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Investment value of changes in analysts' consensus-recommendations on JSE Top 40 shares

Vilosha Soni

A research report submitted to the Faculty of Commerce, Law and Management, University of the Witwatersrand, in partial fulfilment of the requirements for the degree of Master of Business Administration

Johannesburg, 2013

ABSTRACT

The aim of this study was to determine whether there was investment value to trading on upgrade and downgrade changes in analysts' consensus. An event study was undertaken on JSE Top 40 shares to measure the sensitivity of cumulative average abnormal returns (CAARs) to changes in analysts' consensus for the period 2001 to 2012. A comprehensive literature review was conducted to establish the study approach employed and select the best available methodology to model expected market returns. Limited evidence of the semi-strong form of market efficiency was shown for the JSE, with JSE Top 40 share prices and therefore returns responding quickly to changes in analysts' consensus upgrades. Changes in analyst consensus downgrades, however, were met with longer post event drift.

Short-term trading and profit opportunities could exist, mostly for institutional investors acting on changes in consensus upgrades and downgrades. High transaction costs, however, would leave very few profitable trading opportunities for smaller private investors. Smaller investors should be cautioned against trading on analyst recommendations alone, without paying attention to other signals, as signs of analyst bias (including herding) were found in this sample.

Overall the study provides evidence that analysts do add value from the technical and fundamental analysis that they conduct by uncovering valuable, new information to the market, in line with the market efficiency view of Grossman and Stiglitz (1980). This could allow mainly, institutional investors, trading opportunities to earn abnormal returns when considerable changes to analyst consensus on JSE Top 40 companies are made.

Search words: abnormal returns, JSE Top 40 shares, buy and sell recommendations, analyst consensus recommendations, market efficiency

DECLARATION

I, Vilosha Soni, declare that this research report is my own work except as indicated in the references and acknowledgements. It is submitted in partial fulfilment of the requirements for the degree of Master of Business Administration in the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in this or any other university.

Vilosha Soni

Signed at ……

On the 15th day of May 2013

DEDICATION

To my parents: Pramella and the late Hariparsad Roopnarain.

You both have allowed me the opportunity to dream big and brought the stars within my reach, at every possible moment in my life.

In loving memory of my dad:

Words could never express the void that we feel without you. Life will never be the same now that you are gone. I miss you every day and know that you watch over me.

ACKNOWLEDGEMENTS

I acknowledge with sincere thanks and the greatest appreciation the following people, who have assisted me in completing this project:

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TABLE OF CONTENTS

ABSTRACT ..... **II**

DEDICATION ..... **IV**

ACKNOWLEDGEMENTS ..... **V**

LIST OF TABLES ..... **X**

LIST OF FIGURES ..... **XI**

CHAPTER 1: INTRODUCTION **1**

1.1 PURPOSE OF THE STUDY 1
1.2 CONTEXT OF THE STUDY 1
1.3 PROBLEM STATEMENT 3
1.3.1 MAIN PROBLEM 3
1.3.2 SUB-PROBLEM 1 4
1.3.3 SUB-PROBLEM 2 4
1.4 SIGNIFICANCE OF THE STUDY 4
1.5 DELIMITATIONS OF THE STUDY 6
1.6 DEFINITION OF TERMS 7
1.7 ASSUMPTIONS 8

CHAPTER 2: LITERATURE REVIEW **11**

2.1 INTRODUCTION 11
2.2 THE EFFICIENT MARKET HYPOTHESIS (EMH). 11
2.2.1 WEAK FORM OF THE EMH 13
2.2.2 SEMI-STRONG FORM OF THE EMH 13
2.2.3 STRONG FORM OF THE EMH 13
2.2.4 SUMMARY OF THE DIFFERENT FORMS OF MARKET EFFICIENCY 15
2.3 EMPIRICAL EVIDENCE ON THE EMH 16
2.3.1 SUPPORT FOR THE EMH 16
2.3.2 THE CASE FOR MARKET EFFICIENCY ON THE JSE 17
2.3.3 OPPOSITION TO THE EMH 17
2.3.4 THE CASE AGAINST MARKET EFFICIENCY OF THE JSE 19
2.3.5 CONCLUDING NOTE ON MARKET EFFICIENCY 19
2.4 ROLE OF ANALYSTS 20
2.4.1 FUNDAMENTAL ANALYSIS 21
2.4.2 TECHNICAL ANALYSIS 22
2.5 CRITICISMS OF ANALYST BEHAVIOUR 23
2.5.1 HERDING BEHAVIOUR 23

2.5.2 Overconfidence, over-optimism and over-issue 24
2.5.3 Conflicts of interest due to investment banking relationships 25
2.5.4 Informational conflicts 25
2.5.5 Analysts differ in quality 26
2.5.6 Brokerage Commissions and analyst compensation 26
2.5.7 Analysts' bias disadvantage smaller investors 27
2.5.8 Concluding note on analyst bias 27
2.6 Do analyst recommendations add value? 28
2.6.1 Support for following analyst recommendations 29
2.6.2 Criticisms of following analysts' recommendations 30
2.6.3 Concluding note on the value of analyst recommendations 32
2.7 Market effects or anomalies 33
2.7.1 The evolution of CAPM in event studies 33
2.7.2 Fama-French 3-Factor Model 35
2.7.3 JSE Market Anomalies 37
2.7.4 Previous models used to model JSE expected market returns 39
2.7 Conclusion of Literature Review 40
2.8 Hypothesis 41
2.9.1 Hypothesis 1 – Upgrades 41
2.9.2 Hypothesis 2 - Downgrades 42

CHAPTER 3: RESEARCH METHODOLOGY 43

3.1 Research methodology 43
3.2 Research Design 43
3.3 Population and sample 44
3.3.1 Population 44
3.3.2 Sample and sampling method 45
3.4 The research instrument 45
3.5 Procedure for data collection 46
3.6 Data analysis and interpretation 47
3.6.1 Define an event that provides new information to the market 47
3.6.2 Eliminate for firms that experience other events during the event window 48
3.6.3 Identify a set of firms that experience this event and identify event dates .. 48
3.6.4 Choose and appropriate event window and justify its length 48
3.6.5 Compute abnormal returns during the event window 49
3.7 Limitations of the study 54
3.8 Validity and reliability 55
3.8.1 External validity 55
3.8.2 Internal validity 56
3.8.3 Reliability 57

CHAPTER 4: PRESENTATION OF RESULTS 59

4.1 Introduction 59
4.2 Sample profile 59
4.3 CAARs from varying levels of change in analyst consensus 60
4.3.1 Exploratory event window 60
4.3.2 Closer look at the empirical event windows for upgrades and downgrades 63

4.3.3 CAAR FINDINGS FOR THE PROPOSED WINDOW PERIOD 65
4.4 HYPOTHESIS TESTING FINDINGS 66
4.5 SUMMARY OF THE RESULTS 69

CHAPTER 5: DISCUSSION OF THE RESULTS 70

5.1 INTRODUCTION 70
5.2 SAMPLE CHARACTERISTICS 70
5.2.1 SAMPLE PROFILE 70
5.2.2 WEIGHTING OF UPGRADES VERSUS DOWNGRADES 71
5.2.3 EXPLANATION OF THE SAMPLE CHARACTERISTICS 72
5.3 PRE-CONDITIONS FOR THE USE OF EVENT STUDIES 74
5.3.1 MARKET EFFICIENCY 74
5.3.2 THE MARKET ONLY BECOMES AWARE OF THE EVENT UPON ANNOUNCEMENT 75
5.3.3 NO OTHER MAJOR CONFOUNDING EFFECTS DURING THE EVENT WINDOW 75
5.4 LENGTH OF THE EVENT WINDOW 76
5.5 DISCUSSION OF OBSERVED CAARS FOR UPGRADES 77
5.5.1 EXTENDED PROFIT TAKING OPPORTUNITIES? 78
5.5.2 DAY BEFORE MOVEMENTS IN CAARS 78
5.5.3 WHEN TO TRADE 79
5.5.4 TRANSACTION COSTS 80
5.6 DISCUSSION OF OBSERVED CAARS FOR DOWNGRADE MOVEMENTS 82
5.6.1 MINIMISING LOSSES 83
5.6.2 JITTERY INVESTORS 83
5.6.3 DAY BEFORE MOVEMENTS IN CAARS 84
5.6.4 WHEN TO TRADE 84
5.6.5 TRANSACTION COSTS 86
5.7 TESTS FOR SIGNIFICANCE 88
5.7.1 HYPOTHESIS 1 - UPGRADES 88
5.7.2 HYPOTHESIS 2 - DOWNGRADES 89
5.8 CONCLUSION 90

CHAPTER 6: CONCLUSIONS & RECOMMENDATIONS 93

6.1 INTRODUCTION 93
6.2 CONCLUSIONS OF THE STUDY 93
6.3 RECOMMENDATIONS 95
6.4 SUGGESTIONS FOR FURTHER RESEARCH 96

REFERENCES 99

APPENDIX A: COMPANIES IN THE SAMPLE 109

APPENDIX B: UPGRADE SUBSAMPLE 111

APPENDIX C: DOWNGRADE SUBSAMPLE 115

APPENDIX D: AAR & CAAR FOR UPGRADES 119

APPENDIX E: AAR & CAAR FOR DOWNGRADES 120

LIST OF TABLES

Table 1: Control Portfolios or style factors 51

Table 2: p-values for Upgrades 67

Table 3: p-values for Downgrades 68

Table 4: List of companies making up the final sample, divided into upgrade and downgrade sub-samples 109

Table 6: Sub-sample of downgrade data including movements in consensus 115

Table 7: Upgrade sub-sample showing AARs and CAARs for differing levels of movement in analyst consensus 119

Table 8: Downgrade sub-sample showing AARs and CAARs for differing levels of movement in analyst consensus 120

LIST OF FIGURES

Figure 1: Summary of progressive forms of market efficiency, with investor implications and tests for in/efficiency 15

Figure 2: Depiction of the timeline of a typical event study 48

Figure 3: Sample Distribution of Changes in Analysts' Consensus Recommendation Ratings 59

Figure 4: Upgrades - Exploratory chart showing CAARs over extended event window 61

Figure 5: Downgrades - Exploratory chart showing CAARs over extended event window 62

Figure 6: Upgrades - CAARs for window -10 days to + 10 days 63

Figure 7: Downgrades - CAARs for window - 5 days to + 25 days..... 64

Figure 8: Upgrade – CAARs in event window from - 5 to + 5 days 65

Figure 9: Downgrade – CAARs in event window from -5 to + 5 days..... 66

Figure 10: CAARs around the event window for Upgrades including transaction costs..... 82

Figure 11: CAARs around the event window for Downgrades including transaction costs 87

CHAPTER 1: INTRODUCTION

1.1 Purpose of the study

The purpose of this research is to evaluate whether trading on changes in analyst consensus upgrade and downgrade recommendations, made on JSE Top 40 companies, as reported on Bloomberg's Professional Service between the periods 1 February 2001 to 30 November 2012 would allow investors to earn abnormal returns.

1.2 Context of the study

The allure of the stock market's ability to outperform most other investments over the long term has proven an attractive option for many South Africans. The interest of the South African public in the stock market has not gone unnoticed by the JSE Limited. JSE (2010), commented in their annual report that they were actively embarking on a retail strategy, specifically aimed at increasing the participation of the general public in their services.

Most private investors, however, lack the knowledge, time, resources and skill required to make informed choices amongst the thousands of investment opportunities available in capital markets (Baugh & Yatrakis, 2005). This gap between skill and desire has allowed the professional investment advice industry to flourish (Ahern, 2009). Business periodicals, on-line services, retail banks, radio broadcasts and a host of other service providers all advertise their offerings daily in a multitude of media channels. Services such as the Financial Mail's *Ranking the Analyst* series (McNulty, 2012), have sought to educate the captive South African public on the quality of service providers in the market place, by assessing, ranking and publishing their findings of South Africa's best ranked analysts.

Empirical evidence, however, has suggested that professional investors and fund managers who actively invest and manage funds have failed to outperform market benchmarks on aggregate. Desai and Jain (1995) found on average that investors following recommendations of money managers at *Barron's* were unable to beat the market over the long term. Malkiel (2005) similarly found that the majority of actively managed funds in his study failed to beat market index benchmarks. Accordingly, the Efficient Market Hypothesis (EMH) offers, that in an efficient market there would be no role for analysts. This is because market efficiency would imply the immediate incorporation of new information into the pricing of shares, leaving no arbitrage opportunities for profit taking (Fama, 1970). Markets in reality, however, have exhibited many instances of inefficiency and instability; demonstrated by collapses in the market, the development of bubbles and company bankruptcies like that of Enron (Tonge, Greer, & Lawton, 2003).

The most recent collapse of global stock markets, in 2008, has set into motion a renewed debate around the contribution of each of the key players to the failure of the market. Experts have accused analysts of sticking to their herds and not downgrading recommendations with enough time to highlight underlying risk in the shares they covered. Ratings agencies have also been lambasted with blame for not downgrading their ratings in time.

The debate on whether analysts' add value has been a long raging one, and one of particular interest to this research topic. Internationally Stickel (1995) and Womack (1996) found in favour of investors following analysts' recommendations. Jegadeesh and Kim (2005) added to the body of literature in support of following analyst recommendations with findings from USA stock exchanges. Chan, Chang, and Wang (2009) extended the evidence in favour of the value of analysts by showing that brokerage firms followed their in-house analysts' trading advice by forming trading strategies informed by these recommendations.

Conversely, however, work from Dimson and Fraletti (1986) and Walker and Hatfield (1996) showed evidence against the value of following analysts'

recommendations. Barber, Lehavy, McNichols, and Trueman (2001) showed that the increase in transaction costs due to high portfolio turnover, when following analysts' recommendations outweighed the returns for investors.

In the South African context, Bhana (1990) and Hall and Millard (2002) found support for following analyst recommendations on JSE companies. Prayag and Van Rensburg (2006) found limited benefit for investors acting on analyst upgrades, but found that investors could limit losses by acting on analysts downgrades.

Although significant literature exists internationally on the value of analysts investment recommendations, the literature is divided on whether following these recommendations can add value to investors.

One of the criticisms of many of the studies in the literature is that the methodologies employed to determine expected market returns have been inefficient in accommodating market anomalies (Fama & French, 1992). Van Rensburg (2001) shows empirically that both the CAPM and 2-factor APT models for modelling expected market returns are lacking sufficient style based risk factors of the JSE to be able to sufficiently account for market anomalies. An additional focus of this study will also be to ensure that market returns are adequately modelled to ensure market anomalies are addressed.

1.3 Problem statement

1.3.1 Main problem

Can investors profit from trading on changes in analysts' consensus recommendations for JSE Top 40 companies?

1.3.2 Sub-problem 1

The first sub-problem is to determine if investors can profit from trading on changes in analysts' consensus upgrade recommendations for JSE Top 40 companies?

1.3.3 Sub-problem 2

The second sub-problem is to determine if investors can profit from trading on changes in analysts' consensus downgrade recommendations for JSE Top 40 companies?

1.4 Significance of the study

Although significant research exists on the value of analyst recommendation internationally, no clear consensus was found on the value of following these recommendations. This study builds on older published work of the JSE by Hall and Millard (2002), Prayag and Van Rensburg (2006) and the dissertation submission by Mweli (2010) and adds to the literature in the following unique ways:

- The methodology used in this study deviates from both CAPM and risk-adjusted CAPM methods (ICAPM, APT and Jensen's alpha) which have been previously used. This study uses a modified Fama-French 3-factor model from Mordant and Muller (2003) and Ward and Muller (2010) to account for the size, value and resource anomaly (Van Rensburg, 2001; Van Rensburg & Robertson, 2003a, 2003b) exhibited on the JSE, thereby bridging the gap in explaining all the currently acknowledged market anomalies on the JSE that were found in the literature.

- Previous studies have all used relatively short periods for analysis. Hall and Millard (2002) cover a period of 5 years, from January 1994 to

December 1998. Prayag and Van Rensburg (2006), only cover a 4 year period, from March 2000 to April 2003, whilst Mweli (2010) extends his analysis up to 7 years, with data from July 2003 to July 2010. This study will focus on a period of almost 12 years, beginning from February 2001 to November 2012 and will therefore constitute the longest periods studied thus far for JSE data in this area of research.

- This study uses Bloomberg as a source of recommendation data. Bloomberg, ensure that analysts reporting on their service use the most up-to-date company financials which are automatically updated on the Bloomberg interface. Bloomberg claim that their service, therefore, guarantees the most accurate underlying financial information on which analysts forecasts are derived, unlike other services where analysts have to manually update inputs. Bloomberg provide wide coverage of the market with more than 315 000 subscriptions globally and more than 1800 in South Africa (Bloomberg, 2012).

- Lastly this study controls for confounding effects around the event window, which the prior reviewed, South African studies (Hall and Millard (2002), Prayag and Van Rensburg (2006) and Mweli (2010)) have not done. This study screens analyst recommendations to ensure that revisions in recommendations do not result from companies issuing information directly to the market via SENS.

This study could provide guidance to existing Bloomberg customers on the value of recommendations published on this pay-for service. Bloomberg sales executives could find value in building sales pitches should the findings show positive returns for following analyst recommendations. Importantly the study could be of value to both institutional and private investors, including the South African public, who are interested in investing in JSE Top 40 companies. Brokerage firms, investment houses and other financial firms who employ analysts may also find value in the outcomes of this research. Lastly regulators

may be interested in the results especially around the findings of market efficiency.

1.5 Delimitations of the study

- This study focusses only on the JSE Top 40 shares. JSE Top 40 shares have the most coverage of all shares traded on the local South African market. Limiting the study to only the Top 40 shares ensures that the sample receives sufficient analyst cover to be studied. Similarly JSE Top 40 shares are also much more liquid than other shares on the JSE, which ensures that the event study is not tainted by a thin-trading bias (Maynes & Rumsey, 1993).

- The effect of reputation, competence, track record, status and other effects relating to the analysts making recommendations which compromise the consensus recommendation will not be controlled for in this study, as the data was not consistently available.

- This study aims to isolate the impact of a movement in analysts' consensus on the returns of JSE Top 40 shares. The screening method employed in this study aims to minimise the influence of confounding effects by screening out any data points that fall within 7-days (5 trading days) of SENS announcement for each of the Top 40 companies in the sample.

- Event studies are constrained by the nature of the methodology, in that the method assumes market efficiency as a precondition for determining abnormal returns. If market efficiency cannot be properly established then a null hypothesis of zero abnormal returns cannot be rejected.

- The interpretation and ability to detect abnormal returns in an event study is limited by the asset pricing model used to describe the expected

market returns. This study aims to use a modification of the 3-factor Fama-French method (Fama & French, 1992) which accounts for size and value anomalies. The modified method will additionally cater for the resource/sector anomaly (Gilbertson & Goldberg, 1981) which was found to be specific to the JSE. The asset pricing model chosen was one that is believed to be the best in minimising any bias that could result from a mis-specified asset pricing model.

1.6 Definition of terms

- Abnormal returns: used to describe the returns generated by a given security or portfolio over a period of time that are different from the expected rate of return (Abarbanell & Bushee, 1998).

- Individual/private investor: individual who purchases small amounts of shares for him/herself, as opposed to an institutional investor (WebFinance, 2012).

- Institutional investor: entity with large amounts to invest, such as investment companies, mutual funds, brokerages, insurance companies, pension funds, investment banks and endowment funds. Institutional investors are assumed to be more knowledgeable and better able to protect themselves. They account for a majority of overall volume traded on stock exchanges (WebFinance, 2012).

- Type II error - statistical term used to describe a form of error that occurs in hypothesis testing. Type II errors occur when a false negative is presented, and the test fails to show an effect even when the effect truly exists (Mittendorf, Arun, & Sapugay, 1995).

- Private information – information that is of a limited nature and to which access is restricted to only certain market players. Can sometimes also be referred to as *insider information*.

- Public information – information that is either in the public domain or made easily accessible to the market without restriction

- SENS (Stock Exchange News Service) - a news service that seeks to ensure early, equal and wide dissemination of all information that is expected to have an effect on the prices of shares listed on the JSE (JSE, 2006)

- Liquidity: The ability of an asset to be converted into cash quickly and without any price discount (WebFinance, 2013).

- Market anomaly: patterns in the average return or cross section of share returns that cannot be explained by the CAPM model (Fama & French, 1996b).

- Share/security/stock: these terms are used interchangeably within this report to mean a tradable entity which represents a claim by the holder on a portion of a company's assets and earnings (WebFinance, 2013).

- Cross section: refers to the average sample characteristics.

1.7 Assumptions

- The study aims to restrict the source of analyst information to only private information. Any recommendations made on the day of a company's SENS announcement, or the calendar week following it, will be screened out. It is assumed that a calendar week is sufficient to screen for

confounding effects, as analysts tend to adjust forecasts very shortly after public announcements from the company due to the decaying value of information once it is published (Michaely & Womack, 2005).

- By restricting the study to JSE Top 40 shares, it is assumed that these shares are well traded (liquid) and that this study will not suffer from the shortcomings of thinly traded shares (Maynes & Rumsey, 1993; Van Rensburg & Robertson, 2003a).

- The JSE Top 40 shares are the most popular shares on the South African market and generate the greatest volume of trading on the JSE. It is assumed that these shares will be covered by the best analysts and that since the best analysts on the market will be split over sectors and industries that reputation effects of analysts' will not be a major factor which needs to be controlled for.

- Should any macroeconomic factors change, which may affect share prices, such as exchange and interest rates, it is assumed that these changes would affect the entire cross section of shares equally and that on aggregate the effect would be smoothed out over the sample, and therefore does not need to be controlled for.

- A total event window of 11 trading days (15 calendar days) was selected, including 5 days before the event and 5 days after the event day. This was done to cater for any analyst findings that may be pre-released or leaked to private clients prior to making the recommendation and earnings forecasts public to the market (Green, 2006). The 5 trading days after the event was to allow the market and small investors especially, sufficient time to respond to the update, being cognisant of the decaying value of public information (Michaely & Womack, 2005). The total event window period was kept to a minimum to prevent false

inferences in hypothesis testing to creep in (Brown & Warner, 1980, 1985; Dimson & Marsh, 1986).

- The ability of an event study to detect abnormal returns is highly sensitive to the benchmark model chosen for the estimation of market returns. The Ward and Muller (2010) model has been selected from other recent methods, as it offers a comprehensive modelling that encapsulates Fama and French's 3-factor model (Fama & French, 1992, 1993, 1996b) as well as the JSE specific "resource effect" (Mordant & Muller, 2003, p. 19). It is assumed that the selection of this model will sufficiently cater for the identified market anomalies and reduce biases associated with mis-specified asset pricing models that have plagued previous studies.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

This chapter reviews the role that analysts play in the distribution of information and their ability to add value to investors. The chapter begins by explaining the Efficient Market Hypothesis (EMH), the implication of the EMH holding true and the debate around the role of analysts in the transmission and processing of information. Different forms of the EMH are then discussed with empirical evidence for and against the EMH presented from international as well as South African studies. The next section then goes on to examine the role of analysts' and the main methods that analysts use to arrive at recommendations. General criticisms that have been levelled against analysts are discussed in Section 2.5. Section 2.6 explores evidence for and against the ability of analysts' recommendations to add value, before the literature review is concluded and the hypotheses built.

2.2 The Efficient Market Hypothesis (EMH).

The Random Walk Model serves as a precursor to the much debated and researched topic of market efficiency. The random walk model postulates that current share prices are not linked to previous share prices, implying that trends in past share prices cannot be used to predict current share prices (Fama, 1970).

The Efficient Market Hypothesis (EMH), which followed the Random Walk Theory proposed that new information made available to the stock market is quickly and uniformly distributed to key stakeholders, such that share/stock prices fully and instantly reflect all available information (Fama, 1970). The EMH is based on the assumption that market investors are rational and therefore make decisions informed by the information available to them at the

time (Cubbin, Eidne, Firer, & Gilbert, 2006). Dimson and Mussavian (2002) build on the definition of an efficient market; as one where trading on available information would fail to provide an abnormal profit, because markets always and fully reflect all available information.

As Malkiel (2003) notes, according to the EMH, efficient capital markets would then represent a situation such that when new information becomes available, news would spread instantly and be incorporated into share prices immediately. Under these conditions there would be no need for professional investment analysts who uncover new information, as the market would already have responded to the new information. Billions, however, are spent annually on asset management and the employment of active money managers, so it would be implausible to believe that the EMH held strictly true.

The existence and strength with which the EMH is accepted as being a real account of how share prices adjust has great implications for the various agents that typically facilitate the trading of shares within the stock exchange. The implications of the EMH, holding strictly true is that information is immediately and uniformly incorporated into share prices. This would imply that no group of investors would be able to consistently out-earn the market. Any mismatching of prices compared to the *correct pricing* will then quickly be arbitraged until price equilibrium is restored. Under these conditions there would be little or no trading of shares (Lo, 1997). The reality, however, is that markets are rarely frictionless. Noise trading, misinterpretation of signals from key players and certain behavioural biases, all facilitate the buying and selling of shares in the hope of earning profits.

Grossman and Stiglitz (1980) were the first to identify issues of informational inefficiency in the market. They proposed a revised model of market efficiency, that allowed for an “equilibrium degree of disequilibrium” (Grossman & Stiglitz, 1980, p. 393). This would allow individuals (analysts) to be compensated for their efforts in uncovering new information up to the point where the marginal benefit from new information equalled the marginal costs (Michaely & Womack, 2005). Under this expanded definition, it is therefore possible to explain the

thriving market for investment advice. It is this view of expanded market efficiency that this report builds on when examining the investment value of changes in analysts' consensus recommendations.

2.2.1 Weak form of the EMH

Dimson and Mussavian (2002) define a market as being weak form efficient (in accordance with the Random Walk theory), when prices reflect all *past market information*. Testing for weak form efficiency has been widely conducted, and generally entails searching for trends in share returns, which if present constitute rejection of weak form market efficiency (Fama, 1991).

