EARNING NEWS ON STOCK LIQUIDITY AND POST EARNINGS ANNOUCEMENT DRIFT IN FRANCE, USA AND SOUTH AFRICA

By

OYEBANJI FUNKE BUSAYO

Thesis submitted in fulfilment of the requirements for the degree of
Master of Management in Finance & Investment

In the

FACULTY OF COMMERCE LAW AND MANAGEMENT
WITS BUSINESS SCHOOL

At the

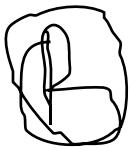
UNIVERSITY OF THE WITWATERSRAND

SUPERVISOR: **PROFESSOR KALU OJAH**

DECLARATION

I, **Oyebanji Funke Busayo**, declare that the research work reported in this dissertation is my own, except where otherwise indicated and acknowledged. It is submitted for the degree of Master of Management in Finance and Investment in the University of the Witwatersrand, Johannesburg. This thesis has not, either in whole or in part, been submitted for a degree or diploma to any other universities.

Oyebanji Funke Busayo



Signed at----------

On the13th---------- Day ofMay----------2013

ABSTRACT

This thesis aims to investigate the influence of earnings news on stock liquidity and the relationship between information asymmetry cost component and Post Earnings Announcement Drift in different equity markets. The scope of this research includes 426 firms from three countries in capital trading, the United States of America, South Africa and France. The first part of empirical work, shows that price reaction and liquidity effect are profound during short term event window length and reduce over time when the news ceases, The second part, a multivariate regression analysis which uses Generalised Method of Movement to capture both the problems of a likely presence of endogeneity between the explanatory variables and cross-stock heterogeneity, shows that the impact of earnings announcement on stock liquidity can split in two directions. The immediate effect is the shock after the news, causing stock liquidity to decrease immediately by lifting the illiquidity function upward. After the event, from the new increased position of illiquidity function, stock liquidity improves over time due to the trading volume increases and shifts the slope of illiquidity function downward. The overall effects at a point of time will be the total impact of the two side effects. And as shown in the results, the overall impact on the US and SA markets are that stock liquidity decreases while that of Euronext Paris, the stock liquidity increases. There are two types of Accounting law systems of which the common law system is used in the US and SA equity markets and the code law system used in France, the difference between the two law systems is that the information asymmetry component dominates the bid-ask spread in common law countries as in the US and SA markets while the cost of trading dominates the bid-ask spreads in code law countries such as France equity market. Finally, it is shown that there are several determinants of the PEAD, of which stock liquidity is one. Earnings news changes the stock liquidity, and therefore stock liquidity plays a role in the market response. When earnings news is released, it initially creates a gap between the informed traders and the uninformed traders, increasing the bid ask spread. Over time, this information gap decreases, however in the meantime more information on the market increases trading volume and reduces trading cost, leading to another part of the bid ask spread decreasing or stock liquidity improving. After decomposing bid ask spread into information asymmetry cost and cost of trading components, the final part of empirical

analysis shows that information asymmetry cost component provides a partial explanation for PEAD in the Johannesburg stock exchange and Euronext Paris.

DEDICATION

This research report is dedicated to

God Almighty, my parent and my siblings.

ACKNOWLEDGEMENTS

I would like to record my thanks and gratitude to everyone who assisted and encouraged me during my master's program and in the completion of this research. All their help and understanding contributed to the successful completion of this difficult task. Particularly, I would like to thank the following people

Prof. Kalu Ojah: My supervisor, whose extreme support and constant guidance provided me with the inspiration to complete the research. His professional and expert knowledge was critical in making this research possible.

My Family: Thanks to my Father Oyebanji Olayemi, my Mother Oyebanji Funmilayo for their continual supports in all aspect, my siblings Damilola, Morenike, Eniola and Dolapo. Special Thanks to my Uncle Mr Yemi Popoola for been part of my success story.

My friends: Thanks to all my friends, who helped me in one way or the other; assistance, advice, encouragement, for the success of this program.

TABLE OF CONTENTS

LIST OF TABLES

CHAPTER ONE

1. INTRODUCTION:

Post earnings announcement drift (PEAD) is the tendency for a stock's cumulative abnormal return to drift in the direction of an earnings surprise for the time following an earnings announcement. The persistence of PEAD involves numerous studies since it was first reported by Ball and Brown (1968). The main focus of available literature on earning announcement has been on the reaction of investors to new earnings information. In the market efficiency hypothesis, available information at time, t, should be reflected in stock price immediately. The investor's expectation of tomorrow prices is today's price plus a small risk premium, because they cannot predict the direction of the market. However, PEAD is an anomaly that is inconsistent with the efficient market hypothesis. PEAD was reported from efficient market test, where it looks like after controlling for risk, it is still possible to earn abnormal return. Stocks with high earnings surprises have high abnormal returns and continue to drift in the direction of positive earnings surprise, while stocks with negative surprise continue to decline, where by initially price reacts to information on a large scale, but this reaction is not complete after the news, but rather it continues to drift dependent on the direction of the news in the months after. And this is confirmed by Ball et al. (1993), Mendenhall (2002), Ng et al. (2008), Hou and Moskowitz (2005),Chordia et al.(2006),Sadka and Sadka (2004), Jacob et al. (2000), Kim and Kim (2003).

What can an investor do to trade on PEAD? He can exploit this phenomenon by buying stock with highest positive earnings surprise and short stocks with lowest negative surprise to maximize the drift. This highlights the curiosity around the role of PEAD and why it can be important to investors as well as researchers.

The prevalence of this observable fact has been confirmed for the last decades since the work of Ball and Brown (1968). This phenomenon has not only been confirmed in the US for many years following Ball and Brown, but also in the UK in the studies by Hew et al.(1996), Liu and strong (2003); in the emerging Finnish stock market by Booth et al. (1997), Hanna et al. (2005). Unfortunately not so many researches have been done on PEAD and stock liquidity in South Africa thereby data related to this topic is limited. So far there have been quite a lot of attempt to solve the question of what causes PEAD, some possible explanation for it are analysts and investors' under-reactions to earnings surprises, information biases processing, deficient asset pricing model and misspecification of risks which still remain controversial and unclear.

1.1. PROBLEM STATEMENT:

Post earnings announcement drift is the tendency of stock cumulative abnormal return to drift in the direction of an earnings surprise for the time following an earnings announcement. PEAD contests both efficient market hypothesis and capital asset pricing model, as under the expectations of these theories PEAD cannot occur.

In an efficient market hypothesis, stock price reflect all available and relevant information, hence adjust immediately to earning news instead of it continuing to drift in the direction of earnings surprises for up to several months after earning news.

The reasons why efficient market hypothesis is not consistent with PEAD are explained by Albarbanell and Bernard (1992) PEAD is as a result under-reaction by analyst and investors to earning surprise.

Ball (1992) also explained PEAD could result when the market is inefficient, and also when the market is efficient but measurements error are incorrect, errors such as errors in estimating rates of returns, errors in measuring normal expected returns, overstated statistics.

Bhushan (1994) also point out that transaction costs, in conjunction with different abilities among investors to process information can result in a drift.

In the capital asset pricing model, stock prices follows a random walk in a foreseeable manner, since stock prices are unpredictable, leading to no drift in the capital asset pricing model, based on the anomaly of PEAD, stock price can be predictable leading to a drift in the cumulative abnormal returns of stocks price in the direction of earning surprise for the time following the earnings announcement.

Most studies from Jones and Litzenberger (1970), Bernard and Thomas (1989), Albarbanell and Bernard (1992), Freeman and Tse (1989), Bhushan (1994). Consider under reaction as the main basis for PEAD, analyst under react and investors who are advised by analysts were said to be unconfident about the information gotten, consequently they steadily adjust stock prices even after earnings announcements.

Information biased processing is another form of under-reaction; it is the market's inefficiency in processing earnings information. Some people in the past believed that PEAD result is due to a methodological limitation or measurement error. Lee (1992) provides evidence on the estimation between the PEAD and the extent to which sophisticated investors can limit the mispricing, AsthanaSharad (2003) proves that PEAD dropped with the growth of information technology.

On the other hand, other studies point out that PEAD in fact occurs due to the inadequacy of CAPM regardless of investors' behaviour. This argument is consistent with Ball (1978), and Foster et al. (1984). According to Ball (1978), the two-parameter model when applied to a portfolio of common stocks, mis-specify the process of generating securities yield. He stated that CAPM omits one or more variables. Later on, in Foster et al (1984), their tests results are consistent with the notion of the capital asset pricing model misspecification and reject the possibility of an interference of information market or time period explanation.

Most previous studies in the literature assume that liquidity risk is constant during the period of earnings announcement. However, this is now being quizzed. Bhushan (1994) is the first to *indirectly* link stock liquidity and PEAD by suggesting a transaction cost explanation for PEAD. Over the last several years, checks on PEAD developed a new direction for empirical analysis, questioning the impact of liquidity risk on the PEAD. Following Bhushan and Mendenhall (2004), Hou and Moskowitz (2005) and Brav and Heaton (2006), however, none of them studies directly the relationship between PEAD and transaction cost. Only several papers, studied in detail the relationship between PEAD and stock liquidity; they are: Sadka (2006), Battalio and Mendenhall (2007), Ng, Rusticus and Verdi (2008) and Chordia et al (2009). Examine in details the relationship between PEAD and liquidity, Among these papers, Sadka (2006) uses *price impact* to proxy liquidity and decompose it into fixed and variable price effects; Chordia et al (2009) *standardised zero trading volume day* with the PEAD, *Amihud et al. (2002) Amihud illiquidity ratio*, Battalio and Mendenhall (2007) study the implication of *quote bid ask spread*, finally, Ng et al (2008) study the implication *of transaction cost (bid ask spread and commission)* to the PEAD. The major drawback from Chordia et al (2009) is that they exclude illiquid stocks lower than $5 and requiring stocks with at least 10 day trading each month. This is problematic because it is very well-known that infrequently traded stocks drive liquidity premium, which creates bias in results. The major drawback from Battalio et al (2007) and Ng et al (2008) is that they use bid ask spread or bid ask spread and commission as direct estimates of transaction costs, overlooking the information factor of earnings announcement. In fact, none of those studies use other data but US data; none of those studies include an information based factor, and they mainly focus on the transaction cost rather than liquidity itself

Liquidity effect in fact is a type of risk misspecification, which could be the cause of PEAD. The higher the liquidity the lower is the risk. Using different measurements of liquidity these studies by Brennan et al. (1998), Hegde and Mc Dermott (2003), Kluger et al. (1997), Li et al. (2003), Amihud et al. (2002), developed a theory that liquidity could be an explanation of

PEAD. So therefore, based on the above explanations earning news pose to have an impact on stock liquidity, as a result of information asymmetry cost component and also on post earnings announcement drift.

1.2. OBJECTIVES OF THE STUDY:

Based on the foregoing sections highlighted problem, the main objective of this research is, to examine the relationship between stock liquidity and post earnings announcement drift and also

- Examine the use of bid ask spread to fill in or alternate stock liquidity.
- Examine the influence of information asymmetry cost component of bid ask spread on the impact of the event.
- Conduct cross country comparism, between two different accounting systems i.e. the code law and common law systems in analysing PEAD.

