4550				
Changes in Shareholdings				
	0.0192***	0.3824	0.2619	0.6597
	(5.128)	(1.625)	(0.556)	
n = 927, R^2 = 0.0028, F[2,924] = 2.2928, BP(2) = 19.9859				

Notes:
($API_{i,post}$-1) measures the net return of £1 invested in ith security, over the post period where (t=+1,...,+20),
DG_i equals the event day residual, if the residual is positive and greater than 1%, and zero otherwise,
DB_i equals the event day residual, if the residual is negative and greater than 1%, and zero otherwise,
Figures in parentheses are t statistics,
*,**,*** statistically significant at the 10%, 5% and 1% critical level, respectively,
Wald $X^2(1)$ tests the statistical equivalence of coefficients a_1 and a_2,
n represents the number of observations,
R^2 is adjusted for degrees of freedom,
F-stat is a joint test of statistical significance,
BP(2) is the Breusch-Pagan Chi-squared test for heteroscedasticity, with 2 degrees of freedom.

Table 7.4b

The Relation between Post-event Stock Returns and the Residual Return on the Event Day, for Major News Events, Estimated Using Market Adjusted Returns (MKT)

Clear Event Window

$$(API_{i,post} - 1) = a_0 + a_1 (DG_i . AR_0) + a_2 (DB_i . AR_0) + u_i$$

	a_0	a_1	a_2	Wald $X^2(1)$ $a_1=a_2$
Annual Earnings				
	0.0054	0.3655	-0.2309	0.7501
	(0.324)	(0.777)	(-0.484)	
n = 116, R^2 = -0.0018, F[2,113] = 0.8878, BP(2) = 40.6924				
Interim Earnings				
	0.0054	-0.9324***	0.1642	0.6755
	(0.318)	(-2.783)	(0.491)	
n = 152, R^2 = 0.0263, F[2,149] = 3.2438, BP(2) = 7.0417				
AGMs				
	-0.0140	0.3586*	0.0359	0.0048
	(-1.269)	(1.650)	(0.077)	
n = 106, R^2 = -0.0073, F[2,103] = 0.5961, BP(2) = 3.0013				
Board Changes				
	-0.0198***	0.0210	0.1464	0.1015
	(-3.157)	(0.028)	(0.385)	
n = 387, R^2 = -0.0046, F[2,384] = 0.0531, BP(2) = 0.8292				
Changes in Shareholdings				
	0.0006	-0.1442	0.5189	3.4466*
	(0.188)	(-0.903)	(1.568)	
n = 927, R^2 = 0.0019, F[2,924] = 1.9688, BP(2) = 1.7325				

Notes:
$(API_{i,post}-1)$ measures the net return of £1 invested in ith security, over the post period where (t=+1,...,+20),
DG_i equals the event day residual, if the residual is positive and greater than 1%, and zero otherwise,
DB_i equals the event day residual, if the residual is negative and greater than 1%, and zero otherwise,
Figures in parentheses are t statistics,
*,**,*** statistically significant at the 10%, 5% and 1% critical level, respectively,
Wald $X^2(1)$ tests the statistical equivalence of coefficients a_1 and a_2,
n represents the number of observations,
R^2 is adjusted for degrees of freedom,
F-stat is a joint test of statistical significance,
BP(2) is the Breusch-Pagan Chi-squared test for heteroscedasticity, with 2 degrees of freedom.

Table 7.4c

The Relation between Post-event Stock Returns and the Residual Return on the Event Day, for Major News Events, Estimated Using Mean Adjusted Returns (MN)

Clear Event Window

$$(API_{i,post} - 1) = a_0 + a_1 (DG_i \, . \, AR_0) + a_2 (DB_i \, . \, AR_0) + u_i$$

	a_0	a_1	a_2	Wald $X^2(1)$ $a_1 = a_2$
Annual Earnings				
	0.0862***	0.5525	-0.4417	1.3657
	(3.524)	(0.873)	(-0.706)	
n = 116, R^2 = 0.0045, F[2,113] = 1.2797, BP(2) = 23.7183				
Interim Earnings				
	0.0728***	-0.8018**	-0.0957	0.1400
	(3.547)	(-2.235)	(-0.216)	
n = 152, R^2 = 0.0094, F[2,149] = 1.7906, BP(2) = 7.8685				
AGMs				
	0.0051	0.3824	0.2252	0.1550
	(0.426)	(1.228)	(0.321)	
n = 106, R^2 = -0.0056, F[2,103] = 0.6883, BP(2) = 0.8062				
Board Changes				
	0.0093	0.3258	0.0955	0.0332
	(1.336)	(0.385)	(0.187)	
n = 387, R^2 = -0.0041, F[2,384] = 0.1507, BP(2) = 0.3962				
Changes in Shareholdings				
	0.0229***	0.4299*	0.5132*	2.4090
	(5.784)	(1.727)	(1.998)	
n = 927, R^2 = 0.0053, F[2,924] = 3.5985, BP(2) = 26.1652				

Notes:
($API_{i,post}$-1) measures the net return of £1 invested in ith security, over the post period where (t=+1,...,+20),
DG_i equals the event day residual, if the residual is positive and greater than 1%, and zero otherwise,
DB_i equals the event day residual, if the residual is negative and greater than 1%, and zero otherwise,
Figures in parentheses are t statistics,
*,**,*** statistically significant at the 10%, 5% and 1% critical level, respectively,
Wald $X^2(1)$ tests the statistical equivalence of coefficients a_1 and a_2,
n represents the number of observations,
R^2 is adjusted for degrees of freedom,
F-stat is a joint test of statistical significance,
BP(2) is the Breusch-Pagan Chi-squared test for heteroscedasticity, with 2 degrees of freedom.

The results reported in Table 7.3 are sensitive to the model of expected returns employed, but are generally found to be statistically insignificant, with one exception. The post-event response in stock returns for interim earnings, is significantly negatively related to the initial response to favourable news. This implies investors initially overreact on the event day, to the announcement of favourable interim earnings news. Given the overall low significance, we therefore cannot reliably predict the direction of post-event returns by the sign of the initial price change on day 0. The low significance of the results, is reflected accordingly by the low explanatory power of the regressions. The R^2 values generally fail to exceed 1 per cent. This implies the post-event pattern of stock returns is generally unrelated to the price change on the report date. This is true for both good and bad news.

Beyond this, the t-statistics indicate that post-event responses tend to be more pronounced for positive news than for negative news. Note also, the magnitude of the coefficient for positive news, a_1, is generally larger than the corresponding coefficient for negative news, a_2. Nevertheless, the results of the Wald test show we unable to reject the null hypothesis that $a_1=a_2$; with a single exception. Hence, for a given signal size, we find no supporting evidence of a differential price reaction between good and bad news.

For both MM and MN, the intercept term is both positive and highly significant for annual and interim earnings, as well as a change in shareholding. For MKT, the intercept is both negative and highly significant for board changes. This implies in some instances, there is price activity regardless or not whether there is the release of new information. This however is consistent with the existence of liquidity traders.

The picture changes little in Table 7.4, which reports the post-event response to 'major' news; i.e. where the residual return on the event day exceeds 1 per cent. The signs and relative significance of the coefficients remain unchanged.[4] However, this

[4] Tests were also conducted for news with a residual return of at least 2.5 per cent on the event day. But typically the results were relatively unchanged from those reported in Tables 7.3(a,b,and c) and 7.4(a,b and c). Results are available upon request.

may partly be explained by a small sample bias. In sum, the results must be viewed tentatively given their generally low level of significance. However, it is possible to infer that the direction of post-event returns cannot reliably be predicted by the sign of the initial price change on the event day.

However these results do have implications for the manner in which the sign of the news is determined. In that they question the reliability of defining the sign of a news event, by the sign of the residual return on the event day, as frequently employed by other studies (see Chamber & Penman 1984 and Brown, Harlow & Tinic 1988). Thus providing support for the method employed in chapter 6, by determining the sign of the news by the sign of the net return over the duration of the event period.

7.5 EVALUATION OF POST-EVENT VOLATILITY OF STOCK RETURNS

The previous section, examined the price effect of the announcement of both good and bad news. However, this section investigates the effect of favourable and unfavourable news upon the volatility of stock returns over the post-event period. The motivation for this comes from the evidence of a greater increase in the volatility of stock returns following the disclosure of unexpected bad news, than the disclosure of unexpected good news (French, Schwert & Stambaugh 1987, Engle & Ng 1993). Similarly, Campbell & Hertschel (1992) find that market volatility is greater after stock market falls than after stock market rises.

To investigate the cross-sectional variation in the volatility of stock returns after the release of good and bad news, we employ the dummy variable regression,

$$VOLPOST_{,i} = a_0 + a_1 DG_i\,(\bar{API}_{i,post} - 1) + a_2 DB_i\,(\bar{API}_{i,post} - 1) + u_i \quad (7.2)$$

Where

$(API_{i,post} - 1)$ = the net return of investing £1 in the ith security over the post-event period, on event days (t=+1,...,+20),

DG_i = 1, if $(API_{i,20} - 1)$ is positive, and zero otherwise,

DB_i = 1, if $(API_{i,20} - 1)$ is positive, and zero otherwise.

Dummy variables, DG and DB, separate the volatility response to good news from bad news, respectively. Where, the sign of the news is determined by the net return over the post-event window, ($API_{i,20}$ - 1). Hence, announcements convey good news in the sense that they affect stock prices of reporting firms positively, and have an API_{20} value greater than 1.0. Announcements with an ($API_{i,20}$ - 1) value less than 1.0 are classified as bad news, and those with an ($API_{i,20}$ - 1) value equal to 1.0 contain no news. We control for the size of the news by letting the dummy variable, in effect adopt the size of the signal, as measured by ($API_{i,20}$ - 1). Hence, the coefficient a_1 measures the impact on post-event volatility of the release of good news, and similarly a_2 measures the impact of bad news. This regression is applied to each information type, whereby residual returns are estimated using the same three expected return models, as previously defined.

In the absence of the release of new information (i.e. where ($API_{i,post}$ - 1) is equal to zero), there should be no change in investors' expectations, and subsequently no change in price. Thus, the intercept is hypothesised to be zero. Post-event volatility is also hypothesised to be an increasing function of the size of the news, and thus also predict a positive coefficient for a_1, and negative for a_2. A Wald test is employed to test the null, that for a given size of news, the volatility response is equivalent between good and bad news; i.e. (a_1=-a_2). The results are presented in Table 7.5 below. Briefly, the results show that:

The volatility of stock returns following the release of information, is an increasing function of the size of the news, except for annual earnings.

After controlling for the size of the signal, the post-event volatility of stock returns is more pronounced for bad news.

Table 7.5a

The Relation between the Volatility of Post-event Stock Returns, VOLPOST$_i$, and the Sign of the News, Estimated Using Market Model Adjusted Returns (MM)

Clear Event Window

$$VOLPOST_{,i} = a_0 + a_1 DG_i\,(API_{i,post} - 1) + a_2 DB_i\,(API_{i,post} - 1) + u_i$$

	a_0	a_1	a_2	Wald $X^2(1)$ a_1=-a_2
Annual Earnings				
	0.0162***	0.0414**	-0.0393	0.0072
	(5.612)	(2.211)	(-1.045)	
n = 116, R^2 = 0.0566, F[2,113] = 4.7513, BP(2) = 15.1978				
Interim Earnings				
	0.0054***	0.1067***	-0.1805***	26.0292***
	(3.310)	(6.969)	(-7.335)	
n = 152, R^2 = 0.6175, F[2,149] = 135.004, BP(2) = 74.6164				
AGMs				
	0.0040***	0.1006***	-0.1337***	4.2095**
	(3.182)	(2.959)	(-14.208)	
n = 106, R^2 = 0.5223, F[2,103] = 61.6732, BP(2) = 136.7270				
Board Changes				
	0.0056***	0.0800***	-0.1466***	60.4759***
	(8.822)	(7.341)	(-16.833)	
n = 387, R^2 = 0.5353, F[2,384] = 238.8445, BP(2) = 57.8510				
Changes in Shareholdings				
	0.0055***	0.0800***	-0.1276***	57.1343***
	(12.755)	(10.398)	(-19.369)	
n = 927, R^2 = 0.4027, F[2,924] = 330.3257, BP(2) = 229.9650				

Notes:
DG_i equals ($API_{i,20}$- 1), if the residual is positive, and zero otherwise,
DB_i equals ($API_{i,20}$- 1), if the residual is positive, and zero otherwise,
Figures in parentheses are t statistics,
*,**,*** statistically significant at the 10%, 5% and 1% critical level, respectively,
Wald $X^2(1)$ tests the statistical equivalence of coefficients a_1 and a_2,
n represents the number of observations,
R^2 is adjusted for degrees of freedom,
F-stat is a joint test of statistical significance,
BP(2) is the Breusch-Pagan Chi-squared test for heteroscedasticity, with 2 degrees of freedom.

Table 7.5b

The Relation between the Volatility of Post-event Stock Returns, VOLPOST$_i$, and the Sign of the News, Estimated Using Market Adjusted Returns (MKT)

Clear Event Window

$$VOLPOST_{,i} = a_0 + a_1 DG_i (API_{i,post} - 1) + a_2 DB_i (API_{i,post} - 1) + u_i$$

	a_0	a_1	a_2	Wald $X^2(1)$ $a_1=-a_2$
Annual Earnings				
	0.0236***	-0.0084	0.0316	0.3473
	(6.999)	(-0.544)	(1.080)	
n = 116, R^2 = -0.0109, F[2,113] = 0.3271, BP(2) = 2.8932				
Interim Earnings				
	0.0054***	0.1395***	-0.1546***	1.1449
	(3.356)	(7.119)	(-7.517)	
n = 152, R^2 = 0.6231, F[2,149] = 138.1989, BP(2) = 68.4987				
AGMs				
	0.0043***	0.1084***	-0.1216***	0.4148
	(4.709)	(4.084)	(-12.672)	
n = 106, R^2 = 0.4510, F[2,103] = 46.5872, BP(2) = 40.3477				
Board Changes				
	0.0050***	0.1139***	-0.1336***	3.8379**
	(7.895)	(9.037)	(-15.997)	
n = 387, R^2 = 0.5378, F[2,384] = 241.2435, BP(2) = 33.9740				
Changes in Shareholdings				
	0.0048***	0.1086***	-0.1267***	7.9551***
	(12.432)	(13.310)	(-19.113)	
n = 927, R^2 = 0.4350, F[2,924] = 377.1160, BP(2) = 162.2630				

Notes:
DG_i equals ($API_{i,20}$- 1), if the residual is positive, and zero otherwise,
DB_i equals ($API_{i,20}$- 1), if the residual is positive, and zero otherwise,
Figures in parentheses are t statistics,
*,**,*** statistically significant at the 10%, 5% and 1% critical level, respectively,
Wald $X^2(1)$ tests the statistical equivalence of coefficients a_1 and a_2,
n represents the number of observations,
R^2 is adjusted for degrees of freedom,
F-stat is a joint test of statistical significance,
BP(2) is the Breusch-Pagan Chi-squared test for heteroscedasticity, with 2 degrees of freedom.