2.2.2 Semi-strong form of the EMH

The semi-strong form of the EMH asserts that prices reflect all relevant *publicly available information*. As noted by Mabhunu (2004), tests for this form of efficiency are mostly concerned with speed and accuracy of the market's reaction to information as it becomes available. Professional investment managers are supposed to be able to analyse market information to advise their clients on optimal investment decisions. Semi-strong form efficiency, however, would suggest that the markets' dynamic response to new information would leave no room for professional investment advisors. Other tests for semi-strong efficiency have sought to test whether acting on professional investment advice would enable investors to beat some yard-stick such as the market index or a passive buy and hold strategy. Fundamental analysis and trading rules have been pitted against the market to test for abnormal returns, in order to reject semi-strong market efficiency (Strebel, 1977). This study tests the semi-strong form of market efficiency.

2.2.3 Strong form of the EMH

Finally the strong form of market efficiency checks that prices fully reflect *both public and private information*. Fama (1970) raised the concern of insider

trading when this form market efficiency is violated. Mabhunu (2004) suggests that this form of market efficiency is concerned more with disclosure efficiency than with price efficiency. Testing for strong form efficiency, is the most challenging, as it is very difficult to constitute what counts as private information, until disclosure is made. Most tests for strong form efficiency have involved testing for insider trading amongst corporate insiders, analysts, professional asset manager and stock exchange specialists.

It is important to note that each form of market efficiency is progressive, and not competing. Markets can only be semi-strong efficient if weak form efficiency is exhibited, and likewise strong-form efficient markets, rely on the conditions of both semi-strong and weak-form efficiency being met. Figure 1 below summarises the most pertinent points relating to each form of market efficiency and the tests conducted to confirm market in/efficiency.

2.2.4 Summary of the different forms of market efficiency

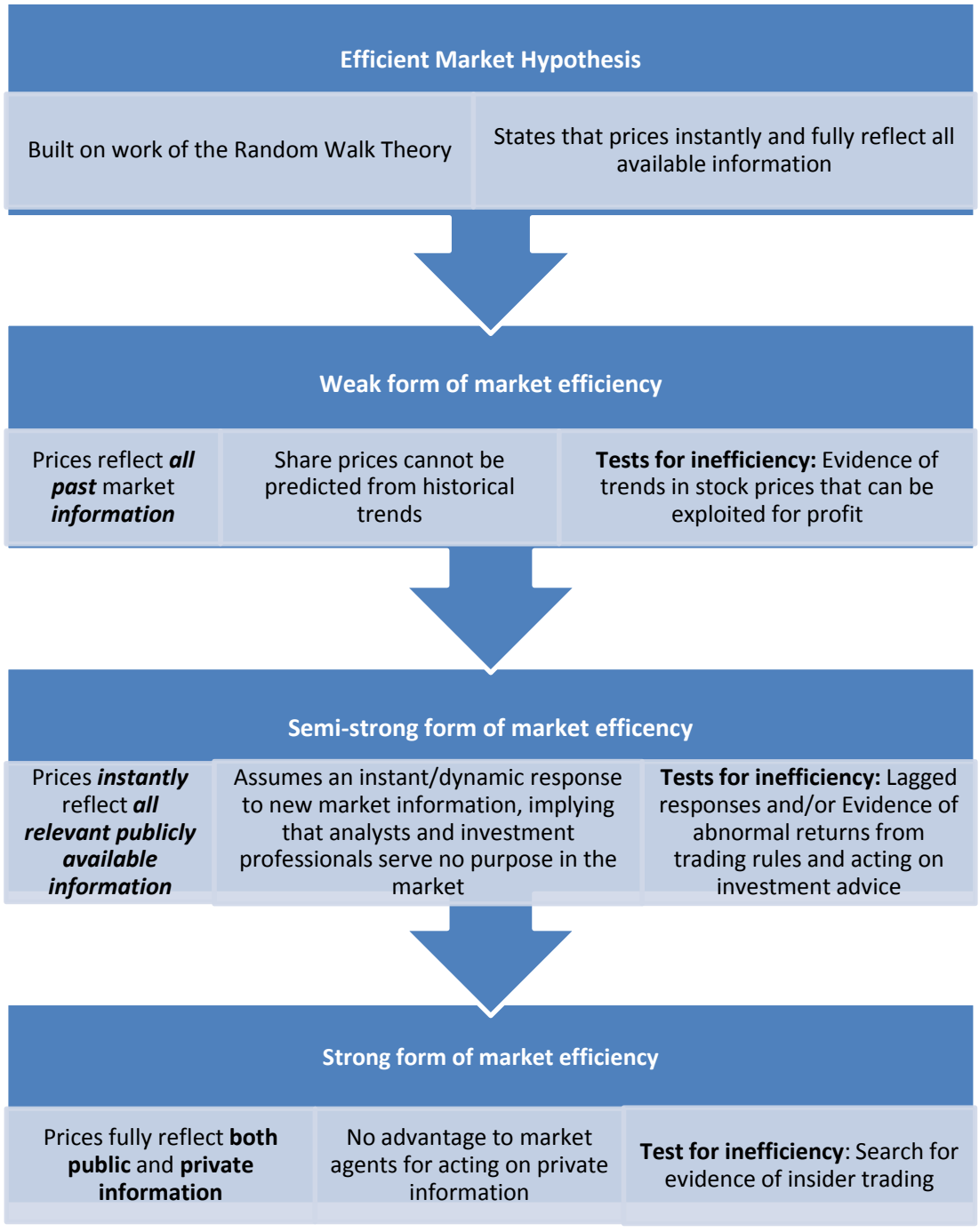


Figure 1: Summary of progressive forms of market efficiency, with investor implications and tests for in/efficiency

2.3 Empirical evidence on the EMH

2.3.1 Support for the EMH

The EMH has enjoyed much support and has been one of the most researched theories in finance (Malkiel, 2003). Fama, Fisher, Jensen, and Roll (1969) were one of the early proponents reporting on results that found in favour of market efficiency; finding that stock prices adjusted very rapidly to new information. Work from Fama (1970) continued to offer support for the EMH in US stock exchanges. His work suggested that that neither technical analysis of past stock prices, nor fundamental analysis would allow investors to earn abnormal returns on their portfolios. Other supporters of the EMH include Jensen (1968), Chang and Lewellen (1984) and Malkiel (1995) who all found empirical support for the theory. Desai and Jain (1995) added to the support for the EMH when they showed that money managers at *Barron's* were not able to outperform passive benchmarks in the long term, on average. Similarly Chang (2003) examined the performance of US mutual funds from 1992 –1996 and found that passive index funds performed better than actively managed funds. Barber, Lehavy, McNichols, and Trueman (2006) also found support for the semi-strong form of the EMH, when they concluded that following publicly available analysts' recommendations did not allow investors to earn returns in excess of the market. Carhart (1997) using a four-factor model to account for market anomalies found that mutual fund portfolio managers were unable to outperform market benchmarks adding support for market efficiency.

By and large, evidence has been found in support of the EMH. Many US studies have found the market to be weak and semi-strong efficient by showing that portfolio managers were not able to consistently outperform market benchmarks, especially when transaction costs were accounted for.

2.3.2 The case for market efficiency on the JSE

In the South African context, Strebel (1977) found in favour of the efficiency of the JSE by showing that professionally managed mutual funds failed to achieve superior performance versus market benchmarked returns. His work was subsequently criticised on the grounds of: quality of raw data, methodology and even the rigour of his conclusions, by Gilbertson and Roux (1978). Gilbertson and Roux (1978), however, could not themselves reject market efficiency as the dependencies that were found in their results were too small to be profitably exploited. Firer, Ward, and Teeuwisse (1987) also found in favour of market efficiency of the JSE and noted that the levels of predictability required to beat the JSE were not dissimilar to those needed to beat the New York Stock Exchange (NYSE). Similarly when testing the efficiency of seven other African markets, Jefferis and Smith (2005) found the JSE to be weak form efficient throughout the period from the early 1990s to June 2001.

Robins, Sandler, and Durand (1999, p. 61) concluded that the JSE was efficient despite its "idiosyncrasies". Scher and Muller (2005) also could not rule against market efficiency, when they found that for the most part, South African fund managers were unable to outperform the market, once market anomalies were accounted for. Of late, Mbululu and Chipeta (2012) have also concluded in favour of weak-form efficiency of the JSE as they found no significant day-of-the-week effect on eight of the nine sectors of the JSE.

2.3.3 Opposition to the EMH

Malkiel (2003) in his review paper of the EMH explains that by the start of the twenty first century, dominance of the EMH had begun to wane, with opinion leaders looking at behavioural, psychological, fundamental and technical factors to prove that investors could earn excess risk adjusted rates of return. His explanation of the rejection of the EMH is due to empirical evidence which shows that new announcements are only grasped over a period of time, making stock prices slow to respond to new news and therefore in violation of the semi-strong form of efficiency. He does, however, concede that transaction costs

make it very difficult for momentum strategies to beat buy-and-hold strategies. De Bondt and Thaler (1985) found weak-form inefficiency of US markets in the period 1926 to 1982 by finding long run mean reversion of shares. Their finding meant that future share prices could be predicted from past share prices and that the market was weak form inefficient. These authors were amongst the first to discuss the behavioural biases of market agents as explanatory factors.

Womack (1996), Palman, Sun, and Tang (1994) as well as Barber et al. (2006) support Malkiel (2003) in his finding that share prices are slow to react to new information. Palman et al. (1994) finds abnormal returns for publication of analyst recommendations on the *Inside Wall Street* column of a popular US business periodical which are robust to alternative samples and methodologies. Similarly Cubbin et al. (2006) found evidence, albeit limited, of being able to beat the market. They showed returns that were able to sustainably outperform market benchmarks, however, only after an initial period of losses. They concluded that their approach still needed further refinement before it could be considered as a trading rule. Some authors (Barber et al., 2006; Barber & Odean, 2008) concede that arbitrage opportunities which exist, may be limited by capital constraints, transaction costs and risks associated with concentrated positions in a share.

Block (1999) surveyed close to 300 financial analysts in the USA and reports that almost 100% (97.3%) were either neutral or strongly disagreed with the EMH.

In the South African context, Knight and Affleck-Graves (1985) showed the JSE could anticipate poor results from companies with share prices falling, even before results were released publicly, but conversely for positive results that the market only responded post the revelation of good news. They found that the market lag in adjusting prices after an announcement was up to ten weeks, implying that the market was semi-strong form inefficient.

2.3.4 The case against market efficiency of the JSE

Bhana (1990) found that share prices did not respond immediately to information as it becomes publicly available. He observed that share prices consistently overreacted to negative events with the anomaly persisting for up to a year after the event. Arbitrage opportunities for astute investors were therefore possible, in contravention of the EMH. Page and Way (1992) reported that stock markets over-react to recent and "dramatic news" (Page & Way, 1992, p. 35). They found in the period between 1974 to 1989, that shares on the JSE that over-shot when shocked by dramatic news, reverted back in the opposite direction over time, similar to the mean reversion observed by De Bondt and Thaler (1985). This mean reverting nature was later also confirmed for the JSE by Cubbin et al. (2006), confirming weak-form inefficiencies on the JSE

2.3.5 Concluding note on market efficiency

The results in terms of market efficiency, as postulated by the EMH are divided. There are as many advocates for efficiency, as those against, even in the case of the JSE, in the South African context. Those studies that have supported market efficiency have been criticised for not having controlled for thinly traded stocks, using weekly instead of daily data as well as insufficient modelling of the market to accommodate market anomalies in the calculation of expected returns.

For those studies that have found against the EMH on the JSE, it should be noted that since many of these studies were published, the JSE has undergone massive transformation, which included measures to increase information flow, reduce insider trading, and transaction costs amongst other things (Mkhize & Msweli-Mbanga, 2006). Moreover, as Roll (1994) notes, despite the onslaught on the EMH, very few have managed to profit from even the most extreme findings of market inefficiency. Crucially, though due to what has been dubbed the joint hypothesis problem, event studies simultaneously test for market efficiency and the validity of the asset pricing model used. Results can

therefore never conclusively rule in favour of market (in)/efficiency as model misspecification cannot be ruled out.

2.4 Role of Analysts

Whether the EMH is applicable or not, two shortcomings of the theory still persist. Firstly, the EMH theory is silent on the quality and quantity of information that is made available. Second, and more importantly, it is silent on the equilibrium mechanisms by which the market becomes efficient (Barker, 1998). The Grossman and Stiglitz (1980) expanded view of market efficiency goes some way to bridge this gap, by explaining that information will be uncovered and provided to the market, up to the point where it remains profitable for information providers to do so. This then allows for the role of analysts in the information dissemination process and thereby the process of achieving price equilibrium in the market to be accommodated.

Financial analysts are an integral part of capital market operations. They promote market efficiency by gathering, screening and filtering relevant information to each of the key market players (Contoudis, 2003). By providing their research to investors, analysts facilitate optimal capital allocation when investment decisions are made (X. Chen & Cheng, 2003; Jegadeesh & Kim, 2005). They use a multitude of methods, including interviewing executives, clients, customers and company advisers amongst others when producing detailed reports on the prospects of listed companies (JSE, 2006).

Contoudis (2003) identifies the three general types of analysts' as: buy-side, sell-side and independent analysts. He explains that sell-side analysts typically work for a full service financial firm that provides broker-dealer and investment banking services. Buy-side analysts, however, work for institutional money managers, such as mutual funds, hedge funds and investment advisors, advising their employers on investment decisions (Mokoaleli-Mokoteli, Taffler, &

Agarwal, 2009), whilst independent analysts typically do their research for private subscription.

Typically security analysts tend to be industry specialists, who cover between 5 and 25 shares, generally within the same sector. A significant aspect of their job is to update the relative valuation of the shares they follow and transmit this information to their customers (Jegadeesh & Kim, 2005), specifically looking to identify mispriced shares, as opportunities to trade for profit (Kothari, 2001) .

This study focusses exclusively on sell-side analysts who in their process of gathering and processing information ultimately make recommendations for investors to buy and sell shares (Mokoaleli-Mokoteli, 2005) with the expectation of earning brokerage commissions for their firms. The literature will from this point on refer to analysts, as *sell-side analysts*, unless otherwise stated. The next section describes the two methods of analysis that all analysts use in their trade.

2.4.1 Fundamental analysis

Analysts generally begin their process of stock evaluation by conducting macroeconomic analysis of the broad market indicators and deciding on factors like economic and political outlook (Mabhunu, 2004). The next step will typically involve a review of the market as a whole with specific focus on selected industries and then more specifically, a comprehensive review of the specific shares of interest.

Breton and Taffler (2001) find that analysts are equally concerned with a company's management track record, strategy and trading environment when arriving at their investment recommendations. The valuation process is then a balancing of each of these factors which are subjectively determined by the analyst (C. R. Chen, Chan, & Steiner, 2002). Focussed analysis of company specific financial statements and peer comparisons are included in the analysis undertaken to determine the company's intrinsic value or equilibrium price against the market (Kothari, 2001). Barniv, Hope, Myring, and Thomas (2009)

explain that analysts typically estimate a company's intrinsic value by estimating future cash flows, which are then incorporated into a residual income valuation model. When estimated residual income values are above (below) the current share price, then analysts issue a buy (sell) recommendation.

Lawrence (1997), views fundamental analysis as a superior method of forecasting long-term stability and growth of a share; he cites the systematic approach of fundamental analysis and the comparison of peer companies to be an advantage to investors who need to become more familiar with the company. The negative he cites, however, is the subjectivity required in interpreting the inputs of fundamental analysis.

2.4.2 Technical analysis

Technical analysis is founded on the assumption that historical market movements, especially in prices and volumes would allow for trend prediction of a share's future movement. This is clearly a technique which is practiced when the market is believed to be weak-from inefficient (Fama, 1965). The technique uses patterns in the history of a share's price to predict future behaviour of prices. Tools used by the technical analyst include price, volume, and open interest statistics. Technical analysts, however, mostly use charts to predict future stock movements (Lawrence, 1997) and are often referred to as chartists in the literature.

While in 1965, Fama was able to conclude that "pure chartists are relatively rare amongst stock market analysts" Fama (1965, p. 55), the practice of technical analysis has been a growing trend. Lawrence (1997) and Malkiel (2003), both found increasing traction for chartists' who, emphasise psychological and behavioural elements in trying to find predictable patterns for investors to leverage for financial gain. Technical analysis has often been blamed for being highly subjective, as charts can be interpreted differently by different people. New developments in behavioural finance and the commensurate increase in analytical tools that have become available to the chartist has spurred the acceptance of this form of analysis Lawrence (1997).

Ultimately analysts use both technical and fundamental analysis to derive their earnings forecast of a firm as well as their recommendations of a share. Despite all the analysis that analysts may undertake or provide to their clients, asset managers and investors are the ultimate decision makers on portfolio composition. They generally balance the risk-return relationship in accordance with their risk appetites, personal biases, market timing and other factors when making decisions on the purchase and sale of shares.

2.5 Criticisms of analyst behaviour

In early 2002, just six weeks before the collapse of Enron, fifteen of the seventeen analysts covering the share were still recommending the company as a "buy" or "strong buy" (Michaely & Womack, 2005). Analysts have come under fire from investors, politicians, and regulators in the early 2000s and since, for being manipulative, insincere and even immoral in their disregard of investors, when making recommendations that favoured their own pockets and their investment banking clients (Jegadeesh & Kim, 2005). This section looks at some of the main criticisms levelled at analysts.

2.5.1 Herding behaviour

Welch (2000) shows that analysts tend to herd in their recommendations and that recommendations seem to be positively correlated with previous analysts' views. This trend of consensus herding is more pronounced when little information is available to the analyst. Hong, Kubik, and Solomon (2000) find the problem of herding to be exacerbated amongst inexperienced analysts who deviate less from consensus forecasts, in fear of career motivated concerns. Costello and Hall (2010) supported this finding, showing that analysts who face greater employment risk (of being fired for poor performance) tend to herd and issue forecasts that deviate less from consensus. Jegadeesh and Kim (2007) also find herding particularly evident when analysts are from larger brokerages or following stocks with smaller dispersion across recommendations.

2.5.2 Overconfidence, over-optimism and over-issue

Zitzewitz (2001) reports on the bias of analysts favouring their private information and therefore overweighting private information in their forecasting. Q. Chen and Jiang (2006) support these findings and show that analysts are frequently inefficient in weighting their private versus public information.

Scherbina (2004) finds that although analysts consistently exhibit an optimistic bias, that they are constrained by how optimistic they can be in their forecasts by their reputation in the market place to provide accurate and useful information. She posits that analysts will set the optimistic bias at a point where benefits do not exceed reputational damage costs. She offers that analysts' would rather drop cover from a share for fear of being cut-off from sources of private/inside information than issue very pessimistic recommendations.

Baugh and Yatrakis (2005) provide evidence for over-reaction and overconfidence bias in analysts. They find that sell-side analysts revise their recommendations (to counteract their over-optimism) far more frequently than independent analysts. Support for the overconfidence of analysts is also cited by Mokoaleli-Mokoteli (2005) who finds this demonstrated specifically in the tone of language used by analysts in their reporting.

Womack (1996) demonstrates a version of overconfidence bias in analysts' recommendations, when he finds that new buy recommendations were seven (7) times greater than that of new sell recommendations. Likewise, Barber et al. (2006) documents that sell recommendations dipped as low as 2% with buy recommendations peaking at 74% in the USA in the mid-2000s. This is confirmed by Labhart (2004) who found that only 2% of all analyst recommendations in his sample in 2001 were "sell". Similarly when evaluating analyst consensus recommendations in the South African context, Prayag and Van Rensburg (2006) found that sell recommendations made up less than 3% of their total sample of 5282 observations.

2.5.3 Conflicts of interest due to investment banking relationships

Many analysts work for large financial companies who in addition to providing brokerage and investment services, also offer a host of other financial services including the underwriting of initial public offerings (IPOs) and investment banking services.

Research by Lin and McNichols (1998), Michaely and Womack (1999) and Barber et al. (2006) all provide evidence of analyst bias arising from investment banking ties. Lin and McNichols (1998) found that lead and co-underwriters issued significantly more favourable recommendations than unaffiliated analysts, although their fundamental analysis did not differ greatly. Michaely and Womack (1999) found that recommendations at the time of IPOs for affiliated analysts were significantly more favourable than unaffiliated analysts. Barber et al. (2006) showed that analysts who were tainted by ties with investment banking divisions produced inferior performance when compared to independent analysts.

In the South African context, Hall and Millard (2002) record a large percentage of buy recommendations over all others. They cast doubt on the quality of the underlying fundamentals leading to the recommendations being made and also hint at herding as well as the according of favour to investment banking clients over other investors.

2.5.4 Informational conflicts

Analysts have come to rely on access to management and company insiders as a significant source of unique private information. Labhart (2004), however, reports that companies are reluctant to give information to analysts who will negatively rate a company's share, even so far as to cut-off certain types of information to analysts issuing negative recommendations. In the same vein, Barniv et al. (2009) indicates that being optimistic has historically helped analysts get access to inside information.

2.5.5 Analysts differ in quality

As in any other field, not every analyst can be the best (FINRA, 2013). Zitzewitz (2001) offers that the informational quality content of reports issued by the top 10% of analysts is roughly six (6) times that of the bottom 40% of analysts when using the *Institutional Investor* magazine ranking of analysts in the USA. Relatedly Fang and Yasuda (2011), using data from 1994 to 2009, show that the difference in portfolio returns of recommendations from *All-American (AA)* analysts' were 7% per annum higher after risk adjustment than that for non-AA analysts.

Similarly, Desai, Liang, and Singh (2000) found positive reputation effects when examining analysts from *Wall Street Journal's* annual *All-Star Survey.* They found that highly ranked analysts' recommendations were able to outperform stocks recommended by lower ranked analysts for similar companies and industries.

2.5.6 Brokerage Commissions and analyst compensation

Brokerage firms' compensation arrangements can put pressure on analysts to issue positive research reports and recommendations as many base the remuneration of analysts on the firms' underwriting profits (FINRA, 2013; Labhart, 2004). Some firms remunerate analysts based on the trade they generate for their brokerage firm (Barniv et al., 2009). Many sell-side analysts make their ratings available to the public for free. Labhart (2004) has criticised analysts for issuing forecasts with the intent of generating trading commission and suggests that these forecasts have little accuracy.

An exacerbating problem is that underwriters of newly issued shares often receive payment for their services, in the newly listed shares. This leaves analysts of the underwriting firm with incentive to inflate earnings forecasts and recommendations to maximise their possible revenue (Labhart, 2004). Further the initiation of coverage with favourable recommendations is also seen as a

necessary condition to obtaining future underwriting deals (Barniv et al., 2009; Baugh & Yatrakis, 2005).

2.5.7 Analysts' bias disadvantage smaller investors

C. R. Chen et al. (2002) found over time that the market has come to discount recommendations made by brokerage firms who have investment banking relationships. Malmendier and Shanthikumar (2003), Scherbina (2004) and Baugh and Yatrakis (2005), however, find that small investors who are mostly naïve about the incentives of affiliated analysts' may be disadvantaged. Similarly, Mikhail, Walther, and Willis (2007) also find that small investors lack the ability to discern between conflicted analysts. They posit that small investors are therefore not savvy enough to be able to detect inconsistencies between the informational content of analysts' reports and their recommendations. They show that small investors trade on the occurrence of a recommendation alone, whilst large investors trade on the informational content of analysts' reports and earnings forecasts. These findings are corroborated by Malmendier and Shanthikumar (2007), who confirm that whilst small investors follow recommendations, large investors discount recommendations, preferring to track forecast and earnings updates.

2.5.8 Concluding note on analyst bias

The section above outlines the literature on sources of analyst bias. Despite the many sources of analyst bias, regulation and legislation in South Africa and internationally have been revised to control analyst bias. South African legislation as well JSE regulation has kept pace especially with regards to informational conflicts. The Insider Trading Act of 1998 and the Securities Services Act 34 of 2004 were brought into South African law as separate acts, outside the previous provision in the Companies Act 61 of 1973. This was to ensure sufficient provision for the prosecution of insider trading on the securities exchange.

In addition, the JSE launched the Securities Exchange News Service (SENS) in 1997 to ensure equitable dissemination of price sensitive information to all market participants simultaneously. JSE listing requirements have also been updated to ensure adherence of all listed companies to minimum regulated standards (JSE, 2006). Changes in the Companies Act 71 of 2008, clearly outlines director dealings, to ensure corporate insiders are well informed of their responsibilities and that insider trading is regulated and controlled.

The competitiveness of the investment research industry and the link between remuneration and value-adding capability to clients, should provide enough incentive for analysts to keep honest and accurate in their reporting, especially as their rating and remuneration are often based on client perceptions and the accuracy of their research findings (JSE, 2006). Analysts, in many cases have the ability to affect share prices and the volume traded as a result of the recommendations that they make from their analysis and therefore have an important part to play in the transacting of shares.

2.6 Do analyst recommendations add value?

X. Chen and Cheng (2003) support the expanded view of market efficiency of Grossman and Stiglitz (1980). They posit that analysts serve to propagate market efficiency by uncovering new information and uniformly and quickly informing market participants of their findings. Analysts therefore promote optimal capital allocation, whilst at the same time reducing information asymmetries between companies and the market. Analysts' services therefore result in benefits to investors, companies and the brokerage firms who employ financial analysts. It is for this reason that analysts should be rewarded for their function of keeping the market informed and therefore efficient. The literature on this topic, however, is divided along the lines of those who believe that analysts have value to add and those that clearly do not.

2.6.1 Support for following analyst recommendations

Internationally Stickel (1995) and Womack (1996) both report favourable findings for investors following analysts' recommendations. Stickel (1995) found support for following brokers buy and sell recommendations in being able to influence the share price both in the short and long term. Womack (1996) similarly showed that following analysts' recommendations, could earn investors between three to five percent in a period of three days. Correspondingly Juergens (1999) also found that investors who followed analyst recommendations could earn significant and immediate returns which were not short-lived or mean reverting.

Kim, Lin, and Slovin (1997) found a significant increase in firm value, when share prices increased due to an initiation of coverage with a buy recommendation, concluding that analysts possessed the capacity to add value. Barber et al. (2001), examined a trading strategy of buying the most favourable and selling the least favourable stocks based on levels of analyst recommendations. They find in favour of analysts ability to add value, when they show that stocks with the most favourable analysts' recommendations outperform those with least favourable recommendations, without accounting for transaction costs. Similarly, Jegadeesh, Kim, Krische, and Lee (2005) formed portfolios based on analysts' consensus recommendation levels and found a difference of 2.3% between the performance of the most and least favourably recommended portfolios over a six-month horizon.