1.3 SIGNIFICANCE OF THE STUDY:

There are four categories of potential beneficiaries of this research:

- Any the researcher who studies behavioural finance and microstructure of financial markets can be a beneficiary. The outcome of this research provides an incentive for them to explore and further develop their studies into the relationship between bids-ask spread and PEAD.
- Any financial analyst involved in market microstructure and stock performance analysis can be a beneficiary. This research will provide more empirical and theoretical insight into the formulation and development of their earnings and pricing models. They can account the bids-ask spread and information asymmetry as factors that can affect stock price and returns behaviours. In addition, from my research, analysts will be able to determine the difference in the pattern of returns /market liquidity behaviour between small and large companies; they can anticipate the above impact being different between large and small sized companies.
- Any investor or student who wants to gain a better understanding and to further enhance their expertise in this subject matter can do so from this research.
- International accounting bodies can also be beneficiaries of this research for their institutional interests. Contribute to existing literature; this research demonstrates that PEAD means information disclosure is inadequate. In other words, markets do not fully understand information when information is released. PEAD means that markets need long time to digest disclosures. In such situation, there are two questions to be raised: (i) Are accounting

numbers such as earnings information really meaningful? (ii) Is the current method of disclosures appropriate? Perhaps we need a standard format for narrative disclosure. Further understanding about the above three issues can help the International Accounting bodies to setup more appropriate accounting standards.

1.4. OVERVIEW OF RESEARCH METHODOLOGY:

My data sample will covers three countries: the USA, South Africa, and France with firms listed in 7 indices, of which 3 indices are from Johannesburg Stock Exchange 3 indices from US Stock Exchanges, and 1 index from Paris Bourse. My samples will also cover two types of accounting systems, one is the common law system used in the US and the SA, and the other is code law based system used in France. There is a difference between code law and common law accounting systems. In the common law countries, earnings information is that stock information is released on the day of the event, whilst in the code law countries earnings information is released to the markets much earlier (month earlier) through a variety of channels before the official announcement date. Therefore the earnings news in code law based countries has already been digested by the markets and is no longer new news.

This thesis intends starting with the event study method to examine stock market price's response to the earnings events and in a later part to examine short term and long-term impact of earnings announcements on the bid-ask spreads. This methodology was introduced by Brown and Warner (1985), and subsequently used by Beneish and Gardner (1995), Gregoriou and Ioannidis (2006), Gregoriou, (2009) and many others event studies in literature have further modified the methodology.

As the thesis progresses, I intend to use different regression models. There will also be empirical design parts to explain each of the methodology and explanatory variables. Based on the data collection, sample construction and methodology used I would be able to gather enough information to arrive at a meaningful conclusion on this topic.

1.5. OUTLINE OF THE STUDY:

The study will unfold as follows. Chapter two will discuss a literature review on PEAD, the explanations for it, and the relationship between PEAD and stock liquidity, particularly with stock liquidity measured by bid ask spread and why I would use bid ask spread to alternate stock liquidity. Chapter three will performs a general task to describe the sample coverage, data selection process, variables and methodology approach intended to be used in this study. Chapter four will conducts different uni-variate analysis that includes price response impact,

application of information cost liquidity hypothesis, the different impacts of earnings announcement in the previous chapter in a multi-variate analysis to explore the impact of earnings announcements on the stock market liquidity, Factors of the market response to earnings announcements, of which stock liquidity is the focus. Furthermore, this chapter will performs bid ask spread decomposition into information asymmetry and cost of trading components, it will also examine the relationship between information asymmetry component of Bid-Ask Spread and Post earnings announcement drift. In conclusion, Chapter five will sum up the findings and put forwards recommendations for further research.

CHAPTER TWO

LITERATURE REVIEW OF PEAD AND EXPLANATIONS FOR IT

The purpose of this chapter is to review and discuss the literature on Post Earnings Announcement Drift. The persistence of PEAD involves numerous studies; it was first reported by Ball and Brown (1968) that PEAD is an anomaly that is inconsistent with market efficiency hypothesis which states that prices of stock should reflect all available information. PEAD was inconsistent with efficient market hypothesis where it was observed that after controlling for risk, it was still possible to earn high abnormal returns. This shows that stocks with positive surprise have high abnormal return and continue to grow, while stocks with negative surprise have low or negative abnormal return and continue to decline.

What can an investor do to trade on PEAD? Chordia and Shiva Kumar (2006) suggest that investors can exploit this phenomenon by buying stocks with the highest earning surprise and short stocks with the lowest negative surprise to maximize the drift. This explains the role of PEAD and why PEAD is important to investors. The questions for researchers are: what are the effects of PEAD in the short term and long term and what the effects look like? What are the reasons behind these effects?

The outlay of this chapter is organized as follows: Section 2.1 provides definition of PEAD and the reported evidence of PEAD. Section 2.2 to 2.4 reviews related theories, methodology to explore PEAD and the reported evidence of PEAD in the literature. Section 2.5 summarizes possible explanations for PEAD and subsections discuss the literature with respect to stock liquidity, discusses the literature of stock liquidity in relation to earnings announcements and PEAD. Section 2.6 summarizes the possible measurement of stock liquidity, advantage and disadvantages of each measurement and why bid-ask spread can be used as an alternate to stock liquidity.

2.1. DEFINITION OF PEAD

PEAD is the tendency of stock cumulative abnormal return to drift in the direction of earning surprise for a period of time following the announcement period, and this is inconsistent with the efficient market hypothesis which states that stock price should reflect all available information in the market unlike PEAD that continues to drift in the direction of earning surprise several months even after the earning news. Studies showed that Ball and Brown (1968) were the first to note that stock prices continue to drift in the direction of earnings surprises for several months after earnings are announced, after earnings announcement abnormal returns of good news firm continues to drift up in positive direction while abnormal returns of bad news firms continue to drift in the opposite direction. Initially prices react to information on a large scale, but this reaction does not complete after the news, it continues to drift dependent on the direction of the news months later.

According to Bernard and Thomas (1989), studies showed that the majority of the drift takes place in the first 60days following the announcement of earnings. The drift lasts for approximately 9months for small firms and around 6 months for large firms. This is supported by Watts (1978) whose study established that the drift lasts for 6month for large firms. Bernard and Thomas (1989) found that a large amount of the drift that takes place in the first 60days following the announcement of earnings that occurs within the last 5days following the announcement of earnings. In fact, Bernard and Thomas(1989) established that the percentage of the drift that occurs within the first 5days following the announcement of earnings in relation to the drift that takes place in the first 60days following the announcement of earnings is 13% for small firms, 18% for medium firms, and 20% for large firms.

The survival of this phenomenon has been confirmed by the work of Ball and Brown (1968) Hew, skeratt, strong and walker (1996); Liu and Strong (2003), Booth et al (1997) … so far there have been quite lots of attempts to solve the question of what causes Post Earning Announcement Drift. The possible explanations for it are analyst and investor's under-reaction to earnings surprises, information biased processing, deficient asset pricing model and misspecification of risk.

2.2 EXPLANATION OF PEAD

Though, there is not a generally satisfactory explanation, the existing explanation of PEAD falls in three categories: 1) under-reaction to earnings surprises 2) misspecification of risk 3) biased information processing.

2.2.1 Under-reactions to earning surprise

Under-reaction to earning surprise means that stock price does not reflect equilibrium in price. People including analysts, investors advised by analysts, under-react to positive or negative earnings news and when this happens they need time to assess and adjust to information through trading and these impact prices of stock. Bernard (1993) in his study shows that market participants do not recognize the positive autocorrelation in earning changes but believe that earnings follows random walk. In this case, investors do not fully reflect the news content of earnings announcement and a subsequent drift can be observed.

The reason for under-reaction includes analyst under-reaction, investor's under-reaction, and biased information processing. All these three factors lead to the market's inability to respond rapidly and completely to the publicly available information.

Analyst under-reaction

Albarbanell and Bernard (1992) carried out a test, whether analyst over or underreact to earnings information is an explanation for PEAD. They tested if forecast errors can be explained by previous years earning change, the result showed that there is a positive relationship between the forecast errors and previous earning change, the interpretation is that analyst are cautious and do not believe that rise in earnings will continue, because if earnings

are rising, the forecast is smaller than the actual earnings at time t. this lead their test suggesting that analyst produce forecast that are less simple than the seasonal random walk model, however their test fail to recognize the extent to which earnings deviate from the announcements.

Investors' under-reaction

Barberis, shleifer and vishnny (1998) provide a formal model to explain investor's under-reaction to earning announcements is related to investors conservatism, conservatism refer to the reluctance of individual to update their beliefs upon new information on earnings. Investors dependent on conservatism disregard the full information content of an earnings announcement because they tend to cling partially, on their prior estimates of earnings to their prior estimates of earning rather than update their estimates based on the new information contained in the earning announcement.

Biased information processing

Ball (1992), Bhuhsan (1994), Rangan and Sloan (1998), in their studies observed that methodological limitation in research model and abnormal return measurement required to process information is incomplete, leading to biased information processing.
Ball (1992) in his study gave two explanations for PEAD (1) either the market truly is inefficient (2) the market is efficient but measurement used for data processing are incorrect, bias in information processing could be errors in estimating rates of returns, errors in measuring expected returns, overstated T-statistics all contribute to PEAD.

2.2.2 MISPECIFICATION OF RISK

Literatures have not measured risk properly, while drifts look at future performance and are always risk adjusted. Misspecification of risk includes beta risk measurement (CAPM) and liquidity or trading risk.

MISPECIFICATION OF CAPM

Ball, Kothari and Watts (1988) state that many PEAD studies assumed a stationary beta, where the outcome of abnormal returns generated is upward bias which leads to exploitation of the PEAD anomaly. They concluded that allowing for betas to shift annually results in an insignificant PEAD.

FOS (1984) found that using security return model instead of Earning based model method does not suggest the existence of PEAD. Bernard and Thomas (1989) explains that when the Earning based model is used it reflects an unidentified risk premium which leads to PEAD been identified and this is because one of the problems security return model aims to alleviate is the risk adjustment problem of the Earning based model.

Bernard and Thomas (1989) does not support the conclusion that misspecification of the CAPM explains PEAD anomaly as the findings of their studies is inconsistent Ball, Kothari, and Watts (1988) findings in terms of stationary betas causing a significant upward bias in abnormal returns. For instance Bernard and Thomas (1989) established that the size of the estimated beta shifts in their study was only around 8% as great as would be required for a full explanation of the drifts magnitude.

Additionally, Bernard and Thomas (1989) findings are inconsistent with the explanation that PEAD is a result of excluding risk factors apart from the systematic risk. For example they found a disproportionate amount of drift based round the earnings announcement of the subsequent quarter.

LIQUIDITY RISK

Individual stock liquidity evolves from both firm-specific and market factors, with links to market characteristics providing a stimulus for liquidity risk as a pricing factor. Acharya and Pederson (2005) find that the most important source of liquidity risk is the covariance of individual stock liquidity with market returns, so that investors value stocks that are liquid when market returns are low.

Sadka and Sadka (2005) linked liquidity risk and post- earnings announcement drift because liquidity risk increases around earnings announcement. Chordia et al. (2007) and Vega (2007) suggest that random noise trader and strategic market maker liquidity provision provide a stimulus for drift in prices following earnings announcements.

Battalion and Mendenhall (2005) show that, institutions and individual's trade differently around earnings announcements, benchmarking to analyst forecasts and prior year earnings, respectively. These differential reactions suggest that investor flux occurs as analyst forecast and seasonal random walk earnings diverge. Investor flux can be represented by changes in the ratio of informed to noise traders, the ratio of informed to uninformed traders, or the mix of different institutions holding stock, which highlights the central role of institutional holdings and trading in determining flux. Indeed Woodruff and Senchack (1988) finds that positive earnings surprises are immediately followed by a large numbers of small trades and later followed by relatively fewer trades with higher volumes, implying that either retail investors enter the market earlier than institutions or, more likely, that institutions are not able to trade large blocks of shares immediately following these announcements, based on these larger institutional holdings serve to magnify investor flux around earnings announcements and thus increase liquidity risk in the market.