Table 7.5c

The Relation between the Volatility of Post-event Stock Returns, $VOLPOST_i$, and the Sign of the News, Estimated Using Mean Adjusted Returns (MN)

Clear Event Window

$$VOLPOST_{,i} = a_0 + a_1 DG_i (API_{i,post} - 1) + a_2 DB_i (API_{i,post} - 1) + u_i$$

	a_0	a_1	a_2	Wald $X^2(1)$ $a_1=-a_2$
Annual Earnings				
	0.0241***	-0.0068	0.0815*	1.4980
	(7.003)	(-0.757)	(1.661)	
n = 116, R^2 = -0.0021, F[2,113] = 0.8692, BP(2) = 6.4654				
Interim Earnings				
	0.0063***	0.0891***	-0.1819***	41.2250***
	(4.491)	(9.257)	(-6.984)	
n = 152, R^2 = 0.6196, F[2,149] = 136.1710, BP(2) = 48.7758				
AGMs				
	0.0040***	0.0936***	-0.1265***	4.1431**
	(3.207)	(2.875)	(-10.725)	
n = 106, R^2 = 0.4826, F[2,103] = 52.7680, BP(2) = 123.8580				
Board Changes				
	0.0055***	0.0776***	-0.1399***	57.6149***
	(7.890)	(7.793)	(-13.108)	
n = 387, R^2 = 0.5218, F[2,384] = 226.3485, BP(2) = 59.6816				
Changes in Shareholdings				
	0.0052***	0.0819***	-0.1175***	38.6829***
	(12.018)	(11.957)	(-13.207)	
n = 927, R^2 = 0.4296, F[2,924] = 368.9446, BP(2) = 348.7020				

Notes:
DG_i equals ($API_{i,20}$- 1), if the residual is positive, and zero otherwise,
DB_i equals ($API_{i,20}$- 1), if the residual is positive, and zero otherwise,
Figures in parentheses are t statistics,
*,**,*** statistically significant at the 10%, 5% and 1% critical level, respectively,
Wald $X^2(1)$ tests the statistical equivalence of coefficients a_1 and a_2,
n represents the number of observations,
R^2 is adjusted for degrees of freedom,
F-stat is a joint test of statistical significance,
BP(2) is the Breusch-Pagan Chi-squared test for heteroscedasticity, with 2 degrees of freedom.

The results are robust across the three measures of expected returns, and consistent for all information types with the exception of annual earnings. The following discussion will therefore initially refer only to interim earnings, AGMs, board changes and a change in shareholding. The signs of the coefficients are all as predicted, positive for good news, and negative for bad. Supporting the intuition that the volatility of post-event stock returns, is an increasing function of the size of the news. The size of the coefficient for negative news, a_2, is correspondingly larger than the coefficient for positive news, a_1. The t-statistics are all significant, and indicate that post-event responses tend to be more pronounced for bad news than for good. With the exception of market adjusted returns (MKT), the calculated Wald test values exceed the 0.05 critical value of 3.84, for all information types. Thus, the null hypothesis that the post-event volatility response is equivalent between good and bad news (ie. a_1=-a_2), can be rejected in the majority of cases. Therefore we can reliably report, that post-event volatility of stock returns is more pronounced for bad news.

The R^2 value implies the sign of the news explains 62 per cent of the volatility in stock returns, after the release of the interim earnings report. The ability of the sign of the news in explaining the volatility response to interim earnings, is substantiated by the larger coefficients associated with interim news than for other event types. For the other events, depending on the returns model, 52 to 54 per cent of the activity for board changes, 45 to 52 per cent for AGMs, and between 40 to 44 per cent following a change in shareholding.

With respect to annual earnings, the value of the coefficients a_1 and a_2, is equivalent to zero. The low explanatory power of the sign of the news for post-event volatility is supported by an R^2 value no greater than 6 per cent. However in chapter 5, we reported a higher level of drift for annual earnings than for the other information types. High drift coupled with low volatility implies annual earnings is a clearer signal. Therefore, it appears as though investors are confident as to the implications of annual earnings, but take time to impound the information. In addition, the intercept term is positive and statistically significantly different from zero. Here the size of the intercept is relatively small, no greater than 0.006; with the exception for annual earnings. This implies security prices are volatile even in the absence of information. However, a plausible explanation which is not inconsistent with an efficiency explanation, maybe the activity reflects the actions of liquidity traders.

In brief, the results thus far support the hypothesis that the variability of stock returns following the release of information, is an increasing function of the size of the news, with the exception of annual earnings. However, by controlling for the size of the signal, post-event volatility is even greater for bad news. This is consistent with the earlier observation in chapter 6, of greater sign reversal in daily excess returns for bad news. Such a response by investors, would imply bad news is associated with greater uncertainty than good news.

7.6 THE RESOLUTION OF PRIOR UNCERTAINTY

The relative increase in the volatility of stock returns surrounding the announcement of earnings, compared to non-announcement periods, is well documented.[5] Where the increase in volatility is interpreted as an indicator of more information arriving at the market, during periods when earnings are reported than at other times, on average. So far throughout this thesis, all price movement is presumed to be in response to information, whether this be the investors' own information, or information inferred from the actions of others (see Bikchandani, Hirshleifer & Welch 1992, Trueman 1992 and 1994). The volatility of stock returns is therefore presumed to measure the extent to which investors trade on their (newly) acquired information.

The financial markets literature implies stock return volatility captures more than information (Roll 1988, Cutler, Poterba & Summers 1989). The actions of liquidity traders is one example. While the average returns behaviour surrounding a change in shareholding, reported in Table 6.5 in the previous chapter, is suggestive of possible herding by investors (Bikhchandani, Hirshleifer & Welch 1992). A shareholding change is more likely to occur after a period of pronounced activity. For example, the likelihood of an investor buying (selling) a large stockholding, increases after a period

[5] See Beaver (1968), Patell & Wolfson (1979), Brookfield & Morris (1992), and Pope & Inyangete (1992).

of positive (negative) returns. The significant positive returns continue after the announcement, suggesting a larger stockholding change acts as an important signal to other, and perhaps less informed investors. In addition, in both chapters 5 and 6, we find our model explains post-announcement drift far better than price movement on the announcement day. This may indicate that investors' initial reactions to both earnings and non-earnings news, are not based on informed judgements.

We argue in chapter 3, that the volatility of stock returns prior to an event ($VOLPR_i$), measures the extent to which investors have chosen to be informed, in anticipation of the forthcoming event. The higher the volatility of prior stock returns ($VOLPR_i$), the higher the expected anticipation. The level of prior volatility reflects the markets' uncertainty as to the implications of available information, as well as to the expected outcome of the event. The extent to which uncertainty is resolved by the disclosure, will in part depend on the precision of the information released. For instance, disclosure of the earnings figure will reduce one source of uncertainty, but depending on the quality of the information, could either increase or decrease uncertainty as to the future payoffs of the security.[6]

Hence, if investors are informed traders, for expected events, we expect to see a trade-off between prior and post-event uncertainty, as measured by the volatility of stock returns. An increase in post-event uncertainty would suggest prior anticipation was uninformed. However, the extent of the trade-off between prior and post-event volatility is also dependent on the actual precision of the information announced (Kim & Verrecchia 1991a and 1991b, Demski & Feltham 1994, and McNichols & Feltham 1994).

If the quality of the announcement is so precise, it will cause individual beliefs to converge, and reduce the level of volatility in stock returns.[7] If the announcement

---

[6] There two further sources of uncertainty associated with an announcement's release: (i) there is always a measure of error involved, and so the true implications are never certain; and (ii) the surprise associated with the unexpected timing of its release.

[7] There is always some level of volatility reflecting the actions of liquidity traders.

is so imprecise, the information will be ignored by investors. Post-event volatility ($VOLPOST_i$), therefore measures the extent to which prior uncertainty has been resolved, and the need to acquire further information is reduced. Hence, according to the precision of the information, an event can either increase or reduce the divergence in beliefs across investors. Hence, post-event volatility is a function of both prior anticipation and the precision of the information disclosure.

Table 7.6 below, reports the descriptive statistics of the changing level of volatility over the duration of the event period, for each class of information. The mean values indicate only AGMs and a change in shareholding reduce the volatility of stock returns to below pre-event levels. However if we condition post-event volatility on prior volatility, as measured by ($VOLPOST_i$ / $VOLPR_i$), on average all information types increase post-event uncertainty to varying degrees. Where an event is defined as increasing uncertainty when ($VOLPOST_i$ / $VOLPR_i$) has a value greater than 1. For an event to resolve uncertainty, we therefore assume there to be trade-off between pre-announcement and post-announcement volatility.

However, we do not interpret our measure of a change in volatility ($VOLPOST_i$ / $VOLPR_i$), as a measure of information content, for which we would need to scale the event period volatility by pre-event period volatility (Patell 1976). Although $VOLPR_i$ does to some extent control for the level of pre-disclosure information it may be argued it does not cover a period for which there is a 'normal' level of unsystematic risk caused by information arrival and noise traders (Strong 1992). Instead the measure ($VOLPOST_i$ / $VOLPR_i$) is interpreted as the extent to which the public signal acts as a substitute for the acquisition of private information, over the event period.[8]

[8] A similar technique is employed by Brown, Harlow & Tinic (1993), who instead use the measure calculated by equation (7.1) as a proxy for risk, which captures not only potential changes in systematic risk but also changes in parameter uncertainty over the event period. They find that abnormal post-event returns can be explained by a considerable by the post-event volatility of stock returns, for both positive and negative events.

Table 7.6

Distribution Properties of the Volatility of Stock Returns over the Event Period, for Each Class of Information

Event Window	Mean	Std.Dev	Skewness	Kurtosis	Minimum	Maximum
Annual Earnings (n=116)						
Prior	0.0196	0.0359	7.823	76.338	0.0000	0.3742
Prior+Ann	0.0236	0.0365	6.933	64.393	0.0000	0.3686
Post	0.0218	0.0275	2.742	12.031	0.0000	0.1605
Post/Prior	1.0306	1.3937	3.551	22.591	0.0000	10.9300
Interim Earnings (n=152)						
Prior	0.0189	0.0327	7.924	84.754	0.0000	0.3742
Prior+Ann	0.0225	0.0334	6.921	69.998	0.0000	0.3686
Post	0.0221	0.0265	2.490	10.969	0.0000	0.1605
Post/Prior	1.1655	2.7690	9.024	99.415	0.0000	32.4700
AGMs (n=106)						
Prior	0.0130	0.0095	1.131	3.925	0.0000	0.0449
Prior+Ann	0.0140	0.0106	1.341	4.897	0.0000	0.0552
Post	0.0121	0.0130	3.614	19.692	0.0000	0.0887
Post/Prior	1.0946	0.9157	1.506	4.847	0.0000	4.2430
Board Change (n=387)						
Prior	0.0144	0.0151	3.734	27.544	0.0000	0.1595
Prior+Ann	0.0144	0.0148	3.710	27.145	0.0000	0.1558
Post	0.0144	0.0152	2.735	13.978	0.0000	0.1256
Post/Prior	1.1271	1.4255	5.207	44.434	0.0000	16.2000
Change in Shareholding (n=927)						
Prior	0.0135	0.0157	6.104	74.956	0.0000	0.2631
Prior+Ann	0.0137	0.0158	5.858	68.107	0.0000	0.2569
Post	0.0127	0.0134	3.063	16.867	0.0000	0.1193
Post/Prior	1.2343	1.4795	4.137	28.713	0.0000	16.1600

Notes:
n represents the number of observations,
Prior window - the value of $VOLPR_i$, where (t=-20,...,-1),
Prior+Ann window - the value of $VOLPR{+}A_i$, where (t=-20,...,0),
Post window - the value of $VOLPOST_i$, where (t=+1,...,+20),
Post/Prior - the ratio of $VOLPOST_i$ relative to $VOLPR_i$,

The extent to which the announcement resolves prior uncertainty, reflects the quality of the information announced, and is measured by the trade-off between prior and post volatility. Where, volatility prior to an event is assumed to measure the extent which investors are informed about the forthcoming disclosure, conditional on the pre-disclosure environment. To provide an empirical test, we employ the dummy variable regression

$$VOLPOST_i = a_0 + a_1(DG_i.VOLPR_i) + a_2(DB_i.VOLPR_i) + u_i \qquad (7.3)$$

Where

$VOLPOST_i$ = the volatility of stock returns for the ith security over the post period, where (t=+1,...,+20),

$VOLPR_i$ = the volatility of stock returns for the ith security over the prior period, where (t=-20,...,-1),

DG_i = 1 for good news, and 0 otherwise,

DB_i = 1 for bad news, and 0 otherwise.

Dummy variables, DG and DB, are again used to separate the volatility response to good news from bad news, respectively. The dummy variables, in effect adopt the value of prior volatility, $VOLPR_i$. Hence, the coefficient a_1 measures the trade-off between post-event volatility and the prior anticipation of good news. Similarly, a_2 measures the trade-off between post-event volatility and the prior anticipation of bad news. The sign of the news is determined as before, by the sign of the net return of investing £1 in the ith security over the duration of the event window ($API_{i,20}$-1). If pre-event volatility measures the extent to which investors are informed, we assume greater anticipation leads to lower uncertainty in the post period, ceteris paribus. If there is perfect anticipation, or the quality of the event is so precise, investor beliefs will converge. Consequently, the coefficients a_1 and a_2 will equal zero.

It is improbable there will be either perfect anticipation, or that the event will be so precise to resolve uncertainty completely. However, the greater the precision or anticipation of the event, the greater the trade-off between prior and post volatility of stock returns (i.e. $VOLPOST_i$ / $VOLPR_i$ < 1). Accordingly, if there is a trade-off between prior and post-event volatility, we expect the coefficients a_1 and a_2 to take a value less than one. If the coefficients take a value greater than one, this may suggest prior activity was not in response to information. By controlling for the level of prior anticipation, the relative precision of the different information types can be inferred by the relative size of the coefficients. The lower the size of the coefficient, the greater the trade-off (i.e. the resolution of prior uncertainty), and therefore the greater the precision of the information.

We can also test a earlier notion from chapter 6. If, on average, there is greater anticipation of good news than bad, we expect there to be less uncertainty after the announcement of good news in comparison to bad news. Accordingly, we expect the coefficient of good news, a_1, to exceed the coefficient of bad news, a_2. The results are presented in Table 7.7 below. The main finding is:

> Higher volatility in stock returns in the prior period leads to lower volatility in the post-announcement period. This suggests volatility reflects the impounding of information, as opposed to uninformed trading.

Table 7.7a

The Relation between the Volatility of Post-event Stock Returns ($VOLPOST_i$), and Prior Stock Returns ($VOLPR_i$), Estimated Using Market Model Adjusted Returns (MM)

Clear Event Window

$$VOLPOST_i = a_0 + a_1(DG_i.VOLPR_i) + a_2(DB_i.VOLPR_i) + u_i$$

	a_0	a_1	a_2
Annual Earnings			
	0.0151***	0.4111***	0.2231
	(6.780)	(12.136)	(1.630)
n = 116, R^2 = 0.2632, F[2,113] = 23.3215, BP(2) = 1.0341			
Interim Earnings			
	0.0131***	0.5732***	0.3862*..
	(6.174)	(3.449)	(14.691)
n = 152, R^2 = 0.2456, F[2,149] = 28.0222, BP(2) = 9.8639			
AGMs			
	0.0031	0.6490***	0.7458***
	(1.625)	(2.664)	(3.995)
n = 106, R^2 = 0.2400, F[2,103] = 18.5227, BP(2) = 87.0362			
Board Changes			
	0.0078***	0.3133***	0.6120***
	(8.079)	(3.844)	(6.329)
n = 387, R^2 = 0.2453, F[2,384] = 68.1137, BP(2) = 122.5160			
Changes in Shareholdings			
	0.0080***	0.3393***	0.3610***
	(9.258)	(5.479)	(3.417)
n = 927, R^2 = 0.1687, F[2,924] = 100.0992, BP(2) = 566.0610			

Notes:
DG_i equals $VOLPR_i$, if the residual is positive, and zero otherwise,
DB_i equals $VOLPR_i$, if the residual is positive, and zero otherwise,
Figures in parentheses are t statistics,
*,**,*** statistically significant at the 10%, 5% and 1% critical level, respectively,
Wald $X^2(1)$ tests the statistical equivalence of coefficients a_1 and a_2,
n represents the number of observations,
R^2 is adjusted for degrees of freedom,
F-stat is a joint test of statistical significance,
BP(2) is the Breusch-Pagan Chi-squared test for heteroscedasticity, with 2 degrees of freedom.