Jegadeesh and Kim (2005) when examining international evidence find that strategies that bought upgraded stocks and sold downgraded stocks revealed profits, especially in the USA. Chan et al. (2009) find support for analyst recommendations and show that financial firms are willing to back their analysts research by pursuing trading strategies based on their in-house analysts' recommendations.

Palman et al. (1994), found abnormal returns for investors trading on second hand information published in the popular *Wall Street Journal.* Green (2006)

examined 7000 recommendation changes, from 16 major US brokerage firms in the period 1999 to 2002. He found that private brokerage clients who received recommendations before they were published on more widely available or public platforms were able to earn abnormal returns when acting on these recommendations. Even when controlling for transaction costs, purchasing upgraded stocks and selling downgraded stocks, resulted in two-day average returns of 1.02% and 1.50% respectively. The author therefore concluded that short term informational advantages to private clients was of value, and could result in profit opportunities of up to 30% annualised.

In the South African context, Bhana (1990) evaluated the effectiveness of recommendations by examining two large stockbrokerage firms between 1979 and 1988. He found that analysts' *buy* recommendations had significantly positive abnormal returns, whilst *sell* recommendations were unable to out-perform the market. His conclusion was that analysts exhibited ability to find undervalued shares, which could have been as a result of analyst access to superior, new, private information. Dek (2009) examined the effectiveness of following analysts' recommendations during the credit crunch of 2008. He found that investors were able to earn abnormal returns when buying shares that were the most highly recommended and selling those that had the lowest analyst consensus recommendation levels.

2.6.2 Criticisms of following analysts' recommendations

Early work by Dimson and Fraletti (1986) found no evidence of significant abnormal performance of recommended stocks when examining 1649 recommendations made over the telephone by a leading UK stockbroker. Similarly Walker and Hatfield (1996) found that individual investors did not profit from analyst advice. Barber et al. (2001) found that when transaction costs were accounted for, following investor advice on buy and sell recommendations did not yield abnormal returns due to higher portfolio turnover.

Walker and Hatfield (1996) showed that although analysts have the ability to identify under and over-valued stocks, following analyst recommendations from

the *Market Highlights* section of *USA Today* did not yield profits for investors, even before transaction costs. Their results are robust to the use of different analytical techniques. Similarly, Tumarkin and Whitelaw (2001) despite observing abnormally high trading volume around message board activity on www.ragingbull.com found that investors were unable to profit from these recommendations.

In the South African context, Hall and Millard (2002) examined the value of broker recommendations by selecting investment recommendations from three brokerage houses who featured on the Financial Mail *Analyst of the Year* awards. Portfolios of buy, hold and sell recommendations were formed for 16 companies, controlling for risk, to be compared to monthly movements of both the JSE All-share and Industrial indices. Results showed that investors could earn abnormal returns from following broker recommendations without adjusting for risk. When risk was accounted for, it was found that investors could limit losses in relation to the market but could not beat or even equal market returns.

Prayag and Van Rensburg (2006) found that investors could only earn abnormal returns when acting on downgrades, enabling investors that follow analysts sell recommendations to limit their losses. Their advice was that potential investors should look beyond just analysts' consensus recommendations when making investment decisions on the stock exchange.

Mweli (2010) examined analysts' consensus recommendations between 2003 and 2010 for JSE listed companies. He created portfolios based on buy and sell recommendations, balancing portfolios monthly. He found in favour of following analyst advice, especially for long-term investors in a bear market, where it was found that analysts were able to outperform the market both in normal and risk adjusted returns. Mweli (2010), however, was unable to find significance when measuring the value of analyst recommendations during a bull market. He concluded that risk-averse investors would find value in analysts' recommendations, as they provide higher risk adjusted returns than the general market when using the SATRIX Top40 as a proxy for market returns.

2.6.3 Concluding note on the value of analyst recommendations

The debate on whether analysts provide value for investors has delivered empirical results both for and against following analyst recommendations. Hirschey, Richardson, and Scholz (2000), who found that second hand information from the popular The Motley Fool (TMF) website resulted in abnormal returns for investors, were recently challenged by Giacomino and Akers (2011) who found support against following analyst advice, for the very same on-line advisory service. Similarly, Barber, Lehavy, McNichols, and Trueman (2003) show using more recent data, that the finding of longer term abnormal performance in the earlier Barber et al. (2001) study are completely reversed.

Advocates, who support the value of analysts' recommendations, argue that analysts have a role to play in the dissemination of information to the market. They put forward that as rational agents, clients of brokerage houses, ultimately fund research departments in the belief that security analysis will allow them to generate superior returns. This view is supported by Tan and Lin (2012) who find that institutional investors who follow analyst recommendations and trade in the same direction as consensus target price changes are able to earn abnormal returns.

Critics against following analysts' recommendations, for example Groth, Lewellen, Schlarbaum, and Lease (1979), offer that analysts ride on the momentum of good news around a share to generate trading pressure rather than providing genuine fundamental analysis.

Incorrect evaluation techniques to properly account for market anomalies in predicting market returns, infrequent data and thin trading amongst the investigated sample are often reasons cited to discount findings. The inability to narrowly define an event, which could lead to confounding effects in the results, has also been a criticism of many event studies with long event windows. Another popular reason for criticising those who found in favour of following

analysts' recommendations has been the failure of most studies to account for transaction costs (Ahern, 2009; Barber et al., 2006; Barber & Odean, 2008).

2.7 Market effects or anomalies

2.7.1 The evolution of CAPM in event studies

The Capital Asset Pricing model of Sharpe (1964) and Lintner (1965) is a simple, linear model which uses a single risk factor (beta) to estimate expected returns on an asset. The CAPM model depicted by Equation 1 below implies that the regression slope of a share's return against that of the market (usually a market proxy index) is given by beta (β). CAPM also proposes a positive risk return correlation between the expected market return and beta (Fama & French, 1996a) as per Equation 1 below.

$$\boldsymbol{E(R_i) = R_f + \beta_i E\left((R_m) - R_f\right) \ldots \ Equation\ 1}$$

Where:

$E(R_i)$ = Expected return of share/asset (*i*);

R_f = Risk free rate, usually a long-term government bond return rate, which in the South African context could be the R186, R201 or R 203 (SARB, 2013);

$E(R_m)$ = Expected return of the market;

β_i = Volatility of the share or the risk associated with the share in comparison to the market;

$E\left((R_m) - R_f\right)$ is also known as the *market premium* (Ward & Muller, 2012).

Early event studies used CAPM extensively to predict expected returns. Brown and Warner (1980) were amongst those in favour of using CAPM and other simple models, stating that more complicated methodologies did not offer any additional benefits. Despite support in the early 1980's for CAPM, the deficiency of simple CAPM to explain the variability in returns across samples (cross section of expected stock returns) came under fire (Banz, 1981; Binder, 1998; De Bondt & Thaler, 1985; Dimson & Marsh, 1986; Fama & French, 1992, 1996a, 1996b; Lakonishok, Shleifer, & Vishny, 1992). One of the earliest observed empirical contradictions of the CAPM was observed by Banz (1981), who found that small companies consistently outperformed larger companies over time, and documented this as the *size effect.*

Over time various patterns in average or cross sectional returns began to emerge, that could not be accounted for by CAPM. These patterns collectively became known as market anomalies (Fama & French, 1996b). Over time various asset pricing models have been developed to bridge the gap in accommodating anomalies that CAPM did not address. The Arbitrage Pricing Theory (APT) model of Roll and Ross (1980) gained favour for a period as it was more flexible. Other models, including the mean adjusted return model of Brown and Warner (1985) and a variety of CAPM variations came into being. Jensen (1968) rearranged the CAPM model to account for a separate risk factor known as Jensen's alpha. Similarly the Intertemporal Capital Asset Pricing Model was developed to explain additional risk factors.

A few models are highlighted below with definitions from Mushidzi and Ward (2004, p. 21).

Market model: calculation of a company's expected return incorporate the risk of the firm with respect to the market. Many authors have, however, documented that market betas are insufficient to describe the cross section of expected returns, similar to the CAPM model.

Mean adjusted model: a company's return is expected to generate the same returns that it averaged during the estimation period. A criticism of this model is

that share performance does not necessarily reflect linear trends, and that past performance is not a perfect indicator of future returns.

Market adjusted model: a company is expected to generate the same returns as the market during the event window. This model does not accommodate for the cross section of expected returns.

Control portfolio model: a company is grouped with a portfolio of similar companies based on grouping criteria. The expected return of the company is then the same as that of the control portfolio during the event window.

2.7.2 Fama-French 3-Factor Model

The most significant and widely used break-through in accommodating market anomalies has come from Fama & French (1992, 1993 and 1996b), who argue strongly against a single factor beta model being able to explain the cross section of expected share returns. Size and value anomalies have been the most consistently cited anomalies used as proof of the insufficiency of CAPM.

Fama and French (1996b) were able to combine the market anomalies of size, P/E, cash flow/price, book-to-market (BTM), past sales growth, long term past return and short term past return that were previously published market anomalies into a succinct 3-factor model, in which the anomalies across the cross section of returns largely disappeared. Size and BTM were shown to provide a superior explanation of average share returns and together absorb the role of leverage and E/P (Fama & French, 1992, 1993, 1996b). Their proposed method which is called the Fama-French (FF) 3-factor model has become the most widely accepted and used, for modelling share returns in recent times. The equation below models the work of Fama and French (Fama & French, 1992, 1996b). The FF 3-factor model accommodates the standard risk factor of CAPM and additionally 2 other market anomalies of size and value.

$$R_{it} - R_{ft} = \alpha_i + \beta_{iM}\left(R_{Mt} - R_{ft}\right) + \beta_{is}SMB_t + \beta_{ih}HML_t + \varepsilon_{it} \quad \ldots \textit{Equation 2}$$

Where

R_{it} = Returns of share *(i)* for period *t;*

R_{ft} = Risk-free rate for period *t;*

SMB_t = Expected premiums for size (market capitalisation) or specifically the difference in returns of portfolios of diversified small and big stocks;

HML_t = Expected premiums for value (BTM) or specifically the returns on diversified portfolios of high and low BTM stocks;

$(R_{Mt} - R_{ft})$ = Average value of the market premium;

β_{iM} , β_{is} , β_{ih} = Beta slope coefficients in the regression of $R_{it} - R_{ft}$ against $R_{Mt} - R_{ft}$ for size and value.

Equation 2 above, from Fama and French (1996b) states that the expected return of share *i* (in excess of the risk-free rate) is explained by the sensitivity of its return to 3 factors; the market return in excess of its risk-free rate, the underlying companies size (market capitalisation) and its value (BTM). Despite criticism by the authors themselves (Fama & French, 2004) that the method does not have theoretical origins but has arisen from "brute force constructs" (Fama & French, 2004, p. 39), this method has been the most popular and widely used in recent event studies and accounts for both size and value anomalies simultaneously.

Carhart (1997) attempted to add a fourth *momentum* factor to the FF 3-factor model, but found that the momentum effect could not be reliably demonstrated across his sample, concluding that the FF method for capturing size and value was sufficient to explain the observed cross-section of returns. Similarly Ahern (2009) tested 40 years of US market data (1964 to 200) and found the FF 3-factor model to be the most robust and powerful in detecting abnormal return

2.7.3 JSE Market Anomalies

Similar to international studies, South African studies have also consistently reported on size and value anomalies. In the South African context, however, evidence as early as Gilbertson and Goldberg (1981) indicated that an additional anomaly specific to the JSE existed. The authors showed a unique duality of the JSE whereby resource and industrial shares behave differently. The authors concluded that any asset pricing model used on the JSE would benefit by accommodating the influence of the resource and industrial effect.

Page (1996) as cited in Strugnell, Gilbert, and Kruger (2011) found the existence of the value effect, measured by P/E, which was robust to both risk adjusted CAPM and APT models up to five factors. Similarly Van Rensburg and Slaney (1997) used a two-factor APT model to account for this effect, and later Van Rensburg (2001) showed the need to add an additional parameter to sufficiently account for the value effect. He suggested using earnings yield as a proxy for the value effect in a three-factor APT model.

Van Rensburg (2002) proposed the use of a two-factor APT model using returns on the JSE's Financial and Industrial Index and Resources Index as proxies for style factors uncovered in their earlier study. Van Rensburg and Robertson (2003a) took a portfolio approach to isolate the size and value effects. They built on the earlier research which confirmed the value effect, by showing that both the size and value (proxy of P/E ratio) effects existed independently of each other and that both were required to explain returns on the JSE.

The authors also surprisingly found a negative correlation between market returns and beta. Their findings show, contrary the CAPM model, that beta actually is a negative predictor of stock returns. This finding would raise significant concern about investment theory and practice in South Africa, which the authors explain as a bias that may have resulted due to thinly thinly-traded stocks in their data. Strugnell et al. (2011) also recorded an inverse relationship between beta and market returns, using a dataset that covered a longer period

than Van Rensburg and Robertson (2003a) and estimated beta's over a period of 60 months compared to the shorter period of 12 to 15 months of Van Rensburg and Robertson (2003a). They find when replicating Van Rensburg and Robertson (2003a) that market capitalisation and P/E ratios can serve as indicators of size and value respectively.

Auret and Sinclaire (2006) found BTM equity ratios to be a better indicator of the value premium than P/E ratio and that when BTM was added to the model of Van Rensburg and Robertson (2003b), that it completely subsumed the effect of size and P/E. Importantly though, Auret and Sinclaire (2006) also showed that although BTM has more explanatory power than either size or P/E, adding the additional BTM variable to the model of Van Rensburg and Robertson (2003b), did not lead to an improvement of the original model in accounting for market anomalies.

Similarly, Basiewicz and Auret (2010), used both portfolio-based and regression approaches to show prominent size premiums on the JSE over the period from 2003 to 2005, which was not included in the earlier published work (Auret & Sinclaire, 2006). Strugnell et al. (2011) argued that one of the primary reasons for the lack of a size effect in the earlier South African studies was due to small sample sizes, where smaller companies have routinely been excluded from prior South African studies due to thin trading concerns.

Since many of the earlier studies, the JSE has undergone a re-classification in June 2002, where shares which are not traded, but held for equity purposes have been excluded from what is considered to be free float and what makes up the market capitalisation of companies on the stock exchange (Mangani, 2007). This action has reduced the number of companies on the JSE All Share Index (ALSI) from more than four hundred to just one hundred and sixty. This reduction has also meant that those shares that currently make up the ALSI are traded more often and are highly liquid. Studies post 2002 should benefit from the efforts to address the concern of thin trading and poor liquidity that earlier studies have been criticised for.

2.7.4 Previous models used to model JSE expected market returns

Early studies by Knight and Affleck-Graves (1983) and Bhana (1996, 2000, 2001) used the market model to predict expected returns. Prayag and Van Rensburg (2006) found in favour of the 2-factor APT model as superior to a risk adjusted CAPM model, using Jensen's alpha and the mean-market adjusted return. Basiewicz (2007) replicated the Fama and French (1992) study using JSE shares, and found that both value and size effects were independent and significant in explaining the cross section (average) of returns on the JSE.

Studies by Scher and Muller (2005) and Bhana (2007) used the FF 3-factor model. Basiewicz and Auret (2010) also concluded in favour of using the FF 3-factor model to predict expected returns for firms listed on the JSE using portfolios to sort for different effects.

From the literature surveyed, Mutooni and Muller (2007) and Ward and Muller (2010) have developed what seems to be the most comprehensive account for measuring share returns on the JSE. Their methodology combines the findings of earlier authors who found in favour of the FF 3-factor model and additionally also caters for the JSE specific behaviour around resource versus non-resource (industrial) shares that was identified by Gilbertson and Goldberg (1981).

Mordant and Muller (2003) formed 8 "factor-mimicking" portfolios to control for style effects of: size, value/growth and the resource/non-resource effect, whilst Ward and Muller (2010) used a similar method but with 12 portfolios, controlling for one extra size ranking. Due to the comprehensiveness of their model in accounting for JSE specific market anomalies, this model will be used to minimise bias arising from a mis-specified asset pricing model. The choice of asset pricing model is of critical importance to event studies, according to Rozeff and Zaman (1988), as an incorrect model can falsely inflate returns and lead to incorrect inferences. Section 3.4 outlines the specifics of the method in greater detail.

2.7 Conclusion of Literature Review

This chapter reviews the EMH and some of the consequences in the stock exchange for market efficiency holding true. The extended form of the EMH that was first postulated by Grossman and Stiglitz (1980) is of particular interest for this research as it accommodates the role that analysts play in the dissemination of information in the market. The various forms of market efficiency were discussed, with empirical evidence being presented both for and against market efficiency, offering specific insight into the JSE.

The JSE was found to be mostly weak form efficient, with studies that suggest weak-form inefficiency generally being published prior to 2002, after which significant restructuring of the JSE occurred to ensure improved liquidity and trading. This study is more concerned with the semi-strong form of market efficiency, which deals with the speed and accuracy with which the JSE responds to new information. The study seeks to measure the market response to changes in analysts' consensus recommendations.

The literature also focuses on the central protagonist, the analyst. Analysts' methods of evaluation are examined and it is revealed that although fundamental analysis has been favoured by analysts, that technical analysis was also found to gain momentum as an alternative method for analysts to find arbitrage opportunities. Analysts are found to suffer from numerous biases which can affect their ability to add value to investors following their advice. Small investors were shown to be particularly vulnerable to analysts' biases.

The rest of the chapter examines the evolution of the models that have been derived to cope with the deficiencies of CAPM. The FF 3-factor model was shown to be the most applicable and widely used in the modelling of market anomalies. The evolution of market anomalies is also explored, with the size and value effects confirmed for the JSE. The applicability of the FF 3-factor model for modelling JSE returns is established from literature. Lastly the Mordant and Muller (2003) and Ward and Muller (2010) methods were discussed for use in this research as they combine the FF 3-factor model for

value and size anomalies with the resource effect of the JSE to provide the most comprehensive model of the cross section of JSE returns.

This study aims to add to the literature on the effectiveness of trading on changes in analysts' consensus recommendations for JSE Top 40 companies. It updates previous literature to include data up to November 2012 and thus far covers the longest period (12 years) found in the literature review for a South African study in this field.

2.8 Hypothesis

The study aims to test the following hypothesis for abnormal returns resulting from changes in analysts' consensus recommendations.

2.9.1 Hypothesis 1 – Upgrades

Null hypothesis: Trading on upgrade changes in analyst consensus recommendations on JSE Top 40 shares yield cumulative abnormal returns (CAARs) equal to zero.

$$\boldsymbol{Ho_{upgrade}}\boldsymbol{:\ CAAR_t = 0}$$

Alternate hypothesis: Trading on upgrade changes in analysts' consensus recommendations on JSE Top 40 shares, earn cumulative abnormal returns (CAARs) not equal to zero.

$$\boldsymbol{H_{A:\ upgrade}CAAR\ \neq 0}$$

2.9.2 Hypothesis 2 - Downgrades

Null hypothesis: Trading on downgrade changes in analysts' consensus recommendations on JSE Top 40 shares, earn cumulative abnormal returns equal to zero.

$$\boldsymbol{Ho_{downgrade} : CAAR_t = 0}$$

Alternate hypothesis: Trading on downgrade changes in analysts' consensus recommendations on JSE Top 40 shares, earn cumulative abnormal returns not equal to zero.

$$\boldsymbol{H_{A\ downgrade} : CAAR \neq 0}$$

CHAPTER 3: RESEARCH METHODOLOGY

This chapter outlines the event study methodology that is used in this research. A brief overview of the benefits and limitations of the approach is followed by an in-depth review of the research design. The population and sample characteristics are highlighted next with a short overview of the research instrument. The procedure for data collection, as well as the analysis of the data is discussed in Section 3.6. Limitations of the study, validity and reliability analysis conclude the chapter.

3.1 Research methodology

This research uses the event study methodology which was pioneered by Fama et al. (1969) when they measured the impact of stock splits. Eugene Fama modestly does not accept credit for the founding of event studies but rather credits computational advancements. Binder (1998, p. 111) proclaims event studies to be the "methodological revolution in accounting, economics and finance".

3.2 Research Design

While Eugene Fama, himself, states that the event study has passed all tests for scientific usefulness, the central issue of a joint hypothesis problem still plagues this method (Fama, 1991). Event studies by definition become joint tests of market efficiency and the asset pricing model used. This issue of joint hypothesis testing makes it almost impossible to explain whether anomalies arise from mis-specified asset pricing models or market inefficiency (Dimson & Marsh, 1986; Fama, 1991; Kothari, 2001). Another complication associated with conducting event studies, as outlined in McWilliams, Siegel, and Teoh

(1999) is that three prior conditions need to be met to enable abnormal returns to be identified.

These conditions are:

- The market needs to be weak-form efficient;
- The market only becomes aware of the event upon announcement;
- No other major events (confounding effects) should occur during the event window.

Conducting event studies would therefore need to take cognisance of the three pre-conditions and adequately ensure that these are met.

3.3 Population and sample

A quantitative analysis of the data collected was used, which includes hypothesis testing for abnormal gains via the event study methodology. Share data and analyst recommendations were gathered from Bloomberg Professional Service and SENS announcements were obtained from Moneyweb.

3.3.1 Population

The total population consists of all buy and sell recommendations made on Bloomberg Professional Service between, 1 January 1997 and 30 November 2012. Bloomberg was selected as the data source because they offer an international service, and claim to have the most up-to-date financial information on their system from which analysts' earnings forecasts and recommendations are derived. Locally Bloomberg Professional Service has a subscription base of over 1800 licenses and over 315 000 active licenses internationally (Bloomberg, 2012).

3.3.2 Sample and sampling method

A total of 34 215 data points for analyst recommendations made on JSE Top 40 shares were obtained from Bloomberg for the period, 1 January 1997 to 30 November 2012. Each data point included the date, number of analyst "buy", "hold" and "sell" recommendations for each of the JSE Top 40 shares, as well as share prices.

Restricting the sample to JSE Top 40 shares provided a filter against thin trading biases, which can affect shares that are not liquid (Maynes & Rumsey, 1993; Van Rensburg & Robertson, 2003a). Further, the sample was restricted to the Top 40, as these shares have the highest concentration of analyst coverage on the market, which ensures sufficient analyst coverage to compute consensus ratings.

SENS announcements were obtained from www.moneyweb.co.za for JSE Top 40 shares. Moneyweb's repository of SENS announcements however, only began from 1 February 2001. This then restricted the duration of the study to the period 1 February 2001 to 30 November 2012 and reduced the sample of analyst recommendations to 32 411 data points.

3.4 The research instrument

A quantitative event study analysis of the data collected was used. Each event measured the response of share returns around a specified upgrade or downgrade in consensus recommendation. Abnormal returns (ARs) were calculated around the event window, which were then averaged for each event day to obtain average abnormal returns (AARs). Findings were aggregated to obtain cumulative average abnormal returns (CAARs). CAARs were then tested for significance to ensure that the effect could be validated and generalised over the entire sample, to answer the problem statement outlined in Chapter 1.

3.5 Procedure for data collection

The 32 411 analyst recommendations for the period 2001 to 2012 were screened against the 16267 SENS announcements obtained from Moneyweb for the same period. Knight and Affleck-Graves (1985) and Malkiel (2003) caution that the market responds to new news over a period of time. To allow analysts sufficient time to adjust forecasts and recommendations following public announcements from companies, a period of 7 calendar days (5 working days) after a SENS announcement was allowed to screen recommendations against. Any recommendation made by analysts during this time was excluded from the sample to avoid confounding effects of recommendation changes arising from public announcements creeping into the study. This screening reduced the sample by 85.42%, to a total of 4 727 screened analyst recommendations.

Consensus analyst recommendations were then calculated on the screened sample of 4 727 data points, using the Bloomberg scale of 1 to 5. The weighting factors used by Bloomberg are:

- Buy = 5
- Hold = 3
- Sell = 1

These weighting factors were applied, to each data point to obtain a total consensus score. Consensus scores were then normalised by dividing by the number of analysts contributing to the overall rating of the share. This resulted in consensus scores, ranging from 1 to 5, where a “1” rating would indicate a unanimous “sell” and a “5” rating would indicate a unanimous “buy” recommendation.

Differences in the normalised analyst consensus scores were calculated. A share’s previous consensus rating was subtracted from the current consensus rating for each data point to capture changes in consensus.

From Loh and Stulz (2009) it was apparent that only substantial changes in analyst consensus recommendations would result in corresponding share price returns. Similar to the process followed by Mokoaleli-Mokoteli (2005, p. 117) only extreme values were considered. Distributions were plotted and extreme values were determined via this screening process. It was found that analyst' consensus changes greater than +/-0.5 were suitable for further evaluation. Sensitivities for analyst consensus changes greater than +/-0.5, +/-0.75 and +/1, were considered as sufficient change in consensus for consideration in the final sample.

The final sample was then screened one last time to ensure a minimum of 3 analysts following the company for each data point. This ensured that smaller shares, exhibiting exaggerated movements due to only 1 or 2 analysts changing their recommendation did not bias the final sample selection.

3.6 Data analysis and interpretation

McWilliams et al. (1999) provides a good outline of the steps involved in the analysis and interpretation of an event study. Sub-headings in this section were adapted from McWilliams et al. (1999), with changes where necessary to accommodate differences in the method of evaluation followed. The steps in the process are outlined below.

3.6.1 Define an event that provides new information to the market

Changes in analysts' consensus recommendations greater than +/-0.5, +/-0.75 or +/-1 with a minimum of 3 analysts following the share, were considered as events that would be noteworthy to potential investors. Positive changes in the consensus recommendations were considered upgrades, with negative changes considered downgrades.

3.6.2 Eliminate for firms that experience other events during the event window

Firms that experienced confounding effects, which were considered to be any firm that had a SENS announcement released, either on the day of the recommendation revision or within 5 trading days (7 calendar days) of a SENS announcement were excluded from the sample during the preceding data collection process.

3.6.3 Identify a set of firms that experience this event and identify event dates

A total of 380 share recommendations meeting the criteria outlined in Section 3.6.1 made up the final sample in the event study.

3.6.4 Choose and appropriate event window and justify its length

Figure 1 below from MacKinlay (1997) shows the typical timeline of an event study.