Mendenhall (2004) shows that stocks with high arbitrage risk experience greater drift, because institutional trading prior to earnings announcements appears to temper investor flux at the announcement as institutions incorporate relevant information ahead of earning news. Likewise are post earnings announcements negatively related to liquidity risk, consistent with the challenge of trading large quantities of stock without price impact in response to earning news. Increased liquidity risk is reflected in the excess volatility of post- announcement returns, signifying the trouble that arbitrageurs face in trading at relatively unstable prices in the post- announcement market.

Anderson, Harris and So (2007) investigate liquidity risk and it relationship with PEAD discovered that earnings surprises change the composition of investors, this represent liquidity risk to those who might try to trade profitably against predictably drift returns. They characterize the determinants of unexplained volume at the earnings announcement and find that both liquidity levels (volume and spreads) and liquidity risk (flux in institutional holdings and retail trading activity) are significantly related to unexplained volume, so their result suggest that liquidity risk manifest in trading volume which leads to post earnings announcement drift.

2.3. MEASURES OF EARNINGS SURPRISE AND DETECTION OF PEAD IN THE LITRETURE

Three main measures of earning surprise have been used in the literature, to quantify new information in earnings and measure of PEAD. They are as follows:

1) The Earnings based measure
2) The Analyst forecast measure
3) The Price based measure

2.3.1. Earning based measure: Standardized unexpected earnings

This measurement uses standardized unexpected earnings (SUE) to measure earnings surprise. Following Mendenhall (2004), SUE is defined as the difference between actual and expected earnings scaled by the standard deviation of the forecast errors during the estimation period, where expected earnings are estimated either from analysts' forecast or from a time series model of earnings.

$$SUE_{it} = \frac{UE_{it}}{\sigma(UE_{it})} = \frac{e_{it-E[e_{it}]}}{\sigma\left(e_{it-E[e_{it}]}\right)}$$

Where

- SUE_{it} is the quarter t standardised unexpected earnings of stock i
- e_{it} is the quarter t actual earnings per share reported by the firm i
- $E[e_{it}]$ is the quarter t expected value of e_{it}
- $\sigma\left(e_{it-E[e_{it}]}\right)$ is the quarter t standard deviation of unexpected earnings

This methodology was used by Bernard and Thomas (1989), Bidwell (1979) and Chan et al (1996). A major downside of SUE is that, although it captures the earnings surprises, it neither captures other new information that might be unveiled around earnings announcement dates; nor does it capture market reactions to the information.

Three influential models used to calculate $E[e_{it}]$ are

1) The naïve random walk model

$$E[e_{it}] = \delta + e_{it-4}$$

Where

- $E[e_{it}]$ is the expected earnings of stock i at quarter t
- δ is the drift term

- $e_{i,t-4}$ is the actual earnings at quarter t-4

2) The first order autoregressive earning expectation model by Foster (1977)
$E[e_{it}] = \delta + e_{i,t-4} + \varphi(e_{i,t-1} - e_{i,t-5})$
Where
- $E[e_{it}]$ is the expected earnings of stock i at quarter t
- δ is the drift term
- $e_{i,t-4}$ is the actual earnings at quarter t-4
- $\varphi(e_{i,t-1} - e_{i,t-5})$ Is the first order autoregressive term that account for the positive but decaying autocorrelations in seasonally differenced earnings.

3) Brown and Rozeff (1979) used uni-variate time series model of quarterly accounting earning per share.
The Brown and Rozeff (1979) earnings expectation from this model is expressed as follows
$E[e_{it}] = \delta + e_{i,t-4} + \varphi(e_{i,t-1} - e_{i,t-5}) + \theta\varepsilon_{i,t-4}$
$\theta\varepsilon_{i,t-4}$ Is a seasonal moving average term at the four lag to account for the observed negative correlation in year to year seasonally differenced earnings.
The SUE involves uni-variate time series earnings forecasting model described above, might omit other important variables or information that could be meaningful in the explanation process.

2.3.2. Analyst forecast based measure: Analyst forecast error and earnings forecast revision

Brown et al (1997) supports the direct use of analyst forecasts of earnings to measure earnings surprise. Due to the analysts' ability to use information and timing in their forecasts, they are able to revise their forecast which reflects up to date information in a timely manner. Analysts forecast earnings based measure of earnings surprise uses analyst forecast error. It is computed as the difference between the actual earnings and forecast of reported earnings. Forecast error is usually scaled by security price for cross-sectional comparability purpose.

$$FEit = \frac{e_{it} - F[e_{it}]}{P_{it}}$$

Where,

- $FEit$ is forecast error
- eit is actual reported earnings for stock i at time t.
- F $[eit]$ is the forecast of reported earnings for stock i at time t.
- Pit is stock i price at time t.

Freeman and Tse (1989) used this methodology to measure earning surprise and detect PEAD which lead to them suggesting that the future abnormal returns should be positively correlated with the most recent earnings forecast error. An alternative analyst forecast based measure of earnings surprise is forecast revision, which is calculated as the change in analyst

earnings forecasts divided by stock price. The insight is if there is a greater change in analyst earnings forecasts then there is a greater earnings surprise.

$$REVit = \frac{F[e_{it}] - F[ei_{t-1}]}{P_{it}}$$

Where,

- $REVit$ is earnings forecast revision
- F $[eit]$ is the forecast of reported earnings for stock i at time t.
- F $[ei, -1]$ is the forecast of reported earnings for stock i at time t-1.
- Pit is stock i price at time t

This methodology was used by Mendenhall (1991); REV should be positively associated with future abnormal return.

There is also a slightly different measure of REV by Chan, Jegadeesh and Timan (1996), which is a six month moving average of past changes in earning forecast by analysts. By using this moving average of past changes in earnings forecasts by analysts, information is assumed to be released gradually over time. O'Brien (1988); Abarnbanell and Bernard (1992), established the shortcoming of this measure, that there is a potential for bias while using analyst forecasts due to lags in publication of analysts' forecasts.

2.3.3. Price-based measure: Cumulative Abnormal Returns and Buy Hold Abnormal Return

Supporters of this measure are Beaver et al (1980); Beaver et al (1987), Chan et al (1996), and Bernard and Thomas and Wahlen (1997). In this method the calculation of surprise involves the abnormal return, which is the difference between individual stock return and market stock return. Abnormal stock return can be calculated either by a market adjusted model, market model, CAPM, multi-factor model, or Matched-firms returns. Among these models, the first two models are the most often used.

i) In *the market adjusted return model*, defined by Brown and Warner (1985),

$$AR_{it} = R_{it} - R_{mt}$$

Where,

- AR_{it} is abnormal return of stock i at time t
- R_{it} is single stock return at time t
- R_{mt} is market stock return at time t

The use of market adjusted return seems doubtful because it does not adjust for basic CAPM β risk. However, Brown and Warner (1980, 1985) found that the simple mean returns model often yields results similar to those of the more sophisticated models, because the variance of abnormal returns is not reduced much by choosing a more sophisticated model.

ii) In the *market model*, abnormal return is calculated as:

$AR_{it} = R_{it} - \alpha_{it} - \beta R_{mt}$

Where

- AR_{it} is abnormal return of stock i at time t
- R_{it} is single stock return at time t
- R_{mt} is market stock return at time t
- α_{it} is constant.
- B is systematic risk.

This model assumes the risk free interest rate included in α is constant, whereas market returns are assumed to change.

iii) *The basic CAPM model*:

$R_{it} = R_{f*}\beta(R_{mt} - R_f)$

Where

- R_{it} is return of stock i at time
- R_m is market stock return at time t
- B is systematic risk.
- R_f is the risk free rate.

iv) *The multi factor models* such as Fama-French 3 factor model, Carhart 4 factor model or APT model:

$AR_{it} = R_{it} - \alpha_i - \sum \beta_{jF_j}$

Where

- AR_{it} is abnormal return of stock i at time t
- R_{it} is single stock return at time t
- α_{it} is constant.

βj is risk associated with each individual factor Fj

v) Matched-firms returns/sort

This methodology assumes that there are factors that affect returns. All returns will be sorted into 10 deciles by size and then each decile continues being sorted by other factor e.g. book-to-market value. The expected return for each group will then be computed and used as "normal return" for that group. The deviation of a stock return from "normal return" of the group it belongs to, will be the abnormal return. This method is problematic because the results change when sorted by different characteristics therefore its level of accuracy is low.

In addition to different ways to calculate abnormal returns, there are two ways to test the non-normal distribution in order to find out the influence of news by time, which are Cumulative Abnormal Returns (CAR) and Buy and Hold Abnormal returns (BHAR) and this was first established by Brown and Wanner (1985).

CAR is cumulative abnormal returns, which is the sum of the differences between the expected return on a stock and the actual return that comes from the release of news to the market, calculated by the following formula:

$CAR^{i}t, _{t+k} = \Sigma_k AR_{i, t+k}$

Where

$AR_{i, t+k}$ is the abnormal returns on stock i on the day $_{t+k}$

$CAR^{i}_{t, t+k}$ is the cumulative abnormal returns on stock i over the period t to $_{t+k}$

Following the main-stream literatures, we assume that if there is no influence of earnings news, CAR will follow normal distribution.

$CAR^{i}_{t,\ t+k} \sim N\ (0,\ \sigma 2_{i,\ t+k})$

Buy and Hold Abnormal Returns ("BHARs") measure the difference between the compounded actual return and the compound predicted return. BHAR is calculated by

$BHAR_{it} = \prod_{t}^{t} =_{0} [1 + R_{it}] - \prod_{t}^{t} =_{0[1+R_{mt}]}$

Where:

R_{it} is the time *t* arithmetic return (including dividends) on security *i*

R_{mt} is the time *t* arithmetic return on the market weighted index

Similarly, following the law of large numbers of studies we assumed BHAR will follow normal distribution if there is no influence of news.

$BHAR_{it} \sim N\ (0,\ \sigma^{2}_{i,\ t+k})$

When there are N firms in the category, we use average across the number of firms. The t test for normality will be used to detect the drifts.

$t_{CAR} = \overline{CAR_{i\tau}}\ /(\sigma(CAR_{i\tau})/\sqrt{n})$

Or

$TBHAR\ = \overline{BHAR_{i\tau}}\ /(\sigma(BHAR_{I\tau}\sqrt{n})$

In a not so long event window length using CAR or BHAR is almost similar. For long horizons, BHAR seems conceptually better. BHAR tends to be right skewed (bounded from below).

Amongst the three measures of PEAD, the price based method focused on price reaction to the earnings news and suggests that the surprise is well reflected directly by the change of daily price around the event. This price-based method is therefore widely and commonly used especially with the first two measures of abnormal returns: market adjusted model and market model. For this reason, this thesis will demonstrate and use the price based measure, CAR for the market-adjusted model first established by Brown and Wanner (1985), and also used frequently by other researchers such as Beneish and Gardner (1995); Gregoriou (2006) among others , due to its accuracy, and popularity.

2.4. EVIDENCE OF PEAD

Using different methodologies which were listed in the previous parts, most of empirical analysis over the last 4 decades, against the market efficient hypothesis, proves that PEAD exists everywhere both in the developed and the emerging markets.