Table 7.7b

The Relation between the Volatility of Post-event Stock Returns (VOLPOST$_i$), and Prior Stock Returns (*VOLPR$_i$*), Estimated Using Market Adjusted Returns (MKT)

Clear Event Window

$$VOLPOST_i = a_0 + a_1(DG_i.VOLPR_i) + a_2(DB_i.VOLPR_i) + u_i$$

	a_0	a_1	a_2
Annual Earnings			
	0.0138***	0.4402***	0.3902***
	(5.618)	(4.001)	(12.031)
n = 116, R^2 = 0.2546, F[2,113] = 22.3425, BP(2) = 3.3496			
Interim Earnings			
	0.0125***	0.7151***	0.3800***
	(6.275)	(3.898)	(13.282)
n = 152, R^2 = 0.2612, F[2,149] = 30.3409, BP(2) = 12.3363			
AGMs			
	0.8713*	0.7492***	0.6247***
	(1.678)	(2.671)	(3.955)
n = 106, R^2 = 0.2425, F[2,103] = 18.7637, BP(2) = 76.6773			
Board Changes			
	0.0077***	0.3371***	0.5688***
	(7.630)	(3.810)	(5.953)
n = 387, R^2 = 0.2269, F[2,384] = 61.6061, BP(2) = 133.2860			
Changes in Shareholdings			
	0.0078***	0.4118***	0.3262***
	(9.829)	(5.333)	(4.479)
n = 927, R^2 = 0.1721, F[2,924] = 102.5228, BP(2) = 418.9190			

Notes:
DG_i equals VOLPR$_i$, if the residual is positive, and zero otherwise,
DB_i equals VOLPR$_i$, if the residual is positive, and zero otherwise,
Figures in parentheses are t statistics,
*,**,*** statistically significant at the 10%, 5% and 1% critical level, respectively,
Wald $X^2(1)$ tests the statistical equivalence of coefficients a_1 and a_2,
n represents the number of observations,
R^2 is adjusted for degrees of freedom,
F-stat is a joint test of statistical significance,
BP(2) is the Breusch-Pagan Chi-squared test for heteroscedasticity, with 2 degrees of freedom.

Table 7.7c

The Relation between the Volatility of Post-event Stock Returns ($VOLPOST_i$), and Prior Stock Returns ($VOLPR_i$), Estimated Using Mean Adjusted Returns (MN)

Clear Event Window

$$VOLPOST_i = a_0 + a_1(DG_i.VOLPR_i) + a_2(DB_i.VOLPR_i) + u_i$$

	a_0	a_1	a_2
Annual Earnings			
	0.0153***	0.3969***	0.1705
	(6.886)	(13.450)	(1.395)
n = 116, R^2 = 0.2474, F[2,113] = 21.5492, BP(2) = 0.0445			
Interim Earnings			
	0.0127***	0.5893***	0.3817***
	(5.850)	(3.696)	(14.737)
n = 152, R^2 = 0.2483, F[2,149] = 28.4160, BP(2) = 10.4914			
AGMs			
	0.0031	0.6508***	0.7313***
	(1.642)	(2.569)	(4.066)
n = 106, R^2 = 0.2389, F[2,103] = 18.4223, BP(2) = 87.0608			
Board Changes			
	0.0079***	0.3358***	0.5991***
	(7.823)	(3.974)	(5.773)
n = 387, R^2 = 0.2356, F[2,384] = 64.6585, BP(2) = 146.908			
Changes in Shareholdings			
	0.0080***	0.3442***	0.3564***
	(9.502)	(5.608)	(3.394)
n = 927, R^2 = 0.1685, F[2,924] = 99.9632, BP(2) = 546.9180			

Notes:
DG_i equals $VOLPR_i$, if the residual is positive, and zero otherwise,
DB_i equals $VOLPR_i$, if the residual is positive, and zero otherwise,
Figures in parentheses are t statistics,
*, **, *** statistically significant at the 10%, 5% and 1% critical level, respectively,
Wald $X^2(1)$ tests the statistical equivalence of coefficients a_1 and a_2,
n represents the number of observations,
R^2 is adjusted for degrees of freedom,
F-stat is a joint test of statistical significance,
BP(2) is the Breusch-Pagan Chi-squared test for heteroscedasticity, with 2 degrees of freedom.

With two exceptions, the coefficients a_1 and a_2 are all significantly different from zero. This implies post-event volatility of stock returns is positively related to prior volatility. However, it also implies that the average event is not perfectly anticipated. Or alternatively, the average event is not precise enough to converge all investors' future expectations. The coefficients a_1 and a_2, also always take a value less than one. There is therefore a trade-off between the level of prior and post-event volatility of stock returns. This suggests, that on average, investors trade on information prior to a forthcoming disclosure. However, it could also imply that the average corporate disclosure, is precise enough to partially resolve prior uncertainty.

By controlling for the level of prior uncertainty, the relative size of the coefficient between information types will indicate their relative precision. The smaller the coefficient, the greater the precision of the information. For good news events, the relative pattern of coefficient sizes is consistent across return metrics. For example using market adjusted returns (MKT), the respective coefficient sizes are as follows: 0.3371 for board changes, 0.4118 for a change in shareholding, 0.4402 for annual earnings, 0.7175 for interim earnings, and 0.7492 for AGMs. This implies the average board change resolves prior uncertainty to the greatest extent, and the average AGM the least. For bad news events the pattern is not robust across return metrics, although AGMs generally appear to be the least precise.

If there is greater anticipation of good news, we predict the bad news coefficient to exceed the good news coefficient; i.e (a_2>a_1). Table 7.7 shows the results are sensitive to the returns model. However for earnings information, the opposite to what we predict holds true; the coefficient for favourable earnings news exceeds that for unfavourable earnings news. Favourable earnings news would appear to resolve prior uncertainty to a lesser extent than unfavourable earnings news. One possible interpretation is therefore, bad earnings news is more precise than good news. Or alternatively, maybe unfavourable earnings news provokes less interest. This would be consistent with recent UK evidence, that finds investors ignore bad news (see Sharkaway & Garrod 1995). This also fits with the lower level of anticipation and drift identified in chapter 6, for bad news relative to good news.

For non-earnings events, the picture is less clear. However, the explanatory power of prior volatility for post-event volatility (as measured by the R^2 values), varies between 23 to 26 per cent for earnings, AGMs and board changes. For a change in shareholding, the R^2 value is no greater than 17 per cent. This implies post-event volatility is less associated with prior volatility for a change in shareholding. However this is to be expected given that a shareholding change is more unexpected than the other events.

7.7 CONCLUSIONS

The chapter addresses the issues of both under and overreaction to the release of information, and also examines the volatility of post-event stock returns, distinguishing between the sign of the news. The main tests involve using dummy variable analysis which test the equivalence of the market reaction (i.e. both price and volatility) between the sign of the news. The following observations are made.

The period prior to the announcement is associated with more positive returns than negative, possibly indicating the greater anticipation of good news than bad news by investors. However, the initial price adjustment to the announcement of earnings reports is associated with the release of more bad news than good; as identified by the skewness of returns. This is consistent with the work of McNichols (1988), who similarly finds the release of earnings reports is associated with more bad news than good news.

The empirical literature documents many instances of both under and overreaction to information (Brown, Harlow & Tinic 1988, Kasznik & Lev 1994). Although few studies determine the type of information the market either under or overreacts to, and fewer still determine the sign of information. The pattern of stock return behaviour depicted in chapter 6, is suggestive of underreaction to both earnings and non-earnings information, over the duration of the event window, regardless the nature of the news. However, on a daily basis investors appear to overreact to information. When we control for the size of the news, we are unable to statistically confirm either scenario.

However, it can be confirmed that the direction of the post-event pattern of stock returns cannot reliably be predicted by the direction of the initial price change on the announcement day. This holds for both good and bad news, and for all classes of information. This has implications for the manner in which the sign of the news is measured. Determining the sign of the news by the return over the announcement period is therefore inappropriate, although it is an approach which is nevertheless adopted in many studies (Chambers & Penman 1984, Brown, Harlow & Tinic 1988).

We find supporting evidence that the volatility of stock returns following the release of information, is an increasing function of the size of the news; with the exception of annual earnings. The relatively high level of drift and low level of volatility associated with annual earnings, implies that annual earnings is a clearer signal than the other information types. It appears as though investors are confident as to the implications of annual earnings, but take time to impound the information.

After controlling for the size of the signal, post-event volatility of stock returns is more pronounced for bad news. This is consistent with the results of Brown, Harlow & Tinic (1988). Such a response by investors, would imply bad news is associated with greater uncertainty than good news. This would certainly agree with the observations made in chapter 6 of the greater daily sign reversal in abnormal returns for bad news, and indications of the lower anticipation of bad news, for instance. A possible explanation is that bad news is perhaps more difficult to anticipate and interpret, relative to good news.

The trade-off between the level of prior and post-event volatility of stock returns, suggests that on average, investors trade on information prior to an event as opposed to noise. It could also imply that the average corporate disclosure is precise enough to partially resolve prior uncertainty. For earnings news, the results indicate a greater trade-off between prior and post-event volatility for bad news than good. This suggests that unfavourable earnings news is more precise than favourable earnings news. A more likely explanation, maybe unfavourable earnings news provokes less interest by investors. This would be consistent with recent UK evidence, that finds investors ignore bad news (see Sharkaway & Garrod 1995). The picture is less clear cut for non-earnings information.

8. CONCLUSIONS

There is evidence of both market anticipation (Ball & Brown 1968, Kothari & Sloan 1992), and lagged impounding (Bernard & Thomas 1989, Ou & Penman 1989) of value relevant information. An efficiency explanation for this apparent anomaly is that investors choose not to be informed, and consequently not all information will be impounded into security prices. The papers by Grossman & Stiglitz (1980), Kim & Verrecchia (1991a and 1991b), Demski & Feltham (1994) and McNichols & Trueman (1994) all identify conditions under which the search for information will take place. Grossman and Stiglitz were among the first to suggest that prices in equilibrium are unlikely to fully reflect all information, because the expected costs of information exceed the expected benefits of being informed.

The objective of this research is therefore to identify the conditions under which investors choose to be informed, in anticipation of and in response to, different types of information. More specifically, we attempt to explain the behaviour of stock returns in terms of the expected costs and expected benefits which investors must consider when faced with the decision of whether to acquire and interpret information. Both firm-specific characteristics and different information types are chosen to proxy for the associated costs and benefits of being informed. The chosen proxies are firm size, the number of years a firm has been trading, the number of disclosures a firm makes, and the volatility of stock returns prior to the announcement under examination. Different types of information are chosen to specifically examine whether the anticipation and the interpretation of an event varies according to its expected probability and expected precision of the released information. The information types examined are the annual earnings report, the interim earnings report, the annual general meeting, notification of a board change and of a change in shareholding. In all, this research is an attempt to further our understanding of how and why investors react to new information, and may provide a further explanation for post-announcement drift.

The Anticipation and Interpretation of Information

Chapter 5 initially examines the pattern of average stock returns over the event period, for each class of information, and identifies the impounding behaviour of investors. The market appears to anticipate part of the information content of the average corporate disclosure, but continues to adjust after the report date perhaps as the full implications become known. The average earnings report, in particular the annual report, is associated with a much higher level of anticipation and drift relative to non-earnings news. This possibly indicates the greater relevance and precision of earnings information for security valuation. The corresponding high level of drift in security returns following the earnings release, is consistent with the notion that earnings reports contain information not available from alternative more timely information sources (Chambers & Penman 1984). However, the results must be viewed tentatively due to the predominantly low significance of the daily average abnormal returns. One cannot therefore be certain that the average event, for any class of information, causes a persistent, positive or even negative impact on stock returns. The apparent drift in security returns, may therefore indicate possible model mis-specification in the calculation of unexpected returns.

The objective has been to try and explain this pattern of stock return behaviour for each information type, in terms of the factors hypothesised in chapter 3 to explain the process of anticipation and interpretation of information. The results are generally consistent with our expectations. Market anticipation is found to be an increasing function of firm size, the number of years a firm has been trading, and the volatility of prior stock returns. This in turn implies the cost of being informed is a decreasing function of firm size, age and other factors as proxied by the volatility of stock returns. However, the increasing voluntary disclosure by firms appears to reduce the ability of investors to both anticipate and interpret information. A possible interpretation may be that increased disclosure by firms discourages investors from acquiring costly information, if they expect their expectations will soon again need to be revised on the release of new information (Trueman 1994). Or alternatively, increased disclosure of imprecise information may confuse the expectations of investors.

The model explains post-announcement drift better than the price movement on the announcement day, which may indicate investors initial reactions are not always based on informed judgements. The initial market reaction on the announcement day to the disclosure of both earnings and non-earnings information is predominately a function of firm size. However, the volatility of stock returns (prior to the disclosure) is the main driving force behind the explanation of post-announcement drift. We also find the stock return behaviour surrounding the announcement of interim earnings is least explained, relative to the other information types. This is surprising given the higher level of drift observed for interim reports, and would suggest investors are less informed about the implications of interim earnings news.

Allowing other disclosures within the event window, noticeably reduces both the overall level of significance of the daily abnormal returns. This reduction may in part reflect the small firm bias of examining isolated events, and in part reflect an increase in the level of noise present in prices from the inclusion of confounding events. However, we assert the problem is one of small firm bias given the overall increase in the explanatory power of firm size for stock returns behaviour on the announcement day. Furthermore, allowing other events in the event window increases the explanatory power of the volatility of stock returns, which remains the main driving force behind the explanation of post-announcement drift.

Good and Bad News

Chapter 6 extends the results of the previous chapter by addressing the issue of good and bad news. This is prompted by growing evidence that the market reaction to corporate disclosure varies according to the sign of the news, and therefore so may the process of anticipation and interpretation of good and bad news. As in chapter 5, this chapter proceeds by firstly identifying the pattern of average stock returns over the event period for each class of information, distinguishing between the sign of the news. We find initial indications of differential price behaviour towards the release of good and bad news. The results emphasise the need to partition events according to their sign, to more fully appreciate the process of impounding information by investors. The analysis also demonstrates the ability of investors to anticipate the sign of the news by up to twenty trading days in advance of its release.

The general pattern of security returns, is upward for good news and downward for bad; a pattern suggestive of underreaction. Both the significance of daily abnormal returns, and the level of anticipation and the level of drift, is higher for good news events than bad. Without controlling for the size of the news, it is not possible to say whether the average good news event is more informative than bad news, or that bad news is generally more difficult to anticipate and interpret. An alternative explanation is that bad news is ignored by investors (Sharkarway & Garrod 1995). Or maybe what we have captured is not bad news but instead the liquidity trades of investors, and investors selling due to information; and thereby giving the appearance of bad news being ignored.

On further investigation, we find for both annual and interim earnings reports, the absolute size of the price adjustment on the announcement day, is greater for unfavourable earnings news than favourable earnings news. This further suggests that bad news is not as easily interpreted as good news. This is substantiated by the greater daily sign reversal in the abnormal returns observed for bad news. The level of anticipation and level of drift associated with earnings announcements, is again higher than for the other information types, for both good and bad news events. In addition, the significance of the abnormal returns over many days of the event window, surrounding a change in shareholding is indicative of possible herding by investors.

The objective then is to explain the stock return behaviour surrounding the different disclosures of information, separately for good and bad news. As in chapter 5, the model explains post-announcement drift better than announcement returns. This further suggests investors' initial reactions are neither informed for good or bad news events. Our model also explains the behaviour of stock returns surrounding good news events better than for bad news events. A possible explanation may be that investors reactions to bad news are less informed in general, and supports our earlier notion that bad news is more difficult to interpret.

As before, allowing other disclosures within the event period, increases the overall power of the model in the explanation of the behaviour of stock returns. Firm size explains announcement returns (ANN_i) for good news, but less so for bad news. However firm size does not explain post-announcement drift. A potential explanation for this is that bad news is difficult to anticipate and to interpret for all classes of information, regardless the sign of the news. The volatility of prior stock returns persists as the most prominent explanation of post-announcement drift.