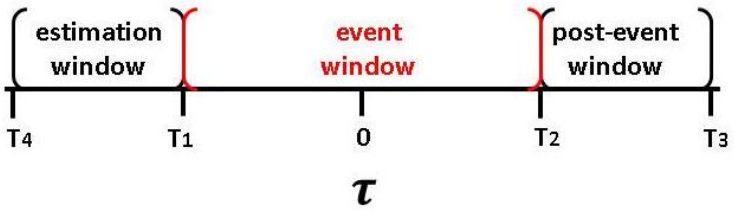


Figure 2: Depiction of the timeline of a typical event study

An event window of 11 trading days was selected, as depicted by T1 to T2 in Figure 2. The window period consisted of 5 trading days prior to the event day as well as 5 trading days after the event. It is well documented that analysts pre-release their information to a select group of private clients in the hope of generating brokerage commissions, prior to making their recommendation and earnings forecasts public to the market (Green, 2006). The 5 trading days (7 calendar days) before the announcement was made public (T1 to 0) was

allowed to capture any trading as a result of the pre-lease of information. Analysts, however, need to balance the revenue prospects from private clients with their reputation amongst their public followers for providing valuable information, when deciding on how long to keep news private before releasing to the market. A week before releasing new news would allow analysts' private clients sufficient time to respond to the updates, whilst still allowing the news to be worthy of eliciting a response when released to the market at large. The period after the event day 0 to T2 in Figure 2, of 5 trading days was also allocated to allow small investors, especially, sufficient time to respond to the recommendation change. The total event window period of 11 trading days was decided upon, to ensure sufficient time to capture an investor response but also taking cognisance of the decaying value of information once it is made public (Michaely & Womack, 2005). The post event window (T2 to T3) depicted in Figure 2 is usually of importance for event studies that cover long periods and look for mean reversion of returns after the event. This phenomenon is, however, out of the scope of this study. .

McWilliams et al. (1999) caution against using long event windows, as this is difficult to reconcile with the presumption of market efficiency required in conducting event studies. Long event windows have also been shown to significantly reduce the power of the test statistic in hypothesis testing, leading to false inferences about significance of an event (Brown & Warner, 1980, 1985; Dimson & Marsh, 1986).

3.6.5 Compute abnormal returns during the event window

The *Market Effects Control Model* (Mordant & Muller, 2003, p. 21) which is an adaptation of work from Muller and Ward (2010) and Muller and Mordant (2003) was selected for the calculation of expected market returns. This method accounts for the well-established market anomalies of size and value (Fama & French, 2004), and additionally models the *resource* anomaly which was first identified by Gilbertson and Goldberg (1981) as being relevant for studies of the JSE.

a) Control portfolios

Control portfolios were formed to cater for the size and value effect (Fama & French, 1992, 1993, 1996b) as well as a sector category to accommodate the resource anomaly of the JSE (Gilbertson & Goldberg, 1981; Van Rensburg, 2001). Each of the Top 160 shares listed on the JSE mainboard, were allocated to *one* of *twelve* control portfolios depending on the share's characteristics as defined below.

Control portfolios were rebalanced quarterly to ensure that changes in share characteristics (P/E ratios, market capitalisations, new listings and de-listings) were closely monitored over time. De-listed shares were included up to the date of last trading, after which the returns of the de-listed companies were assigned a zero value until the end of the quarter. De-listed shares were then removed from portfolios for the following quarter. Similarly, returns of newly listed shares were included in the quarter following listing, when the control portfolios were rebalanced (Ward & Muller, 2010). The control portfolios used are depicted in Table 1 below.

b) Size portfolio

Since the study looks exclusively at JSE Top 40 shares, it could be assumed that all of these shares would be *large* and that size would not be a control factor. Since the study, however, covers a period of 12 years, movements in the market capitalisation of companies in the sample due to mergers and acquisitions, new share listings and other factors having changed made it necessary to track other size factors. Size (market capitalisation) of companies were therefore split into three categories, namely *large*, *medium* and *small* (Ward & Muller, 2010, p. 30).

The top 160 JSE shares which constitutes approximately 98.5% (Sharedata, 2013) of the market capitalisation of the JSE and which makes up the JSE All Share Index (ALSI) were used to create portfolios. These shares were sorted by market capitalisation with the largest 40 shares being classified as the *large* portfolio. Shares between 41 and 100 were classified as *medium*, and the

those from 100 to 160 made up the *small* control portfolio (Ward & Muller, 2010, p. 30).

c) Value portfolio:

A company was allocated to either a growth or value sector, by calculating and ranking its P/E ratios The median of the sample was used as the break-point, with all shares above the median placed into the *growth* portfolio and those below the median making up the *value* portfolio (Ward & Muller, 2010, p. 30).

d) Sector portfolio:

JSE sector classifications were used to determine whether shares were resources or not. All resource shares, including mining resources were placed in the *resource* portfolio, with the remaining shares being allocated to the *non-resource* portfolio (Ward & Muller, 2010) .

Table 1: Control Portfolios or style factors

Control Portfolio	Size	Growth or Value	Resource/Non-Resource
SGN	Small	Growth	Non-resource
SGR	Small	Growth	Resource
SVN	Small	Value	Non-resource
SVR	Small	Value	Resource
MGN	Medium	Growth	Non-resource
MGR	Medium	Growth	Resource
MVN	Medium	Value	Non-resource
MVR	Medium	Value	Resource
LGN	Large	Growth	Non-resource
LGR	Large	Growth	Resource
LVN	Large	Value	Non-resource
LVR	Large	Value	Resource

Daily equal weighted indices were constructed for each of the twelve control portfolios using logarithmic (log) returns. Log returns were used as they are stationary (Mangani, 2007) and more likely to be normally distributed (Mushidzi & Ward, 2004). Normality of returns was, however, not a required pre-condition for this study.

$$\boldsymbol{R_{it} = \log\left(\frac{P_{it}}{P_{it-1}}\right)} \qquad \ldots \boldsymbol{Equation\ 3}$$

Where

R_{it} = the daily weighted share return for portfolio *i* on day *t;*

P_{it} = the equal weighted share value of portfolio *i* at the end of day *t;*

Similar to the FF 3-factor method, beta coefficients were calculated from the regression equation for each share in the sample. Betas were calculated by regressing each share's monthly log-function returns against market returns of each of the twelve control portfolios (style factors) for a period of 48 months (Depicted as period T4 to T1 in Figure 2).

This resulted in regression Equation 4 below for each share. An alpha coefficient for each share was calculated from the regression equation and included in the estimation of expected returns. Alpha and beta parameters for each share in the sample were updated on a rolling monthly basis using prior data.

The control portfolio model measures the expected return of share *i* in period *t* as the sum of the sensitivity of share *i* to the returns on the twelve control portfolios or style factors and a calculated alpha estimate in period *t* (Ward & Muller, 2010). It should be noted that a share's return may be sensitive to the returns of all shares in the market and not necessarily only to those shares in the portfolio whose characteristics it matches. Factor loadings (betas) would therefore be more weighted towards the matching portfolio of the share, but may also carry lower factor weightings (betas) on other portfolios, implying that

each of the style factors in Equation 4 are independent variables contributing to the explanation of returns.

$$\boldsymbol{E(R_{it}) = \alpha_{it} + \beta_{i,1}SGN_t + \beta_{i,2}SGR_t + \beta_{i,3}SVN_t + \beta_{i,4}SVR_t + \beta_{i,5}MGN_t + \beta_{i,6}MGR_t + \beta_{i,7}MVN_t + \beta_{i,8}MVR_t + \beta_{i,9}LGN_t + \beta_{i,19}LGR_t + \beta_{i,11}LVN_t + \beta_{i,12}LVR_t} \quad \ldots \quad \boldsymbol{Equation\ 4}$$

$E(R_{it})$ = the expected return on share *i* for day *t;*

α_{it} = the alpha intercept term of security *i* on day *t;*

$\beta_{i,1}\ to\ \beta_{12}$ = the beta coefficients on each control portfolio return;

$SGN_t\ to\ LVR_t$ = the log-function share price returns on each of the twelve control portfolios set out in Table 1.

Daily abnormal returns (ARs) were then calculated using Equation 5 below, and averaged across the event window to give Average Abnormal Returns (AARs) of Equation 6.

$$\boldsymbol{AR_{it} = R_{it} - E(R_{it})} \quad \ldots \quad \boldsymbol{Equation\ 5}$$

Where:

AR_{it} = the abnormal return of stock *i* in period *t;*

R_{it}= actual observed return of stock *i* in period *t;*

$E(R_{it})$ **=** the expected share price return of stock *i* in period *t,* as determined in Equation 4 above.

$$\boldsymbol{AAR_t = \sum_{i=1}^{n} \frac{AR_{it}}{n}} \quad \ldots \quad \boldsymbol{Equation\ 6}$$

Where:

AAR_t = Average abnormal return of all shares in period *t;*

n = Number of shares in the sample.

Performance over an extended period was calculated by accumulating the Average Abnormal Returns to obtain the Cumulative Average Abnormal Return (CAAR), for each share, over the event window period as illustrated in Equation 7.

$$\boldsymbol{CAAR_{\tau} = \sum_{t-t1}^{t2} AAR_t} \quad \ldots \quad \boldsymbol{Equation\ 7}$$

Where

$CAAR_{\tau}$ = Cumulative average abnormal return for the event window τ

τ = Event window from T2 - T1 + 1

e) Test for significance

Using the daily CAARs for each of the shares in the event sample for two prior years, and heeding the advice of McWilliams et al. (1999) to bootstrap, a bootstrapped distribution of one-day CAARs was calculated for each event day. The CAARs over the event period could then be tested against this distribution for significance (Mordant & Muller, 2003). This method of significance testing is superior to the t-test in that no assumption of normality is made and therefore non-parametric tests are not necessary (McWilliams et al., 1999).

3.7 Limitations of the study

Although confounding events were screened for by excluding data that occurred within a week of SENS announcements, the effect of analysts anticipating

market updates and adjusting their recommendations prior to the release of SENS announcements was not controlled for as this would have severely reduced the overall sample size.

Certain macroeconomic factors like exchange rate movements, inflation and other factors may affect this study. These effects were, however, not controlled for in this study. It was assumed that the duration of this study is sufficiently long to allow for these factors to be smoothed out over the 12 year period. Additionally due to only the Top 40 shares being considered most macroeconomic shocks are likely to affect all shares in the study. Lastly due to the length of the study, the market would have experienced both positive and negative shocks, which would smooth out over the period from 2001 to 2012.

The study did not consider the effect of dividends on returns. Additionally the study did not control for reputation effects amongst analysts rating the JSE Top 40 companies, where some analysts may be more popular and therefore have a greater ability to move the market, as the information was not consistently available.

3.8 Validity and reliability

A general definition of validity was obtained from Bhattacherjee (2012). The author comments that validity is often used to imply construct validity, which is a yardstick for checking whether a measure adequately reflects the underlying construct it is meant to quantify. Specific reliability and validity checks used in this study are outlined in this section.

3.8.1 External validity

This study uses a well-known and documented methodology of event studies which has spanned over five decades. The method of calculating expected market returns is based on the well published FF 3-factor model (Fama &

French, 1992, 1993, 1996b, 2004), which is widely used in international studies to accommodate market anomalies (Fama & French, 2004). Additionally the methodology has been adapted by Ward and Muller (2010) to accommodate the resource anomaly of the JSE thereby ensuring that errors arising from asset model misspecification are minimised. The period of study undertaken in this research was 12 years. From the South African published literature reviewed, this study covers the longest period thus far, and includes both bull and bear markets.

The final sample used in this study is representative of the JSE Top 40, with 39 of the 40 companies on the JSE Top 40 being present in the final sample. British American Tobacco (BTI) was excluded from the sample as the largest change in analysts' consensus for this share over the 12 year period never exceeded a value greater than 0.31, and was therefore under the cut-off screen for inclusion in the sample.

Lastly trading costs are incorporated into the results to show opportunities when investors could profit from the findings of this research.

3.8.2 Internal validity

Sampling error was kept to a minimum as screening rules were systematic, explicit and consistent. Excel macros and screening techniques were used to ensure human error did not bias the sampling procedure. Random spot checks were also performed to ensure that screens were effective.

The event window of the study was restricted to 11 trading days to control; firstly for confounding effects that may cause observed abnormal returns, and secondly, to ensure that Type II statistical error, where the null hypothesis is falsely rejected, did not creep in.

Confounding effects were catered for by screening the sample to remove any data points that occurred within 5 trading days (1 calendar week) of a SENS announcement. Only closing prices were used from I-net Bridge for JSE share

prices in the calculation of returns and these were randomly checked against the share prices obtained from Bloomberg for consistency

The selection of the asset pricing model used was done with great consideration to ensure that all anomalies that have been previously shown to be relevant from the literature were captured. Special attention was given to the JSE in particular, and the resource anomaly that is specific to the JSE was accommodated in the methodology.

JSE Top 40 shares are well traded and liquid, which ensures that biases of thinly traded shares were not introduced to the methodology (Maynes & Rumsey, 1993).

The use of previous distributions of the shares returns removes any bias that may be introduced in the hypothesis testing and also absolves the need for testing for normality or having to use non-parametric tests. Additionally bootstrapping techniques were employed to ensure validity was maximised.

The screening of the sample to ensure minimum changes greater than +/-0.5, +/-0.75 and +/-1 in analyst consensus recommendation and a minimum coverage of 3 analysts ensures that the final sample does not suffer from over representation of small shares with exaggerated movement due to low analyst coverage (1 or 2 analysts).

3.8.3 Reliability

According to Bhattacherjee (2012), *reliability* is an indication of how consistent or dependable a measure is. So a test for reliability would be to conduct a measure multiple times with the same underlying conditions and check the outcome for consistency. This definition is in line with the Sechrest (1984) definition for reliability as *repeatability* or *consistency*. The method of event studies is well researched and the literature review provides a good basis to contrast the findings of this research against.

The sample was selected from stringent and consistent screening of all share recommendations made between 1 February 2001 and 30 November 2012 to ensure no selection bias was introduced. Random spot checks on the data were also conducted to ensure that screening rules were correctly applied.

CHAPTER 4: PRESENTATION OF RESULTS

4.1 Introduction

This chapter introduces the sample for consideration in this event study. The sample profile along with a histogram of the distribution of changes in analysts' consensus ratings are described in the first section. The next section presents CAARs around an exploratory window for both upgrades and downgrades. Results of the CAARs for upgrades and downgrades around an empirically determined event window as well as the event window of 11 days defined in the methodology chapter are also presented. The chapter is concluded by presenting the hypothesis testing findings for statistical significance across both upgrade and downgrade sub-samples.

4.2 Sample profile

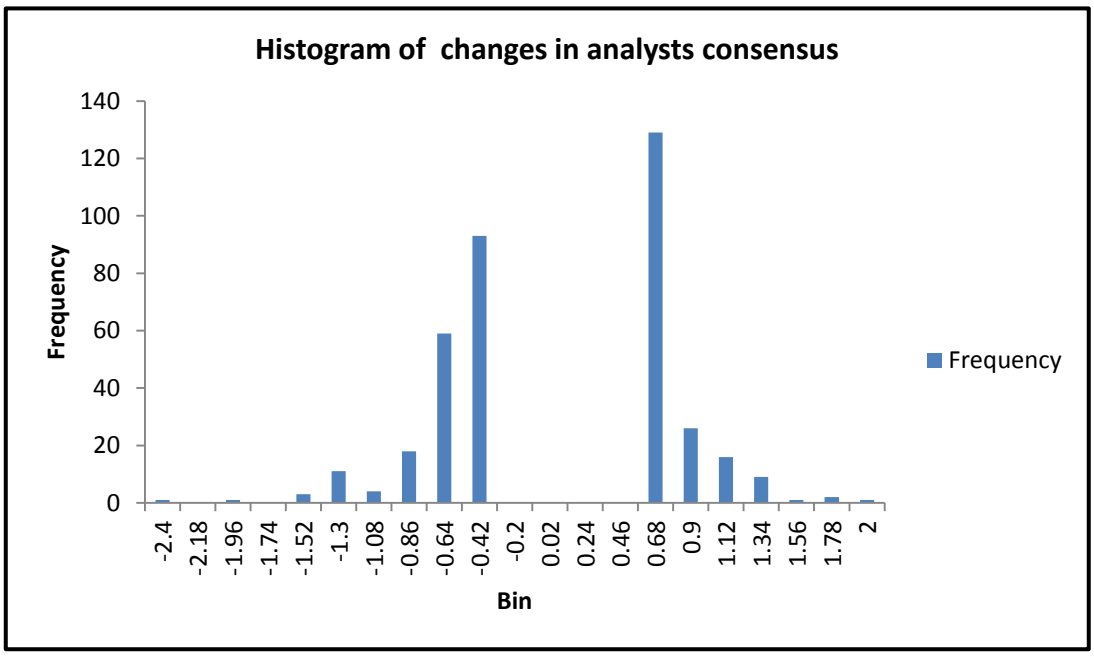


Figure 3: Sample Distribution of Changes in Analysts' Consensus Recommendation Ratings

The final sample consisted of 380 data points, which met the criteria of having a minimum change in analyst consensus recommendation rating greater than +/0.5, +/-0.75 and +/-1 and having 3 or more analysts rating the share. The sample was split almost equally between upgrades and downgrades, with 49% (185) being upgrades, and 51% (195) constituting downgrades.

Figure 3, above shows a histogram of the sample distribution of changes in analyst consensus recommendations. A maximum 2 point change was observed for upgrades, with a -2.4 point change for downgrades. The total of 380 observations making up the sample has a mean of -0.5 and a standard deviation of 0.76. The distribution is not continuous and has a gap in the histogram between -0.5 and +0.5 due to the data screening which only allowed for data points greater than +0.5 and smaller than -0.5.

4.3 CAARs from varying levels of change in analyst consensus

4.3.1 Exploratory event window

Event days presented in this section are only trading days, which exclude weekends, and South African public holidays over the 12 year period of the study.

Although the proposed methodology catered for an event window of 11 trading days, when calculating CAARs, changes in CAARs outside of the event window were noted in the calculation stage. It was therefore decided to investigate an extended window around the event. Upgrades were defined to be positive changes in analyst consensus recommendation, and downgrades were consequently negative changes.

Whilst it was known from Loh and Stulz (2009) and Mokoaleli-Mokoteli (2005) that substantial or extreme changes in the consensus rating would be required

to observe significant CAARs, the extent of the changes, however, were not clear from the literature. For this reason the sample was split according to varying increments of change in analysts' consensus recommendations to investigate the sensitivity of a change in recommendation on CAARs. The smallest change in consensus of +/-0.5 was selected to begin with, with break points of +/-0.75 and +/-1 also included to determine whether and how the relative strength of the change impacted CAARs.

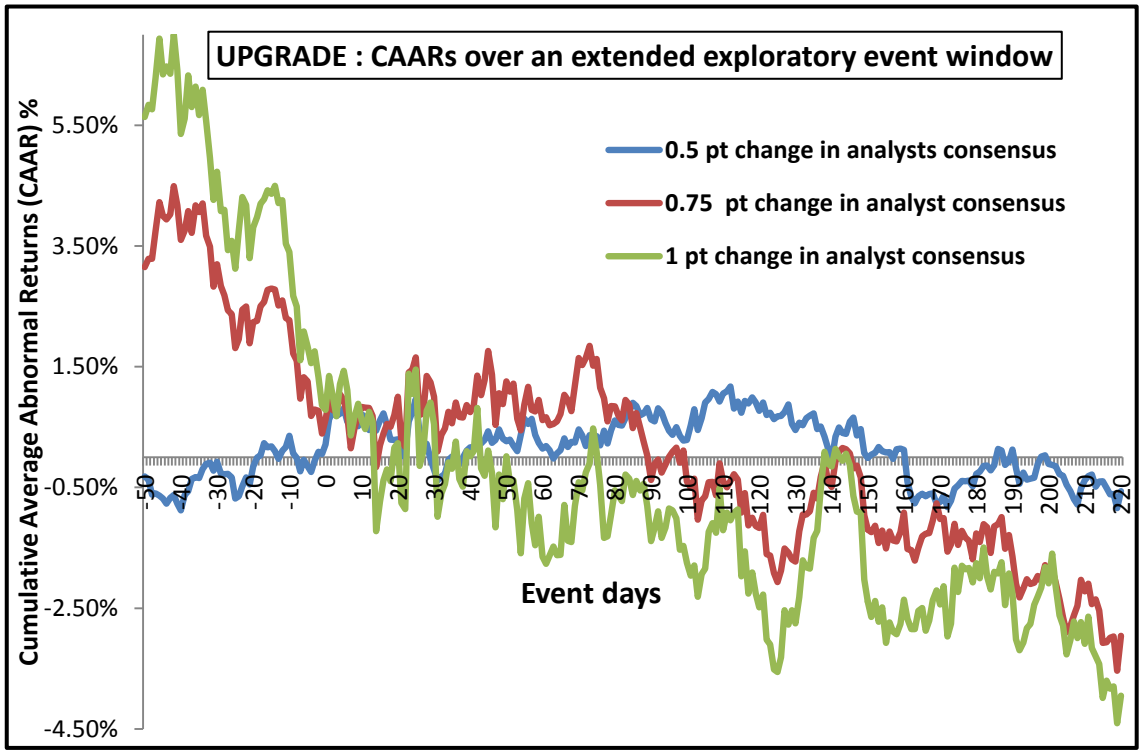


Figure 4: Upgrades - Exploratory chart showing CAARs over extended event window

In Figure 4, and each of the charts to follow, the event day is shown as Day 0, with negative days representing days prior to the event day and positive days signalling days after the event day. Figure 4 shows an exploratory window period for upgrades, of -50 days (prior) to the event up to +220 days after.

Figure 4 also shows that the CAARs are more sensitive to larger changes in analyst consensus. CAARs for a +/-1 point movement in analyst consensus are larger than that of +/-0.75 and +/-0.5 change respectively. Similarly an absolute

0.75 point change, in analyst consensus results in a larger response in CAARs than that of an absolute 0.5 point change.

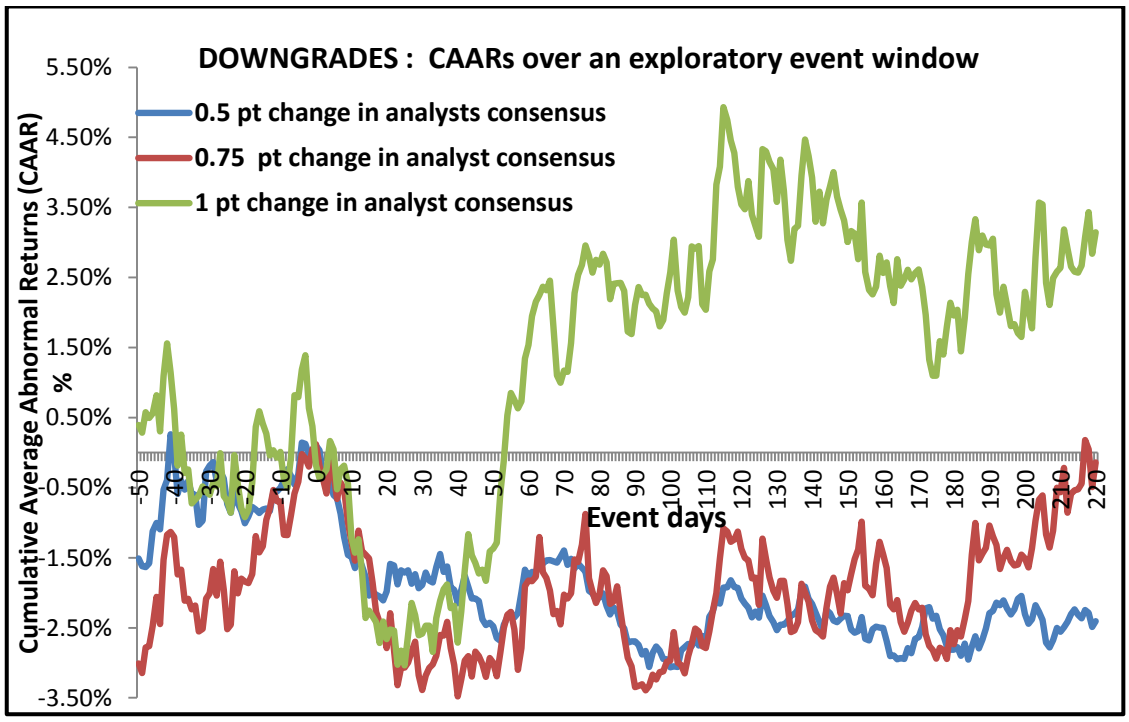


Figure 5: Downgrades - Exploratory chart showing CAARs over extended event window

Figure 5, similarly shows an exploratory window period for downgrades of -50 days (prior) to +220 days, after event day 0. The pattern of a higher sensitivity of the CAARs to larger changes in consensus that was observed for upgrades is also evident for downgrades.