Securities with positive earnings surprises will drift further than normative predicted prices, and securities with negative earnings surprises will drift below the predicted prices. Ball and Brown, (1968) first reported that estimated cumulative abnormal returns continue to drift up after every quarterly earnings announcement for good news firms and down for bad news firms. The return residuals for earnings surprises portfolio persisted for as long as two months after the announcement. Their sample includes 261 firms in the nine fiscal years 1957 to 1965. The sample does not include young firms or that have failed, those firms that do not report on December 31 and those not represented on Compustat, the CRSP tapes and Wall

street Journal. Their method is to construct two alternative models of what the market expects income to be and then investigate the market's reaction when its expectations prove false. They investigate net income and earnings per share using time series regression model and earnings per share using a naïve model. The distribution of the residuals then shows the behaviours of the drift. The subsequent study by Jones and Litzenberger (1970) on two groups from Compustat, one group of 510 companies for the period 1962-1965, and the second of 618 companies for the period 1964-1967 shows drift for positive surprises but not for negative surprises; by Latane, Joy and Jones (1977) test on 975 standardised unexpected earnings shows drifts for both positive and negative surprises.

Foster (1977) test using time series model for 96 firms during the period 1946-1974 show drifts for day -20 to day +20. In fact there are numerous studies that demonstrate evidence of PEAD since its first discovery. Ball (1978) reviews the PEAD studies in the ten years following Ball and Brown. Ball's review includes not only evidence of PEAD but also explanations for the cause of PEAD as systematic experimental error, market imperfections and private costs of information processing, and failure of the two-parameter model. While most of the early studies on the PEAD suffered from limitations such as a small sampling size, sample selection bias and risk measurement error, the latter research on the PEAD shows continuous improvement in data selection process and research methodologies.

The extensive and detailed documentation of the PEAD in the following period are from: Foster, Olsen, and Shevlin (1984); Bernard and Thomas (1989), (1990); Albarbanell and Bernard (1992); Ball (1992); Bhushan (1994); Hew, Skeratt, Strong, and Walker (1996); Chan et al (1996); Rangan and Sloan (1998), Brown and Han (2000). More recently are Mendenhall (2004); Battalio and Mendenhall (2007). Most of these studies provide evidence against EMH because market failed in reflecting earnings news into stock prices while trying to explore the reasons behind PEAD phenomenon.

Foster, Olsen, and Shevlin (1984) use a sample of more than 56000 observations from 2,053 companies' quarterly data over the period from 1974-1981 on Compustat. They report that earnings are partially anticipated but if there is a positive (negative) surprise, then there is a positive (negative) drift of up to 13 weeks after earnings announcement. Drifts are persistent phenomenon over the study period with no concentration in any specific period. Consistent to common findings in previous literature, this paper intensively documented that the drift is negatively related to firm size variable and positively related to the sign and magnitude of earnings-surprise variable. The sign and magnitude of earnings forecast error independently explains 81% the variation in PEAD, and firm size independently explains 61% the variation in PEAD. This tests result based on the two earnings based models one scaled by the absolute value of earnings and the other scaled by the standard deviation of the forecast error. Their price based models and do not show drifts.

Bernard and Thomas (1989) study 84,792 firms' quarter data for NYSE/AMEX during the period 1974-1986 and 15,475 firm quarter data for OTC stocks on NASDAQ system during the period 1974-1985. Their research provides intensive evidence of the PEAD. They reported that most drifts occur during the first 3 months subsequent to the earnings announcement and there is little evidence that drift exists beyond 180 trading days. In addition they also find the magnitude of the drift is positively related to the magnitude of the unexpected earnings and the absolute value of the drift is inversely related to the firm size.

The methodology that Bernard and Thomas (1989) use is earnings based model to forecast standardised unexpected earnings.

In their following study Bernard and Thomas (1990) studied 2,697 firms from 1974-1986, and found PEAD exists for the four quarters following earnings announcement. A large proportion of drift happened within 5 days around earnings announcement. In this study they focused on the explanation for the reason of PEAD. There hypothesis showed that price fails to reflect the extent to which the time series behaviour of earnings deviates from a naïve expectation. Their conclusion is that market price adjusts slowly to earnings information. Again in this study they use earnings based measure. Firms are assigned to one of 10 portfolios based on standardised unexpected earnings.

Following Bernard and Thomas (1989), Freeman and Tse (1989) worked on a sample of 1054 firm's quarterly data during the period 1984-1988. Their explanation for the existence of PEAD in their report said "as investors obtain post announcement information, they revise their initial estimates of persistence by reassessing the implications of past earnings for future earnings. As a result, post announcement security returns and continue to be influenced by previously announced earnings" (page 50).

Abarbanell and Bernard (1992) examined 178 firms for up to 44 quarters over the period 1976-1986. They formed portfolio of quintiles based on the magnitude of analysts" earnings forecast errors, and calculated cumulative abnormal (sized adjusted) returns up to and including the fourth subsequent announcement and found drifts.

Up to the early 1990s, the anomaly had been remarkably over time. In addition it was not explained by either the size or the book/market factor3. Finally, although there were a lot of speculations, including the fact that people used such a naïve forecasting model, nobody knew what was going on in this phenomenon. A survey of the literature up to the early 1990s is provided by Ball (1992). He characterized "the 'drift' in abnormal returns after quarterly earnings announcements" as being one of the two principal versions of the earnings-price anomaly. He then concluded there are two classes of explanation for earnings-price anomalies: the first one being the market truly is inefficient, and the other one being the market is efficient but the measurements were incorrect4.

Bhuhsan (1994) undertook the study of 2,642 firms with 85,056 quarterly announcements on NYSE/AMEX covering the period 1974-86. Bhushans findings confirm the relationship between the firm sizes and drift which was reported previously. It is interesting that he concluded that the different abilities to process information among investor in relation to transaction cost cause the PEAD. His methodology is earnings based measure.

Recently, studies on the PEAD have become more and more complex, from different angles and intuitively. Mendenhall (2002) study sample consists of 107589 firm-quarter observations from 4910 firms giving the conclusion that drift exists, but independent from historical persistence. In the following study in 2004, Mendenhall test result is consistent with Wurgler and Zhuravskaya (2002); found the strong relationship between the PEAD and the risk faced by the arbitrageurs. Liu, Strong and Xu (2003) provide another test for the existence of PEAD in the UK by a sample of 835 stock and 13,848 half year earnings figures over the period 1988-1998. Their conclusion is that whatever the measure of earnings surprises used there is evidence of PEAD in the UK; however, the different measures will give different drift effects.

Asthana Sharad (2003) use the research design controls for firms size, magnitude, and sign of the forecast error, investor sophistication and value relevance/information content of earnings on 27260 quarter observations for 1613 firms. He found that drift declines significantly with the growth of information technology revolution and explain that the information technology reduces the trading friction and improves the market information efficiency.

2.5. New explanation for PEAD: Stock Liquidity and measures of stock liquidity in relation to PEAD

As discussed above, liquidity effect in fact is a type of risk misspecification which could be the cause of PEAD. This part will focus on the multi-dimensional characteristics of stock liquidity, manifested through different measurements in literature.
Stock liquidity by definition is the ability to trade the stock rapidly with little price impacts. It is an important characteristic without which the investors cannot trade. Highly liquid stocks will attract more investors than low liquid stocks. A growing number of researches show that there is an inverse relation between stock liquidity and returns. Examples are Amihud and Mendenson (1986) Brennan and Subrahmanyam (1996), Brennan, Chordia and Subrahmanyam (1998) Easley, Hvidjaker, and O'Hara (2002) among others. This flags the possibility that PEAD and liquidity have some determinant relationship.
Stock liquidity comes in a multi-dimensional form; therefore there have been less agreement on a particular method in the measures of stock liquidity. Existing literatures have used different measures of stock liquidity, of which the following listed below are the most frequently used ones.

Trading volume and standardised trading volume

Trading volume in fact is a popular measure of liquidity; it was used by Brennan et al (1998) among others and it seen that Stock with high liquidity will be traded at high volume and stock with low liquidity will be traded at low volume. However, there is a potential problem in using trading volume as it does not take into account the differences in the number of shares outstanding and number of shareholders.

Standardised trading volume

This is the ratio of trading volume divided by the number of share outstanding. Amihud et al (1986) mentioned that stock liquidity is correlated with trading frequency so we can observe the trading frequency and use it to proxy liquidity. Datar et al (1998) Chordia et al (2001); Hedge and Mc Dermott (2003), Gregoriou (2008) used the standardised trading volume as a proxy for stock liquidity.

Firm size

Though the firm size is not directly related to liquidity according to the liquidity definition, the firm size is correlated to other factors such as trading volume, number of shareholders,

stock price continuity, and the number of market makers. Garbade, (1982); Stoll (1985) and Kluger et al (1997) discovered this.

Price impacts

Price impact is the response of price to the large orders. Price impact can be measured using the transaction prices. This formal liquidity measure even though widely used, is only available for large trade so I cannot use it in this framework. Kraus and Stoll (1972) made the findings. Its adequacy as a liquidity measure is still questioned, this was observed by Matei Demetrescu (2006); Stange et al (2008).

Effective commission rate

Effective commission rate is also being used to proxy for market liquidity in Jinliang Li et al (2003) research, this measurement however is subjectively dependent on an individual trader, thus is not commonly used.

Standardised turnover-adjusted zero-volume day

This measure is developed by Liu (2006) and it takes into account many factors such as trading quantity, trading cost and especially the trading speed that is the continuity of trading and potential delay in executing an order.

$LM_{ix} = ZV_{ix+1/T0ix/deflator} * 21x/N_i$

Where,

LMix is the stock i^{th} standardised turnover-adjusted zero-volume days over the period x month, x= 1,6,12

ZV_{ix} is the stock ith number of zero-volume trading days over prior x month.

$T0ix$ is the stock ith turnover the prior x-month, calculated as the sum of daily turnover the prior x month where daily turnover is the ratio of the number of shares traded on a given day to the number of shares outstanding at the end of that day.

21 is standard number of trading day in a month.

N_i is the total number of trades per day, in the market over the prior x month, Deflator is arbitrarily chosen to ensure that the ratio $0<1/T0_{ix/deflator}< 1$ for all sample stocks. It is equal to 11,000 where x=6, 12 and equal 480000 where x = 1.

This measure uses the pure number of zero trading days over the prior x month to identify the least liquid stock and rely on the turnover to indicate the most liquid stock among frequently traded stocks classified by the pure number of zero-volume trading days. This measure however contains a potential problem as it excludes the less frequently traded stock.

Amihud illiquidity ratio

This is the average of the ratio of daily absolute return to the daily volume in dollars; developed by Amihud et al (2002) following the Kyle (1985) model.

$$PI_{it}=\frac{1}{\mathrm{D_{it}}}\sum_{\mathrm{t=1}}^{\mathrm{dit}}\frac{\backslash R_{itd}\backslash}{DV_{itd}}$$

Where,

PI_{it} Is the stock it is illiquidity ratio,

\Ritd\ is the absolute value of daily return

DV_{itd} is the absolute value of daily return is the daily dollar volume (in millions) on day d month t for stock i

D_{it} is the number of valid days in month t for stock i

Amihud illiquidity ratio is designed to capture the cost of trade. The cost of trade in fact is normally captured in bid-ask spreads which would be mentioned in the next section below.

However, an advantage of Amihud illiquidity ratio is to account for the cross sectional variation within the sample. In this thesis, my samples are split into different indices, already taking into account the cross sectional variation. It becomes unnecessary to use Amihud ratio in such a framework. Lastly, if stock trading volume is zero on a particular day its Amihud illiquidity ratio cannot be calculated, so it excludes the effect of trading absence.