Is Price Movement in Response to Information?

It is generally assumed that the market response is equivalent towards both good and bad news, ceteris paribus. However, in the previous chapter we made a number of indications of how investors both anticipate and respond differently to the announcement of good and bad news. It has similarly been assumed, that all price movement is in response to information; whether this is in response to investors' own information, or information inferred from the actions of others. However in both chapters 5 and 6, we found indications that investors' initial reactions to earnings and non-earnings information may be uninformed. The objective of chapter 7, is to determine the validity of these observations and our underlying assumptions.

In general, bad news appears to be associated with greater uncertainty than good news. A possible explanation is that bad news is perhaps more difficult to anticipate and interpret, relative to good news. Subsequent tests find further indications of the earlier anticipation of good news relative to bad news. For instance, we show the release of interim and annual earnings is associated with more bad news than good news. This is consistent with work of McNichols (1988). Such a response by investors, would imply bad news is associated with greater uncertainty than good news. This would certainly agree with the observations made in chapter 6 of the greater daily sign reversal in abnormal returns for bad news, and indications of the lower anticipation of bad news, for instance. Supporting the explanation that bad news is perhaps more difficult to anticipate and interpret, relative to good news.

Furthermore, the sign of the post-event pattern of stock returns cannot be predicted by the sign of the initial price change on the announcement day. This holds for both good and bad news, and for all classes of information. This has implications for the manner in which the sign of the news is measured. Determining the sign of the news by the return over the announcement period is therefore inappropriate, although it is an approach which is nevertheless adopted in many studies (Chambers & Penman 1984, Brown, Harlow & Tinic 1988).

We find supporting evidence that the volatility of stock returns following the release of information, is an increasing function of the size of the news; with the exception of annual earnings. The relatively high level of drift and low level of volatility associated with annual earnings, implies that annual earnings is a clearer signal than the other information types. It appears as though investors are confident about the implications of annual earnings, but take time to impound the information.

The trade-off between the level of prior and post-event volatility of stock returns, suggests that on average, investors trade on information prior to an event as opposed to noise. It could also imply that the average corporate disclosure is precise enough to partially resolve prior uncertainty. For earnings news, the results indicate a greater trade-off between prior and post-event volatility for bad news than good. This suggests that unfavourable earnings news is more precise than favourable earnings news. A more likely explanation, maybe unfavourable earnings news provokes less interest by investors. This would be consistent with recent UK evidence, that finds investors ignore bad news (see Sharkaway & Garrod 1995). The picture is less clear cut for non-earnings information.

Implications for UK Corporate Disclosure

Whether investors can anticipate information and whether information can be impounded in price quickly are important characteristics of corporate disclosure. They relate not only to the efficiency of the stock market, but also have important practical implications for financial reporting. If the market is not exploiting publicly available information including earnings reports (Bernard & Thomas 1989), then how does the market interpret and impound information that is less well publicised? If the market can anticipate information, then disclosure is restricted to a confirmatory role. If the market takes time to impound information, then the Stock Exchange and the Accounting Standards Board (ASB) may wish to suggest alternative forms of disclosure to ensure that investor expectations are updated in a more timely way.

The 'information set' approach which the ASB is now taking to many reporting issues, assumes that a substantial part of users needs can be served by more disclosure. They justify increased disclosure as a way to 'level the playing field' by providing equal access to information across investors. This is an attractive route to take when there is no consensus on measurement methods. But we find investors are limited in their ability to interpret the extra disclosure, and therefore this strategy of the ASB needs further investigation. Research by Indjejikian (1991) demonstrates as investors become less sophisticated they require increasing disclosure. This is consistent with Cready & Mynatt (1991) who find little evidence of a price or volume response on the annual reports release, although the number of transactions in small stockholdings increases significantly a couple of days after it's release, suggesting annual reports are more important to the smaller less sophisticated and poorer investor. In a recent UK study by Wild (1992), he addresses the argument that increased disagregation of data leads to a decrease in the quality and effectiveness of financial communications to shareholders, but found the greater the disclosure the greater the informativeness

One may argue that the ability to earn abnormal returns can never be a valid basis for assessing the value of information. One cannot conclude from the presence of any pre- or contemporaneous announcement effects, and the absence of any post-announcement effect that the market is informationally efficient. Similarly, no reaction does not necessarily imply no information content. Price reaction only measures the actions of investors who trade on the information immediately. However, surely what is relevant in the future must therefore be relevant now. In this regard, the speed of impounding does measure the success of disclosure.

Our results indicate there is greater anticipation of large firm events relative to small firms. We argue this is in response to the relative unavailability of information for small firms, and promotes the idea of increasing the disclosure of small firm information. However, there exists a conflict of interest between disclosure requirements and firm size. Without doubt it is costlier for smaller firms to meet the same disclosure requirements as their larger counterparts, and so for this reason it is argued they should face less restrictive requirements. Although it the shareholders of the small firms that have most to lose from reduced disclosure, for it is for the small firms that incremental information is most important (Firth 1981, Lang 1991, Wild 1992).

Future Research

The joint explanatory power of the variables for market anticipation is very low, and generally the R^2 values do not exceed 9 per cent. This may be indicative of a relatively efficient market, in which one cannot explain a large proportion of future movements in price with historic information. Or alternatively, it may reflect the use of inappropriate proxies to the measure the availability of pre-disclosure information. Given there is not a direct measure of the level of pre-disclosure information, and the lack of any formal theory concerning the relationship between firm specific factors and information flows, it may be difficult to conclude that our explanatory variables cause cross-sectional differences in returns behaviour. The inclusion of other omitted variables might provide alternative explanations for the results. Similarly, the results would be strengthened with a more accurate measure of investors' expectations.

Another modification would be to address the volume reaction to information, in conjunction with the price reaction. The price reaction measures the average change in investors' beliefs, whereas trading volume reflects the accumulated reaction of all investors. Hence, there may be an increase in volume following an announcement, but no observed price change. Addressing the price reaction alone therefore favours the hypothesis of no information content. Kim & Verrecchia (1991a and 1991b) show analytically that trading volume is not only an increasing function of the absolute change in price, but also reflects the level of information asymmetry prevailing before the announcement.[1] The greater the information asymmetry across investors, the greater the expected volume reaction due to the extent of belief revisions.

[1] See Kim & Verrecchia (1991a) (p312) for proof.