4.3.2 Closer look at the empirical event windows for upgrades and downgrades

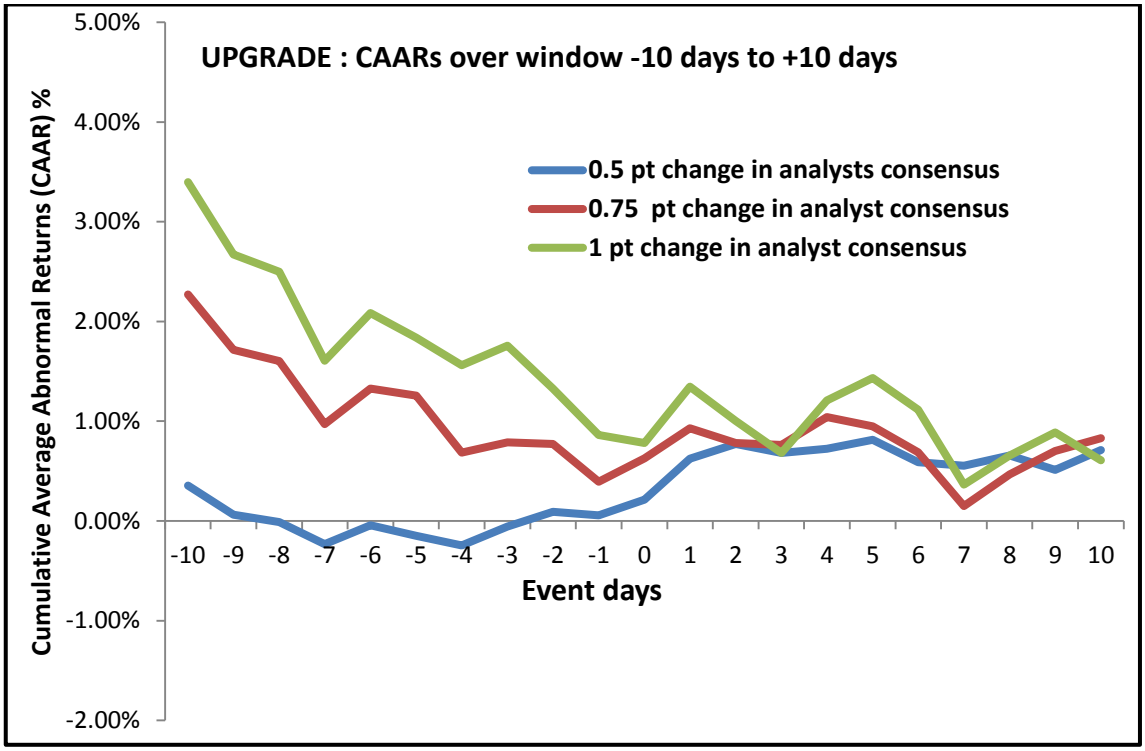


Figure 6: Upgrades - CAARs for window -10 days to + 10 days

Figure 6 shows an expanded view of Figure 4 around the event day (day 0), which covers the period of -10 days to + 10 days around day 0. A closer look at the graphs indicates that returns (CAARs) show a small increase close to the event day which begins a day before the event day. The small jump in CAARs occurs from -1 day before the event, with CAARs levelling off after +2 days. This would suggest a response period or event window for upgrades that last for 4 day around the event window.

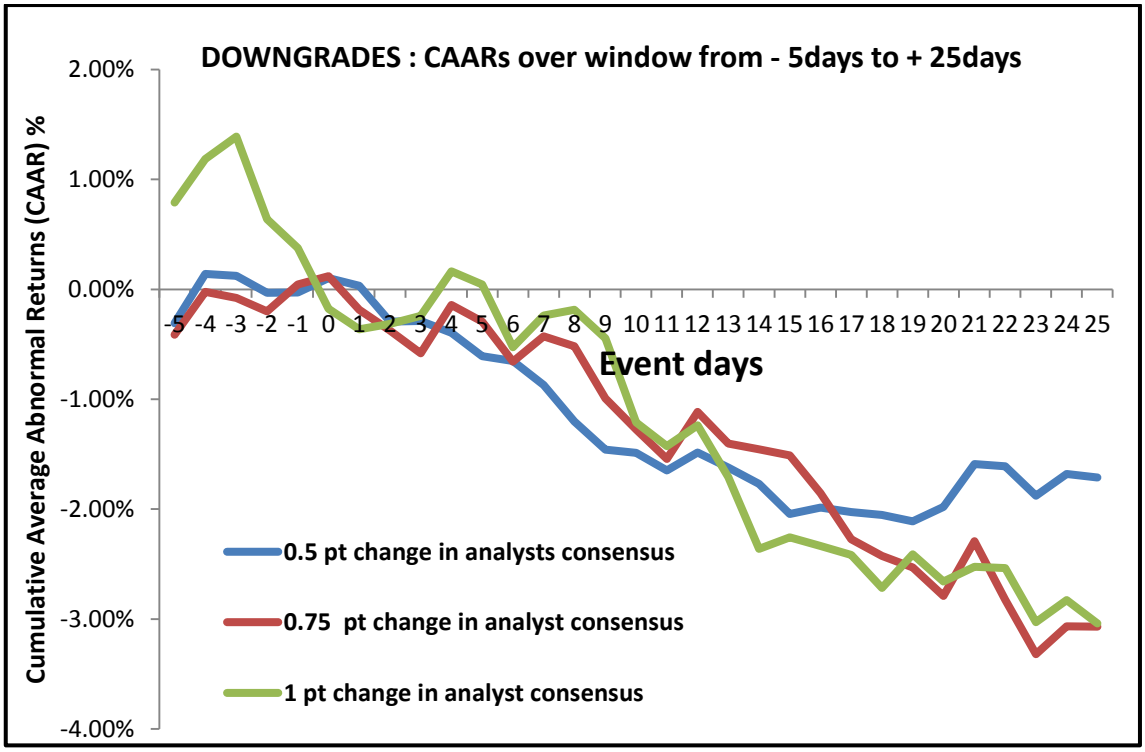


Figure 7: Downgrades - CAARs for window - 5 days to + 25 days

Similarly from Figure 5, the exploratory window around the event day for downgrades was expanded in Figure 7 above. The window of -5 days to + 25 days shows the general trend of decreasing CAARs around the event. This empirical finding suggests an event window of 31 days during which CAARS decrease for downgrades in the vicinity of the event (day 0). In Figure 2 of Chapter 3, period T1 to 0, consists of the prior period of 5 days with an extension of the event window to 25 days after the event (0 to T2 in Figure 2). This period is much longer than the small movement in the upgrade sample observed in Figure 6.

4.3.3 CAAR findings for the proposed window period

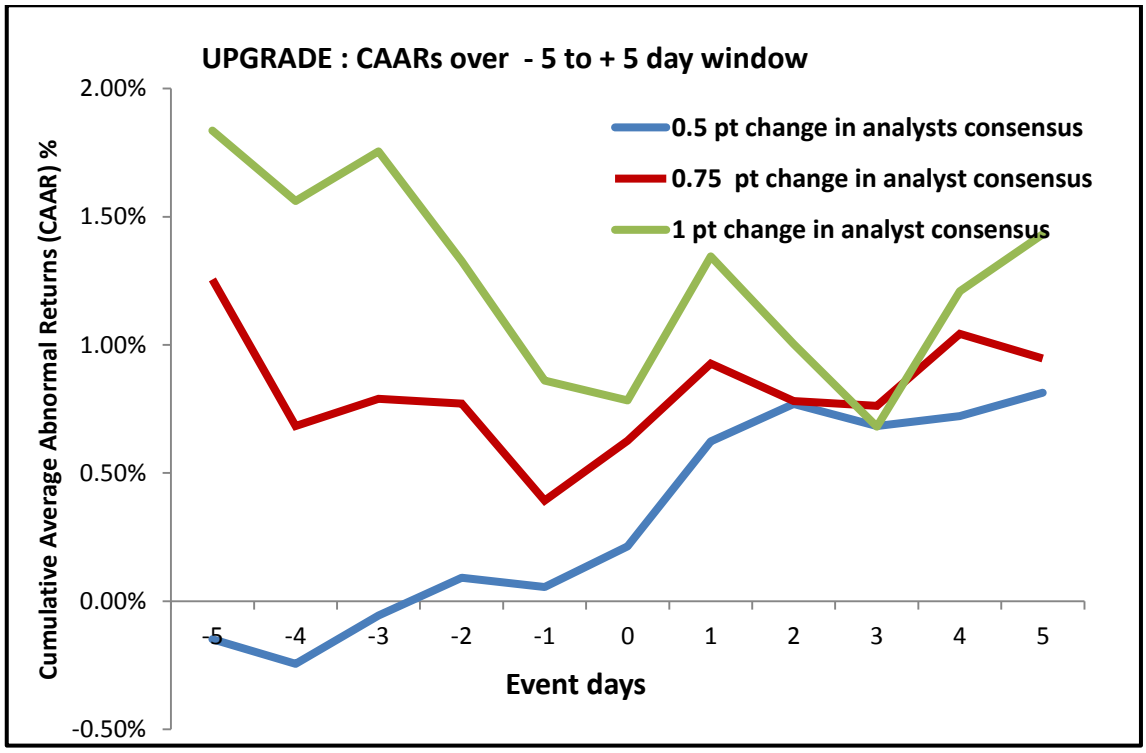


Figure 8: Upgrade – CAARs in event window from - 5 to + 5 days

To investigate the original proposed window period that was outlined in the methodology chapter (Chapter 3), CAAR's around the window period of -5 days to +5 days are also presented. Figure 8 magnifies the response of CAARs around the event day. Clear increases in CAARs are observed from -1 day lasting up to 2 days after the event. This suggests that if investors are restricted to trading on a change in consensus only in the trading week prior to and after the event, then returns (CAARs) could be maximised for upgrades over the small 4-day window period of -1 days to + 2days.

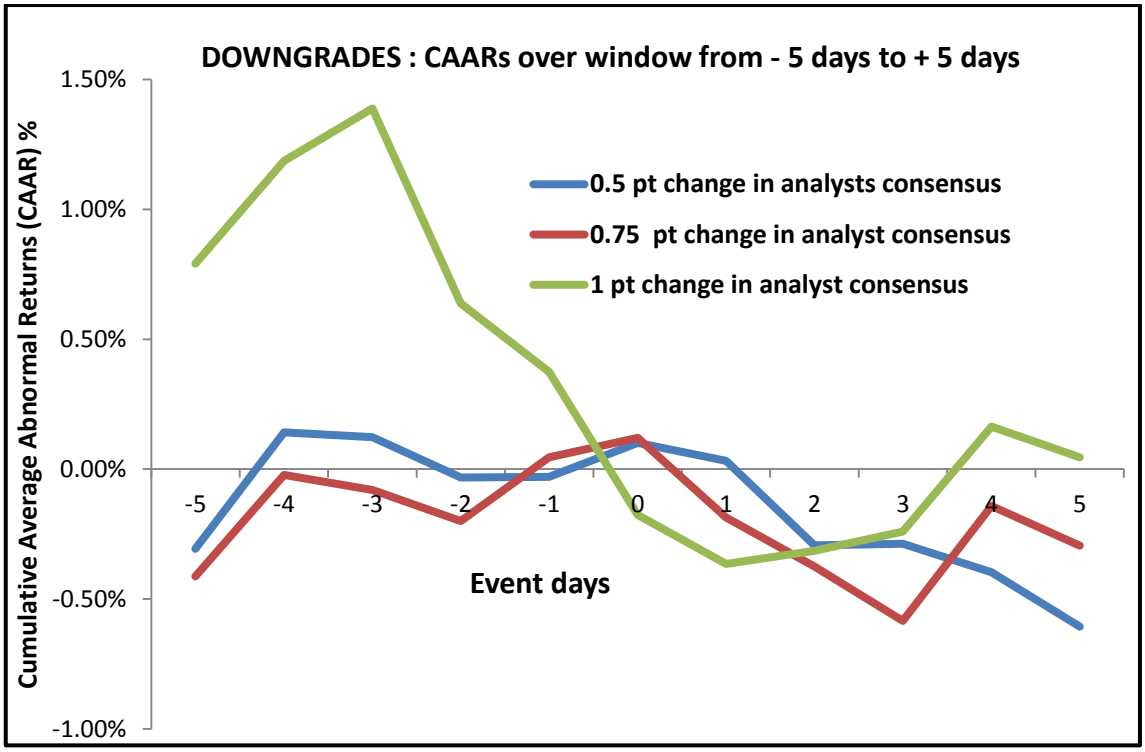


Figure 9: Downgrade – CAARs in event window from -5 to + 5 days

Similarly, Figure 9 shows CAARs for downgrades over the window -5 days to +5 days. For investors restricted to trading only within this time period, losses are minimised in the 4-day period from day 0 to +3 days.

4.4 Hypothesis testing findings

Results for the hypothesis testing of the upgrade and downgrade sample are presented in Table 2 and 3 below. P-values, represent the probability of obtaining a test statistic as extreme as that which was actually observed, assuming the null-hypothesis to be true (Bhattacherjee, 2012). A prior distribution of CAARs over a period of 2 years was used to contrast the CAARs calculated for the event period under consideration against. Table 2 shows the p-value findings for the upgrade sub-samples. Low p-values were sought for the upgrade sample to show the CAARS found to be significantly greater than that of the prior period distribution. CAARs, significant at the 5 and 10% level

were found for the sample around the event day, consistently lasting for up to 2 days after the event. The 0.75 and 1 point upgrade samples indicate significant CAARs at the 5% and 10% significance level even prior to the event day.

Table 2: p-values for Upgrades

p-values			
Event days	**0.5 point movement in consensus**	**0.75 point movement in consensus**	**1 point movement in consensus**
-10	0.24	** 0.01	** 0.01
-9	0.45	*** 0.05	** 0.02
-8	0.50	*** 0.05	** 0.02
-7	0.70	0.13	*** 0.08
-6	0.54	*** 0.05	** 0.03
-5	0.65	*** 0.05	** 0.03
-4	0.77	0.16	** 0.03
-3	0.58	*** 0.09	** 0.02
-2	0.37	*** 0.06	** 0.02
-1	0.40	0.12	** 0.03
0	0.13	** 0.02	*** 0.05
1	** 0.01	** 0.03	** 0.02
2	** 0.01	*** 0.09	*** 0.09
3	** 0.02	0.13	0.24
4	** 0.04	*** 0.08	0.11
5	** 0.03	0.12	0.10
6	0.10	0.20	0.18
7	0.12	0.46	0.44
8	0.10	0.32	0.34
9	0.15	0.25	0.29
10	0.10	0.23	0.39

** Significant at the 5% level

*** Significant at the 10% level

Hypothesis testing results for the downgrade sample is shown in below. High p-values were sought for the downgrade sample to show the CAARS found were significantly smaller than that of the prior period distribution. CAARs were found to be significant at the 5% and 10% level, but only after the event day and

for a lagged period after the event day, beginning as early as 5 days after the event and lasting for up to 25 days after.

Table 3: p-values for Downgrades

p-values			
Event days	**0.5 point movement in consensus**	**0.75 point movement in consensus**	**1 point movement in consensus**
-5	0.76	0.73	0.22
-4	0.41	0.56	0.10
-3	0.41	0.57	0.05
-2	0.57	0.65	0.15
-1	0.58	0.45	0.23
0	0.31	0.38	0.64
1	0.49	0.64	0.75
2	0.79	0.73	0.66
3	0.76	0.81	0.62
4	0.83	0.63	0.43
5	*** 0.92	0.67	0.50
6	*** 0.94	0.78	0.69
7	** 0.97	0.70	0.59
8	** 0.99	0.72	0.57
9	** 1.00	0.83	0.65
10	** 1.00	0.86	0.83
11	** 1.00	*** 0.92	0.85
12	** 1.00	0.83	0.81
13	** 1.00	0.88	0.87
14	** 1.00	0.89	*** 0.94
15	** 1.00	0.89	*** 0.92
16	** 1.00	*** 0.92	*** 0.93
17	** 1.00	** 0.96	*** 0.94
18	** 1.00	** 0.97	*** 0.95
19	** 1.00	** 0.98	*** 0.92
20	** 1.00	** 0.99	*** 0.94
21	** 1.00	** 0.96	*** 0.93
22	** 1.00	** 0.98	*** 0.93
23	** 1.00	** 1.00	** 0.96
24	** 1.00	** 0.99	*** 0.95
25	** 1.00	** 0.99	** 0.96

** Significant at the 5% level

*** Significant at the 10% level

4.5 Summary of the results

Whilst the proposed methodology aimed only to consider returns from -5 days to +5 days around the event, the analysis of results indicate significant movements in CAARs, especially for downgrades over longer periods, suggesting the need for a longer event window than was initially anticipated to capture the total impact of a change in consensus recommendation. From this exploratory work, CAARs were found to increase around the event day in the period -10 days to + 10 days for upgrades. For downgrades, however, CAARs were found to be decreasing around the event day in the period -5 days to +25 days. Magnified plots of the period close to the event day presented in Figures 6 and 7 show increasing CAARs specifically from -1 day to + 2 days for upgrades and similarly decreasing CAARs from – 5 to +25 days for downgrades. The initial proposal for an event window of – 5 day to + 5 days was also considered and results for this window period were presented in Figure 8 and Figure 9. From these results it was shown that if investors are restricted to trading in only the week prior to, and after the event, that CAARs could be optimised for upgrades over the small 3-day window period of -1 day to +1 days and that similarly for downgrades, in the period day 0 to +3 days.

Hypothesis testing conducted for the upgrade sample yielded significant results at the 5% and 10% level for the event day and up to 2 days after. The samples with greater change in analyst consensus (0.75 and 1) showed significant CAARs in the days leading up to the event as well. Similarly CAARs were found to be significant at the 5% and 10% level for the downgrade sample, but only after the event day, beginning after a lagged period, as early as 5 days after the event and lasting up to 25 days after.

CHAPTER 5: DISCUSSION OF THE RESULTS

5.1 Introduction

This chapter discusses the results presented in the previous chapter. The chapter begins by discussing the sample demographics and explaining the differences observed in the sample versus what was expected from literature. The preconditions that are necessary in order to conduct an event study including a justification of the length of the event window is discussed next. Section 5.5 and 5.6 focusses on the results found for upgrades and downgrades, paying particular attention to any peculiarities in the findings and suggesting trading opportunities for both small, private and large, institutional investors. The last section of the chapter discusses the hypothesis testing findings for significance before conclusions are drawn.

5.2 Sample Characteristics

5.2.1 Sample Profile

The final sample consists of 380 data points, which was just over 1% of the initial data of 34215 data points gathered for the period 1 February 2001 to 30 November 2012. The final sample contained 39 out of the 40 shares making up the JSE Top 40, with British American Tabaco (BTI) being the only excluded company. This exclusion was due to minimum screening levels of change in consensus (> +/- 0.5) not being met for BTI (See Table 4 in Appendix A).

McWilliams et al. (1999) in their review paper of event studies in management research, criticise published studies for small sample size, especially when the sample is split into sub categories. In their study the smallest total sample consisted of 35 data points, with the largest having 767 (sub-sample of 93) data points.

The sample size of 380 data points in this study disaggregated into sub-samples of 185 for upgrades and 195 for downgrades meet the criteria of McWilliams et al. (1999) for what constitutes a large enough sample size to draw inferences from. Additionally, MacKinlay (1997) shows that samples between 150 and 200 data points have a greater ability (power) to detect abnormal returns. The sample under study also satisfies the conditions of MacKinlay (1997) for power.

5.2.2 Weighting of upgrades versus downgrades

The finding of an almost even split between upgrades (49%) and downgrades (51%) was surprising. Considering that upgrades act as a proxy for *buy* recommendations and similarly that downgrades proxy *sell* recommendations, a much smaller proportion of the sample was expected to be downgrades. International studies by Barber et al. (2006) and Labhart (2004) quote the proportion of sell recommendations to be as low as 2% in their samples. The South African studies by Prayag and Van Rensburg (2006) and Hall and Millard (2002) both quote sell recommendations as being below 3% of their entire sample.

To find a greater number of downgrades versus upgrades in the sample was therefore surprising and prompted a deeper investigation into the raw buy, sell and hold recommendations that were obtained from Bloomberg to make up consensus views. Going back to the original, unprocessed and unscreened data, it was observed that 16% of the original sample was sell recommendations with the remaining 84% being buy and hold recommendations.

The final screened sample, presented in Figure 3 had a negative mean of -0.5, as well as a negative skew to the distribution confirming the greater bias towards downgraded shares in the overall sample, and possibly suggesting that the magnitude of overall downgrades were greater than that for upgrades, which can be seen in the distribution of returns in Figure 3.

5.2.3 Explanation of the sample characteristics

The finding that whilst the raw data holds a very small percentage of sell recommendations (16%) compared to the final sample in which downgrades constitutes 51% of the final sample may be explained by a number of factors. Most of the factors that could explain the findings are detailed in Section 2.5 under analyst bias and will be explained here in context.

a) Overconfidence, over-optimism and over-issue

Firstly the finding could be indicative that analysts on aggregate are over-optimistic and over-confident, leading to an over-issue of buy and hold recommendations when compared to sell recommendations, which is evident in the raw data. Due to this optimism, analysts would then have to adjust their recommendations by downgrading them over time, as company updates become available and earnings forecasts are adjusted in line with new information (Baugh & Yatrakis, 2005). This would then account for the high proportion of downgrades in the final sample when compared to the small proportion of sell recommendations in the raw data.

b) Herding

Equally though, the findings seem to suggest evidence of herding amongst analysts (Costello & Hall, 2010; Welch, 2000). The empirical screening found changes in analysts' consensus as low as +/-0.5 on a rating scale of 1 to 5 to be sufficiently large to be considered outliers or extreme values. This is indicative of very small changes in analyst consensus over time. This final sample constituted only 1% of the raw data, and indicates that for 99% of the observations, analysts' consensus recommendations changed by less than +/-0.5 point during the 12 year period for each company in the sample. The exclusion of BTI from the final sample was due to the maximum observed change in analysts' consensus rating only reaching 0.31 on a 5 point scale over 12 years. This again points to evidence of herding where analysts have not strayed far from prior consensus, especially on the BTI share.

c) Informational conflicts

Other explanations of the high proportion of buy and hold recommendations in the raw data that do not translate to upgrades in consensus, could be due to pressure that analysts are faced with from the companies they cover to issue positive recommendations for fear of being cut off from valuable, private information sources (Barniv et al., 2009; Labhart, 2004). This would cause analysts to issue an overwhelming proportion of buy recommendations that only get downgraded over time.

d) Brokerage Commissions and analyst compensation

Likewise analysts may be pressured by the remuneration structure within their brokerage firm to issue more buy recommendations. This would be to attract more, new, buying customers, thereby generating incremental trade. Further, buy recommendations guarantee new brokerage commissions for agents over both the purchase and sale leg of the transaction, as purchased shares will eventually also be sold. Sell recommendations, however, only generate one commission opportunity for brokerage firms, which exist only for clients who already hold the share. Overall the brokerage firm would therefore benefit when new buy recommendations are issued, as they would attract new clients and incremental trading commissions.

e) Conflicts of interest due to investment banking relationships

Analysts may also be loyal to large companies for which their brokerage firms perform underwriting services (Mokoaleli-Mokoteli et al., 2009). This could be another factor explaining the large proportion of buy recommendations in the raw data.

From the sample characteristics described it would be hard to argue with critics like Labhart (2004) who suggest that the value of analysts' recommendations come seemingly not from their forecast accuracy but from their ability to generate revenue.

5.3 Pre-conditions for the use of event studies

Section 3.2 outlined three preconditions that needed to be met before the event study findings could be interpreted. These preconditions will be discussed in greater detail in the section that follows.

5.3.1 Market efficiency

Of the three South African studies reviewed that found violations of market efficiency on the JSE from Section 2.3.4. Two of the studies (Bhana, 1990; Page & Way, 1992), were published before changes in South African legislation and JSE regulation. Both these studies findings occurred in the period before the reclassification of the JSE in 2002 and the promulgation of the Insider Trading Act of 1998 and the Securities Services Act 34 of 2004.

The Cubbin et al. (2006) study which showed mean reversion of the JSE was undertaken after changes to South African legislation and JSE regulation. This study, however, did not take into account the size anomaly which is well documented for the JSE. It is therefore plausible that the results of Cubbin et al. (2006) could be falsely inflated by discounting the size effect and that if size was accounted for, the authors' findings may have been different.

The published studies in support of JSE efficiency range from the early works of Strebel (1977), Gilbertson and Roux (1978) and Firer et al. (1987) to more recent studies by Jefferis and Smith (2005), Scher and Muller (2005) as well as most recently, Mbululu and Chipeta (2012).

Overall the empirical evidence regarding market efficiency on the JSE leans more towards market efficiency than it does against. Further, this study is concerned with the Grossman and Stiglitz (1980) expanded/relaxed view of market efficiency. Given the evidence in support of market efficiency, the study proceeded assuming that weak form market efficiency was met and proceeded to test for semi-strong form of market efficiency in the hypothesis testing.

5.3.2 The market only becomes aware of the event upon announcement

Green (2006), showed that institutional investors who have early access to analysts' research findings are able to profit from the information. He focused on individual brokerage houses to obtain his sample data and was therefore able to track when information was pre-released to clients. In this study, however, the focus is on changes in analysts' consensus recommendations which does not allow for the tracking of individual analysts releasing information to the market.

Whilst it is plausible that private clients of brokerage firms who report on Bloomberg, may receive analysts' research findings ahead of time (Green, 2006), each of these private clients will, however, only have access to a few analysts' findings at a time. From the sample in this study, recommendations from a minimum of 3 analysts going up to 37 analysts, in the case of SABMiller (SAB) were considered. It was therefore assumed that private clients would not have access to all the individual analysts' recommendations making up the consensus, simultaneously.

Whilst insiders at Bloomberg may have access to the consensus view across analysts shortly before it becomes publicly available, these individuals would be forbidden from trading on the information in terms of the Insider Trading Act of 1998 and the Securities Services Act 34 of 2004. For these reasons it is assumed that the market only becomes aware of the consensus view of all analysts once the information goes live on the Bloomberg Professional Service Terminal.

5.3.3 No other major confounding effects during the event window

Pre-screening of the data was done to ensure that consensus updates did not occur due to the release of public announcements from companies directly, via SENS. This screening would have effectively minimised if not eliminated any public, price sensitive information that was released to the market around the recommendation updates. Any macroeconomic changes that may have

occurred such as dramatic movements in exchange rates, or adjustments in the South African Reserve Bank's (SARB) repo rate would have resulted in SENS announcements by companies and therefore be screened out. If not, these effects over the aggregate would be smoothed out across the cross section of the sample over the 12 year period under study. Lastly Table 5 and 6 in Appendix B and C, shows that there is very little overlap of data points in the sample which minimises the impact of confounding effects arising from simultaneous movement in multiple shares on the CAARs observed.

5.4 Length of the event window

Authors; Brown & Warner (1980, 1985), Dimson and Marsh (1986), MacKinlay (1997) and McWilliams et al. (1999) all warn about the dangers of incorrect inferences of abnormal returns due to confounding effects that can creep in during long event windows. Heeding the advice of these authors, but also being cognisant of the finding of Malkiel (2003) that the market requires sufficient time to respond to analyst consensus movements, an event window of 11 trading days was decided upon. 5 days before the event day, the event day (day0) and 5 days after the event.