Bid-ask spread

In organized stock exchanges, liquidity is maintained by the market makers, the people who are conferred the right by the stock exchange authority, to set up different price level of buy and sell. The market makers create the market to trade the stocks by buying at bid price and selling at a higher ask price. The difference between and ask price, the bid-ask spreads, is the source for market makers to compensate their ability and costs to provide the market for traders. Due to the above nature, size of the bid-ask spreads have been frequently used to measure liquidity of stocks. The more liquid a stock is, the smaller the bid-ask spreads, leading to a lower the risk, so also the higher the bid ask spread, higher the risk. By looking at impacts of earnings announcements on the bid ask spread around the news, one could see how bid-ask spreads can measure liquidity risk around public disclosures.

Given the advantages and disadvantages of the above measures of stock liquidity, (i.e. Trading volume does not take into account the differences in the number of shares outstanding and number of shareholders; the firm size is not directly related to liquidity according to liquidity definition; Price impact is only available for large trades) I would use the bid ask spread as the main measure of stock liquidity.

2.6. Bid-ask spread and the PEAD

2.6.1. Bid-ask spread measures

Bid-ask spreads are measured in three different terms;

a) The quoted bid-ask spreads which is the difference between the ask price quoted by a dealer and the bid price quoted by a dealer at a point of time.

b) The relative bid-ask spreads defined as the ask price minus the bid price, divided by the mid-price, which is the average of the bid and ask prices.

C) The effective bid-ask spreads which is computed as twice the absolute value of the difference between a transaction price and the mid-price in effect at the time of the trade.

An important key studies such as Amihud and Mendelson (1986), Grossman and Miller(1988), and Vijh (1990) use quoted bid-ask spreads to proxy stock liquidity; Ofeck and Recharson (2003) use relative bid-ask spreads; meanwhile, effective bid-ask spreads was used as a proxy for liquidity by Heflin and Shaw (2000), Hedge and McDermott (2003) and Gregoriou and Ioannidis (2006), Gregoriou (2010).

Relative spread was commonly used, Roll (1984) first pointed out, this proxy was problematic due to the fact that the actual trading occurs mostly within the bid ask bound. For a more accurate measure of that reason, Lee et al (1993), Heflin and Shaw (2000), Hedge and McDermott (2003) and Gregoriou and Ioannidis (2006), and Gregoriou (2010) included effective spread to proxy for liquidity in their research. Unfortunately, both measures of relative bid-ask spreads and effective bid-ask spreads included mid-price. Which caused other problems such as changes in the mid-price and also changes in the bid ask spreads. To minimize the shortcomings of the above two methods, they included the quote bid-ask spread in their study, which I would also use in this study.

2.6.2. Bid-ask spread decomposition

Historically, there have been three main theoretical models of decomposing bid-ask spreads

1) The trade indicator regression models pioneered by Glosten and Harris (1988)

2) The time series co-variance models pioneered by Stoll (1989)

3) The combination of the above two models first applied by Huang and Stoll (1997) Campbell, Lo and Mackinlay (1997) extended from these two and other models were built from them.

Spreads was first decomposed in permanent and transitory components using trade indicator regression form by Glosten and Harris (1988). Permanent component is due to the inventory costs and transitory component is due to information asymmetry costs. Their test results prove that significant fractions of NYSE common stock spread are due to information asymmetry. Researchers also using trade indicator regression model are Mahavan, Richardson, and Roomans (1997). They decompose spreads with adverse selection and order-processing components; inventory holding cost is assumed to be zero. They conclude that adverse information cost increases through the day of information shock, while the order-processing components cost decrease.

Stoll (1989) pioneered a model of time series behaviour of spreads and specified the relationships between the quoted spread and realized spread. Based on that, he establishes a relationship between a quoted spread and the co-variance estimate of the spread that depends on two parameters, which is the probability of a price reversal and the amount of a price reversal. By using data from the NASDAQ on quoted spread and transaction prices, he used these two parameters, from which he was able to calculate the relative proportions of three

spread components: order processing cost, inventory holding cost, and information asymmetry cost for data set from October, November and December 1984. Following Stoll, George, Kaul and Nimalendran (1991).also used series co-variance, but their model assumes a zero inventory cost.

Huang and Stoll (1997) in "The components of the Bid-ask spread" found that existing bid ask models, which includes trade indicator regression model and series co-variance models, did not decompose the spread fully. They made two extension tests to the trade indicator regression model to separate the effects on order processing and inventory costs. Their study also shows that spread components vary depending on the size of a trade.

However, there are also studies that do not give results that can be interpreted as in the above three components, for example Winne and Majors (2007) among others support the hypothesis of no inventory holding costs in order-driven markets.

In another direction, empirical studies also show that bid-ask spreads are related to some of the characteristics of stock such as stock price, trading volume, volatility of return, number of market dealers, the risk of stock and other factors, for example,

Atkins and Dyl (1997) Gregoriou, Ioannidis and Skerratt (2005). Gregoriou et al (2005) tests the model with a multi variant linear relationship between Spread and 4 independent variables: Variance of Forecast, Variance of Returns, stock Market Value, Volume of stock trading to explain spread. Information asymmetry in this study is proxied by Variance of forecasts. From the tests, authors found that not only the volatility of returns but also disagreement among analysts were significant. Volatility captures information uncertainty about current period to the end of the year; it reflects economy wide aspects of uncertainty. Disagreement related to firm specific issues, for example poor results add to volatility. Poor performance causes delay in reporting the year end results and cause additional information asymmetry between market maker and market investors. For the statistical significance of the Variance of Forecast in the presence of the other variables that are regularly included in modelling spread, their explanation is that disagreement among analysts affects the behaviour of market makers, and those market makers act to protect themselves from informed traders by increasing spreads. Market makers cannot recognize the different types of traders they are dealing with; some have information advantages, while others do not. As a result market makers protect themselves from those informed traders by increasing the spread. The study toward the direction that bid ask spread related to characteristics of securities such as stock price, trading volume, volatility of return, number of market dealer, the risk of stock and other factors is still being developed. Though these multi-variant models of bid ask spread in study such as Gregoriou et al (2005) do not decompose spread into three different cost components, rather the role of adverse selected information component is emphasized.

At current time, in terms of costs, the existing market microstructure theories imply that bid ask spread must cover three costs faced by a dealer: The order processing costs, inventory holding costs and adverse information cost. The third component is sometimes known as information asymmetry cost. The inventory holding cost is the fee associated with risk of holding inventory of the stock, which is first argued by Demsetz (1968) and Tinic (1972). The order processing cost, conceptualized by Benston and Hagerman (1974) and Stoll (1978), is the actual cost charged by the market makers to process the order which includes labour, communication, clearing and record keepings. Finally, the information asymmetry or adverse

information cost is established by Copeland and Galai (1983), Glosten and Milgrom (1985) and recently by Foster and Viswanathan (1993) and Madhavan et al (1997).

2.6.3 How is bid-ask spread an explanation for PEAD?

2.6.3.1. Earnings announcements and bid-ask spreads

There have been less number of studies on the subject of market liquidity impacts of earnings announcements with liquidity measured by bid ask spread. Kim and Verrecchia (1994) suggested a theoretical model that information disadvantage of the market makers increases the bid-ask spreads. Information asymmetry increases around earnings announcements due to information flows from public disclosures. The informed traders will exploit their ability to process public information. In turn, investors have to increase bid-ask spreads to protect themselves from informed traders. Increase in bid-ask spreads suggest that market liquidity decreases due to the event.

Other studies of the behaviour of the bid-ask spreads around earnings announcements in NYSE are Foster and Viswanathan (1993) and Krinsky, and Lee (1996). These studies use intraday data. The first papers finding is that order processing cost does not account much for the change in bid-ask spreads, while information asymmetry dominates this change. Krinsky and Lee's finding is that the total bid-ask spreads might not change significantly because information asymmetry increases while order processing cost and inventory holding cost decrease.

In a working paper, Voetman (2000-2006) uses Stoll's methodology to provide evidence from Copenhagen Stock Exchange that quote bid-ask spreads does not change significantly because of earnings announcements even though information asymmetry increases. His findings also show that positive earnings have less uncertainty than negative earnings. This is a study on a code law country using daily data.

Acker et al (2002) provides evidence from London Stock Exchange using daily data over the period from 1986-1994. Due to earnings announcements bid ask spreads fall and trading volumes and returns volatility rise.

Recently, Gregoriou (2008) investigated the impact of earnings announcements on the components of bid-ask spreads on the London Stock Exchange using intraday data. Information asymmetry cost has been found to dominate the change in the bid-ask spreads, resulting in bid-ask spreads to decrease.

Above studies stay only at the point to explore the impact of earnings announcement on stock liquidity; they have not explored the relationship between liquidity and the PEAD.

2.6.3.2. Bid-ask spread as a measure of stock liquidity in relation to PEAD

Based on Kim and Verrechia (2001) suggestion, in explaining drift, spread has two Potential roles:

1. To indicate the cost of transacting. A large spread might discourage trading, and therefore might lead to a lag in information getting in to prices. (But this wouldn't explain the long term results)
2. as a measure of risk. Information causes the risk of the stock to increase.

Though still very limited, there are two directions in studies on the linkage between PEAD and spread as measure of stock liquidity: implication of transaction cost to explain PEAD and information based explanation.

Transaction cost (proxied by spread)

Bhushan (1994) is the first researcher who indirectly examined the relationship between liquidity and the PEAD, by relating transaction cost and the PEAD. He redefines Bernard and Thomas (1990) model with a transaction cost framework. However, he uses annual trading volume in money to proxy for the inverse of indirect cost of trading, and stock price to proxy for direct cost of trading. Stocks with high transaction cost have lower volume of trading and vice versa. His work shows that stocks with high transaction costs drifted more. Especially after control for transaction cost, firm size and analysts play no role in explanation of PEAD. However in this study, there is an absence of the direct link between liquidity and PEAD.

Brown (1997) indicates that PEAD is not evident throughout so it challenges transaction cost as an explanation of PEAD. In addition, Spiegel and Wang (2006) questions should transaction costs be proxied by previous year trading volume? Trading volume can indicate the degree of liquidity but it does not tell us the cost of trading so this methodology in fact goes around.

Although all of the above studies were after Bhushan (1994) provided the link between transaction cost and PEAD, transaction cost has not been used to provide an explanation of PEAD, until a recent study by Ng et al (2008).

To the best of my knowledge the only two studies directly linking the relationship between bid ask spread and the PEAD are Ng et al (2008) and Chordia et al (2009).

Ng et al use bid ask spread to proxy for transaction cost. They provide evidence that stocks with higher transactions cost have a smaller reaction to the earnings announcement, and the drift is larger for stock with high transaction cost. The results confirm that spread provides an explanation for the PEAD. This study uses US data only. In addition there is absence of information factor in the explanation.

Chordia et al (2009) use a multiple measures on transaction cost (proportional effective bid-ask spreads, dynamic institutional trading costs, and the market impact costs) following Kim and Madhavan (1997), Korajczyk and Sadka (2004) and Chen, Stanzl, and Watanabe (2004) and indicates that transaction cost can possibly be an explanation for the PEAD. Chordia et al prove that "transaction costs account for 66% to100% of the potential paper profits from the long-short strategy designed to exploit the earnings drift". Their research however, excluded illiquid stocks, i.e. stock with price lower than £5 and stocks with at least ten days of trades each month, meanwhile stocks with less frequently trading largely drives liquidity premium. In addition,

Chordia et al (2009) construct one month liquidity measures in that research fail to capture information from stocks that have zero trading volume over the whole month.