APPENDIX 1: FORTRAN PROGRAM

This program is designed to read the cd-rom output and identify the news announcements of interest, and to check if the event window is clear from other news announcements. If clear, then find and match with the relevant share price data, the market index data, and company characteristics, from the separate data files.

```
C declare variables and their respective dimensions
      CHARACTER*30 NAME
      CHARACTER*7 AGE91
      INTEGER IND, DAY(100), YEAR(100), IMONTH(100), NEWS
      CHARACTER*1 SLASH
      CHARACTER*3 MONTH(100), MKT
      CHARACTER*5 XPRICE(100)
      CHARACTER*33 HEADLINE(100)
      CHARACTER*80 LINE
      REAL MV91, MV92

C for the price data
      CHARACTER*80 PLINE
      INTEGER PDAY,PMONTH,PYEAR
      INTEGER DATE301(1000)
      CHARACTER*14 PRICE301(1000)
      INTEGER DAYSBEFORE,DAYSAFTER, FOUNDI3

C for the market data, FT
      INTEGER FTDATE301(1000)
      CHARACTER*14 FTPRICE301(1000)

C for variance calculations
      REAL RETURN (1000), FTRETURN(1000)
      REAL PRICEREAL (1000), INDEXREAL(1000)
      REAL EXRET(1000), SUM, VAR

C set the length of the event window, the number of days before & after
      DAYSBEFORE=20
      DAYSAFTER=20


C==================================================================
C open input and output files
      OPEN (UNIT=4, FILE='H:\RAWDATA\PRICES\ft.dat')
      OPEN (UNIT=5, FILE='H:\RAWDATA\WATFOR\agm.dat')
      OPEN (UNIT=9, FILE='H:\RAWDATA\WATFOR\agm.chk')

C clean and check datastream output for the market index, and keep in memory
      KFT=0
      LOOP
       READ(4,201,END=301) PLINE
       IF (PLINE(4:4) .EQ. '/'   ) THEN
       OPEN (UNIT=8, FILE='H:\RAWDATA\WATFOR\TEMP1')
       WRITE(8,204) PLINE(2:3), PLINE(5:6), PLINE(8:9)
       CLOSE (UNIT=8)
       OPEN (UNIT=8, FILE='H:\RAWDATA\WATFOR\TEMP1')
```

```
      READ(8,*) PDAY, PMONTH, PYEAR
      CLOSE (UNIT=8)

C check for overlap in dates
       IF (KFT.EQ.0) THEN
       QUIT
       ELSEIF
     1     (IDATE(PDAY,PMONTH,PYEAR) .EQ. FTDATE301(KFT-4)) THEN
       KFT=KFT-5
       ENDIF

      KFT=KFT+1
      FTDATE301(KFT)=IDATE(PDAY,PMONTH,PYEAR)
      FTPRICE301(KFT)=PLINE(10:23)
      KFT=KFT+1
      FTDATE301(KFT)=FTDATE301(KFT-1)+1
      FTPRICE301(KFT)=PLINE(24:37)
      KFT=KFT+1
      FTDATE301(KFT)=FTDATE301(KFT-1)+1
      FTPRICE301(KFT)=PLINE(38:51)
      KFT=KFT+1
      FTDATE301(KFT)=FTDATE301(KFT-1)+1
      FTPRICE301(KFT)=PLINE(52:65)
      KFT=KFT+1
      FTDATE301(KFT)=FTDATE301(KFT-1)+1
      FTPRICE301(KFT)=PLINE(66:79)

      ELSE
      ENDIF

      UNTIL (PLINE(2:9) .EQ. '27/ 7/92')

C eliminate any blank records in FT data
      J=0
      DO 23 I=1,KFT
      J=J+1
      FTPRICE301(J) = FTPRICE301(I)
      FTDATE301(J) = FTDATE301(I)
      IF (FTPRICE301(I) .EQ. '              ') THEN
      J=J-1
      ENDIF
 23   CONTINUE
      KFT=J

C check the continuity of the index
      DO 21 I=1,KFT-1
      IF ( (FTDATE301(I+1)-FTDATE301(I)) .GT.3 ) THEN
      WRITE (9,*) 'Index is not continuous'
      GO TO 301
      ENDIF
 21   CONTINUE
```

```
C================================================================
C read all the news announcements for each company
C IFILE is the number of the news data file, ICOMP is the number of the company in the file
      IFILE=0
      ICOMP=0

C MAIN LOOP ****************************
C read the news data files, file by file, where the company data is kept alphabetically
      LOOP
      IFILE=IFILE+1
      WRITE(9,*) 'The number of the data file is', IFILE

       IF (IFILE.EQ.1) THEN
       OPEN (UNIT=3, FILE='H:\RAWDATA\LISTS\NAMES.A')
       OPEN (UNIT=6, FILE='H:\RAWDATA\NEWS\NEWS.A')
       OPEN (UNIT=7, FILE='H:\RAWDATA\PRICES\A.DAT')
       ELSEIF (IFILE.EQ.2) THEN
       OPEN (UNIT=3, FILE='H:\RAWDATA\LISTS\NAMES.B')
       OPEN (UNIT=6, FILE='H:\RAWDATA\NEWS\NEWS.B')
       OPEN (UNIT=7, FILE='H:\RAWDATA\PRICES\B.DAT')
       ELSEIF (IFILE.EQ.3) THEN
       OPEN (UNIT=3, FILE='H:\RAWDATA\LISTS\NAMES.C')
       OPEN (UNIT=6, FILE='H:\RAWDATA\NEWS\NEWS.C')
       OPEN (UNIT=7, FILE='H:\RAWDATA\PRICES\C.DAT')
       ELSEIF (IFILE.EQ.4) THEN
       OPEN (UNIT=3, FILE='H:\RAWDATA\LISTS\NAMES.D')
       OPEN (UNIT=6, FILE='H:\RAWDATA\NEWS\NEWS.D')
       OPEN (UNIT=7, FILE='H:\RAWDATA\PRICES\D.DAT')
       ELSEIF (IFILE.EQ.5) THEN
       OPEN (UNIT=3, FILE='H:\RAWDATA\LISTS\NAMES.E')
       OPEN (UNIT=6, FILE='H:\RAWDATA\NEWS\NEWS.E')
       OPEN (UNIT=7, FILE='H:\RAWDATA\PRICES\E.DAT')
       ELSEIF (IFILE.EQ.6) THEN
       OPEN (UNIT=3, FILE='H:\RAWDATA\LISTS\NAMES.F')
       OPEN (UNIT=6, FILE='H:\RAWDATA\NEWS\NEWS.F')
       OPEN (UNIT=7, FILE='H:\RAWDATA\PRICES\F.DAT')
       ELSEIF (IFILE.EQ.7) THEN
       OPEN (UNIT=3, FILE='H:\RAWDATA\LISTS\NAMES.G')
       OPEN (UNIT=6, FILE='H:\RAWDATA\NEWS\NEWS.G')
       OPEN (UNIT=7, FILE='H:\RAWDATA\PRICES\G.DAT')
       ELSEIF (IFILE.EQ.8) THEN
       OPEN (UNIT=3, FILE='H:\RAWDATA\LISTS\NAMES.H')
       OPEN (UNIT=6, FILE='H:\RAWDATA\NEWS\NEWS.H')
       OPEN (UNIT=7, FILE='H:\RAWDATA\PRICES\H.DAT')
       ELSEIF (IFILE.EQ.9) THEN
       OPEN (UNIT=3, FILE='H:\RAWDATA\LISTS\NAMES.I')
       OPEN (UNIT=6, FILE='H:\RAWDATA\NEWS\NEWS.I')
       OPEN (UNIT=7, FILE='H:\RAWDATA\PRICES\I.DAT')
       ELSEIF (IFILE.EQ.10) THEN
       OPEN (UNIT=3, FILE='H:\RAWDATA\LISTS\NAMES.J')
       OPEN (UNIT=6, FILE='H:\RAWDATA\NEWS\NEWS.J')
       OPEN (UNIT=7, FILE='H:\RAWDATA\PRICES\J.DAT')
       ELSEIF (IFILE.EQ.11) THEN
       OPEN (UNIT=3, FILE='H:\RAWDATA\LISTS\NAMES.K')
       OPEN (UNIT=6, FILE='H:\RAWDATA\NEWS\NEWS.K')
```

```
OPEN (UNIT=7, FILE='H:\RAWDATA\PRICES\K.DAT')
ELSEIF (IFILE.EQ.12) THEN
OPEN (UNIT=3, FILE='H:\RAWDATA\LISTS\NAMES.L')
OPEN (UNIT=6, FILE='H:\RAWDATA\NEWS\NEWS.L')
OPEN (UNIT=7, FILE='H:\RAWDATA\PRICES\L.DAT')
ELSEIF (IFILE.EQ.13) THEN
OPEN (UNIT=3, FILE='H:\RAWDATA\LISTS\NAMES.M')
OPEN (UNIT=6, FILE='H:\RAWDATA\NEWS\NEWS.M')
OPEN (UNIT=7, FILE='H:\RAWDATA\PRICES\M.DAT')
ELSEIF (IFILE.EQ.14) THEN
OPEN (UNIT=3, FILE='H:\RAWDATA\LISTS\NAMES.N')
OPEN (UNIT=6, FILE='H:\RAWDATA\NEWS\NEWS.N')
OPEN (UNIT=7, FILE='H:\RAWDATA\PRICES\N.DAT')
ELSEIF (IFILE.EQ.15) THEN
OPEN (UNIT=3, FILE='H:\RAWDATA\LISTS\NAMES.O')
OPEN (UNIT=6, FILE='H:\RAWDATA\NEWS\NEWS.O')
OPEN (UNIT=7, FILE='H:\RAWDATA\PRICES\O.DAT')
ELSEIF (IFILE.EQ.16) THEN
OPEN (UNIT=3, FILE='H:\RAWDATA\LISTS\NAMES.P')
OPEN (UNIT=6, FILE='H:\RAWDATA\NEWS\NEWS.P')
OPEN (UNIT=7, FILE='H:\RAWDATA\PRICES\P.DAT')
ELSEIF (IFILE.EQ.17) THEN
OPEN (UNIT=3, FILE='H:\RAWDATA\LISTS\NAMES.Q')
OPEN (UNIT=6, FILE='H:\RAWDATA\NEWS\NEWS.Q')
OPEN (UNIT=7, FILE='H:\RAWDATA\PRICES\Q.DAT')
ELSEIF (IFILE.EQ.18) THEN
OPEN (UNIT=3, FILE='H:\RAWDATA\LISTS\NAMES.R')
OPEN (UNIT=6, FILE='H:\RAWDATA\NEWS\NEWS.R')
OPEN (UNIT=7, FILE='H:\RAWDATA\PRICES\R.DAT')
ELSEIF (IFILE.EQ.19) THEN
OPEN (UNIT=3, FILE='H:\RAWDATA\LISTS\NAMES.S')
OPEN (UNIT=6, FILE='H:\RAWDATA\NEWS\NEWS.S')
OPEN (UNIT=7, FILE='H:\RAWDATA\PRICES\S.DAT')
ELSEIF (IFILE.EQ.20) THEN
OPEN (UNIT=3, FILE='H:\RAWDATA\LISTS\NAMES.T')
OPEN (UNIT=6, FILE='H:\RAWDATA\NEWS\NEWS.T')
OPEN (UNIT=7, FILE='H:\RAWDATA\PRICES\T.DAT')
ELSEIF (IFILE.EQ.21) THEN
OPEN (UNIT=3, FILE='H:\RAWDATA\LISTS\NAMES.U')
OPEN (UNIT=6, FILE='H:\RAWDATA\NEWS\NEWS.U')
OPEN (UNIT=7, FILE='H:\RAWDATA\PRICES\U.DAT')
ELSEIF (IFILE.EQ.22) THEN
OPEN (UNIT=3, FILE='H:\RAWDATA\LISTS\NAMES.V')
OPEN (UNIT=6, FILE='H:\RAWDATA\NEWS\NEWS.V')
OPEN (UNIT=7, FILE='H:\RAWDATA\PRICES\V.DAT')
ELSEIF (IFILE.EQ.23) THEN
OPEN (UNIT=3, FILE='H:\RAWDATA\LISTS\NAMES.W')
OPEN (UNIT=6, FILE='H:\RAWDATA\NEWS\NEWS.W')
OPEN (UNIT=7, FILE='H:\RAWDATA\PRICES\W.DAT')
ELSEIF (IFILE.EQ.24) THEN
OPEN (UNIT=3, FILE='H:\RAWDATA\LISTS\NAMES.XYZ')
OPEN (UNIT=6, FILE='H:\RAWDATA\NEWS\NEWS.XYZ')
OPEN (UNIT=7, FILE='H:\RAWDATA\PRICES\XYZ.DAT')
ENDIF
```

```
      LOOP
C read the news file, company by company
C find the first announcement for the company (if EOF, then open new files)
      LOOP
      READ (6,201,END=102) LINE
 201 FORMAT (A80)
      UNTIL (LINE(5:8).EQ.'Date')

C read the rest of the announcements for the company, where I=no. of announcements
      I=0
      LOOP
      I=I+1
      READ (6,202) DAY(I), SLASH, MONTH(I), YEAR(I),HEADLINE(I),
     1         XPRICE(I)
 202 FORMAT (I4,A1,A3,1X,I2,1X,A33,A5)
      UNTIL (SLASH.NE.'/')

C all the announcements for the company are now in program's memory,
C the program will have read the next line after the announcements,
C therefore need to remind it to go back one line I-1
      IEND = (I-1)
      ICOMP=ICOMP+1
      WRITE(9,*) '                                    '
      WRITE(9,*) 'Company number',ICOMP

C change the format of the date, ie. name of month to numbers,
      DO 122 KM=1,IEND
      IF (MONTH(KM).EQ.'Jan') THEN
       IMONTH(KM)=1
      ELSEIF (MONTH(KM).EQ.'Feb') THEN
       IMONTH(KM)=2
      ELSEIF (MONTH(KM).EQ.'Mar') THEN
       IMONTH(KM)=3
      ELSEIF (MONTH(KM).EQ.'Apr') THEN
       IMONTH(KM)=4
      ELSEIF (MONTH(KM).EQ.'May') THEN
       IMONTH(KM)=5
      ELSEIF (MONTH(KM).EQ.'Jun') THEN
       IMONTH(KM)=6
      ELSEIF (MONTH(KM).EQ.'Jly') THEN
       IMONTH(KM)=7
      ELSEIF (MONTH(KM).EQ.'Aug') THEN
       IMONTH(KM)=8
      ELSEIF (MONTH(KM).EQ.'Sep') THEN
       IMONTH(KM)=9
      ELSEIF (MONTH(KM).EQ.'Oct') THEN
       IMONTH(KM)=10
      ELSEIF (MONTH(KM).EQ.'Nov') THEN
       IMONTH(KM)=11
      ELSEIF (MONTH(KM).EQ.'Dec') THEN
       IMONTH(KM)=12
      ENDIF
  122 CONTINUE
```

```
C=====================================================
C find the company's characteristics from the names file, and keep in memory
      READ (3,200,END=303) NAME, IND, MKT, MV91, MV92, AGE91
 200 FORMAT (A30,1X,I2,1X,A3,1X,2F10.2,1X,A7)
      WRITE(9,*) 'Company name from names file is   ', NAME


C find the share price data
C clean and check datastream output for the share price data, and keep in memory
C the event date is IDATE(DAY(ICOUNTER),IMONTH(ICOUNTER),YEAR(ICOUNTER))
      KK=0
      KNAME=0
      LOOP
      READ(7,201,END=302) PLINE

       IF (KNAME.EQ.0) THEN
       IF (PLINE(4:4).NE.'/') THEN
       WRITE(9,*) 'Company name from prices file is   ', PLINE(1:50)
       KNAME=1
       ENDIF
       ENDIF

       IF (PLINE(4:4) .EQ.'/'   ) THEN
       OPEN (UNIT=8, FILE='H:\RAWDATA\WATFOR\TEMP1')
       WRITE(8,204) PLINE(2:3), PLINE(5:6), PLINE(8:9)
 204   FORMAT (A2,1X,A2,1X,A2)
       CLOSE (UNIT=8)
       OPEN (UNIT=8, FILE='H:\RAWDATA\WATFOR\TEMP1')
       READ(8,*) PDAY, PMONTH, PYEAR
       CLOSE (UNIT=8)

C check for overlap in dates
        IF (KK.EQ.0) THEN
        QUIT
        ELSEIF
     1     (IDATE(PDAY,PMONTH,PYEAR).EQ.DATE301(KK-4)) THEN
        KK=KK-5
        ENDIF

       KK=KK+1
       DATE301(KK)=IDATE(PDAY,PMONTH,PYEAR)
       PRICE301(KK)=PLINE(10:23)
       KK=KK+1
       DATE301(KK)=DATE301(KK-1)+1
       PRICE301(KK)=PLINE(24:37)
       KK=KK+1
       DATE301(KK)=DATE301(KK-1)+1
       PRICE301(KK)=PLINE(38:51)
       KK=KK+1
       DATE301(KK)=DATE301(KK-1)+1
       PRICE301(KK)=PLINE(52:65)
       KK=KK+1
       DATE301(KK)=DATE301(KK-1)+1
       PRICE301(KK)=PLINE(66:79)
```

```
      ELSE
      ENDIF

     UNTIL ( PLINE(2:9) .EQ. '27/ 7/92')

C eliminate the blank records in price data
     J=0
     DO 28 I=1,KK
     J=J+1
     PRICE301(J) = PRICE301(I)
     DATE301(J) = DATE301(I)
     IF (PRICE301(I) .EQ. '             ' ) THEN
     J=J-1
     ENDIF
     IF (PRICE301(I) .EQ. '          N/A' ) THEN
     J=J-1
     ENDIF
 28  CONTINUE
     KK=J

C check the continuity of the price data
     DO 20 I=1,KK-1
     IF ( (DATE301(I+1)-DATE301(I)) .GT.3 ) THEN
      WRITE (9,*) 'Prices not continuous: skip this company'
      GO TO 22
     ENDIF
 20  CONTINUE


C=================================================================
C now with all the data in memory, return to the announcements to check if the window is clear
C match with all the relevant data and write to output file

C count the number of announcements after 1/1/91, for the company
     INEWS=0
     DO 125 KN=1,IEND
     IF (IDATE(DAY(KN),IMONTH(KN),YEAR(KN)) .GE. IDATE(1,1,91)) THEN
     INEWS=INEWS+1
     ENDIF
 125 CONTINUE

C find the event of interest, in this case AGMs
     K=0
     DO 123 K=1,IEND
     IF (HEADLINE(K)(1:3).EQ.'AGM') THEN

C check that the window is clear: ICLEAR =1 if true
       ICLEAR=0

C ignore the first or last events for each company, as can not check to see if the window is clear
C 1 is before, 2 is after, 3 is announcement day
       IF ( (K.NE.1) .AND. (K.NE.IEND)  ) THEN
       N1=IDATE(DAY(K-1),IMONTH(K-1),YEAR(K-1))
       N2=IDATE(DAY(K),IMONTH(K),YEAR(K))
       N3=IDATE(DAY(K+1),IMONTH(K+1),YEAR(K+1))
```

```
      IF ( ((N2-N1).GT.DAYSBEFORE) .AND.
    1       ((N3-N2).GT.DAYSAFTER)   ) THEN
      ICLEAR=1
      ENDIF
     ENDIF

C if not clear, search for next occurrence
     IF (ICLEAR.EQ.0) THEN
     WRITE(9,*) 'Window not clear'
     WRITE(9,*) 'SKIP this obs'
     WRITE(9,406) DAY(K),MONTH(K),YEAR(K),HEADLINE(K)
 406 FORMAT (I4,1X,A3,1X,I2,1X,A33)
     GOTO 123
     ENDIF

C the window is clear, and the event date is
    I3=IDATE(DAY(K),IMONTH(K),YEAR(K))


C===============================================================
C find the share price data for the event period, but first find the event data
C when the event day is found, this is marked in the price array with IPRICE301
    FOUNDI3=0
C IPRICE301=0 when theres not enough data
    IPRICE301=0

    DO 206 JJ=1,KK-1
     IF (FOUNDI3 .EQ. 0) THEN
      IF (I3 .EQ. DATE301(JJ)) THEN
C write the price data to the output file, if available
      IF ( (DATE301(JJ)-DATE301(1) .GE. DAYSBEFORE).AND.
    1     (DATE301(KK)-DATE301(JJ) .GE. DAYSAFTER) ) THEN
      WRITE(5,*) 'Price variables'
      DO 24 I=(-DAYSBEFORE),(+DAYSAFTER),1
      WRITE (5,304) DATE301(JJ+I), PRICE301(JJ+I)
 24   CONTINUE
      IPRICE301=JJ
      ELSE
      WRITE(9,*) '1:Announce found, but not enough prices either side'
      WRITE(9,*) 'SKIP this obs'
      GO TO 123
      ENDIF
 304 FORMAT(I20, A14)
     FOUNDI3=1

     ELSEIF ( (I3 .EQ. DATE301(JJ+1)).OR.
    1  ((I3.GT.DATE301(JJ)).and.(I3.LT.DATE301(JJ+1))) ) THEN

      IF ( (DATE301(JJ+1)-DATE301(1) .GE. DAYSBEFORE).AND.
    1     (DATE301(KK)-DATE301(JJ+1) .GE. DAYSAFTER) ) THEN
      WRITE(5,*) 'Price variables'
      DO 25 I=(-DAYSBEFORE),(+DAYSAFTER),1
      WRITE (5,304) DATE301(JJ+1+I), PRICE301(JJ+1+I)
 25   CONTINUE
      IPRICE301=JJ+1
```

```
       ELSE
       WRITE(9,*) '2:Announce found, but not enough prices either side'
       WRITE(9,*) 'SKIP this obs'
       GO TO 123
       ENDIF
      FOUNDI3=1
      ENDIF

     ENDIF
 206 CONTINUE

     IF (FOUNDI3 .EQ. 0) THEN
     WRITE (9,*) '3:Cannot find announcement price date      '
     WRITE(9,*) 'SKIP this obs'
     GO TO 123
     ENDIF

C=========================================================
C find the market index data for the event period, but first find the event data
C when the event day is found, this is marked in the price array with IFT301
     FOUNDI3=0
C IFT301=0 when theres not enough data
     IFT301=0

     DO 207 JJ=1,KFT-1
      IF (FOUNDI3 .EQ. 0) THEN
       IF (I3 .EQ. FTDATE301(JJ)) THEN
C write the data to the output file, if available
        IF ( (FTDATE301(JJ)-FTDATE301(1) .GE. DAYSBEFORE).AND.
    1     (FTDATE301(KFT)-FTDATE301(JJ) .GE. DAYSAFTER) ) THEN
        WRITE(5,*) 'FT variables'
        DO 26 I=(-DAYSBEFORE),(+DAYSAFTER),1
        WRITE (5,304) FTDATE301(JJ+I),FTPRICE301(JJ+I)
 26     CONTINUE
        IFT301=JJ
        ELSE
        WRITE(9,*) '4:Announce found, but not enough FT either side'
        WRITE(9,*) 'SKIP this obs'
        GO TO 123
        ENDIF
       FOUNDI3=1

       ELSEIF ( (I3 .EQ. FTDATE301(JJ+1)).OR.
    1   ((I3.GT.FTDATE301(JJ)).and.(I3.LT.FTDATE301(JJ+1))) ) THEN

        IF ( (FTDATE301(JJ+1)-FTDATE301(1) .GE. DAYSBEFORE).AND.
    1     (FTDATE301(KFT)-FTDATE301(JJ+1) .GE. DAYSAFTER) ) THEN
        WRITE(5,*) 'FT variables'
        DO 27 I=(-DAYSBEFORE),(+DAYSAFTER),1
        WRITE (5,304) FTDATE301(JJ+1+I),FTPRICE301(JJ+1+I)
 27     CONTINUE
        IFT301=JJ+1
        ELSE
        WRITE(9,*) '5:Announce found, but not enough FT either side'
        WRITE(9,*) 'SKIP this obs'
```

```
        GO TO 123
        ENDIF
       FOUNDI3=1
       ENDIF

     ENDIF
 207  CONTINUE

     IF (FOUNDI3 .EQ. 0) THEN
     WRITE (9,*) '6:Cannot find announcement FT date        '
     WRITE(9,*) 'SKIP this obs'
     GO TO 123
     ENDIF


C===================================================================
C recall: if IPRICE301 = 0 then no price series
C recall: if IFT301    = 0 then no FT series
C IPRICE301= event day in price file    PRICE301
C IFT301   = event day in FT file       FTPRICE301

C match up with company characteristics and write to output file
      IF ( (IPRICE301 .GT. 0) .AND. (IFT301 .GT. 0) ) THEN
      WRITE (5,400) NAME(1:20), IND, MKT, MV91, MV92, AGE91,
     1  INEWS, IDATE(DAY(K),IMONTH(K),YEAR(K))
 400  FORMAT (A20,1X,I2,1X,A3,1X,2F10.2,1X,A7,1X,
     1  I3,2X,I6)
      WRITE(5,405) DAY(K),MONTH(K),YEAR(K),HEADLINE(K),XPRICE(K)
 405  FORMAT (I4,1X,A3,1X,I2,1X,A33,1X,A5)


C===================================================================
C calculate returns and the variance of returns
C re-read price as a real variable
      DO 399 JJ=1,IPRICE301
      OPEN (UNIT=8, FILE='H:\RAWDATA\WATFOR\TEMP1')
      WRITE(8,404) PRICE301(JJ)
 404  FORMAT (A14)
      CLOSE (UNIT=8)
      OPEN (UNIT=8, FILE='H:\RAWDATA\WATFOR\TEMP1')
      READ(8,*) PRICEREAL(JJ)
      CLOSE (UNIT=8)
 399  CONTINUE

C re-read index as real
      DO 401 JJ=1,IFT301
      OPEN (UNIT=8, FILE='H:\RAWDATA\WATFOR\TEMP1')
      WRITE(8,404) FTPRICE301(JJ)
      CLOSE (UNIT=8)
      OPEN (UNIT=8, FILE='H:\RAWDATA\WATFOR\TEMP1')
      READ(8,*) INDEXREAL(JJ)
      CLOSE (UNIT=8)
 401  CONTINUE
```

```
C calculate returns for company, 2 ... IPRICE301
      DO 402 JJ=2,IPRICE301+DAYSAFTER
      RETURN(JJ) = (PRICEREAL(JJ) - PRICEREAL(JJ-1))
     1            / PRICEREAL(JJ-1)
 402  CONTINUE

C calculate returns for index, 2 ... IFT301
      DO 403 JJ=2,IFT301+DAYSAFTER
      FTRETURN(JJ) = (INDEXREAL(JJ) - INDEXREAL(JJ-1))
     1            / INDEXREAL(JJ-1)
 403  CONTINUE

C Calculate mean returns, over daysbefore excl. the event day
      MEAN=0.0
      DO 135 KL=IPRICE301-DAYSBEFORE,IPRICE301-1
      MEAN=MEAN+RETURN(KL)
 135  CONTINUE
      MEAN = (MEAN/DAYSBEFORE)

C Calculate variance of returns over daysbefore
      VAR=0.0
      DO 136 KL=IPRICE301-DAYSBEFORE,IPRICE301-1
      VAR=VAR+(RETURN(KL)-MEAN)**2
 136  CONTINUE
C Calculate the standard deviation of returns
      VAR=(VAR/DAYSBEFORE)**0.5

C write var to file
      WRITE(5,137) VAR
 137  FORMAT (50X,F10.4)

     ENDIF

    ENDIF

C END of loop within each datafile
C go here when: prices not continuous
C              insufficient prices data
C              announcement price not found
 123 CONTINUE
  22 CONTINUE
    ENDLOOP

C go here when reach END of news file
 102 CONTINUE
    CLOSE (UNIT=3)
    CLOSE (UNIT=6)
    CLOSE (UNIT=7)

C END OF MAIN LOOP
    UNTIL (IFILE.EQ.24)

    GO TO 300
 301 WRITE(9,*) ' stopped: not all FT price data is available'
    GO TO 300
```

```
 302 WRITE(9,*) ' stopped: not enough company price data is available'
     GO TO 300
 303 WRITE(9,*) ' stopped: company characteristics data not available'
     GO TO 300


 300 CLOSE (UNIT=4)
     CLOSE (UNIT=5)
     CLOSE (UNIT=9)
     STOP
     END

C===================================================================
C SUBROUTINE to convert announcement date into a number
     FUNCTION IDATE (D,M,Y)
     INTEGER D,M,Y,X
C to calculate the days from 1/1/80
C number of days for each year
     IF (Y.EQ.80)      THEN
              IDATE=0
     ELSE IF (Y.EQ.81) THEN
              IDATE=366
     ELSE IF (Y.EQ.82) THEN
              IDATE=366+365
     ELSE IF (Y.EQ.83) THEN
              IDATE=366+365+365
     ELSE IF (Y.EQ.84) THEN
              IDATE=366+365+365+365
     ELSE IF (Y.EQ.85) THEN
              IDATE=366+365+365+365+366
     ELSE IF (Y.EQ.86) THEN
              IDATE=366+365+365+365+366+365
     ELSE IF (Y.EQ.87) THEN
              IDATE=366+365+365+365+366+365+365
     ELSE IF (Y.EQ.88) THEN
              IDATE=366+365+365+365+366+365+365+365
     ELSE IF (Y.EQ.89) THEN
              IDATE=366+365+365+365+366+365+365+365+366
     ELSE IF (Y.EQ.90) THEN
              IDATE=366+365+365+365+366+365+365+365+366+365
     ELSE IF (Y.EQ.91) THEN
              IDATE=366+365+365+365+366+365+365+365+366+365+365
     ELSE IF (Y.EQ.92) THEN
              IDATE=366+365+365+365+366+365+365+365+366+365+365
    1 +365
     ENDIF

C remember for a leap year
     IF ( (Y.EQ.80) .OR. (Y.EQ.84) .OR. (Y.EQ.88) .OR. (Y.EQ.92) ) THEN
     X=29
     ELSE
     X=28
     ENDIF
```

```
C number of days for each month
      IF (M.EQ.2)      THEN
            IDATE=IDATE+31
      ELSE IF (M.EQ.3) THEN
            IDATE=IDATE+31+X
      ELSE IF (M.EQ.4) THEN
            IDATE=IDATE+31+X+31
      ELSE IF (M.EQ.5) THEN
            IDATE=IDATE+31+X+31+30
      ELSE IF (M.EQ.6) THEN
            IDATE=IDATE+31+X+31+30+31
      ELSE IF (M.EQ.7) THEN
            IDATE=IDATE+31+X+31+30+31+30
      ELSE IF (M.EQ.8) THEN
            IDATE=IDATE+31+X+31+30+31+30+31
      ELSE IF (M.EQ.9) THEN
            IDATE=IDATE+31+X+31+30+31+30+31+31
      ELSE IF (M.EQ.10) THEN
            IDATE=IDATE+31+X+31+30+31+30+31+31+30
      ELSE IF (M.EQ.11) THEN
            IDATE=IDATE+31+X+31+30+31+30+31+31+30+31
      ELSE IF (M.EQ.12) THEN
            IDATE=IDATE+31+X+31+30+31+30+31+31+30+31+30
      END IF

C add the number of days
      IDATE=IDATE + D
      END
```