Green (2006) confirmed that private clients of brokerage firms who report their findings on public platforms may have access to the information before it becomes publicly available. To capture the impact on returns of this pre-lease of information, a pre-event window of 5 days was allocated before the event date. This pre-event window was restricted to 5-days taking cognisance that analysts would want to maximise revenue prospects from private clients but at the same time ensure that their findings still held value for the market at large when released, thereby protecting their public reputation (Michaely & Womack, 2005).

During the study however, it was found that increasing (decreasing) CAARs were found for upgrades (downgrades) before the pre-event window and that decreasing CAARs continued well beyond 5 trading days after the event day for

the downgrade sample. For this reason and to enrich the applicability of the findings of this research it was decided to explore event window durations longer than the initial stipulated 11 trading days. Consideration was still given to the total length of the event window to ensure that the window did not become so long, as to allow confounding effects to bias the results.

Exploratory CAARS were presented in Figure 4 and Figure 5 in Chapter 4 for an extension up to 220 days after the event day. Both graphs indicate possible mean reversion, especially for large changes in analyst consensus which hints to over-reaction by the market (Baugh & Yatrakis, 2005). Due to the difficulties, however, in controlling for compounding effects over such a long window period (almost a year) and that fact that this fell out of the scope of this research, hypothesis testing was not conducted for the returns over this extended period and no further inferences could therefore be drawn.

5.5 Discussion of observed CAARs for Upgrades

Figure 4 shows the CAARs for upgrades that were observed in the exploratory window period around the event day. An overall decreasing trend is seen over the entire exploratory event window. A shift in the pattern of decreasing CAARs is, however, noticeable around the event day. A closer examination of the area of interest around the event day is provided in Figure 6. From this graph, it can be seen that CAARs increase around the event day, from -1 day before the event up to 2 days after the event.

Although some increases in CAARs are evident before the event day, in reality, however, investors will not have access to the consensus view of all analysts simultaneously. If investors were able to find those analysts that are consistently early movers in updating the consensus and who are deemed to be opinion leaders in moving the consensus view, then profit opportunities could be available for those investors having access to this information (Desai & Jain, 1995; Fang & Yasuda, 2005).

Figure 4 also indicates that the movements in CAARs are much greater for higher levels of change in analyst consensus, suggesting that investors respond more readily to higher/notable shifts in analyst consensus.

5.5.1 Extended profit taking opportunities?

The movement of CAARs in days preceding the upgrade in analysts' consensus may be due to investors trading on the momentum of positive increases in the share price and/or analysts' consensus earnings forecasts and recommendations increasing (Carhart, 1997; Mokoaleli-Mokoteli, 2005). These investors may be purchasing shares, thereby driving up prices and returns (CAARs) even before the upgrade in consensus levels break 0.5 (Green, 2006), as indicated on days -7 and -4 in Figure 6. If key market analysts inform private clients of their change in recommendation before publishing their findings on Bloomberg and these institutional investors purchase significant quantities of the share, this could spur the buying of more shares by other investors and propel the increase in share prices. Increasing movements in CAARs could also potentially be due to insider trading by specific individuals privy to information that only gets released to the market on the event day.

Figure 6, however, indicates that whilst some investors may be transacting prior to the announcement date (-7days and -4days) of the upgrade in consensus reaching the targeted value (0.5, 0.75 and 1), investor reaction on aggregate is visible very close to the event day. CAARs for all levels of change in analyst consensus show an increase just before the event day which lasts for a short while after the event.

5.5.2 Day before movements in CAARs

Movements in CAARs the day before an upgrade in analysts' consensus may be due to an upgrade in earnings forecasts and recommendations by lead analysts who are able to persuade large institutional investors to purchase the share, thereby driving up trading volumes, share prices and therefore returns.

Since the screening methodology did not account for anticipatory actions by analysts and investors, the movement to an increasing CAAR a day before the upgrade in consensus announcement, could be due to savvy investors who *anticipate* positive company announcements. These investors may anticipate the change in recommendation and trade accordingly even before the information is made public.

Whilst some investors may be trading on momentum or anticipation, Figure 6, however, confirms that the market seems to not have any way of predicting the change in analyst consensus on *aggregate* before the announcement date, as explained in Section 5.3.2. If the market on aggregate did have the ability to predict the event, then attenuation of CAARs would have been observed over much longer timeframes than that indicated by Figure 6, and a spike in the CAAR would not be visible around the event day. We can therefore infer that investors on aggregate seem to trade on the movement in analyst consensus only once the information is released to the market, which occurs on Day 0.

5.5.3 When to trade

Seeing as the data indicates that the market only becomes aware of the event on the event day and that limited anticipatory trading may be taking place a day before the announcement, the opportunity to trade on this information is next explored.

This window period in question is expanded in Figure 8, which shows movements in CAARs for the 5 days prior to, and after the event. Figure 8 indicates a distinct increase in CAARs across all samples for the period -1 day before the event, up to 2 days after the event. Considering movements in CAARs over, only this 4 day window period, the largest change in analyst consensus upgrades (greater than 1 point), generates an average CAAR of 0.48% for the event day and the day after. Similarly, the CAAR observed for an upgrade in analyst consensus greater than 0.75 point is 0.54%. Average CAARs for the period -1day to +1 day in the event window for the 0.5 point upgrade sample is 0.57%.

The results shown for upgrades in Table 2 and Figure 4 and 6, suggest that investors can earn abnormal returns when buying consensus upgraded stocks. Investors would need to buy shares on the day/day before a change in consensus exceeds 0.5, and sell the shares the day after. This may allow investors to earn between 0.48% and 0.57% return for their efforts, with the highest return observed for the smallest change in consensus. The last finding is almost counterintuitive, as it is expected from the graphs that the greatest change in analyst consensus should provide the greatest return. A closer look at Figure 6 and Figure 8 together with the significance findings in Table 2, however, shows that investors are following and reacting to the larger changes (0.75 and 1) in analyst consensus over a protracted period of time. For the smaller change (0.5), the movement in CAARs which indicates investor response is, however, concentrated around just the event day, which explains the higher level of CAARs for the smallest movement in consensus.

The results of profit opportunities over a very short window period for upgrades, indicates that this strategy may only be useful to traders and not necessarily long term investors. Traders generally take speculative positions in a share for short term profit opportunities using derivative instruments (such as call options), whilst long term investors generally purchase shares for longer periods and follow buy-and-hold strategies.

The quick response of prices to new information found for upgrades provides support for semi-strong form efficiency of the JSE, showing that prices are quick to impound new information and react correspondingly.

5.5.4 Transaction costs

Buying and selling shares comes at a cost, and both institutional and smaller, private investors have to incur costs or commissions for trading shares. In the case of the JSE, an additional cost of 0.25% is levied as a securities tax to the stock exchange.

An estimate for small private investors looking to trade online was obtained from Standard Bank's online trading platform (StandardBank, 2012). A cost of 0.5% in commission is levied by Standard Bank for both the purchase and sale legs of shares, excluding any subscription and fixed or once-off costs. Accounting for the securities tax to the JSE, a reasonable estimate for a private investor transacting on-line would be a cost of 1.25% per transaction including both the purchase and sale of a share. A similar analysis was conducted for institutional investors, and it was found that many large investors pay a fee of approximately 0.5% (excluding VAT) on average, including the securities tax for both the purchase and sale legs of a transaction. This fee is of course negotiated individually for each large investor based on the volume of trade and the brokerage relationship. 0.5% was taken to represent a reasonable average value approximation for illustrative purposes.

Using the estimated transaction costs described above, for both institutional and smaller, private investors, 2 lines representing the transaction costs were plotted and are presented in Figure 10 below. The figure shows that irrespective of the level of change in analyst consensus for upgrades, individual private investors are not able to profit from arbitrage opportunities by trading on the information as trading costs are higher than the return available to them.

For instituational investors, however, who face transaction costs that are on average 2.5 times lower than that of small private investors, opportunities exist for profit taking, by purchasing shares whose consensus have been upgraded for all levels shown. The higher the change in analyst consensus the larger the profit opportunity availabe for institutional investors. This finding supports that of Tan and Lin (2012) who showed that institutional investors who follow analyst recommendations and trade in the same direction as consensus changes are able to earn abnormal returns.

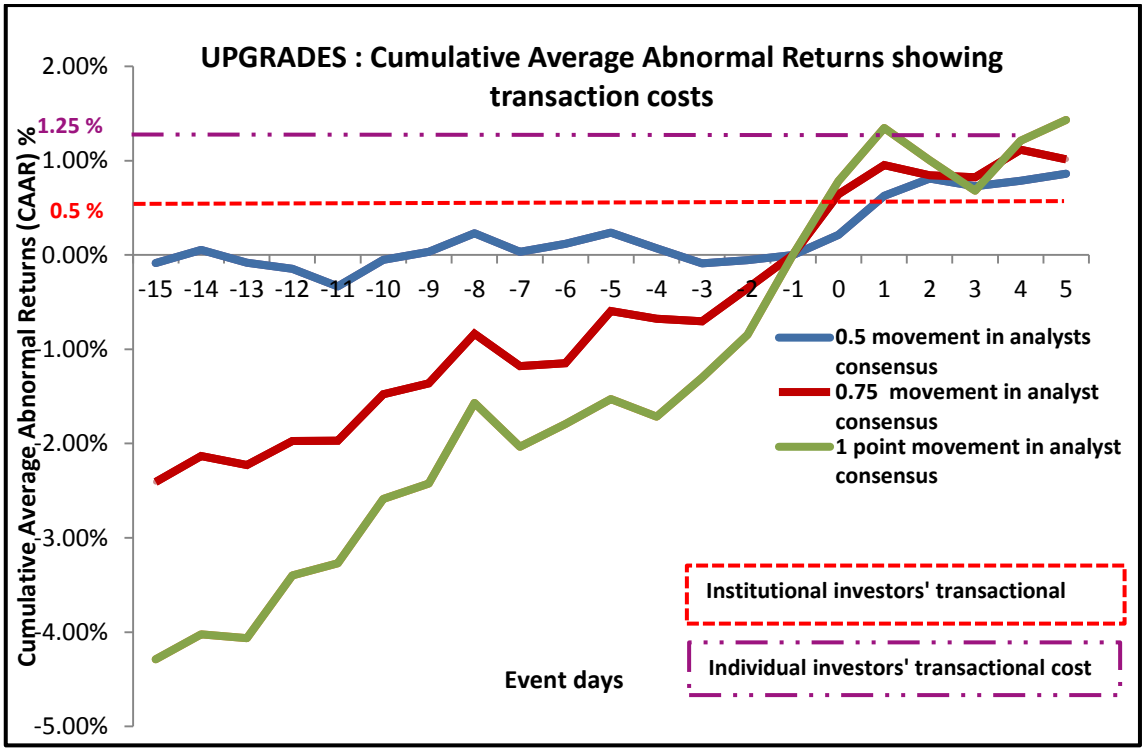


Figure 10: CAARs around the event window for Upgrades including transaction costs

Many large institutional investors do actively allocate a portion of their investment capital to trading activity. The findings for profit opportunities discussed above, would therefore be of great value to these traders provided that transaction costs remain similar to those illustrated in Figure 10.

5.6 Discussion of observed CAARs for Downgrade movements

Figure 5 shows the movement in CAARs in the extended window period, with a downward trend around the event day. The area from -5 days to +25 days of Figure 5 is expanded in Figure 7. From this figure a general downward trend of the CAARs throughout the period -5 days to +25 days can be seen.

5.6.1 Minimising losses

Downgrades again offer an opportunity for traders to profit. For longer term investors, however, the downgrade strategy would be a loss minimising strategy. Investors that stand to benefit from minimising losses due to falling share prices are mostly those investors that already own shares in the companies being downgraded. According to Figure 7, investors already holding the share would do well to sell the share up to 5 days prior to the change in consensus, as losses continue for up to 25 days after the downgrade announcement.

5.6.2 Jittery investors

Knight and Affleck-Graves (1985) showed that the JSE could anticipate poor results before an announcement of the results. This may explain the decreasing movement in CAARs up to 5 days before the event, with some investors suspecting or anticipating a negative consensus outlook from analysts and trading accordingly by selling shares.

Similar to the explanation provided in Section 5.5.1 for upgrades, investors may also be trading on momentum, and may choose to sell shares as soon as prices indicate signs of falling. They may also begin selling shares when lead analysts downgrade their recommendations, ahead of the change in consensus. Insider trading is also a possibility with certain corporate individuals who hold the share, possibly beginning to sell prior to negative updates being made public to minimise their losses.

Some investors have greater risk aversion biases than others and may choose to sell their shares in a company as soon as price or analyst consensus ratings and forecasts begin to fall. If institutional investors exhibit this bias, then the sale of large quantities of shares could spur further selling and therefore decreasing prices.

Figure 7 also shows an aggregation of CAAR movements that are much more concentrated than that observed for upgrades in Figure 6, where larger movements in consensus elicit greater responses in CAARs. This again points to the jittery nature of investors, and shows that investors respond similarly for any level of change in downgrades by analyst consensus, and that even small changes in downgrade levels elicit large investor response.

5.6.3 Day before movements in CAARs

Figure 7, shows that the CAARs only become consistently negative around the event day (day 0). This finding together with the lack of significance for CAARs in the period prior to the event day, shown in

Table 3, indicate that whilst investors may be selling shares and that CAARs may be decreasing prior to the event day, major movement in CAARs only happen around the event day with CAARs becoming negative and continuing to remain so after the event.

Figure 9 expands the area of interest in Figure 7 to focus on the 5 days prior to, and after the event day. This magnification of the CAARs around the event day shows that CAARs only become consistently negative for all levels of change in analyst consensus downgrade on the day after the event. Similar to the explanation offered for upgrades in Section 5.3.2, this serves as proof that whilst some investors may anticipate downgrade movements and react to this, the market on aggregate only becomes aware of the downgrade announcement on the day of the event.

5.6.4 When to trade

Seeing as the data indicates that the market only becomes aware of the event on the event day and that limited anticipatory trading may be taking place a day before the announcement. The window period around the event day, during which the greatest negative movement in CAARs is observed, starts from the event day (day 0) and lasts up to 25 days after the event. This period is much

longer for downgrades than that found for upgrades. The finding of a longer post-event drift for sells or downgrades is confirmed by Stickel (1995), Womack (1996), Mokoaleli-Mokoteli (2005) and Ryan and Taffler (2006) internationally, whilst Bhana (1990) and Knight and Affleck-Graves (1985) show a similar result for the JSE.

Movements in CAARs for downgrades were therefore calculated from day 0 to day 25. The maximum movement was recorded as a negative -3.19% movement for a 0.75 point downgrade in consensus, followed by -2.86% for a 1 point downgrade in consensus and a -1.74% movement for a 0.5 point movement in consensus.

As discussed for upgrades, it is intuitive to expect larger changes in downgrades to elicit stronger investor response, and therefore greater negative movements in CAARs. This pattern is, however, not consistently demonstrated for the downgrade sample, with the 0.75 point movement eliciting the greatest movement in CAARs. A closer look at Figure 7, and the significance findings in

Table 3, shows that the response for the 0.5 point downgrade sample is over a shorter period of time. CAARs begin to level off around day 14 for the 0.5 point downgrade sample, but continue to decrease for the higher levels of analyst consensus downgrade. This could be an indication of investor over-reaction to bad news which is similar to the finding on the JSE by Page and Way (1992) and internationally by Ryan and Taffler (2006). A review of Figure 5, and the possibility of mean reversion that is indicated in the figure also show indicate that the market may over-react sharply in the short term to bad news, only to correct for this in this in the longer term (Cubbin et al., 2006).

The response to downgrades by investors may also be due to psychological factors. Investors may not want to admit that they made an error in stock selection, and may therefore decide to hold the share for longer before deciding to sell, compared to when faced with a buy opportunity (Stickel, 1995). This could explain the longer post event drift for downgrades, as not all investors

respond at once and during a short window period to sufficiently move CAARs (Mokoaleli-Mokoteli et al., 2009).

The results shown for downgrades in Figure 5 and 7, suggest that investors can limit their losses by selling shares that they own when consensus downgrade recommendation changes exceed 0.5 points, thereby limiting losses between 1.74% and 3.19%. Investor losses that can be limited for upgrades offer a larger potential gain for investors selling downgraded shares, that what can be had for those investors purchasing upgraded shares, at all levels of change in analyst recommendation ratings.

Traders may also be able to profit from this strategy by taking slightly longer term (call options) positions than that for upgrades, as CAARs continue to decrease for up to 25 days after the event. This long post-event drift implies that the JSE is not semi-strong efficient, as prices take a relatively long period (more than a month) to respond to news regarding downgraded shares.

5.6.5 Transaction costs

Transaction costs for selling downgraded shares and purchasing a better replacement option are considered. It was assumed that investors even after selling shares would want to reinvest in the market and therefore both the selling and the re-purchasing legs of transactions are considered. Transaction costs presented in Section 5.5.4 will again be used for illustrative purposes, to show the costs incurred by both institutional and smaller, private investors when selling a downgraded share and replacing it with a new share. It is assumed that the new share purchased will not earn abnormal returns for the short period of 25 days after purchase and these returns are therefore not considered in the transaction.

Lines representing the transaction costs were plotted and are presented in Figure 11 below, similar to that of Figure 10. Trading costs are plotted as negative as they represent the opportunity costs of holding the share, for which losses can be hedged once CAARs drop below the level of transaction costs.

The figure shows, irrespective of the level of change in analysts' consensus downgrades that both small, private investors and large, institutional investors are able to hedge their losses by selling a share after a movement in consensus downgrade greater than -0.5 point. Institutional investors are able to benefit the most due to low transaction costs, but declines in CAARs up to 25 days after the event allow even small investors, despite higher transaction costs to hedge some of their losses.

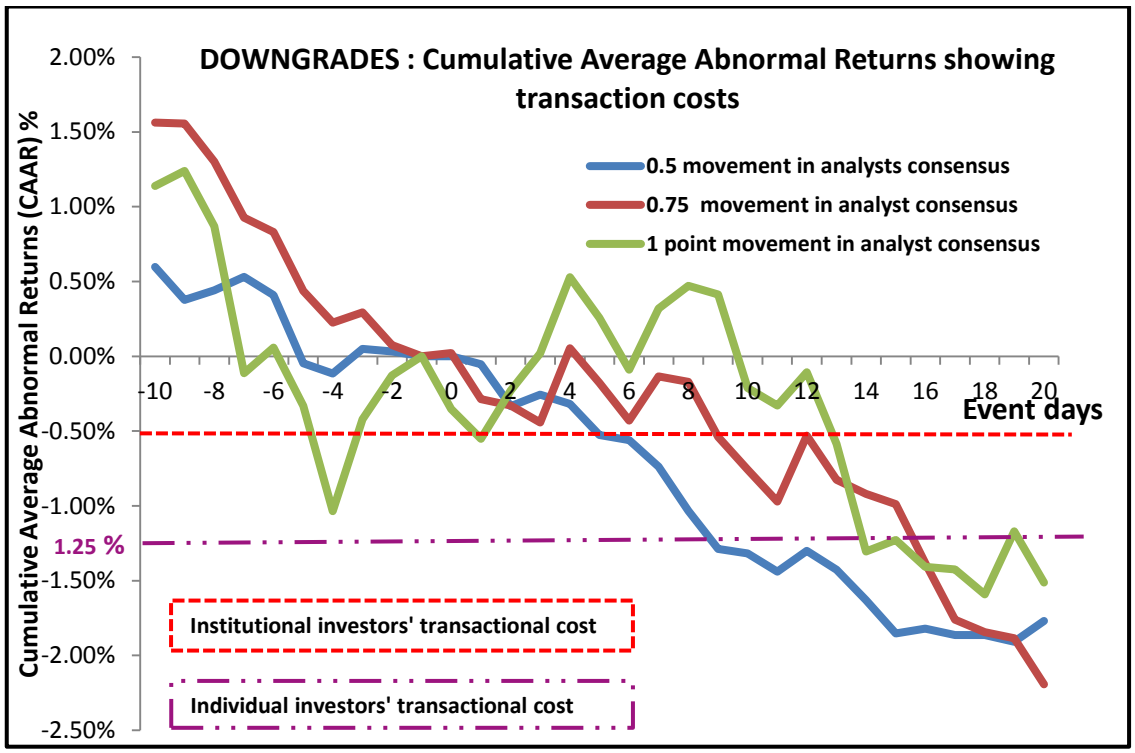


Figure 11: CAARs around the event window for Downgrades including transaction costs

All investors would therefore be advised to sell downgraded shares that change by more than -0.5 in consensus immediately after the announcement of the downgrade. As a best case investors could use the funds to purchase upgraded shares to minimise their prior losses. This finding indicates that similar to Malmendier and Shanthikumar (2003) that risk risk averse investors

would be well advised to pay fees to professionals, like analysts and brokerage firms to limit their losses, almost as a form of insurance.

Larger institutional investors who actively trade or those smaller investors with access to derivative (call and put options) and other short term trading instruments can also benefit from taking positions on downgraded shares expecting the share price to fall over a 25 day period after the downgrade. The findings of profit opportunities discussed would therefore be of great value to these traders provided that transaction costs remain similar to those utilised in the calculation.

5.7 Tests for significance

5.7.1 Hypothesis 1 - Upgrades

Table 2 of Chapter 4, presents the results of hypothesis testing for upgrades. At an alpha value of 0.1, or 10% significance, significant returns are found for the upgrade samples for the event day and up to 2 days after. No significance was, however, found for the CAAR on the event day for the 0.5 point upgrade sample, although the p-value was slightly over the 10 % significance cut-off at 0.13. This finding of significance over a 2-day window allows us to accept the findings for the upgrade sample as significant.

This implies that the null-hypothesis in the case of upgrades can be rejected at the 10% significance level and that the alternate hypothesis, of CAARs not equal to zero can be accepted as a generalised finding over the sample.

The finding of statistically significant CAARs suggests that analysts are able to provide valuable information especially to institutional investors. Interestingly though, significant returns are also found at the 5% and 10% significance levels for almost every day in the 10 days prior to the event for the samples of greater changes in analyst consensus (0.75 and 1). This corroborates the discussion in

Section 5.5.1 that some investors may receive prior access to information and may trade on this information successfully. The likelihood would be that these would be large institutional investors, whose volume traded in these shares would count sufficiently to be able to move the share price. Momentum traders may also be benefitting from seeing large movements in consensus prior to the level actually reaching the 0.75 or 1 point change that this study has screened for. Lastly insider trading cannot be ruled out as a cause of the significant findings prior to the event day.

Institutional investors are therefore advised to trade on the changes in analyst consensus movements by taking short term positions for a day or two around the event day in order to earn abnormal returns, as the returns were found to be statistically significant and higher than average trading costs likely to be incurred. The significance of returns around a very short window period of 2 days after the event is also indicative that the JSE exhibits semi-strong form market efficiency, with prices responding to new information within a short window of 3 days (day 0 to day 2).

5.7.2 Hypothesis 2 - Downgrades

The results for hypothesis testing for the downgrade samples are presented in Table 3. Significance at the 5% and 10% levels was found across all downgraded samples. Additionally, unlike the upgrade sample, significant CAARs were only found after the event, beginning as early as day 5 for the 0.5 point upgrade sample and consistently from day 16 to day 25 for all samples.

This finding verifies results found by Stickel (1995), Womack (1996), Mokoaleli-Mokoteli (2005) and Ryan and Taffler (2006) internationally and by Bhana (1990) and Knight and Affleck-Graves (1985) for the JSE, which all showed longer post event drifts for downgraded or sell samples.

One possible explanation for the observed result could be that investors reacting to downgrades need to already be holding the share in their portfolio in order to benefit from the investment advice, which restricts the applicability of

downgrade consensus changes to a limited group of investors when compared to upgrades and would account for the lack of significance in the sample directly around the event day and in the prior period. The response of CAARs to downgrades was over a much longer period, which may be due to the jittery investor response (Section 5.6.2). This may cause some investors to begin selling shares in advance of the actual consensus downgrade announcement, thereby dampening the movement in share prices and CAARs around the event. Others, however, may be holding onto shares for longer not wanting to admit to making a mistake on the initial purchase. The finding of significance only, after a sustained period of losses, up to 16 days (over three weeks) is also evidence of investor apathy and the willingness to "wait and see" how the market responds before deciding to finally sell shares.

The findings of significance consistently over the entire downgrade sample from days 16 to 25, implies that the null hypothesis can only be rejected for a lagged period beginning from Day 16 to Day 25.

These results are similar to that found by Ryan and Taffler (2006) who find consistent initial under-reaction to bad news (downgrades) and significant post event drifts in returns. This finding therefore provides evidence that the JSE exhibits a violation of the semi-strong form of market efficiency, by showing that prices are slow to respond to new information taking up to 16 days after a downgrade to realise significant decreases in share prices.

5.8 Conclusion

The overweighting of buy recommendations in the raw data that does not translate into upgrades in the final data-set provides evidence of analyst over-optimism, which may be attributed to a number of reasons including remuneration arrangements, investment banking links, maintaining access to private information, and optimism biases. The small change in consensus rating of +/-0.5 on a 5 point scale was shown to be sufficient to demonstrate

abnormal movements in CAARs. This serves as an indication that analysts herd close to the existing consensus when making recommendations and revisions to their recommendations.

Movements in the CAARs to become positive (negative) for upgrades (downgrades), only around the event day provided support for the assumption that the market only becomes aware of the consensus movement in analyst recommendation on the event day. This confirmed that whilst profit taking opportunities before the event day existed, it was unlikely that investors on aggregate would be able to profit from these, as they were only alerted to the opportunity once it was announced on the event day.

Abnormal returns were shown to be significant for upgrades at all levels of analyst consensus movement greater than 0.5, lasting for up to two days after the announcement. This would allow investors to purchase these upgraded shares on the day of the announcement and sell them two days later. Accounting for transaction costs would mean that only institutional investors with low trading costs are able to profit from the purchase and sale of these shares. Smaller private investors faced with higher transaction costs, however, were shown not to be able to benefit from trading on analyst upgrade recommendations. Trading opportunities presented themselves especially for institutional investors who were able to allocate a portion of their total portfolio funding to short term trading and derivative trading.