According to Bhushan and Chordia et al PEAD will not be exploitable after transaction cost. Chorda's analysis of transaction cost (proxied by bid-ask spreads, market impact costs, and institutional transactions costs) proves that most of the net profits disappear upon accounting for trading costs. However, previous studies generally rule out transaction cost as an

explanation of PEAD. Moreover, Ball (1992) and Battalio and Mendenhall (2006) studies claim that PEAD is too large to be bounded by transaction cost. Mendenhall provides evidence that after transaction cost investor can still earn a 14% hedged portfolio return a year.

Information biased factor

There are very few studies indirectly linking the information based factor and the PEAD. Lee and Swaminathan (2000) investigate interaction between price momentum and previous trading volumes to predict cross-sectional returns. They documented that earnings surprise is caused by higher (or lower) future earnings of low (or higher) volume stocks. Investor's expectation affects not only stock returns but also the stock trading activity; therefore the information content of trading volume is related to market misperception of stock future earnings.

Chambers, Jennings and Thompson (2004) use proportion of zero return trading day in the past twelve months as proxy for liquidity, firm with high proportion is expected to have low flow of information and high resolution of uncertainty around earnings announcement, and vice versa. They found that returns are concentrated around earnings announcements for firms with low information flow than for firms with high information flow. However, their studies have the problem of lack of news and the assumption of equal transaction cost across firms is not realistic.

Sadka (2006) is another researcher who studied indirectly the link between PEAD and liquidity. His studies use price impact to proxy for stock liquidity and then follow Glosten and Harris (1998) model, propose to decompose liquidity into two components, the fixed component (associated with market-wise information) and variable component (associated with firm specific information). Unexpected systematic (market-wide) variations of the variable component rather than the fixed component of liquidity are shown to be priced within the context of momentum and post-earnings-announcement drift (PEAD) portfolio returns. The variable component of price impact in his study therefore explains part of PEAD and price momentum. He finally suggests that a bench mark model to explore PEAD should include information based on liquidity risk factor.

CHAPTER THREE

DATA SELECTION AND METHODOLOGY

There are two techniques that will be used. The first one is to describe the data collection and sample construction to obtain the final sample. The second is to describe the methodology used in the research.

My data sample covers three countries: the United States of America, South Africa, and France, with firms listed in 7 indices, of which 3 indices are from Johannesburg Stock Exchange, 3 indices from US Stock Exchanges, and 1 index from Paris Bourse. My samples include both liquid and illiquid stocks from the Johannesburg Stock Exchange, covering two types of accounting systems which are the common law and code law system, the common law system is used in the US and the SA, and the other is the code law system used in France. Ball, Korathi and Robin (2000) used code law and common law accounting systems in their analysis. The difference between code law and common law accounting systems, in the common law countries, earnings announcement on stock information is released on the day of the event, whilst in the code law countries earnings information is released to the markets much earlier (month earlier) through a variety of channels before the official announcement date. Therefore the earnings news in code law based countries has already been digested by the markets and is no longer new news at the time the official news release.

3.1 Companies and Indices covered

3.1.1. Johannesburg Stock Exchange

Data was collected from Bloomberg and I-Net PDF files.

JSE TOP 40 INDEX

It is the capitalization-weighted index of the share prices of the 40 largest companies (Based on market capitalization) traded on the Johannesburg Stock Exchange.

JSE MID CAP INDEX

It is the capitalization-weighted index of 61 companies on the Johannesburg Stock Exchange that are quarterly selected as being the 41st to 101th largest companies.

JSE SMALL CAP INDEX

It is the capitalization-weighted-index consisting of companies outside of the 101th largest companies in South Africa on the Johannesburg Stock Exchange.

3.1.2 US Stock Exchanges

The Dow Jones Industry Average (DJIA)

It is the price-weighted index created by 30 of the largest and most widely held public companies in the United States.

NASDAQ 100

It is the modified capitalization-weighted index comprising of the 100 non-financial largest stocks traded on the NASDAQ Stock Exchange.

S&P 100

It is the capitalization weighted index of 100 largest companies by market capitalization in the S&P 500.

3.1.3 Euronext Paris

CAC40

It is the float capitalization-weighted index comprising of the 40 largest and most liquid stocks trading on the Paris Bourse.

The data obtained is modified quarterly by the end of March, June, September, and December. It should be noted that firms with the largest market caps tend to have the largest influence on the index; the index value is modified to keep any issues from having an "overwhelming" effect on the index results. While the composition of the NASDAQ-100 changes in the case of delisting, the index is only rebalanced once a year, in December, when NASDAQ reviews its components and makes the appropriate adjustments.

Float means that the weightings of each of the index's components are determined by the value of shares outstanding to the public. This prevents a large company that only issues a small amount of its shares from having a disproportionate amount of influence on the index's value.

3.2. Data collection and calculation

Daily stock closing prices, price indices, daily closing bid price, daily closing ask price, daily turnover by volume and daily price high and low were obtained from Bloomberg data base 90 days before and 90 day after the earnings announcements. The numbers of companies that have data available for each index are:

CAC40: 40 companies; DJIA: 30 companies; JSE top 40: 40 companies; JSE mid cap: 60companies; JSE Small Cap: 60 companies; NASDAQ100: 96 companies, S&P100: 100 companies. The selection criteria, is similar to that of Hedge and Mc Dermott (2003), my final data will include stocks that have:

a) Not been involved in a merger during the period of 90 days before and after earnings announcement

b) Not been involved in a split during the period of 90 days before and after earnings announcement

c) Data available on the stock exchanges and on Bloomberg database 90 days before and after earnings announcement. We exclude firms that do not have data available of at least 10 day before an earnings announcement.

Quote bid-ask spreads, relative bid-ask spreads, effective spread are all calculated based on closing bid price and ask price. Quote bid-ask spread is calculated as the difference between bid price and ask price. Relative spread is calculated as the difference between bid prices and ask price divided by average of bid price and ask price (mid-price). Effective spread is calculated as twice as much as absolute value of the difference between executed price and mid-price.

Trading volume is calculated as turnover by volume times the average of the high price and low price on the day.

Pre-earnings announcement period is defined as period from day -90 to day -1. Post earnings announcements period is defined as period from day 0 to day +90.

3.3. Earnings announcements dates

In the Johannesburg Stock Exchange, dates of preliminary report of fourth quarter and final earning, results were taken from JSE's website through Regulatory News Services for 2010-2012. For companies that reported fourth quarter and annual preliminary earning results separately, the annual preliminary report dates was selected. These dates are then compared to sources from companies' websites and also date of earliest earnings announcements released to the public, through various means of media such as press release, conference call, Internet, etc. Basically, companies are required to submit the earning reports before 5PM on the day before announcement day. On the next day, the announcement days, information will be available on the stock exchange for most companies at around 7AM, before the market open's. The analyst conference then will be held in the morning and reason for this is that different companies have different way of calling their earnings announcement dates. Usually they call this "annual/final and fourth quarter financial results" date. Sometime they call it "earning results" date only. But notice that, the turnover or sale report could also be called the final results. We must take a look at each report to make sure that is preliminary earning reports, which included profit and loss account, earning information and was firstly released to the investors through conference call, web-cast, or press.

In the United States Stock Exchanges, earnings announcements dates were earliest fourth quarter and annual earnings release dates, taken directly from companies' websites, for 2010-2012. These are also the dates of reporting to SEC, by regulation, on form 8-K, which is classified as "current reports" or "report of unscheduled material events or corporate event". Foreign companies provide form 6-K of Foreign Private Issuer instead of the form 8-K. The releases were through the press, conference call, Internet etc. Usually, the press releases come first on the announcement day. The announcements will then be made through conference and webcast either before market open or after market close.

For various reasons, there are a few companies in the US, where the filing dates are not on the same day as press/internet release and conference call dates. However this is only for a very few, and the filing dates are not too far from dates of other means of publication.an example is a company listed in NASDAQ100 – AMGEN INCORPORATED. There are also some companies that do not report earning on form 8-K after a delaying period. Instead, they report directly on form 10K, the annual report, which provides a comprehensive overview of the company for the past year, on the same day with press release and conference call and Internet; an example is a company listed in NASDAQ 100 – ECHOSTER COMMUNICATION CORPORATION. In such cases, the earliest earnings announcements date to the public, which normally start with a press release date, was taken.

For both SA and US equity market, companies sometimes provide a corrected/amended version of their announcement. If the amended version affected earning results, I took the amended date as the announcement date.

At the Paris Bourse, the earnings announcements dates are the final earning results report dates taken from the Euronext Paris websites, and then compared to sources from companies'

websites. The earliest earning release dates are selected in the same pattern. Press releases usually come first, followed by conference and other means of media.

During the process of collecting data, it was confirmed that companies listed in different stock exchanges have different ways of presenting their earnings announcements, however they all go through the same process: press release, filing to the stock exchange, investor/analyst conference calls, and webcast.

In addition, in their preliminary earning reports, some companies release fewer details than others. For the United States market, one might not provide a full balance sheet on form 8-K like many others but only selected financial results. The full details will appear later on the annual 10-K. The same situation is applied to companies on the JSE, but the companies on JSE tend to provide more comprehensive reports than in the US and companies in CAC40 provide the most comprehensive final results.

By selecting data from the SA, France, and US in this thesis I also want to make a comparison between common law countries, as in SA and US; and code law countries, of which France is one. In general, the role of accounting statements in the common law countries is to inform the stock market about the Company's financial status. When earnings announcements are made, that is actually new information.

Conversely, in the code law countries, the role of accounting statements is not to inform the shareholders because those people already know company financial situation through other internal means. The role of earnings announcements here is to announce what dividend the company should pay and what tax the company has to pay. Therefore leading to the expectation of different reactions to earnings announcements from the two different systems.

Common law has its origin in England and hence it is found in UK and many former British colonies. Common law is a result of individual action in the private sector. It emphasizes the following legal procedure over rules, as explained by David and briefly, 1985, p.24; Posner, 1996 Common laws including accounting standards have evolved by being commonly accepted in practice. Private sector bodies codify generally accepted rules and make them binding on their members; such standards arise not in government, but in an accounting market. Thus it can be said that common law enforcement is a private matter which involves civil litigation, whereas Code-law originates from collective planning in the public sector.

Code-law enforcement is a government function, which involves administrative bodies undertaking criminal prosecution for code violation as explained by Ball, 2000, (p.13-18). The countries following common law accounting system have, 'shareholder 'corporate governance model in which shareholders alone elect the governing board, while the countries following code law have 'stakeholder' model for resolving information asymmetry by public and private communication. As a result of quicker incorporation of economic losses, accounting income in common-law countries is significantly timelier as compared to code-law countries. In code-law countries information asymmetry is more likely resolved by institutional features other than timely and conservative public financial statements. This is done mostly by major shareholders. One of the major differences between common-law and code-law countries are the manner in which information asymmetry between mangers and potential users of accounting income is resolved. As compared to the common-law countries there is strong political influence on accounting at national and firm levels, in the code-law countries. The Governments in these countries establish and enforce national accounting

standards with representation from major political groups such as labor unions, banks and business associations.
On the firm level the political influence leads to a stakeholder governance model. Due to this, it can be said that the accounting income is divided among different groups such as dividends to shareholders, taxes to governments and bonuses to managers and employees. The demand for accounting income under code law is influenced more by the payout preferences for labor, capital and government, and less by the demand for public disclosure. The groups agents are represented in corporate governance hence the insider communication solves the information asymmetry between the managers and stakeholders. On the contrary in common-law countries the shareholders elect members of the governing board and hence payouts are less closely linked to current-period accounting income and public disclosure is more likely solution for the information asymmetry problem. The properties of accounting income are determines mostly in the disclosure market.