APPENDIX 2a:

Distribution Properties of the Abnormal Performance Index for each Information Type

Clear Event Window

Variable	Mean	Std.Dev.	Skewness	Kurtosis	Minimum	Maximum
Annual Earnings (n=116)						
Using Market Model Adjusted Excess Returns, MM						
API_{prior}	1.050	0.166	0.699	6.617	0.479	1.688
API_{ann}	0.988	0.077	-2.030	18.246	0.484	1.253
$API_{prior+ann}$	1.038	0.188	0.839	6.808	0.437	1.753
API_{post}	1.050	0.221	1.031	7.872	0.379	1.953
Using Market Adjusted Excess Returns, MKT						
API_{prior}	1.010	0.125	1.083	7.020	0.713	1.572
API_{ann}	1.005	0.080	-1.702	15.886	0.500	1.242
$API_{prior+ann}$	1.016	0.156	0.558	6.949	0.454	1.717
API_{post}	1.019	0.166	2.142	10.028	0.720	1.842
Using Mean Adjusted Excess Returns, MN						
API_{prior}	1.114	0.186	1.799	9.215	0.777	2.100
API_{ann}	1.009	0.080	-1.759	16.563	0.496	1.260
$API_{prior+ann}$	1.126	0.220	1.393	8.972	0.468	2.297
API_{post}	1.108	0.234	2.692	11.529	0.793	2.203
Interim Earnings (n=152)						
Using Market Model Adjusted Excess Returns, MM						
API_{prior}	1.051	0.174	0.884	6.442	0.479	1.688
API_{ann}	0.985	0.084	-2.071	15.511	0.484	1.253
$API_{prior+ann}$	1.039	0.205	0.764	6.768	0.297	1.794
API_{post}	1.048	0.204	1.108	8.486	0.379	1.953
Using Market Adjusted Excess Returns, MKT						
API_{prior}	0.995	0.150	0.010	7.502	0.353	1.570
API_{ann}	0.982	0.085	-2.118	15.243	0.482	1.235
$API_{prior+ann}$	0.979	0.178	-0.059	6.939	0.255	1.582
API_{post}	0.990	0.183	0.883	9.256	0.314	1.811
Using Mean Adjusted Excess Returns, MN						
API_{prior}	1.064	0.189	1.160	7.359	0.453	1.962
API_{ann}	0.986	0.084	-2.029	14.951	0.496	1.247
$API_{prior+ann}$	1.052	0.221	1.062	7.053	0.320	1.973
API_{post}	1.065	0.228	1.958	12.965	0.380	2.447

Appendix 2a contd.

Variable	Mean	Std.Dev.	Skewness	Kurtosis	Minimum	Maximum
AGMs (n=106)						
Using Market Model Adjusted Excess Returns, MM						
API_{prior}	1.043	0.108	1.360	6.778	0.840	1.549
API_{ann}	1.005	0.036	2.347	19.076	0.897	1.231
$API_{prior+ann}$	1.048	0.123	1.504	6.973	0.839	1.568
API_{post}	1.011	0.105	-1.275	11.402	0.412	1.283
Using Market Adjusted Excess Returns, MKT						
API_{prior}	1.010	0.090	0.693	4.708	0.792	1.339
API_{ann}	1.004	0.036	2.285	18.826	0.892	1.230
$API_{prior+ann}$	1.015	0.104	1.238	6.631	0.795	1.493
API_{post}	0.989	0.099	-1.830	13.011	0.408	1.253
Using Mean Adjusted Excess Returns, MN						
API_{prior}	1.057	0.117	1.661	8.611	0.855	1.664
API_{ann}	1.005	0.036	2.254	18.201	0.899	1.229
$API_{prior+ann}$	1.062	0.133	1.800	8.550	0.836	1.678
API_{post}	1.008	0.110	-0.959	9.047	0.428	1.267
Board Changes (n=387)						
Using Market Model Adjusted Excess Returns, MM						
API_{prior}	1.019	0.114	2.573	28.399	0.583	2.164
API_{ann}	1.000	0.016	-2.544	27.894	0.843	1.069
$API_{prior+ann}$	1.019	0.118	2.934	34.317	0.566	2.276
API_{post}	1.005	0.119	-0.640	9.707	0.284	1.494
Using Market Adjusted Excess Returns, MKT						
API_{prior}	0.989	0.099	1.358	18.327	0.574	1.858
API_{ann}	0.999	0.016	-2.459	28.119	0.840	1.070
$API_{prior+ann}$	0.988	0.101	1.652	22.600	0.557	1.943
API_{post}	0.980	0.111	-1.297	11.657	0.227	1.392
Using Mean Adjusted Excess Returns, MN						
API_{prior}	1.024	0.116	2.166	23.061	0.592	2.124
API_{ann}	1.001	0.016	-2.246	29.103	0.840	1.070
$API_{prior+ann}$	1.025	0.119	2.557	28.591	0.576	2.233
API_{post}	1.010	0.126	-0.311	9.503	0.280	1.712

Appendix 2a contd.

Variable	Mean	Std.Dev.	Skewness	Kurtosis	Minimum	Maximum
Changes in Shareholdings (n=927)						
Using Market Model Adjusted Excess Returns, MM						
API_{prior}	1.023	0.117	1.248	15.587	0.357	2.073
API_{ann}	1.002	0.023	5.187	77.985	0.862	1.350
$API_{prior+ann}$	1.025	0.120	1.333	14.176	0.458	2.082
API_{post}	1.020	0.113	0.706	10.655	0.266	1.625
Using Market Adjusted Excess Returns, MKT						
API_{prior}	0.998	0.106	0.078	12.184	0.297	1.769
API_{ann}	1.001	0.022	4.792	74.812	0.852	1.338
$API_{prior+ann}$	0.999	0.108	0.237	11.090	0.398	1.774
API_{post}	0.999	0.100	0.044	10.649	0.281	1.552
Using Mean Adjusted Excess Returns, MN						
API_{prior}	1.031	0.124	1.322	14.286	0.377	2.110
API_{ann}	1.002	0.023	5.003	76.387	0.851	1.347
$API_{prior+ann}$	1.033	0.128	1.392	13.196	0.466	2.118
API_{post}	1.023	0.120	0.712	10.762	0.259	1.791

Notes:
n represents the number of observations,
API_{prior} is the value of £1 invested in the prior period for (t=-20,...,-1),
API_{ann} is the value of £1 invested in the announcement period for (t=0),
$API_{prior+ann}$ is the value of £1 invested in the announcement period for (t=-20,...,0),
API_{post} is the value of £1 invested in the announcement period for (t=+1,...,+20).

APPENDIX 2b:

Distribution Properties of the Abnormal Performance Index for each Information Type

Unclear Event Window

Variable	Mean	Std.Dev.	Skewness	Kurtosis	Minimum	Maximum
Annual Earnings (n=1830)						
Using Market Model Adjusted Excess Returns, MM						
API_{prior}	1.032	0.135	1.651	19.822	-0.072	2.487
API_{ann}	1.005	0.077	-4.929	87.747	-0.478	1.421
$API_{prior+ann}$	1.037	0.158	0.846	18.260	-0.372	2.714
API_{post}	1.026	0.143	3.376	36.347	0.087	2.822
Using Market Adjusted Excess Returns, MKT						
API_{prior}	1.004	0.115	0.211	14.894	-0.071	1.876
API_{ann}	1.004	0.077	-4.984	87.123	-0.477	1.422
$API_{prior+ann}$	1.009	0.139	-0.501	14.886	-0.357	2.017
API_{post}	0.997	0.117	1.429	17.727	0.076	2.298
Using Mean Adjusted Excess Returns, MN						
API_{prior}	1.044	0.144	1.455	14.870	-0.074	2.254
API_{ann}	1.006	0.077	-4.837	85.591	-0.476	1.419
$API_{prior+ann}$	1.051	0.169	0.823	14.183	-0.380	2.398
API_{post}	1.036	0.146	2.447	22.163	0.104	2.752
Interim Earnings (n=1452)						
Using Market Model Adjusted Excess Returns, MM						
API_{prior}	1.020	0.120	1.094	17.295	0.047	2.230
API_{ann}	0.996	0.073	-2.952	33.694	0.193	1.474
$API_{prior+ann}$	1.015	0.138	0.216	10.466	0.062	1.794
API_{post}	1.020	0.137	0.723	12.897	0.108	1.998
Using Market Adjusted Excess Returns, MKT						
API_{prior}	0.996	0.112	0.845	26.464	0.049	2.408
API_{ann}	0.995	0.073	-2.984	33.852	0.192	1.473
$API_{prior+ann}$	0.989	0.127	-0.684	10.663	0.063	1.700
API_{post}	0.995	0.124	-0.005	13.008	0.105	1.820
Using Mean Adjusted Excess Returns, MN						
API_{prior}	1.030	0.133	1.992	27.203	0.046	2.735
API_{ann}	0.996	0.073	-2.895	33.298	0.194	1.476
API_{ann}	1.025	0.146	0.539	10.862	0.060	2.010
API_{post}	1.025	0.145	1.304	16.502	0.109	2.447

Appendix 2b contd.