Opportunities to minimise losses were shown to exist for both small and large investors, who could sell the downgraded shares on the event day and minimise losses that prevail for 25 days thereafter. Significant CAARs were found as early as 5 days after a downgrade in analyst consensus ratings greater than 0.5 point and consistently across the sample from day 16 to 25, indicating long post-event drifts. Possible reasons for a this delayed response, include behavioural factors where investors are slow to respond to the sell call as it would indicate a poor judgement by them having purchased the share in the first place. Long post event drifts also diminished the aggregation of CAARs around the event day, making it difficult to find significance for the event day.

Lastly investor response to downgrades has been shown to be jittery, with indications that some investors sold early in anticipation of the downgrade, having recognised a downward momentum in price movements and that others still waited long after the downgrade announcement to sell.

Overall the null hypothesis was rejected for upgrades, implying that significant abnormal returns could be earned for investors following analyst upgrade consensus movements greater than 0.5. The *null-hypothesis was also rejected for the downgrade sample for the event period 16 to 25 days after the event.* This provides evidence in support for the investment value of investors following upgrade and downgrade changes to analysts' consensus recommendation.

The study therefore provides evidence that analysts do add value from the technical and fundamental analysis that they conduct. This supports the Grossman and Stiglitz (1980) view of market efficiency, showing that investors have a role to play in the dissemination of new information to the market. Investors are shown to be able to provide investment value, especially to institutional investors, thereby earning their commissions and justifying their role to investors who trade on JSE Top 40 companies.

Overall the JSE was therefore shown to exhibit limited instances of the semi-strong form market efficiency for upgrades as prices were shown to respond in a reasonably quick time period to the informational content of analysts' consensus upgrades. The long post-event drift found for downgrades, however, suggests a violation of the semi-strong form of market efficiency.

CHAPTER 6: CONCLUSIONS & RECOMMENDATIONS

6.1 Introduction

This chapter begins by summarising the conclusions of earlier, results and discussion chapters. Generalisations for the application of the findings are presented. The next section goes on to provide recommendations to the stakeholders who may be interested in the findings of the study. The chapter is concluded by offering suggestions for future study.

6.2 Conclusions of the study

The study showed that investors, especially, institutional investors can gain by tracking consensus changes in analyst recommendations. Abnormal returns were found for both upgraded and downgraded shares with movements in consensus rating greater than +/-0.5. Statistical significance for CAARs for both upgrade and downgrade samples were shown, up to the 10% level, although only for a lagged period for the downgrade sample beginning 16 days after a consensus downgrade announcement. This lag in response for downgrades was explained by inconsistent and possibly apathetic investor behaviour.

Evidence of analyst bias was demonstrated, with findings to support over-optimism, overconfidence, possible bias to investment banking clients and the over-issue of buy and hold recommendations which are later downgraded. Signs of herding were also evident with very limited movement in consensus shown for the JSE Top 40 companies over the 12 years of the study. Large institutional investors have been shown to be aware of these biases (C. R. Chen et al., 2002), and discount for them when forming trading strategies (Mikhail et al. (2007)), whilst small, private investors have been shown to be mostly naïve to analyst bias (Malmendier & Shanthikumar, 2003).

Analyst bias was shown to be especially disadvantageous to small investors, who faced threshold transaction costs that limit their ability to benefit from consensus upgrade movements at any level. Additionally, small investors are often not savvy enough to distinguish analyst's sources of bias, and generally trade only on the occurrence of buy and sell recommendations. Small investors typically do not track movements in analyst consensus and do not cross check earnings forecast reports for consistency against the published recommendations (Baugh & Yatrakis, 2005); Scherbina (2004). For these reasons small investors would be better off investing in market indices or passive funds that offered market returns for minimal trading costs rather than actively trading on analyst recommendations which were not shown to offer superior returns after accommodating for transaction costs.

Institutional investors, however, stood to gain from following movements in analyst consensus greater than 0.5 on the Bloomberg consensus scale at all levels and significant across the sample. Buying upgraded shares on the day of the upgrade and selling it two days after the event allowed institutional investors to earn abnormal returns and profits even after accounting for transaction costs. Evidence was also shown for both institutional and small investors to limit losses by selling downgraded shares as soon as the information was made public, with share prices and therefore returns continuing to decrease for up to 25 days after the event.

The study therefore found unanimously in favour of institutional investors following the investment advice of analyst consensus downgrade and upgrade recommendations by monitoring movements in the consensus greater than +/- 0.5 on the Bloomberg Service. Small private investors', however, did not stand to benefit from trading on similar movements in analyst consensus mostly due to high transaction costs.

The finding of abnormal returns and the rejection of the null hypothesis for the upgrade and downgrade samples show that following analysts' consensus recommendations does have investment value. The short response time of

returns (prices) to the upgrade event also provides support of the semi-strong form of market efficiency on the JSE.

Long post-event drifts in CAARs for the downgrade sample, implied jittery investor behaviour and other investor biases, which conversely indicate long lags in the market response to downgrade announcements, implying a violation of the semi-strong form of market efficiency.

6.3 Recommendations

The findings of this research indicate that institutional investors with access to Bloomberg's Professional Service Terminal would do well to monitor movements in analyst consensus on the JSE Top 40 companies. They should look for movements in consensus greater than +/-0.5 and buy upgraded shares on the day of the upgrade to sell up to two days later, thereby to maximising profits. Any investors holding shares downgraded by greater than 0.5 point should sell these shares on the announcement day to minimise losses. This short term profit opportunity suggests that traders would benefit from the opportunity presented. Long term investors, however, may find no benefit from this strategy as some indication of longer term mean reversion seems to be present (Cubbin et al., 2006) in Figures 3 and 4 of Chapter 4 (although beyond the scope of this study).

Bloomberg sales executives could use the findings of the research to pitch the benefits of their service to prospective large clients, by showcasing the ability of large traders to earn short term profits by purchasing upgraded shares and minimise losses for downgrades in their portfolio.

The study also provides some redemption for the value of analysts being able to uncover profitable opportunities for prospective clients. Analysts and employers can use the findings of the study to justify their value-add to clients. Analysts

can therefore claim to offer clients value arising from their superior information processing ability.

Regulators may need to re-evaluate the current legislation and regulation on the JSE around analyst bias, as indications of analyst bias and market inefficiency were uncovered in this study. The sample investigated exhibited a herding bias by analysts and other potential biases. The JSE was also shown to violate the conditions of semi-strong form market efficiency in the downgrade sample, with some indication of longer term mean reversion similar to Cubbin et al. (2006)

Lastly the general South African public, would be advised to rather invest in passive funds that offer exposure to the JSE Top 40, with minimal trading costs, than actively seek to follow analyst consensus recommendations in the hope of earning abnormal returns.

6.4 Suggestions for further research

The reliability of research on stock exchange data always benefits from extended study periods. Although, this work currently constitutes the longest period found amongst published work in this area on the JSE, significance testing for downgrades did not yield consistently robust results to be able to generalise the finding. An extension of this study going back at least to 1997 when SENS was introduced on the JSE would allow the study to benefit from additional data that could help solve the significance issue encountered. The restriction of the Moneyweb database on SENS announcements restricted the period of study by a further four years, access to longer periods of SENS information would easily allow the study to be extended.

This study did not control for repuation effects of the individual anlasyts forming the consensus scores of the JSE Top 40 ratings. This information though available from Bloomberg was not easily or reliably extractable from the Bloomberg Professional Terminal. The findings of this study hint towards the

ability of lead or steer analysts to be able to move the consensus. Should it be possible to reliably get access to the indidivual analyst data, this study could benefit hugely from controlling for analysts reputation.

Loh and Mian (2006) show that analysts with superior earnings forecasts significantly outperform their less accurate colleagues in profitable recommendaitons. Similarly Stickel (1995) has shown that lead analysts are able to move the consensus recommendation when they make their findings public. Bloomberg was one of the few subscription services who actually identified the analysts explicitly (not coded); however, getting access to this information would need much collaboration with Bloomberg to reliably extract the information over a respectable timeframe. Extending this study to focus on specific analysts recommendations, would provide valuable insight to the South African investor community on who the best market analysts are, based on actual empiricial findings and not on opinion surveys such as those covered in the Financial Mail. This study would be one of the first of its kind in South Africa, and a valuable and unique offering that Bloomberg could market to its clientele.

Since this study shows that analysts tend to herd in their consensus, future work focussing on discrepancies between analysts' target prices and earnings forecasts compared to their recommendations, could provide more insight into the bias of analysts on the JSE Top 40 companies. This would be a good comparative study to contrast against findings from other countries and other stock exchanges

Future work could also focus on empirically testing the Ward and Muller (2010) model on other datasets. Similarly earlier studies could be repeated using the Market Effects Model to check for consistency and repeatability in the results. The Market Effects Model could also be tested against the FF 3-factor model using the data from this study to test for superior modelling of the market expected return.

The exploratory window period in this study hinted at the existence of longer term mean reversion over a period of approximately 220 days. Since this study did not control for confounding effects over such a long window period, this finding was not explored further. Opportunity exists to test the longer term mean reversion, which would be of particular interest to longer term investors and this study could be contrasted against the published work of Cubbin et al. (2006).

The method of calculating upgrades as an absolute movement of +/-0.5 from previous consensus ratings on the Bloomberg scale can be adjusted to test reliability of the results in this study. Opportunities exist to show what percentage movement in consensus would be required to earn abnormal returns, as this may be more generalizable to other data sources. Similarly absolute levels for analyst consensus could be tested, where strong buys (levels greater than a 4.0 rating) could be pitted against strong sells (levels lower than 1.5) to test for abnormal returns. A number of variations of around defining what constitutes an event could be performed to test the reliability of the results. A lower threshold level than a 0.5 point movement can also be investigated which would allow for a larger sample size, and potentially solve significance issues that were encountered.

Lastly the screening of the data allowed for confounding effects that occurred after the event date to be screened out. The results however hint at the ability of investors to anticipate movements in analyst consensus, especially for downgrades. Screening the data further to remove confounding events in the pre-event window would allow for more definitive conclusions on the anticipatory effects of investors to be drawn. Similarly having access to the market trades that occurred in the pre-event window may allow further inferences to be made about which investors were able to anticipate movements in consensus by buying (upgrades) and selling (downgrades) even before the announcement becomes public. .

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APPENDIX A: COMPANIES IN THE SAMPLE

Table 4: List of companies making up the final sample, divided into upgrade and downgrade sub-samples

SHARE CODE	COMPANY NAME	UPGRADE	DOWNGRADE	TOTAL
AGL	ANGLO AMERICAN PLC	2	2	4
AMS	ANGLO AMERICAL PLATINUM LTD	4	2	6
ANG	ANGLOGOLD ASHANTI LTD	3	1	4
APN	ASPEN PHARMACARE HOLDINGS	13	12	25
ARI	AFRICAN RAINBOW MINERALS LTD	7	7	14
ASA	ABSA GROUP LTD	3	4	7
ASR	ASSORE LTD	4	3	7
BIL	BHP BILLITON PLC	2	2	4
BVT	THE BIDVEST GROUP LTD	5	2	7
CFR	COMPAGNIE FIN RICHEMONT	2	4	6
CSO	CAPITAL SHOPPING CENTRES GROUP PLC	4	4	8
EXX	EXXARO RESOURCES LTD	9	7	16
FSR	FIRSTRAND LIMITED	2	2	4
GFI	GOLD FIELDS LTD	2	4	6
GRT	GROWTHPOINT PROPERTY LTD	16	17	33
HAR	HARMONY GOLD MINING COMPANY LTD	4	6	10
IMP	IMPALA PLATINUM HOLDINGS LTD	2	2	4
INL	INVESTEC LIMITED	9	7	16
IPL	IMPERIAL HOLDINGS LTD	1	5	6
KIO	KUMBA IRON ORE LTD	3	2	5
MND	MONDI LTD	5	4	9
MPC	MR PRICE GROUP LTD	9	11	20
MSM	MASSMART HOLDINGS LTD	4	8	12
MTN	MTN GROUP LTD	1	2	3

SHARE CODE	COMPANY NAME	UPGRADE	DOWNGRADE	TOTAL
NED	NEDBANK GROUP LTD	1	4	5
NPN	NASPERS LTD	4	3	7
OML	OLD MUTUAL PLC	3	5	8
REM	REMGRO LTD	3	5	8
RMH	RMB HOLDINGS LTD	16	19	35
SAB	SABMILLER PLC	0	2	2
SBK	STANDARD BANK GROUP LTD	1	2	3
SHF	STEINHOFF INTERNATIONAL HOLDINGS	10	10	20
SHP	SHOPRITE HOLDINGS LTD	7	4	11
SLM	SANLAM LTD	7	9	16
SOL	SASOL LTD	3	3	6
TBS	TIGERBRANDS LTD	4	1	5
TRU	TRUWORTHS INTERNATIONAL LTD	4	4	8
WHL	WOOLWORTHS HOLDINGS LTD	6	4	10
TOTAL		**185**	**195**	**380**

APPENDIX B: UPGRADE SUBSAMPLE

Table 5: Sub-sample of upgrade data including magnitude of movements in consensus

Share Code	Recommendation Movement Date	Consensus Make-up			No of analysts	Change in consensus	Up/Down Grade
		Buy	Hold	Sell			
AGL	Tue 18 Dec 2007	14	9	2	25	0.54	UPGRADE
AGL	Thu 20 Aug 2009	9	9	3	21	0.57	UPGRADE
AMS	Wed 21 Aug 2002	7	4	2	13	0.59	UPGRADE
AMS	Fri 12 Jan 2007	3	4	1	8	0.50	UPGRADE
AMS	Fri 15 Jun 2007	6	1	0	7	0.57	UPGRADE
AMS	Fri 11 Apr 2008	4	5	2	11	0.56	UPGRADE
ANG	Tue 01 Jul 2003	5	6	4	15	0.51	UPGRADE
ANG	Wed 31 Mar 2004	6	6	3	15	0.86	UPGRADE
ANG	Wed 09 Mar 2005	4	3	1	8	0.55	UPGRADE
APN	Fri 14 Feb 2003	3	1	0	4	0.50	UPGRADE
APN	Tue 21 Oct 2003	2	1	1	4	0.50	UPGRADE
APN	Wed 22 Oct 2003	3	0	1	4	0.50	UPGRADE
APN	Fri 23 Jan 2004	2	2	0	4	0.50	UPGRADE
APN	Fri 21 May 2004	2	1	0	3	0.67	UPGRADE
APN	Wed 08 Dec 2004	3	0	0	3	0.67	UPGRADE
APN	Wed 12 Oct 2005	2	0	1	3	0.67	UPGRADE
APN	Thu 20 Oct 2005	2	1	0	3	0.67	UPGRADE
APN	Mon 15 May 2006	3	1	0	4	0.50	UPGRADE
APN	Wed 01 Nov 2006	2	0	1	3	1.33	UPGRADE
APN	Tue 03 Jul 2007	2	2	0	4	0.50	UPGRADE
APN	Mon 08 Sep 2008	5	0	0	5	0.67	UPGRADE
APN	Thu 26 Feb 2009	3	1	3	7	0.57	UPGRADE
ARI	Wed 24 Apr 2002	2	2	4	8	0.50	UPGRADE
ARI	Fri 17 Jun 2005	1	2	2	5	0.60	UPGRADE
ARI	Tue 13 Dec 2005	2	2	2	6	0.67	UPGRADE
ARI	Thu 14 Dec 2006	3	4	0	7	0.86	UPGRADE
ARI	Thu 15 Mar 2007	2	2	2	6	0.67	UPGRADE
ARI	Wed 08 Aug 2007	2	2	0	4	1.00	UPGRADE
ARI	Tue 09 Oct 2007	2	2	0	4	0.50	UPGRADE
ASA	Wed 25 Jun 2003	8	4	0	12	0.73	UPGRADE
ASA	Mon 26 Jun 2006	7	2	0	9	0.56	UPGRADE
ASA	Tue 27 Mar 2007	7	3	0	10	0.57	UPGRADE
ASR	Tue 23 Mar 2010	0	2	1	3	0.67	UPGRADE
ASR	Mon 12 Apr 2010	1	2	0	3	1.33	UPGRADE
ASR	Wed 16 Nov 2011	3	1	0	4	0.50	UPGRADE
ASR	Wed 18 Jan 2012	5	0	0	5	0.50	UPGRADE
BIL	Fri 30 Apr 2004	15	3	0	18	1.22	UPGRADE
BIL	Mon 13 Jul 2009	14	12	2	28	0.64	UPGRADE
BVT	Mon 19 Mar 2001	3	2	1	6	0.67	UPGRADE
BVT	Thu 09 May 2002	7	2	0	9	0.81	UPGRADE
BVT	Wed 19 Mar 2003	2	3	0	5	0.80	UPGRADE
BVT	Tue 23 Sep 2003	3	3	0	6	0.67	UPGRADE
BVT	Mon 01 Mar 2004	6	0	0	6	1.00	UPGRADE

Share Code	Recommendation Movement Date	Consensus Make-up			No of analysts	Change in consensus	Up/Down Grade
		Buy	Hold	Sell			
CFR	Wed 17 Mar 2010	2	1	2	5	0.50	UPGRADE
CFR	Thu 18 Aug 2011	3	2	0	5	0.80	UPGRADE
CSO	Wed 08 May 2002	4	4	3	11	0.75	UPGRADE
CSO	Fri 09 Jul 2004	4	7	1	12	0.90	UPGRADE
CSO	Mon 26 Jun 2006	2	5	3	10	0.55	UPGRADE
CSO	Wed 29 Dec 2010	0	10	5	15	0.57	UPGRADE
EXX	Mon 01 Mar 2004	3	5	1	9	0.67	UPGRADE
EXX	Mon 07 Feb 2005	2	6	0	8	0.50	UPGRADE
EXX	Wed 29 Jun 2005	5	2	0	7	0.68	UPGRADE
EXX	Tue 16 May 2006	3	3	1	7	0.57	UPGRADE
EXX	Tue 20 Nov 2007	2	1	1	4	0.50	UPGRADE
EXX	Fri 11 Jan 2008	2	0	1	3	0.67	UPGRADE
EXX	Mon 21 Jan 2008	3	0	1	4	0.50	UPGRADE
EXX	Tue 02 Sep 2008	5	2	0	7	0.57	UPGRADE
EXX	Fri 05 Mar 2010	5	1	1	7	0.89	UPGRADE
FSR	Tue 07 Oct 2003	7	1	0	8	0.50	UPGRADE
FSR	Mon 03 Jan 2005	5	3	0	8	0.75	UPGRADE
GFI	Tue 28 Mar 2006	9	0	1	10	0.80	UPGRADE
GFI	Thu 15 Sep 2011	6	4	1	11	0.55	UPGRADE
GRT	Tue 13 Apr 2004	1	1	1	3	0.67	UPGRADE
GRT	Mon 24 May 2004	2	0	1	3	0.67	UPGRADE
GRT	Fri 04 Jun 2004	2	1	0	3	0.67	UPGRADE
GRT	Fri 15 Oct 2004	2	0	1	3	0.67	UPGRADE
GRT	Wed 25 May 2005	3	0	0	3	1.33	UPGRADE
GRT	Mon 21 Nov 2005	2	1	0	3	1.33	UPGRADE
GRT	Thu 05 Oct 2006	3	0	0	3	1.00	UPGRADE
GRT	Thu 15 Mar 2007	1	2	0	3	0.67	UPGRADE
GRT	Mon 17 Dec 2007	2	2	0	4	1.00	UPGRADE
GRT	Mon 07 Apr 2008	3	1	0	4	0.50	UPGRADE
GRT	Tue 27 Jan 2009	1	3	0	4	0.50	UPGRADE
GRT	Wed 28 Jan 2009	2	2	0	4	0.50	UPGRADE
GRT	Fri 11 Dec 2009	0	3	1	4	0.50	UPGRADE
GRT	Mon 01 Feb 2010	1	2	1	4	0.50	UPGRADE
GRT	Mon 19 Apr 2010	2	2	0	4	1.00	UPGRADE
GRT	Wed 02 May 2012	2	5	0	7	0.57	UPGRADE
HAR	Thu 13 Mar 2003	6	4	2	12	0.67	UPGRADE
HAR	Wed 15 Jun 2005	3	3	4	10	1.05	UPGRADE
HAR	Mon 21 Jan 2008	4	4	1	9	0.67	UPGRADE
HAR	Tue 19 May 2009	5	8	0	13	1.05	UPGRADE
IMP	Mon 08 Mar 2010	7	4	1	12	0.50	UPGRADE
IMP	Thu 03 Mar 2011	8	3	1	12	0.62	UPGRADE
INL	Tue 10 Jun 2003	1	1	4	6	0.60	UPGRADE
INL	Thu 16 Oct 2003	1	3	2	6	0.87	UPGRADE
INL	Thu 19 Feb 2004	2	3	2	7	0.57	UPGRADE
INL	Wed 02 Nov 2005	1	3	0	4	1.00	UPGRADE
INL	Mon 15 May 2006	3	1	0	4	1.00	UPGRADE
INL	Fri 03 Nov 2006	4	0	0	4	0.50	UPGRADE
INL	Wed 29 Aug 2007	3	0	0	3	0.80	UPGRADE
INL	Tue 12 Jul 2011	1	1	1	3	1.00	UPGRADE
INL	Mon 09 Jan 2012	2	1	1	4	0.50	UPGRADE
IPL	Mon 22 Sep 2008	2	3	0	5	0.80	UPGRADE
KIO	Mon 05 Jul 2010	2	6	0	8	0.50	UPGRADE

Share Code	Recommendation Movement Date	Consensus Make-up			No of analysts	Change in consensus	Up/Down Grade
		Buy	Hold	Sell			
KIO	Tue 11 Jan 2011	1	6	1	8	0.50	UPGRADE
KIO	Mon 24 Jan 2011	4	4	1	9	0.67	UPGRADE
MND	Wed 29 Aug 2007	5	1	0	6	1.67	UPGRADE
MND	Wed 09 Dec 2009	2	1	1	4	0.50	UPGRADE
MND	Fri 04 Jun 2010	5	0	0	5	2.00	UPGRADE
MND	Tue 27 Sep 2011	4	2	1	7	0.57	UPGRADE
MND	Mon 20 Aug 2012	3	3	0	6	1.00	UPGRADE
MNP	Mon 30 Jul 2007	2	2	0	4	1.00	UPGRADE
MNP	Thu 30 Aug 2007	4	1	0	5	0.60	UPGRADE
MNP	Fri 24 Jul 2009	1	4	1	6	0.67	UPGRADE
MNP	Thu 01 Oct 2009	3	2	0	5	0.87	UPGRADE
MNP	Wed 18 Apr 2012	5	3	0	8	0.50	UPGRADE
MPC	Fri 02 Mar 2001	1	3	0	4	0.50	UPGRADE
MPC	Wed 05 Jun 2002	3	2	1	6	0.67	UPGRADE
MPC	Mon 05 Apr 2004	0	2	2	4	0.50	UPGRADE
MPC	Wed 02 Jun 2004	1	2	1	4	1.00	UPGRADE
MPC	Thu 16 Aug 2007	1	1	1	3	0.50	UPGRADE
MPC	Wed 03 Oct 2007	2	1	1	4	0.50	UPGRADE
MPC	Thu 24 Jan 2008	3	1	1	5	0.80	UPGRADE
MPC	Thu 15 May 2008	2	2	0	4	0.60	UPGRADE
MPC	Thu 22 Jan 2009	4	2	1	7	1.14	UPGRADE
MSM	Mon 04 Apr 2005	1	3	1	5	0.80	UPGRADE
MSM	Fri 31 Aug 2007	4	2	0	6	1.33	UPGRADE
MSM	Thu 22 Jan 2009	5	2	1	8	0.50	UPGRADE
MSM	Fri 28 Jan 2011	1	5	2	8	0.61	UPGRADE
MTN	Mon 23 Nov 2009	10	2	0	12	0.58	UPGRADE
NED	Wed 07 Jan 2009	6	2	4	12	0.67	UPGRADE
NPN	Wed 31 Oct 2001	2	1	1	4	0.50	UPGRADE
NPN	Fri 18 Jan 2002	3	2	0	5	0.70	UPGRADE
NPN	Tue 21 May 2002	2	2	0	4	1.00	UPGRADE
NPN	Thu 04 Dec 2003	3	2	0	5	0.53	UPGRADE
OML	Fri 15 Aug 2003	3	8	1	12	0.67	UPGRADE
OML	Wed 23 Nov 2005	2	6	2	10	0.75	UPGRADE
OML	Wed 11 Apr 2007	8	3	1	12	0.67	UPGRADE
REM	Thu 08 Nov 2001	5	2	0	7	0.57	UPGRADE
REM	Fri 18 Jan 2002	5	2	0	7	0.57	UPGRADE
REM	Tue 12 Apr 2011	3	3	0	6	0.67	UPGRADE
RMH	Fri 25 Jan 2002	2	2	1	5	0.80	UPGRADE
RMH	Tue 08 Oct 2002	1	2	0	3	1.67	UPGRADE
RMH	Mon 25 Jul 2005	1	2	0	3	0.67	UPGRADE
RMH	Wed 12 Oct 2005	1	2	0	3	0.67	UPGRADE
RMH	Wed 16 Nov 2005	2	1	0	3	0.67	UPGRADE
RMH	Thu 06 Apr 2006	1	3	0	4	0.50	UPGRADE
RMH	Wed 03 May 2006	2	2	0	4	0.50	UPGRADE
RMH	Mon 05 Feb 2007	1	2	1	4	0.67	UPGRADE
RMH	Tue 17 Apr 2007	1	3	0	4	0.50	UPGRADE
RMH	Mon 09 Jul 2007	2	2	0	4	0.50	UPGRADE
RMH	Mon 10 Dec 2007	3	1	0	4	0.50	UPGRADE
RMH	Mon 21 Apr 2008	3	0	0	3	0.67	UPGRADE
RMH	Thu 02 Jul 2009	1	3	0	4	0.50	UPGRADE
RMH	Mon 07 Dec 2009	1	3	0	4	0.50	UPGRADE
RMH	Fri 01 Oct 2010	2	0	1	3	0.67	UPGRADE