3.4. A broad view of techniques employed in the thesis

This thesis starts with the event study method to examine stock market prices response to the earnings events and in a later part to examine short-term and long-term impact of earnings announcements on the bid-ask spreads. This methodology was introduced by Brown and Warner (1985), and subsequently used by Beneish and Gardner (1995); Gregoriou and Ioannidis (2006); Gregoriou (2008) and many others event studies in the literature.
Abnormal return (AR) is calculated as difference between individual stock return and market index returns, and then averaged across number of firms in the sample each day t to form average abnormal return (AAR). Average abnormal return AAR is cumulated over interval of k days from day t to t + k for different event windows to obtain cumulative average abnormal return (CAAR). Equally weighted portfolio standard deviation of AAR series is calculated, and t- statistics used to test the hypothesis that:
CAAR = 0.
This research has chosen different short-term event windows as [-1, 1], [-2, 2], [-3, 3], [-4, 4]; [-5, 5]; and long-term even windows as [-90, 0]; [-80, 0]; [-70, 0]; ... [-10, 0]; [0, 10]; [0, 20].... [0, 90].
This traditional market model will contain shortcomings inside if the events are clustered as explained by Brown and Warner, 1985. If all of our firms are exposed to earnings announcements at the same time, the abnormal returns for each firm will unlikely be independent due to contemporary correlation of return across firms. However, in my samples, different firms have different earnings announcement dates so abnormal returns are less likely to suffer from correlations. The test for correlation also supports this.
In this thesis, good and bad news are defined by positive and negative returns over the short-term event window [-5, 1] for the reason that we assume that the news is leaked to the market a couple of days before the official announcement date. The outcome of the positive and negative returns will not be affected by slight changes in the short term window. Pre-earnings announcement period is defined as a period from day -90 to day -1. Post earnings announcements period is defined as a period from day 0 to day +90.

Stock trading volume is calculated as the number of shares traded on the day multiplied by the average of high and low price of that day.

As explained in chapters two, I will use the three measures of bid-ask spread including quote bid-ask spread, relative bid-ask spread and effective-bid ask spread as direct measures of stock market liquidity. Daily trades and quotes from Bloomberg database are used to calculate relative bid ask spread and effective bid-ask spread.

Relative spread = (PA – PB)/ (PA +PB)/2

The relative bid-ask spread is calculated as the difference between bid price and ask price divided by the mid-price.

Effective spread = 2*P – [(PA +PB)/2]

The effective bid-ask spread is calculated as twice as much as the absolute value of the difference between trading price and the mid-price.

As discussed in the literature review chapter, the reason I would use the three measures of bid ask spreads is because large trades are more likely to be executed outside the quoted spreads, so it can be said that quoted spread and relative spread are not an accurate measure, as noted in Roll (1984). In addition, relative spread and effective spread take into account the mid-price so it ignores price movement leading to mid-price change and the relative and effective spread also change. For this reason it is necessary to take into account the three spread measures in the analysis as well.

CHAPTER FOUR

IMPACT OF EARNINGS ANNOUCEMENT ON STOCK LIQUIDITY DESCRIPTIVE STATISTIC AND MULTI-VARIATE ANALYSIS

Earnings announcement is a major event of information at the public level that captures stock market prospect because the information contained, strongly affects investor's decisions. It has been observed that investors tend to trade more heavily and frequently around earnings announcement. As mentioned previously, stock liquidity refers to the ability to trade the stock quickly at any time with lowest price impact. It is an important characteristic that every investor looks for when trading in the market. Given the importance of earnings information, in this chapter I would like to explore the impact of earnings announcements on the stock market liquidity. This chapter has three objectives. First is to examine evidence of post earnings announcement drift and price reaction to the earnings announcements on Johannesburg stock exchanges, with comparison of other important indices from the US and French markets, and by the separation of the large, medium and small securities. Second objective of this thesis is to explore the trading volume effect in both short term and long term of earnings announcement. Finally I would test the information cost liquidity hypothesis, which was first established in 1970 by Van Horn. Given the possibility of an alternative information environment after earnings announcements, I will examine whether there is increase/decrease in market liquidity following earnings announcement.

The layout is as follows. Section 4.1 describes the descriptive statistic employed. Section 4.2 describes the methodology and investigates the stock prices response to earnings announcement. Section 4.3 present the spread effects of earnings announcement. Section 4.4 investigates the use of multivariate analysis on earnings announcement's long term impact on stock liquidity. Section 4.5 investigates the implication of bid-ask spread and information asymmetry cost component. Section 4.6 summary.

4.1 Descriptive statistics

Johannesburg stock exchanges

Table 4.1.1 present descriptive statistics of samples of 40 firms listed on the JSE Top 40, 60 firms listed on the JSE Mid Cap, 60firms listed on the JSE Small Cap, in the period 90 days before earnings announcement and 90days after earnings announcement. It was observed that JSE Top 40 companies are large firms with high market liquidity because of the high market value and low relative bid-ask spreads. In fact, these firms account for about 81% market value of the whole Johannesburg stock exchange. Daily trading volume per market value is also evidence of high liquidity. Firms listed in JSE Mid Cap are medium sized firms. The stocks are still of high liquidity but less so compared to JSE Top 40 firms with a relative higher bid-ask spreads. In addition, the large daily trading volume per market value is evidence of high liquidity of stocks, but this number is lower than that of the JSE Top 40 firms. Firms listed in JSE Small Cap are smaller than firms listed in JSE Top 40 and JSE Mid Cap and also with a lower market value. The bid-ask spreads is relatively higher than the above two indices, this suggests low liquidity. The daily trading volume per market value of the JSE Small Cap is lower than the above two indices, stocks of these firms are illiquid.

America stock exchanges

Table 4.1.2. Presents descriptive statistics for samples of 30 firms listed in DJIA, 96 firms listed in NASDAQ100 and 100 firms listed in S&P100 in pre-earnings announcements period. We observe that firms in DJIA are large and the stocks are of high liquidity because of the high market value and low bid-ask spreads. In addition, high daily trading volume per market value is also evidence of high liquidity. Statistics also show that the NASDAQ100 are large firms with high market value in the US stock exchanges. The low bid-ask spread indicates high liquidity of stocks. Another evidence of high liquidity is daily trading volume per market value, relatively high compared to the stock prices. Finally, firms in the S&P100 index are also large firms. Low bid-ask spreads are indicators of stocks with high liquidity. Moreover, the daily trading volume per market value is relatively high compared to the stock prices. This is further evidence of high liquidity.

Paris Bourse

Table 4.1.3 presents descriptive statistics for final samples of 40 firms listed in CAC40 in pre-earnings announcements period. High market values suggest that the CAC40 firms are large, low quoted bid-ask spreads shows that the stocks are liquid. Additionally, liquidity of firms stock is reflected by high daily trading volume per market value.

Table 4.1.1. JSE– Pre-earnings and Post earnings announcements descriptive statistics.

Variables	**Stock Price**	**Quoted Spread**	**Relative Spread**	**Effective Spread**	**Market value**	**Trading Volume**	**Stock Return**	**Daily TV per MV**
Unit	ZAR	(Cents)	(%)	(Cents)	(Millions ZAR)	(1000ZAR)	(%)	(Per 1000)
JSE Top 40								
Pre EA								
Mean	8.64	1.85	0.25	1.27	14077	80995	0.096	7.13
Std. Dev.	6.27	2.18	0.33	1.63	20877	120453	1.43	6.89
Skewness	1.45	3.82	7.53	3.82	2.94	4.14	0.43	19.33
Kurtosis	5.18	25.54	77.32	30.98	12.08	29.41	9.11	883.98
Jarque-Bera	0	0	0	0	0	0	0	0
Post EA								
Mean	9.16	1.84	0.23	1.26	14272	99582	0.058	8.63
Std. Dev.	6.57	2.31	0.3	1.7	20073	13650	1.7	7.54
Skewness	1.48	7.31	9.54	7.88	2.86	3.79	0.24	7.15
Kurtosis	5.34	145.9	156.4	201.7	11.64	25.83	20.12	113.57
Jarque-Bera	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
JSE Mid cap								
Pre EA								
Mean	5.38	5.25	0.96	3.15	976	6222	0.012	5.42

Std. Dev.	5.4	12.6	1.5	9.03	597	12261	1.7	7.77
Skewness	3.87	8.32	7.21	11.17	1.29	20.13	-1.33	10.82
Kurtosis	25.21	97.72	92.61	165.86	4.3	972.95	64.57	287.76
Jarque-Bera	0	0	0	0	0	0	0	0
Post EA								
Mean	5.78	4.97	0.86	2.94	1045	7339	0.049	6.07
Std. Dev.	5.58	10.53	1.31	6.77	628	12166	1.9	9.46
Skewness	3.26	6.57	7.23	8.45	1.25	9.03	0.11	20.85
Kurtosis	18.53	65.71	95.38	114.83	4.19	186.83	12.06	862.58
Jarque-Bera	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

JSE Small Cap								
Pre EA								
Mean	3.77	11.41	3.23	4.96	192.61	596.73	0.068	2.72
Std. Dev.	14.85	49.33	4.56	21.54	100.62	2035.33	1.81	8.03
Skewness	15.42	15.08	6.84	18.62	1.51	15.91	-1.32	16.25
Kurtosis	253.56	274.1	99.79	481.52	7.57	438.57	55.97	461.56
Jarque-Bera	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Post EA								
Mean	3.95	11.16	3.12	4.8	200.69	615.47	0.025	2.77
Std. Dev.	15.17	48.18	4.53	21.06	97.52	1860.2	1.86	7.9
Skewness	15.14	15.03	10.16	22.44	1.09	14.42	-0.121	16.56
Kurtosis	244.23	264.7	264.63	715.71	4.96	365.39	19.22	478.3
Jarque-Bera	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 4.1.2. The U.S. Stock Exchanges Pre-earnings and Post earnings announcements Descriptive statistics

Variables	Stock Price	Quoted Spread	Relative Spread	Effective Spread	Market value	Trading Volume	Stock Return	Daily TV per MV
Unit	*($US)*	*(cents)*	*(%)*	*(cents)*	*(Millions)$*	*($1000)*	*(%)*	*(per 1000)*
DJIA								
Pre EA								
Mean	49.45	3.41	0.07	2.3	133162	607129	0.075	5.62
Std. Dev.	18.34	3.07	0.057	3.25	96176	582951	1.16	6.12
Skewness	0.55	14.36	12.67	13.02	1.32	7.33	-1.87	10.07
Kurtosis	2.55	440.5	377.4	334.74	4.61	135.68	26.26	185.29

Jarque-Bera	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Post EA								
Mean	52.22	3.45	0.067	2.38	140793	684247	0.101	6.06
Std. Dev.	19.13	2.52	0.048	2.88	98981	495393	1.14	4.99
Skewness	0.58	3.88	8.2	9.82	1.2	2.13	0.28	4.85
Kurtosis	2.81	41.79	185.82	221	4.23	10.07	7.95	44.07
Jarque-Bera	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NASDAQ100								
Pre EA								
Mean	44.56	1.8	0.048	3.85	20181	274136	0.069	15.07
Std. Dev.	51.7	2.87	0.061	7.6	32709	505879	1.96	14.32
Skewness	6.61	5.18	0.56	39.51	4.17	6.77	-0.13	4.79
Kurtosis	54.12	95.03	11.51	2485.73	24.98	106.08	14.63	54.51
Jarque-Bera	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Post EA								
Mean	44.54	2.33	0.061	3.47	20885	285698	0.072	15.08
Std. Dev.	50.35	3.04	0.064	4.42	35775	545093	1.95	14.31
Skewness	6.47	3.59	0.61	7.65	4.43	6.1	0.15	5.88
Kurtosis	53.52	44.68	15.33	119.22	27.14	64.49	20.91	73.99
Jarque-Bera	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S&P100								
Pre EA								
Mean	54.32	3.72	0.076	2.9	73509	419912	0.091	7.22
Std. Dev.	49.4	3.54	0.056	5.1	74930	524184	1.238	7.96
Skewness	6.39	6.42	4.88	14.22	2.24	5.72	-0.45	6.23
Kurtosis	53.8	122.46	133.44	407.54	9.13	85.25	13.7	79.33
Jarque-Bera	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Post EA								
Mean	56.78	3.9	0.077	3.11	76167	489259	0.087	8.18
Std. Dev.	49.89	4.12	0.162	6.94	76876	560221	1.32	7.73
Skewness	5.89	11.63	75.9	44.1	2.15	4.6	-0.041	4.27
Kurtosis	47.79	352.76	6593	2988	8.65	45.96	12	35.27
Jarque-Bera	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 4.1.3. CAC40– Pre-earnings announcements descriptive statistics.