Variable	Mean	Std.Dev.	Skewness	Kurtosis	Minimum	Maximum
AGMs (n=481)						
Using Market Model Adjusted Excess Returns, MM						
API_{prior}	1.028	0.113	2.621	22.942	0.675	2.139
API_{ann}	0.999	0.041	-1.693	22.078	0.665	1.231
$API_{prior+ann}$	1.028	0.130	2.080	16.774	0.643	2.158
API_{post}	1.011	0.108	0.866	16.001	0.412	1.915
Using Market Adjusted Excess Returns, MKT						
API_{prior}	1.002	0.092	1.186	12.607	0.629	1.743
API_{ann}	0.998	0.041	-1.693	22.180	0.665	1.230
$API_{prior+ann}$	1.001	0.107	0.899	9.762	0.631	1.748
API_{post}	0.995	0.098	-0.884	10.999	0.408	1.581
Using Mean Adjusted Excess Returns, MN						
API_{prior}	1.046	0.121	2.428	20.665	0.678	2.196
API_{ann}	0.999	0.042	-1.738	21.928	0.661	1.229
$API_{prior+ann}$	1.046	0.139	1.968	15.371	0.634	2.216
API_{post}	1.010	0.114	0.755	13.408	0.428	1.921
Board Changes (n=1807)						
Using Market Model Adjusted Excess Returns, MM						
API_{prior}	1.014	0.149	0.840	24.485	-0.081	2.703
API_{ann}	0.996	0.068	-8.720	-	-0.359	1.364
$API_{prior+ann}$	1.011	0.163	0.048	22.345	-0.411	2.744
API_{post}	1.010	0.154	-0.403	33.248	-1.039	2.706
Using Market Adjusted Excess Returns, MKT						
API_{prior}	0.986	0.143	1.267	41.156	-0.071	3.065
API_{ann}	0.995	0.068	-8.754	-	-0.361	1.342
$API_{prior+ann}$	0.981	0.154	0.171	34.252	-0.390	3.117
API_{post}	0.982	0.142	-0.496	37.819	-0.850	2.838
Using Mean Adjusted Excess Returns, MN						
API_{prior}	1.024	0.167	2.850	51.477	-0.074	3.700
API_{ann}	0.997	0.068	-8.623	-	-0.358	1.354
$API_{prior+ann}$	1.021	0.179	1.830	43.394	-0.387	3.789
API_{post}	1.015	0.163	0.630	40.386	-1.010	3.286

Appendix 2b contd.

Variable	Mean	Std.Dev.	Skewness	Kurtosis	Minimum	Maximum
Changes in Shareholdings (n=4354)						
Using Market Model Adjusted Excess Returns, MM						
API_{prior}	1.025	0.152	0.169	14.809	-0.485	2.139
API_{ann}	1.002	0.031	1.037	-	0.315	1.562
$API_{prior+ann}$	1.027	0.158	0.315	14.430	-0.490	2.326
API_{post}	1.020	0.132	1.412	23.805	0.031	2.930
Using Market Adjusted Excess Returns, MKT						
API_{prior}	0.998	0.137	-0.803	15.625	-0.472	1.958
API_{ann}	1.001	0.031	0.830	-	0.315	1.564
$API_{prior+ann}$	0.999	0.141	-0.701	14.745	-0.465	1.974
API_{post}	0.997	0.116	0.129	16.425	0.008	2.313
Using Mean Adjusted Excess Returns, MN						
API_{prior}	1.033	0.157	0.160	13.832	-0.496	2.196
API_{ann}	1.002	0.031	0.902	-	0.312	1.565
$API_{prior+ann}$	1.036	0.163	0.291	13.359	-0.499	2.258
API_{post}	1.024	0.139	1.234	19.414	0.003	2.831

Notes:
n represents the number of observations,
API_{prior} is the value of £1 invested in the prior period for (t=-20,...,-1),
API_{ann} is the value of £1 invested in the announcement period for (t=0),
$API_{prior+ann}$ is the value of £1 invested in the announcement period for (t=-20,...,0),
API_{post} is the value of £1 invested in the announcement period for (t=+1,...,+20).

REFERENCES

Abarbanell J.S., 1991. 'Do analysts' earnings forecasts incorporate information in prior stock price changes?' *Journal of Accounting and Economics* 14, 147-165.

Abarbanell J.S. and V.L. Bernard, 1992. 'Tests of analysts' overreaction/underreaction to earnings information as an explanation for anomalous stock price behaviour.' *The Journal of Finance* 3, July, 1181-1207.

Atiase R.K., 1985. 'Predisclosure information, firm capitalisation, and security price behaviour around earnings announcements.' *Journal of Accounting Research* 23, No.1, Spring, 21-36.

Atiase R.K., 1987. 'Market implications of predisclosure information: size and exchange effects.' *Journal of Accounting Research* 25, No.1, Spring, 168-176.

Atiase R.K. and L.S. Bamber, 1994. 'Trading volume reactions to annual accounting earnings announcements - the incremental role of predisclosure information asymmetry.' *Journal of Accounting and Economics* 17, 309-329.

Ball R., 1992. 'What do we know about market efficiency?' Unpublished manuscript (University of Rochester).

Ball R., 1992. 'The earnings - price anomaly.' *Journal of Accounting and Economics* 15, 319-345.

Ball R. and P. Brown, 1968. 'An empirical evaluation of accounting income numbers.' *Journal of Accounting Research*, Spring, 21-36.

Ball R. and S.P. Kothari, 1989. 'Non-stationary expected returns. Implications for tests of market efficiency and serial correlation in returns.' *Journal of Financial Economics* 25, 51-74.

Ball R. and S.P. Kothari, 1991. 'Security returns around earnings announcements.' *The Accounting Review* 66, No.4, October, 718-738.

Ball R., S.P. Kothari, and Watts, 1991. 'Economic determinants of teh relation between earnings changes and stock returns.' Working Paper (University of Rochester, NY).

Bamber L.S., 1987. 'Unexpected earnings, firm size, and trading volume around quarterly earnings announcements.' *The Accounting Review*, Vol.LXII, No.3, July, 510-531.

Banz R.W., 1981. 'The relationship between return and market value of common stock.' *Journal of Financial Economics* 9, 3-18.

Bar-Yosef S. and L.D. Brown, 1977. 'A re-examination of stock splits using moving betas.' *The Journal of Finance*, Vol.XXXII, No.4, September, 1069-1080.

Bartov E., 1992. 'Patterns in Unexpected Earnings as an explanation for post-announcement drift.' *The Accounting Review* 67, No.3, July, 610-622.

Basu S., 1977. 'Investment performance of common stocks in relation to their price-earnings ratios: A test of the efficient market hypothesis.' *The Journal of Finance* 32, June, 663-682.

Basu S., 1983. ' The relationship between the earnings yield, market value, and the return for NYSE common stocks: further evidence.' *Journal of Financial Economics*, June, 129-156.

Beaver W.H., 1968. 'The information content of annual earnings announcements.' Empirical Research in Accounting: Selected Studies, Supplement to *Journal of Accounting Research*, 67-92.

Beaver W.H., 1981. 'Market efficiency.' *The Accounting Review*, Vol.LVI, No.1, January, 23-37.

Beaver W.H., and D. Morse, 1978. 'What determines price-earnings ratios ?' *Financial Analysts Journal*, 65-76.

Beaver W.H., R.A. Lambert and D. Morse, 1980. 'The information content of security prices.' *Journal of Accounting Economics*, March, 3-28.

Beaver W.H., R.A. Lambert and S.G. Ryan, 1987. 'The information content of security prices. A second look.' *Journal of Accounting and Economics* 9, 139-157.

Bernard V.L., 1989. 'Capital market research in accounting during the 1980s: A critical review.' Extract from T.Frecka, ed. *The state of accounting research as we enter the 1990s*, (University of Illinois, Urbana-Champaign, IL), 72-120.

Bernard V.L., 1992. 'Stock price reactions to earnings announcements: A summary of recent anomalous evidence and possible explanations. Extract from R. Thaler, ed. *Advances in Behavioural Finance* (Russell Sage Foundation), 303-340.

Bernard V.L. and J.K. Thomas, 1989. 'Post-earnings announcement drift: delayed price response or risk premium?' *Journal of Accounting Research* 27, Supplement, 1-36.

Bernard V.L. and J.K. Thomas, 1990. 'Evidence that stock prices do not fully reflect the implications of current earnings for future earnings.' *Journal of Accounting and Economics* 13, 305-340.

Bhandari L.C., 1989. 'Debt-equity ratio and expected common-stock returns - empirical evidence.' *Journal of Finance* 43, No.2, 502-528.

Bhushan R., 1989. 'Firm characteristics and analyst following.' *Journal of Accounting and Economics* 11, 255-274.

Bhushan R., 1994. 'An informational efficiency perspective on the post-earnings announcement drift.' Journal of Accounting and Economics 18, 45-65.

Bikhchandani S., D. Hirshleifer and I. Welch, 1992. 'A theory of fads, fashion, custom, and cultural change as informational cascades.' *Journal of Political Economy* 100, No.5, 992-1026.

Black F., 1986. 'Noise.' *The Journal of Finance* 41, No.3, July, 529-543.

Blume M.E., and R.F. Stambaugh, 1983. 'Biases in computed returns: an application to the size effect.' *Journal of Financial Economics* 12, November, 387-404.

Brennan M.J., 1990. 'Latent Assets.' *The Journal of Finance*, Vol.XLV, No.3, July, 709-730.

Brennan M.J., N. Jegadeesh and B. Swaminathan, 1994. 'Investment analysis and the adjustment of stock prices to common information.' Working Paper 158 (Institute of Finance and Accounting, London Business School).

Briston R.J., B. Saadouni, C.A. Mallin and J.A. Coutts, 1992. 'MBO announcements and security returns: a UK study 1984-89.' *Journal of Business and Financial Accounting* 19, No.4, June, 641-655.

Brookfield D., and R. Morris, 1992. 'The impact of UK company news announcements.' *Journal of Business and Financial Accounting* 19, No.4, June, 585-601.

Brown K.C., W.V. Harlow and S.M. Tinic, 1988. 'Risk aversion, uncertain information and market inefficiency.' *Journal of Financial Economics* 22, 355-385.

Brown K.C., W.V. Harlow and S.M. Tinic, 1993. 'The risk and required return of common stock following major price innovations.' *Journal of Financial and Quantitative Analysis* 28, No.1, March, 101-116.

Brown L.D., 1992. 'The impact of annual earnings announcements on convergence of beliefs.' *The Accounting Review* 67, No.4, October, 862-875.

Brown L.D. and J.C.Y. Han, 1992. 'The impact of annual earnings announcements on convergence of beliefs.' *The Accounting Review* 67, No.4, 862-875.

Brown L.D., R.L. Hagerman and P.A. Griffin, 1987. 'An evaluation of alternative proxies for the markets assessment of unexpected earnings.' *Journal of Accounting and Economics* 9, 159-193.

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.

Butler K., and L. Lang, 1991. 'The forecast accuracy of individual analysts and evidence of systematic optimism and pessimism.' *Journal of Accounting Research* 29, No.1, Spring, 150-156.

Campbell J.Y. and L. Hentschel, 1992. 'No news is good news. An asymmetric model of changing volatiity in stock returns.' *Journal of Financial Economics* 31, 281-318.

Chambers A.E. and S.H. Penman, 1984. 'Timeliness of reporting and the stock price reaction to earnings announcements.' *Journal of Accounting Research* 22, No.1, Spring, 21-47.

Chan K.C., 1988. 'On the contrarian investment strategy.' *Journal of Business* 61, 147-163.

Chan K.C., N. Chen and D.A. Hseih, 1985. 'An explanatory investigation of the firm size effect.' *Journal of Financial Economics* 25, 451-471.

Choi S.K. and D.C. Jeter, 1992. 'The effects of qualified audit opinions on earnings response coefficients.' *Journal of Accounting and Economics* 15, 229-247.

Collins D., S.P. Kothari and J. Rayburn, 1987. 'Firm size and the information content of prices with respect to earnings.' *Journal of Accounting and Economics* 9, 111-138.

Cochrane J.H., 1991. 'Volatility tests and efficient markets.' *Journal of Monetary Economics* 27, June, 463-485.

Cohen K.J., S.F. Maier, R.A. Schwartz and D.K. Whitcomb, 1985. *The Microstructure of Security Markets*. Prentice-Hall, New Jersey, USA.

Cook T.J. and M.S. Rozeff, 1984. 'Size and earnings/price ratio anomalies: one effect or two?' *Journal of Financial and Quantitative Analysis* 19, No.4, December.

Cutler D.M., J.M. Poterba and L.H. Summers, 1989. 'What moves stock prices? Moves in stock prices reflect something other than news about fundamental values.' *The Journal of Portfolio Management*, Spring, 4-12.

DeBondt W.F.M. and R.H. Thaler, 1985. 'Does the stock market overreact?' *The Journal of Finance* 40, No.3, 793-805.

DeBondt W.F.M. and R.H. Thaler, 1987. 'Further evidence on investor overreaction and stock market seasonality.' *The Journal of Finance* 42, No.3, 557-581.

DeBondt W.F.M. and R.H. Thaler, 1990. 'Stock market volatility - Do security analysts overreact?' *American Economic Review* 80, No.2, May, 52-57.

DeLong B.J., A. Shleifer, L.H. Summers and R.J. Waldmann, 1990. 'Positive feedback investment strategies and destabilizing rational speculation.' *The Journal of Finance* 45, No.2, 379-396.

DeLong B.J., A. Shleifer, L.H. Summers and R.J. Waldmann, 1991. 'The Survival of Noise Traders in Financial Markets.' *Journal of Business* 64, No.1, 1-19.

Demski J.S. and G.A. Feltham, 1994. 'Market response to financial reports.' *Journal of Accounting and Economics* 17, 3-40.

Diamond D.W., 1985. 'Optimal release of information by firms.' *The Journal of Finance* Vol.XL, No.4, September, 1071-1094.

Dimson E., 1979. 'Risk measurement when shares are subject to infrequent trading.' *Journal of Financial Economics* 7, 197-226.

Dimson E. and P. Marsh, 1984. 'An analysis of brokers' and analysts' unpublished forecasts of UK stock returns.' *The Journal of Finance* 39, No.5, December, 1257-1291.

Dimson E. and P. Marsh, 1986. 'Event study methodologies and the size effect - the case of UK press recommendations.' *Journal of Financial Economics* 17, No.1, 113-142.

Donnelly R. and M. Walker, 1995. 'Share price anticipation of earnings and the firm size effect of earnings persistence and firm size.' *Journal of Business Finance and Accounting* 22, No.1, January, 1995

Dontoh A., J. Ronen and B. Sarath, 1994. 'Post-announcement drift in rational expectations models.' Working Paper (Stern School of Business, New York University).

Dow J. and G. Gorton, 1994. 'Arbitrage chains.' *The Journal of Finance* Vol.XLIX, No.3, July, 819-849.

Easton P.D., 1985. 'Accounting earnings and security valuation: empirical evidence of the fundamental links.' *Journal of Accounting Research* 23, Supplement, 54-87.

Easton P.D., T.S. Harris and J.A. Ohlson, 1992. 'Aggregate accounting earnings can explain most of security returns.' *Journal of Accounting and Economics* 15, 119-142.

Ederington L.H. and J.H. Lee, 1993. 'How markets process information: news releases and volatility.' *The Journal of Finance* Vol.XLVIII, No.4, September, 1161-1191.

Elgers P. and D. Murray, 1992. 'The relative and complementary performance of analyst and security-price based measures of expected earnings.' *Journal of Accounting and Economics* 15, 303-316.

Engle R.F. and V.K. Ng, 1993. 'Measuring and testing the impact of news on volatility.' *The Journal of Finance* Vol.XLVIII, No.5, 1749-1778.

Fama E.F., 1970. 'Efficient Capital Markets: A review of theory and empirical work.' *The Journal of Finance* 25, No.25, 383-417.

Fama E.F., 1976. *Foundations of Finance*, NY: Basic Books.

Fama E.F., 1991. 'Efficient Capital Markets: II.' *The Journal of Finance* Vol.XLVI, No.5, December, 1575-1617.

Fama E.F., L. Fisher, M.C. Jensen and R. Roll, 1969. 'The adjustment of stock prices to new information.' *International Economic Review* 10, No.1, February, 1-21.

Fama E.F. and K.R. French, 1988. 'Permanent and temporary components of stock prices.' *Journal of Political Economy* 96, No.2, 246-273.