Share Code	Recommendation Movement Date	Consensus Make-up			No of analysts	Change in consensus	Up/Down Grade
		Buy	Hold	Sell			
RMH	Thu 31 May 2012	1	3	1	5	0.50	UPGRADE
SBK	Tue 29 Mar 2005	8	2	0	10	0.60	UPGRADE
SHF	Mon 16 Sep 2002	6	0	0	6	1.00	UPGRADE
SHF	Thu 30 Sep 2004	3	1	0	4	0.70	UPGRADE
SHF	Tue 26 Jul 2005	3	2	1	6	1.17	UPGRADE
SHF	Fri 12 May 2006	2	2	1	5	0.80	UPGRADE
SHF	Thu 13 Jul 2006	3	0	1	4	0.50	UPGRADE
SHF	Mon 14 Aug 2006	3	0	0	3	1.00	UPGRADE
SHF	Fri 19 Jan 2007	1	2	1	4	0.50	UPGRADE
SHF	Fri 20 Apr 2007	2	0	1	3	0.67	UPGRADE
SHF	Fri 25 Sep 2009	4	0	0	4	0.50	UPGRADE
SHF	Wed 07 Jul 2010	4	0	0	4	0.50	UPGRADE
SHP	Mon 05 Nov 2001	5	3	2	10	0.80	UPGRADE
SHP	Tue 27 Aug 2002	8	1	1	10	0.60	UPGRADE
SHP	Tue 26 Aug 2003	6	1	1	8	0.50	UPGRADE
SHP	Wed 06 Apr 2005	2	4	0	6	0.67	UPGRADE
SHP	Fri 23 Mar 2007	4	3	1	8	0.50	UPGRADE
SHP	Wed 03 Oct 2007	4	2	1	7	0.57	UPGRADE
SHP	Mon 14 Jul 2008	6	2	0	8	1.00	UPGRADE
SLM	Mon 26 Mar 2001	4	0	0	4	1.33	UPGRADE
SLM	Fri 19 Oct 2001	6	4	0	10	0.53	UPGRADE
SLM	Tue 28 Oct 2003	5	3	0	8	0.58	UPGRADE
SLM	Mon 31 Jul 2006	5	2	0	7	1.43	UPGRADE
SLM	Wed 17 Oct 2007	2	4	1	7	0.62	UPGRADE
SLM	Thu 13 Mar 2008	3	2	1	6	0.67	UPGRADE
SLM	Mon 19 Jul 2010	2	5	0	7	0.57	UPGRADE
SOL	Tue 17 May 2005	3	4	2	9	0.62	UPGRADE
SOL	Mon 23 Jan 2006	3	4	1	8	0.50	UPGRADE
SOL	Mon 10 Jul 2006	6	2	1	9	0.61	UPGRADE
TBS	Fri 25 May 2001	3	3	0	6	0.67	UPGRADE
TBS	Fri 21 May 2004	4	3	0	7	0.86	UPGRADE
TBS	Wed 08 Sep 2004	4	2	0	6	0.53	UPGRADE
TBS	Fri 13 Apr 2007	3	2	1	6	0.67	UPGRADE
TRU	Fri 10 Sep 2004	5	2	0	7	0.57	UPGRADE
TRU	Wed 03 Oct 2007	2	4	0	6	0.67	UPGRADE
TRU	Mon 13 Oct 2008	3	3	2	8	0.50	UPGRADE
TRU	Thu 07 Oct 2010	2	4	6	12	0.50	UPGRADE
WHL	Tue 07 Sep 2004	1	6	0	7	0.86	UPGRADE
WHL	Fri 01 Sep 2006	4	1	0	5	0.80	UPGRADE
WHL	Mon 01 Jan 2007	3	4	0	7	0.52	UPGRADE
WHL	Wed 18 Jun 2008	3	3	0	6	0.71	UPGRADE
WHL	Tue 08 Sep 2009	4	6	1	11	0.73	UPGRADE
WHL	Mon 28 Feb 2011	9	3	0	12	0.50	UPGRADE

APPENDIX C: DOWNGRADE SUBSAMPLE

Table 6: Sub-sample of downgrade data including movements in consensus

Share Code	Recommendation Movement Date	Consensus Make-up			No of analysts	Change in consensus	Up/Down Grade
		Buy	Hold	Sell			
AGL	Fri 16 Jan 2009	6	13	4	23	-0.83	DOWN
AGL	Tue 10 Apr 2012	14	14	2	30	-0.55	DOWN
AMS	Mon 09 Jul 2007	5	1	1	7	-0.57	DOWN
AMS	Mon 22 Oct 2007	4	2	2	8	-0.50	DOWN
ANG	Fri 17 Sep 2004	3	5	2	10	-0.57	DOWN
APN	Thu 03 Apr 2003	3	0	1	4	-0.50	DOWN
APN	Mon 22 Sep 2003	1	2	1	4	-1.00	DOWN
APN	Fri 19 Dec 2003	2	1	1	4	-0.50	DOWN
APN	Tue 24 Feb 2004	1	3	0	4	-0.50	DOWN
APN	Tue 16 Aug 2005	1	1	1	3	-2.00	DOWN
APN	Mon 28 Aug 2006	1	2	0	3	-0.83	DOWN
APN	Mon 09 Oct 2006	0	2	1	3	-1.33	DOWN
APN	Tue 07 Nov 2006	1	1	1	3	-0.67	DOWN
APN	Tue 28 Nov 2006	1	1	2	4	-0.50	DOWN
APN	Tue 23 Sep 2008	3	2	0	5	-0.80	DOWN
APN	Tue 18 Nov 2008	3	1	3	7	-1.60	DOWN
APN	Wed 13 Jan 2010	2	2	4	8	-0.50	DOWN
ARI	Fri 29 Jun 2001	0	4	1	5	-2.40	DOWN
ARI	Wed 16 Jun 2004	1	2	1	4	-0.50	DOWN
ARI	Tue 22 Feb 2005	0	2	2	4	-1.00	DOWN
ARI	Mon 08 Jan 2007	2	4	1	7	-0.57	DOWN
ARI	Thu 08 Mar 2007	1	2	3	6	-0.95	DOWN
ARI	Mon 17 Sep 2007	1	3	0	4	-0.50	DOWN
ARI	Thu 30 Apr 2009	4	3	3	10	-0.53	DOWN
ASA	Tue 05 Feb 2002	5	5	3	13	-0.92	DOWN
ASA	Wed 10 Aug 2005	4	5	1	10	-0.54	DOWN
ASA	Mon 08 Mar 2010	6	4	2	12	-0.50	DOWN
ASA	Wed 04 Jul 2012	3	11	4	18	-0.67	DOWN
ASR	Fri 20 Nov 2009	0	1	2	3	-1.33	DOWN
ASR	Thu 28 Jun 2012	2	3	1	6	-1.00	DOWN
ASR	Tue 18 Sep 2012	0	1	5	6	-0.67	DOWN
BIL	Fri 03 Dec 2004	11	5	1	17	-0.69	DOWN
BIL	Wed 21 May 2008	11	7	3	21	-0.67	DOWN
BVT	Fri 12 Sep 2003	1	4	0	5	-0.80	DOWN
BVT	Tue 09 Jun 2009	3	1	0	4	-0.50	DOWN
CFR	Tue 01 Dec 2009	1	2	1	4	-0.67	DOWN
CFR	Mon 07 Dec 2009	1	1	2	4	-0.50	DOWN
CFR	Wed 25 Jan 2012	2	2	1	5	-0.80	DOWN
CFR	Tue 04 Dec 2012	2	5	1	8	-0.50	DOWN
CSO	Thu 08 Feb 2001	2	1	1	4	-0.83	DOWN
CSO	Wed 16 May 2001	2	1	3	6	-0.83	DOWN
CSO	Tue 02 May 2006	0	5	3	8	-1.42	DOWN
CSO	Tue 14 Nov 2006	2	3	6	11	-0.53	DOWN
EXX	Tue 23 Apr 2002	4	1	1	6	-0.50	DOWN

Share Code	Recommendation Movement Date	Consensus Make-up			No of analysts	Change in consensus	Up/Down Grade
		Buy	Hold	Sell			
EXX	Mon 05 Sep 2005	3	4	0	7	-0.57	DOWN
EXX	Mon 14 Nov 2005	3	2	2	7	-0.57	DOWN
EXX	Mon 26 Mar 2007	1	6	1	8	-0.50	DOWN
EXX	Fri 12 Oct 2007	1	3	0	4	-0.50	DOWN
EXX	Thu 08 Nov 2007	1	1	1	3	-0.67	DOWN
EXX	Fri 30 Nov 2007	1	1	1	3	-0.50	DOWN
FSR	Mon 19 Aug 2002	0	6	1	7	-0.69	DOWN
FSR	Mon 01 Sep 2003	6	0	2	8	-0.50	DOWN
GFI	Thu 31 May 2001	2	5	1	8	-1.08	DOWN
GFI	Tue 07 Nov 2006	4	2	2	8	-0.50	DOWN
GFI	Fri 24 Oct 2008	1	8	3	12	-0.67	DOWN
GFI	Thu 03 Sep 2009	5	4	3	12	-0.50	DOWN
GRT	Mon 23 Feb 2004	1	0	2	3	-0.67	DOWN
GRT	Thu 02 Sep 2004	1	1	1	3	-1.33	DOWN
GRT	Tue 31 May 2005	2	0	1	3	-1.33	DOWN
GRT	Thu 14 Jul 2005	1	1	1	3	-0.67	DOWN
GRT	Tue 05 Dec 2006	2	0	1	3	-1.33	DOWN
GRT	Wed 24 Jan 2007	1	1	1	3	-0.67	DOWN
GRT	Tue 09 Sep 2008	2	2	0	4	-0.50	DOWN
GRT	Wed 12 Nov 2008	2	1	1	4	-0.50	DOWN
GRT	Fri 14 Nov 2008	2	1	2	5	-0.50	DOWN
GRT	Tue 06 Jan 2009	1	1	3	5	-0.80	DOWN
GRT	Tue 10 Feb 2009	1	3	0	4	-0.50	DOWN
GRT	Wed 11 Mar 2009	1	2	1	4	-0.50	DOWN
GRT	Thu 14 May 2009	1	1	2	4	-0.50	DOWN
GRT	Mon 19 Oct 2009	0	2	2	4	-0.60	DOWN
GRT	Wed 03 Aug 2011	1	3	1	5	-0.67	DOWN
GRT	Wed 01 Aug 2012	1	5	1	7	-0.57	DOWN
GRT	Tue 09 Oct 2012	0	3	4	7	-1.14	DOWN
HAR	Mon 12 Aug 2002	6	3	3	12	-0.59	DOWN
HAR	Fri 03 Sep 2004	3	3	3	9	-0.60	DOWN
HAR	Thu 16 Dec 2004	1	1	6	8	-1.42	DOWN
HAR	Wed 12 Sep 2007	1	3	3	7	-1.07	DOWN
HAR	Mon 07 Apr 2008	4	4	4	12	-0.67	DOWN
HAR	Mon 31 May 2010	3	6	3	12	-0.77	DOWN
IMP	Mon 27 Mar 2006	2	5	3	10	-0.80	DOWN
IMP	Thu 04 Oct 2007	3	2	1	6	-0.53	DOWN
INL	Thu 12 Jul 2001	3	3	1	7	-0.57	DOWN
INL	Thu 19 Jul 2001	2	4	2	8	-0.50	DOWN
INL	Thu 09 Jan 2003	3	3	3	9	-0.67	DOWN
INL	Fri 07 Mar 2003	1	2	3	6	-0.67	DOWN
INL	Fri 10 Dec 2004	0	4	1	5	-1.07	DOWN
INL	Thu 03 Mar 2005	0	2	2	4	-0.50	DOWN
INL	Tue 17 Apr 2007	4	0	1	5	-0.80	DOWN
IPL	Tue 20 Mar 2001	3	3	1	7	-0.57	DOWN
IPL	Tue 03 Apr 2007	2	3	0	5	-0.53	DOWN
IPL	Thu 17 Jan 2008	0	4	1	5	-0.80	DOWN
IPL	Mon 29 Nov 2010	4	6	1	11	-0.55	DOWN
IPL	Tue 21 Feb 2012	4	6	1	11	-0.62	DOWN
KIO	Fri 09 Jan 2009	4	2	5	11	-0.55	DOWN
KIO	Thu 11 Nov 2010	1	5	2	8	-1.00	DOWN
MND	Wed 31 Dec 2008	1	2	0	3	-0.93	DOWN
MND	Mon 23 Mar 2009	0	3	0	3	-0.67	DOWN

Share Code	Recommendation Movement Date	Consensus Make-up			No of analysts	Change in consensus	Up/Down Grade
		Buy	Hold	Sell			
MND	Tue 19 Jan 2010	1	2	1	4	-0.50	DOWN
MND	Thu 29 Nov 2012	2	4	1	7	-0.71	DOWN
MNP	Tue 24 Feb 2009	1	3	3	7	-0.57	DOWN
MNP	Tue 19 Jul 2011	4	4	0	8	-0.75	DOWN
MNP	Wed 30 Nov 2011	3	4	1	8	-0.50	DOWN
MPC	Mon 02 Dec 2002	2	2	0	4	-0.50	DOWN
MPC	Mon 31 Mar 2003	2	1	1	4	-0.50	DOWN
MPC	Mon 23 Jun 2003	2	1	2	5	-0.50	DOWN
MPC	Mon 08 Mar 2004	0	1	3	4	-1.10	DOWN
MPC	Tue 07 Sep 2004	0	1	2	3	-1.33	DOWN
MPC	Tue 07 Feb 2006	2	1	0	3	-0.67	DOWN
MPC	Mon 16 Oct 2006	2	0	1	3	-1.33	DOWN
MPC	Mon 19 Mar 2007	2	1	1	4	-0.50	DOWN
MPC	Wed 25 Jul 2007	1	1	2	4	-1.00	DOWN
MPC	Mon 08 Oct 2007	2	0	2	4	-0.50	DOWN
MPC	Fri 01 Aug 2008	2	2	1	5	-0.60	DOWN
MSM	Tue 14 Dec 2004	1	4	1	6	-1.60	DOWN
MSM	Mon 12 Dec 2005	1	2	2	5	-0.73	DOWN
MSM	Tue 11 Dec 2007	1	5	0	6	-0.67	DOWN
MSM	Fri 14 Nov 2008	4	1	3	8	-0.50	DOWN
MSM	Mon 04 May 2009	3	5	0	8	-0.50	DOWN
MSM	Mon 08 Jun 2009	3	4	2	9	-0.53	DOWN
MSM	Tue 17 Nov 2009	0	2	7	9	-0.67	DOWN
MSM	Thu 03 Mar 2011	1	3	5	9	-0.64	DOWN
MTN	Mon 07 Jul 2003	8	3	2	13	-0.62	DOWN
MTN	Mon 02 Jun 2008	3	8	1	12	-0.67	DOWN
NED	Thu 01 Jul 2004	1	2	6	9	-0.57	DOWN
NED	Wed 01 Sep 2004	0	2	7	9	-0.56	DOWN
NED	Fri 30 Oct 2009	1	9	2	12	-0.50	DOWN
NED	Fri 20 May 2011	1	5	7	13	-0.56	DOWN
NPN	Tue 31 Jul 2001	2	2	1	5	-0.60	DOWN
NPN	Fri 01 Mar 2002	1	3	0	4	-0.70	DOWN
NPN	Thu 04 Apr 2002	0	4	0	4	-0.50	DOWN
OML	Mon 30 Jul 2001	4	6	1	11	-0.57	DOWN
OML	Thu 29 May 2003	4	6	3	13	-0.68	DOWN
OML	Thu 10 Mar 2005	1	6	2	9	-0.77	DOWN
OML	Tue 24 May 2005	0	5	3	8	-0.53	DOWN
OML	Thu 29 Dec 2011	9	3	4	16	-0.55	DOWN
REM	Wed 03 Oct 2001	4	1	2	7	-0.57	DOWN
REM	Fri 07 Dec 2001	4	2	1	7	-0.81	DOWN
REM	Mon 02 Dec 2002	4	4	0	8	-0.50	DOWN
REM	Thu 11 Dec 2008	5	3	0	8	-0.50	DOWN
REM	Mon 14 Nov 2011	2	3	1	6	-0.67	DOWN
RMH	Tue 28 May 2002	0	2	1	3	-1.07	DOWN
RMH	Thu 08 Apr 2004	2	2	0	4	-0.50	DOWN
RMH	Mon 30 May 2005	1	2	0	3	-0.67	DOWN
RMH	Thu 21 Jul 2005	0	3	0	3	-0.67	DOWN
RMH	Thu 08 Sep 2005	1	1	1	3	-0.67	DOWN
RMH	Wed 11 Jan 2006	1	2	0	3	-0.67	DOWN
RMH	Fri 20 Jan 2006	0	3	0	3	-0.67	DOWN
RMH	Fri 20 Oct 2006	1	2	0	3	-1.33	DOWN
RMH	Wed 10 Jan 2007	0	3	0	3	-0.67	DOWN
RMH	Tue 23 Jan 2007	0	2	1	3	-0.67	DOWN

Share Code	Recommendation Movement Date	Consensus Make-up			No of analysts	Change in consensus	Up/Down Grade
		Buy	Hold	Sell			
RMH	Thu 02 Oct 2008	2	1	0	3	-0.67	DOWN
RMH	Fri 12 Dec 2008	2	2	0	4	-0.50	DOWN
RMH	Wed 18 Mar 2009	1	3	0	4	-0.50	DOWN
RMH	Fri 17 Apr 2009	0	4	0	4	-0.50	DOWN
RMH	Tue 11 Aug 2009	1	2	1	4	-0.50	DOWN
RMH	Mon 11 Jan 2010	1	2	1	4	-0.50	DOWN
RMH	Mon 29 Nov 2010	1	3	0	4	-0.50	DOWN
RMH	Wed 22 Feb 2012	1	3	1	5	-0.67	DOWN
RMH	Thu 24 May 2012	0	3	1	4	-0.50	DOWN
SAB	Tue 24 Apr 2001	1	2	3	6	-0.67	DOWN
SAB	Tue 12 Dec 2006	12	5	4	21	-0.54	DOWN
SBK	Fri 11 Apr 2008	7	3	1	11	-0.51	DOWN
SBK	Fri 28 Nov 2008	6	2	3	11	-0.55	DOWN
SHF	Fri 01 Jun 2001	2	1	0	3	-0.67	DOWN
SHF	Thu 18 Apr 2002	3	1	1	5	-0.80	DOWN
SHF	Tue 09 Dec 2003	1	3	0	4	-0.50	DOWN
SHF	Tue 02 Nov 2004	3	1	1	5	-0.70	DOWN
SHF	Wed 06 Apr 2005	1	1	2	4	-1.00	DOWN
SHF	Mon 25 Sep 2006	2	2	1	5	-1.60	DOWN
SHF	Tue 09 Jan 2007	0	3	1	4	-0.90	DOWN
SHF	Wed 24 Jun 2009	3	1	0	4	-0.50	DOWN
SHF	Thu 11 Mar 2010	3	1	0	4	-0.50	DOWN
SHF	Thu 15 Jul 2010	3	1	0	4	-0.50	DOWN
SHP	Mon 08 Dec 2003	3	3	1	7	-0.57	DOWN
SHP	Mon 17 Jan 2005	1	4	1	6	-0.67	DOWN
SHP	Thu 01 Dec 2005	3	2	2	7	-0.57	DOWN
SHP	Thu 11 Mar 2010	1	3	8	12	-0.98	DOWN
SLM	Mon 03 Sep 2001	2	7	0	9	-1.06	DOWN
SLM	Fri 13 Dec 2002	3	4	0	7	-0.57	DOWN
SLM	Tue 06 Jan 2004	4	3	1	8	-0.50	DOWN
SLM	Fri 02 Sep 2005	2	5	1	8	-0.86	DOWN
SLM	Tue 16 Jan 2007	2	2	1	5	-1.10	DOWN
SLM	Wed 13 Jun 2007	3	1	3	7	-0.67	DOWN
SLM	Thu 09 Aug 2007	1	2	3	6	-0.67	DOWN
SLM	Thu 10 Sep 2009	2	4	2	8	-0.50	DOWN
SLM	Wed 23 Sep 2009	1	4	3	8	-0.50	DOWN
SOL	Mon 30 Jun 2003	2	6	4	12	-0.67	DOWN
SOL	Fri 01 Dec 2006	5	2	1	8	-0.67	DOWN
SOL	Mon 16 Jul 2007	4	6	3	13	-1.01	DOWN
TBS	Tue 03 Jun 2003	2	3	1	6	-0.87	DOWN
TRU	Mon 01 Jan 2007	1	6	0	7	-0.71	DOWN
TRU	Mon 19 May 2008	1	4	1	6	-0.86	DOWN
TRU	Fri 18 Nov 2011	2	4	8	14	-0.55	DOWN
TRU	Thu 30 Aug 2012	0	7	8	15	-0.53	DOWN
WHL	Fri 02 Mar 2001	2	1	2	5	-1.33	DOWN
WHL	Fri 02 Nov 2001	2	4	2	8	-0.50	DOWN
WHL	Tue 26 Sep 2006	2	2	0	4	-0.60	DOWN
WHL	Thu 28 Feb 2008	2	4	1	7	-0.57	DOWN

APPENDIX D: AAR & CAAR FOR UPGRADES

Table 7: Upgrade sub-sample showing AARs and CAARs for differing levels of movement in analyst consensus

UPGRADES	0.5 point movement in analyst consensus		0.75 point movement in analyst consensus		1 point movement in analyst consensus	
Event days	**AAR**	**CAAR**	**AAR**	**CAAR**	**AAR**	**CAAR**
-10	0.29%	0.35%	0.54%	2.27%	0.70%	3.40%
-9	0.08%	0.06%	0.11%	1.72%	0.17%	2.67%
-8	0.22%	-0.01%	0.62%	1.60%	0.88%	2.50%
-7	-0.19%	-0.23%	-0.35%	0.97%	-0.47%	1.61%
-6	0.10%	-0.04%	0.07%	1.33%	0.24%	2.08%
-5	0.10%	-0.15%	0.57%	1.26%	0.27%	1.84%
-4	-0.19%	-0.24%	-0.10%	0.68%	-0.19%	1.56%
-3	-0.15%	-0.06%	0.02%	0.79%	0.42%	1.76%
-2	0.04%	0.09%	0.38%	0.77%	0.46%	1.33%
-1	0.06%	0.06%	0.39%	0.39%	0.86%	0.86%
0	0.21%	0.21%	0.62%	0.63%	0.78%	0.78%
1	0.41%	0.62%	0.30%	0.93%	0.56%	1.35%
2	0.15%	0.77%	-0.15%	0.78%	-0.34%	1.00%
3	-0.09%	0.68%	-0.02%	0.76%	-0.32%	0.68%
4	0.04%	0.72%	0.28%	1.04%	0.52%	1.21%
5	0.09%	0.81%	-0.09%	0.95%	0.22%	1.43%
6	-0.22%	0.59%	-0.26%	0.69%	-0.31%	1.12%
7	-0.03%	0.55%	-0.54%	0.15%	-0.75%	0.36%
8	0.10%	0.66%	0.32%	0.47%	0.29%	0.66%
9	-0.14%	0.51%	0.23%	0.70%	0.23%	0.89%
10	0.20%	0.71%	0.13%	0.83%	-0.28%	0.61%

APPENDIX E: AAR & CAAR FOR DOWNGRADES

Table 8: Downgrade sub-sample showing AARs and CAARs for differing levels of movement in analyst consensus

DOWNGRADES	0.5 point movement in analyst consensus		0.75 point movement in analyst consensus		1 point movement in analyst consensus	
Event days	AAR	CAAR	AAR	CAAR	AAR	CAAR
-5	-0.45%	-0.31%	-0.39%	-0.41%	-0.39%	0.79%
-4	0.02%	0.14%	0.06%	-0.02%	-0.20%	1.19%
-3	0.15%	0.12%	0.12%	-0.08%	0.74%	1.39%
-2	0.00%	-0.03%	-0.24%	-0.20%	0.26%	0.64%
-1	-0.03%	-0.03%	0.05%	0.05%	0.37%	0.37%
0	0.10%	0.10%	0.12%	0.12%	-0.18%	-0.18%
1	-0.07%	0.03%	-0.31%	-0.19%	-0.19%	-0.36%
2	-0.33%	-0.29%	-0.19%	-0.38%	0.05%	-0.31%
3	0.01%	-0.29%	-0.21%	-0.58%	0.07%	-0.24%
4	-0.11%	-0.40%	0.44%	-0.14%	0.40%	0.16%
5	-0.21%	-0.61%	-0.15%	-0.29%	-0.12%	0.05%
6	-0.05%	-0.65%	-0.37%	-0.66%	-0.57%	-0.53%
7	-0.22%	-0.87%	0.23%	-0.43%	0.29%	-0.24%
8	-0.34%	-1.20%	-0.09%	-0.52%	0.05%	-0.19%
9	-0.26%	-1.46%	-0.48%	-0.99%	-0.26%	-0.45%
10	-0.03%	-1.49%	-0.29%	-1.28%	-0.77%	-1.21%
11	-0.16%	-1.65%	-0.27%	-1.54%	-0.22%	-1.43%
12	0.16%	-1.49%	0.43%	-1.11%	0.19%	-1.24%
13	-0.14%	-1.62%	-0.29%	-1.40%	-0.48%	-1.71%
14	-0.15%	-1.77%	-0.05%	-1.46%	-0.67%	-2.36%
15	-0.28%	-2.04%	-0.06%	-1.51%	0.11%	-2.26%
16	0.06%	-1.99%	-0.35%	-1.86%	-0.08%	-2.34%
17	-0.04%	-2.03%	-0.43%	-2.27%	-0.08%	-2.42%
18	-0.03%	-2.05%	-0.15%	-2.42%	-0.31%	-2.72%
19	-0.06%	-2.11%	-0.11%	-2.53%	0.31%	-2.41%
20	0.13%	-1.98%	-0.27%	-2.79%	-0.25%	-2.66%
21	0.40%	-1.59%	0.51%	-2.29%	0.14%	-2.53%
22	-0.02%	-1.61%	-0.55%	-2.82%	-0.01%	-2.54%
23	-0.27%	-1.88%	-0.51%	-3.32%	-0.50%	-3.03%
24	0.20%	-1.68%	0.26%	-3.07%	0.21%	-2.83%
25	-0.03%	-1.71%	0.00%	-3.07%	-0.22%	-3.04%