Fama E.F. and K.R. French, 1992. 'The cross-section of expected stock returns.' *The Journal of Finance* Vol.XLVII, No.2, June, 427-465.

Figlewski S., 1978. 'Market "efficiency" in a market with heterogeneous information.' *Journal of Political Economy* 86, No.4, 581-597.

Firth M., 1981. 'The relative information content of the release of financial results data by firms.' *Journal of Accounting Research* 19, No.2, Autumn, 521-529.

Foster G., 1977. 'Quarterly accounting data: Time series properties and predictive-ability results.' *The Accounting Review* 52, No.1, 1-21.

Foster G., 1986. *Financial Statement Analysis*, New York: Prentice Hall.

Foster G., C. Olsen and T. Shevlin, 1984. 'Earnings releases, anomalies and the behaviour of security returns.' *The Accounting Review* Vol.LIX, No.4, October, 574-???.

Freeman R.N., 1987. 'The association between accounting earnings and security returns for large and small firms.' *Journal of Accounting and Economics* 9, 195-228.

Freeman R.N. and S.Y. Tse, 1992. 'A nonlinear model of security price responses to unexpected earnings.' *Journal of Accounting Research* 30, No.2, Autumn, 185-209.

French K.R., 1980. 'Stock returns and the weekend effect.' *Journal of Financial Economics* 8, No.1, 55-69.

French K.R. and R. Roll, 1986. 'Stock return variances - arrival of information and the reaction of traders.' *Journal of Financial Economics* 17, 5-26.

French K.R., G.W. Schwert and R.F. Stambaugh, 1987. 'Expected stock returns and volatility.' *Journal of Financial Economics* 19, 3-29.

Froot K.A., D.S. Scharfstein and J.C. Stein, 1980. 'Herd on the street: Informational inefficiencies in a market with short-term speculation.' NBER Working Paper Series No.3250.

Froot K.A., D.S. Scharfstein and J.C. Stein, 1992. 'Herd on the street: Informational inefficiencies in a market with short-term speculation.' *The Journal of Finance* Vol.XLVII, No.4, September, 1461-1484.

Frost C.A. and G. Powell, 1994. 'Accounting disclosure practices in the United States and the United Kingdom.' *Journal of Accounting Research* 32, No.1, Spring, 75-102.

Givoly D. and D. Palmon, 1982. 'Timeliness of annual earnings announcements: some empirical evidence.' *The Accounting Review*, Vol.LVII, No.3, July, 486-508.

Gregory A., J. Matatko, I. Tonks and R. Purkis, 1994. 'UK directors' trading: the impact of dealing in smaller firms.' *The Economic Journal* 104, January, 37-53.

Grieg A.C., 1992. 'Fundamental analysis and subsequent stock returns.' *Journal of Accounting and Economics* 15, 413-442.

Grossman S.J. and J. Stiglitz, 1980. 'On the impossibility of informationally efficient markets.' *American Economic Review* 70, No.3, 393-408.

Hand J.R.M., 1990. 'A test of the extended functional fixation hypothesis.' *The Accounting Review* 65, No.4, October, 740-763.

Harris T.S. and J.A. Ohlson, 1987. 'Accounting disclosures and the market's valuation of oil and gas properties.' *The Accounting Review* 62, October, 651-670.

Harris T.S. and J.A. Ohlson, 1990. 'Accounting disclosures and the market's valuation of oil and gas properties: evaluation of market efficiency and functional fixation.' *The Accounting Review* 65, No.4, October, 764-780.

Hayek F.A., 1945. 'The use of knowledge of society.' *American Economic Review* 34, No.4, September, 429-530.

Ho L.C.J., 1993. 'Option trading and the relation between price and earnings: a cross-sectional analysis.' *The Accounting Review* 68, No.2, April, 368-384.

Holthausen R.W. and D.F. Larcker, 1992. 'The prediction of stock returns using financial statement information.' *Journal of Accounting and Economics* 15, 373-411.

Jensen M.C., 1978. 'Some anomalous evidence regarding market efficiency.' *Journal of Financial Economics* 6, 95-101.

Judge G., W. Griffiths, R. Hill, H. Lutkepohl and T. Lee, 1985. *The theory and practice of econometrics*, New York: Wiley.

Kang S., J. O'Brien and K. Sivaramakrishnan, 1994. 'Analysts' interim earnings forecasts: evidence on the forecasting process.' *Journal of Accounting Research* 32, No.1, Spring 103-112.

Kasznik R. and B. Lev, 1995. 'To warn or not to warn: management disclosures in the face of an earnings surprise.' *The Accounting Review* 70, No.1, January, 113-134.

Keim D.B., 1983. 'Size-related anomalies ans stock return seasonality.' *Journal of Financial Economics* 12, No.1, 13-32.

Kim O., and R.E. Verrecchia, 1991a. 'Trading volume and price reactions to public announcements.' *Journal of Accounting Research* 29, No.2, Autumn, 302-321.

Kim O., and R.E. Verrecchia, 1991b. 'Market reaction to anticipated announcements.' *Journal of Financial Economics* 30, 273-309.

Kim O., and R.E. Verrecchia, 1994. 'Market liquidity and volume around earnings announcements.' *Journal of Accounting and Economics* 17, 41-67.

Kothari S.P., 1992. 'Price-earnings regressions in the presence of prices leading earnings - earnings level vs. changing specifications and alternative deflators.' *Journal of Accounting Economics* 15, 173-202.

Kothari S.P. and R.G. Sloan, 1992. 'Information in prices about future earnings - implications for earnings response coefficients.' *Journal of Accounting and Economics* 15, 143-171.

Kross W., B. Ro and D. Shroeder, 1990. 'Earnings expectations: the analysts' information advantage.' *The Accounting Review* 65, No.2, April, 461-476.

Lakonishok J., A. Shleifer and R. Vishny, 1994. 'Contrarian investment, extrapolation and risk.' *Journal of Finance*, December ????

Lang M., 1991. 'Time-varying stock price response to earnings induced by uncertainty about the time-series process of earnings.' *Journal of Accounting Research* 29, No.2, Autumn 229-257.

Lang M. and R. Lundholm, 1993. 'Cross-sectional determinants of analyst ratings of corporate disclosures.' *Journal of Accounting Research* 31, No.2, Autumn, 246-271.

Lee C.M.C., 1992. 'Earnings news and small traders - an intraday analysis.' *Journal of Accounting Research* 15, 265-302.

Lev B. and J.A. Ohlson, 1982. 'Market-based empirical research in accounting: a review, interpretation, and extension.' *Journal of Accounting Research* 20, Supplement, 249-322.

Lev B. and S.R. Thiagarajan, 1993. 'Fundamental information analysis.' *Journal of Accounting Research* 31, No.2, Autumn, 190-215.

Lipe R.C., 1986. 'The information contained in the components of earnings.' *Journal of Accounting Research* 24, Supplement, 37-64.

Lo A., and C. Mackinley, 1988. 'Stock prices do not follow random walks: Evidence from a simple specification test.' *Review of Financial Studies* 3, 431-468.

London Stock Exchange Official Yearbook: 1990-1991. Macmillan Press.

London Stock Exchange Official Yearbook: 1991-1992. Macmillan Press.

Lonie A.A., R. Lonie and D.M. Power, 1989. 'The overreaction effect: some UK evidence.' Working Paper (University of Dundee).

McNichols M., 1988. 'A comparison of the skewness of stock return distributions at earnings and non-earnings announcement dates.' *Journal of Accounting and Economics* 10, 239-273.

McNichols M., 1989. 'Evidence of informational asymmetries from management earnings forecasts and stock returns.' *The Accounting Review* Vol.LXIV, No.1, January, 1-27.

McNichols M. and B. Trueman, 1994. 'Public disclosure, private information collection, and short term trading.' *Journal of Accounting and Economics* 17, 69-94.

Mendenhall R.R., 1991. 'Evidence on the possible underweighting of earnings - related information.' *Journal of Accounting Research* 29, No.1, Spring, 170-179.

Miller M.H. and F. Modigliani, 1961. 'Dividend policy, growth and valuation of shares.' *Journal of Business* 34, 411-432.

Mitra D. and J.E. Owers, 1995. 'Dividend initiation announcement effects and the firm's information environment.' *Journal of Business Finance and Accounting* 22, No.4, June, 551-573.

Morse D., 1981. 'Price and trading volume reaction surrounding earnings announcements: a closer examination.' *Journal of Accounting Research* 19, No.2, Autumn, 374-383

Muth J.F., 1961. 'Rational expectations and the theory of price movements.' *Econometrica* 29, 315-355.

O'Brien P.C., 1988. 'Analyst's forecasts as earnings expectations.' *Journal of Accounting Economics* 10, 53-83.

O'Brien P.C. and R. Bhushan, 1990. 'Analyst following and institutional ownership.' *Journal of Accounting Research* 28, Supplement, 55-76.

O'Hanlon J., 1993. 'Clean surplus accounting, residual income and the forecasting of earnings: implications for earnings based valuation models and earnings regressions.' Working paper, Lancaster University.

O'Hanlon J. and R. Whiddett, 1991. 'Do UK security analysts overreact?' *Accounting Business Research* 22, No.85, 63-74.

Ohlson J., 1988. 'Accounting earnings, book value, and dividends: The theory of the clean surplus equation.' Working paper, Columbia University (New York:NY).

Ohlson J., 1991a. 'The theory of value and earnings and an introduction to Ball-Brown analysis.' *Contemporary Accounting Research*, 1-19.

Ou J.A. and S.H. Penman, 1989a. 'Accounting measurement, price-earnings ratio, and the information content of security prices.' *Journal of Accounting Research* 27, Supplement, 111-144.

Ou J.A. and S.H. Penman, 1989b. 'Financial Statement Analysis and the prediction of stock returns.' *Journal of Accounting and Economics* 11, 295-329.

Patell J.M. 1976. 'Corporate forecasts of earnings per share and stock price behaviour: empirical tests.' *Journal of Accounting Research*, Autumn, 246-276.

Patell J.M. and M.A. Wolfson, 1982. 'Good news, bad news and the intraday timing of corporate disclosures.' *The Accounting Review* Vol.LVII, No.3, July, 509-527.

Patell J.M. and M.A. Wolfson, 1984. 'The intraday speed of adjustment of stock prices to earnings and dividends announcements.' *Journal of Financial Economics* 13, 223-252.

Penman S.H., 1984. 'Abnormal returns to investment strategies based on the timing of earnings reports.' *Journal of Accounting and Economics* 6, 165-183.

Penman S.H., 1987. 'The distribution of earnings news over time and seasonalities in aggregate stock returns.' *Journal of Financial Economics* 18, 199-228.

Penman S.H., 1991. 'Return to fundamentals.' Working paper (University of California, Berkeley).

Penman S.H., 1991. 'Financial statement information and the pricing of earnings changes.' *The Accounting Review* 67, No.3, July, 563-577.

Philbrick D.R. and W.E. Ricks, 1991. 'Using Value-Line and IBES analyst forecasts in accounting research.' *Journal of Accounting Research* 29, No.2, Autumn, 397-417.

Pope P. and C.G. Inyangete, 1992. 'Differential information, the variability of UK stock returns, and earnings announcements.' *Journal of Business and Financial Accounting* 19, No.4, June, 603-623.

Poterba J.M. and L.H. Summers, 1988. 'Mean reversion in stock prices - evidence and implications.' *Journal of Financial Economics* 22, 27-59.

Reinganum M.R., 1981. 'Misspecification of capital asset pricing: Empirical anomalies based on earnings yields and market values.' *Journal of Financial Economics* 9, March, 19-46.

Reinganum M.R., 1983. 'The anomalous stock market behaviour of small firms in January: Empirical tests for tax-loss selling effects.' *Journal of Financial Economics* 11, June, 89-104.

Rippington F.A. and R.J. Taffler, 1995. 'The information content of firm financial disclosures.' *Journal of Business Finance and Accounting* 22, No.3, April, 345-362.

Roll R., 1983. 'Vas ist das? The turn of the year effect and the return premium of small firms.' *Journal of Portfolio Management* 9, 18-28.

Roll R., 1988. 'R2.' *Journal of Finance* 43, No.3, 541-566.

Salinger M., 1992. 'Standard errors in event studies.' *Journal of Financial and Quantitative Analysis* 27, No.1, March, 39-53.

Schwartz R.A. and D.K. Whitcomb, 1977. 'Evidence of the presence and causes of serial correlation in market model residuals.' *Journal of Financial and Quantitative Analysis*, June, 291-313.

Schipper K., 1991. 'Analysts' forecasts.' *Accounting Horizons*, December, 105-121.

Scholes M. and J. Williams, 1977. 'Estimating betas fron non-synchronous data.' *Journal of Financial Economics* 5, 309-327.

Schultz P., 1983. 'Transaction costs and the small firm effect: a comment.' *Journal of Financial Economics* 12, 82-88.

Sharkarway A. and N. Garrod, 1995. 'Size and functional fixation: further evidence.' Working Paper (University of Glasgow).

Shiller R.J., 1981. 'Do stock prices move too much to be justified by subsequent changes in dividends.' *American Economic Review* 71, 421-436.

Shleifer A. and L.H. Summers, 1990. 'The noise trader approach to finance.' *Journal of Economic Perspectives* 4, No.2, Spring, 19-33.

Shores D., 1990. 'The association between interim information and security returns surrounding earnings announcements.' *Journal of Accounting Research* 28, No.1, Spring, 164-181.

Skinner D.J., 1994. 'Why firms voluntary disclose bad news.' *Journal of Accounting Research* 32, No.1, Spring, 38-60.

Smith P. and A.R. Tremayne, 1992. 'On the information content of time series of accounting earnings.' *Journal of Business and Financial Accounting* 19, No.3, April, 363-385.

Stickel S.E. 1989. 'The timing of and incentives for annual earnings forecasts near interim earnings announcements.' *Journal of Accounting and Economics* 11, 275-292.

Stober T.L., 1992. 'Summary financial statement measures and analysts' forecasts of earnings.' *Journal of Accounting and Economics* 15, 347-372.

Stoll H.R. and R.E. Whaley, 1983. 'Transaction costs and the small firm effect.' *Journal of Financial Economics* 12, 57-79.

Strong N., 1992. 'Modelling abnormal returns: a review article.' *Journal of Business and Financial Accounting* 19, No.4, June, 533-553.

Strong N. and M. Walker, 1993. 'The explanatory power of earnings for stock returns.' *The Accounting Review* 68, No.2, April, 385-399.

Summers L.H., 1986. 'Does the stock market rationally reflect fundamental values?' *The Journal of Finance*, Vol.XLI, No.3, July, 591-601.

Swaminathan S. and J. Weinthrop, 1991. 'The information content of earnings, revenues, and expenses.' *Journal of Accounting Research* 29, No.2, Autumn, 418-427.

Tinic S.M., 1990. 'A perspective on the stock market's fixation on accounting numbers.' *The Accounting Review* 65, No.4, October, 781-796.

The Listing Rules, London Stock Exchange 1993.

Trueman B., 1990. 'On the incentives for security analysts to revise their earnings forecasts' *Contemporary Accounting Forecasts* 6, 203-222.

Trueman B., 1994. 'Analyst forecasts and herding behaviour.' *Review of Financial Studies* 7, No.1, Spring, 97-124.

White H., 1980. 'A heteroscedasticity consistent covariance matrix estimator and a direct test of heteroscedasticity.' *Econometrica* 48, No.4, May, 817-838.

Wiggins J.B., 1991. 'Do misperceptions about the earnings process contribute to post-announcement drift? Working paper, Cornall University.

Woodruff C.S. and A.J. Senchack, 1988. 'Intradaily price-volume adjustments of NYSE stocks to unexpected earnings.' *The Journal of Finance* Vol.XLIII, No.2, June, 467-491.

Zarowin P., 1990. 'Size, seasonality and stock market overreaction.' *Journal of Financial and Quantitative Analysis* 25, No.1, March, 113-125.