Variables	Stock Price	Quoted Spread	Relative Spread	Effective Spread	Market value	Trading Volume	Stock Return	Daily TV per MV
Unit	*(€)*	*(Cents)*	*(%)*	*(Cents)*	*(Millions €)*	*(1000€)*	*(%)*	*(Per 1000)*
CAC40								
Pre EA								
Mean	64.28	6.04	0.089	5.48	32283	126724	0.101	4.77
Std. Dev.	41.83	8.74	0.107	8.21	27535	121315	1.34	3.68
Skewness	1.45	11.11	23.36	12.87	1.68	3.05	0.16	4.43
Kurtosis	5.22	230.2	785.55	294.45	5.64	18.36	6.59	42.03
Jarque-Berra	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Post EA								
Mean	70.02	3.98	0.058	3.63	35023	159508	0.09	5.41
Std. Dev.	46.37	6.37	0.056	5.97	28849	156920	1.47	3.92
Skewness	1.5	5.92	2.41	6.31	1.61	3.66	0.26	3.54
Kurtosis	5.57	60.94	11.57	71.48	5.37	28.2	6.22	28.12
Jarque-Berra	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

4.2. Stock Price response to earnings announcements.

4.2.2. Empirical design

In this section, samples have been split into good news and bad news groups. Good news and bad news firms are defined by positive and negative returns respectively over the short event window period [-5, 1], for the reason that we assume information has been leaked to the market a couple of days before the event and up to day + 1 markets already have enough time to recognize the news direction. In fact the results will not change if we vary this window. For each group, the standard event study method for a window of 181 days around earnings announcements date [-90; +90] was used. The stock price reaction to the earnings announcements around the event date 0 was analysed using the market adjusted model of abnormal returns, which is the difference between rates of return of individual stock and rate of return of the index due to its simplicity and popularity. This market-adjusted model (or constant mean return model) was used by Brown and Warner (1985), Hedge and McDermott (2003) and Gregoriou (2006). In fact, Brown and Warner find that the simple mean returns model often yields results similar to those of more sophisticated models because the variance of the abnormal returns is not reduced much by choosing a more sophisticated model.

$$AR_{it} = R_{it} - R_{mt} \quad (1)$$

Where,

R_{it} is the rate of stock i on day t, $R_{it} = ln\ P_{it} - ln\ P_{i\,(t-1)}$

Rmt is the rate of return of the index on day t,$R_{mt} = lnP_{it} - lnPI_{(t-1)}$. It is value weighted market return of stock index in the abnormal returns *ARit* then are averaged across the number of firms in the sample on each day t to form an average excess returns, (AAR_t).

For the purpose of testing the reaction, Aggregate abnormal returns (*AARt)* are cumulated from day 0 through intervals of k days, k = 10, 20, 30, ...90, and k = -10, -20, -30 ....-90 to test the short run and long run effect of earnings announcements on the stock market. We also cumulate 10 days around earnings announcement.

$$CAAR_t, k = \sum_{t=0}^{k} AARt \quad (2)$$

The variance of the sample is obtained by the following formula:

$$\text{SAAR}^2 \frac{1}{180} \sum_{t=0}^{90} (AARt - \overline{AAR_t})^2 \quad (3)$$

$\overline{AAR_t}$ is the mean of average excess returns *AARt* for 181 trading day period.

If there is no reaction, $CAAR_t, k$ outcome will be.

$$CAAR_t, t + k \sim N(0, \sigma 2t_{, t+k}) \quad (4)$$

The t statistic used to test the hypothesis CAAR equal the zero is calculated as:

$$\text{t- statistic} = \frac{CAAR_{t,t+k}}{\sqrt{(k+1)SAAR^2}} \quad (5)$$

The t-statistics for all indices are presented in 6 tables in the following section. The short-term effect around a five-day event window [-5, +5] is presented in Panel A. The Long term effects for up to 90 days following earnings announcement is presented in Panel B, at 10-day interval. The result shows significant positive stock price reactions to the good news earnings announcements, and significant negative stock price reaction to the bad news earnings announcements for all indices. The good and bad news are defined by positive and negative returns over the short-term event window [-5, 1]. I assume there is leakage of information before the news. Liquidity effects occur for all indices in the short term, and persist longer in the long term for good news firms than for the bad news firms. This happens as we would expect, the reaction occur until the news has ended its effects on stock prices. All of the tables also show that the increases or decreases in price are permanent, (i.e., after the change, the price does not go back down or up to the original level).

4.2.2. Results and explanations of stock price response to earnings announcement on the Johannesburg stock exchange

4.2.2.1. JSE TOP 40

The test result for cumulative average abnormal return (CAAR) for JSE TOP40, presented in table 4.1.2.1 indicate that stock returns of firms included in JSE TOP40 are significantly affected by the earnings announcements, not only after earning announcements but also before earnings announcements.

Before Event
For good news the t-values are mostly insignificant, pre earnings announcements as we can see from Table 4.2.2.1 in Panel A and Panel B there was no previous reaction before the news was released. T-statistics in the short term are 1.43 for the window frame [-3, -1], 0.74 for [-2,-1] and 0.23 for [-1,-1]. T-statistics for long term are 1.35 for the window frame [-40,-1], 1.21 for [-30,-1] and 1.00 for [-20,-1].

For the bad news t-values are totally insignificant in the short term period, as we can see in Table 4.2.2.1 in Panel A. T-statistics are -1.08 for the window frame [-5,-1], 0.13 for [-3,-1], -0.48 for [-2,-1] and -0.80 for [-1,-1]. T-statistics for long term are 1.51 for the window frame [-80,-1], 0.93 for [-50,-1] and 0.39 for [-10,-1] in panel B.

After Event
For good news the t-values are strongly significant as we can see from Table 4.2.2.1 Panel A and Panel B. T-statistics in the short term are 7.79 for the time frame [1, 0], 6.93 for [3, 0] and is 6.23 for [4, 0]. T-statistics for long term are 4.14 for the time frame [10, 0], 2.14 for [40, 0] and 2.59 for [70, 0].

For bad news t-values are strongly significant in the short term, as we can see in table 4.1.2.1 Panel A. T statistics are -5.82 for the time frame [1, 0], -4.74 for [2, 0] and -3.58 for [5, 0]. T statistics for the long term are -0.56 for the window frame [20, 0], 0.18 for [40, 0] and 0.20 for [70, 0] in panel B.

Overall there are positive reactions happening for the good news and negative reaction for bad news. The largest abnormal return occurred on the event day 0 with t statistic for the good news firm's equal 9.98, and for bad news firms are -7.35. Also there is an evidence of abnormal return persisting over the long term, especially for good news firms. However, bad news reaction ends more quickly. The reaction is considerably more expressive on the good news firms and stock prices continue to react while bad news stock prices go back to equilibrium within a shorter time frame. Since there is significant price response to the earnings news, there is possibility of change in liquidity due to the announcement.

Table 4.2.2.1.Abnormal Returns around JSE TOP 40 index earnings announcement.
Panel A. Short-term Abnormal Returns

GOOD NEWS			**BAD NEWS**		
Event day	CAAR	t-statistic	Event day	CAAR	t-statistic
[-5, -1]	0.013	2.33***	[-5, -1]	-0.007	-1.08
[-4, -1]	0.009	1.89*	[-4, -1]	-0.004	-0.72
[-3, -1]	0.006	1.43	[-3, -1]	0.001	0.13
[-2, -1]	0.003	0.74	[-2, -1]	-0.002	-0.48
[-1, -1]	0.001	0.23	[-1, -1]	-0.002	-0.80
[0, 0]	0.024	9.98***	[0, 0]	-0.021	-7.35***
[1, 0]	0.027	7.79***	[1, 0]	-0.023	-5.82***
[2, 0]	0.033	7.88***	[2, 0]	-0.023	-4.74***
[3, 0]	0.034	6.93***	[3, 0]	-0.024	-4.19***

[4, 0]	0.034	6.23***	[4, 0]	-0.025	-3.91***
[5, 0]	0.031	5.18***	[5, 0]	-0.025	-3.58***

* Significant at 10% level
** Significant at 5% level
*** Significant at 1% level

Panel B. Long-term Abnormal Returns

GOOD NEWS			**BAD NEWS**		
Event day	CAAR	t-statistic	Event day	CAAR	t-statistic
[-90, -1]	0.051	2.23**	[-90, -1]	0.047	1.77*
[-80, -1]	0.055	2.50***	[-80, -1]	0.038	1.51
[-70, -1]	0.037	1.81*	[-70, -1]	0.033	1.40
[-60, -1]	0.038	1.99**	[-60, -1]	0.025	1.16
[-50, -1]	0.034	1.96**	[-50, -1]	0.019	0.93
[-40, -1]	0.021	1.35	[-40, -1]	0.014	0.77
[-30, -1]	0.016	1.21	[-30, -1]	0.016	1.03
[-20, -1]	0.011	1.00	[-20, -1]	0.004	0.29
[-10, -1]	0.015	1.91*	[-10, -1]	0.003	0.39
[10, 0]	0.033	4.14***	[10, 0]	-0.029	-3.06***
[20, 0]	0.030	2.73***	[20, 0]	-0.007	-0.56
[30, 0]	0.033	2.46***	[30, 0]	-0.003	-0.21
[40, 0]	0.033	2.14**	[40, 0]	0.003	0.18
[50, 0]	0.046	2.64***	[50, 0]	0.000	-0.02
[60, 0]	0.045	2.36***	[60, 0]	0.003	0.13
[70, 0]	0.053	2.59***	[70, 0]	0.005	0.20
[80, 0]	0.051	2.34***	[80, 0]	0.003	0.12
[90, 0]	0.054	2.33***	[90, 0]	-0.006	-0.24

* Significant at 10% level
** Significant at 5% level
*** Significant at 1% level

In the table above the sample consists of 40 stocks listed on the JSE TOP 40 index. Cumulative average abnormal returns CAAR are computed using the market model and the standard event study methodology. The estimation window for computing the market model parameters is the event time interval [-90, 90]. CAAR is tested for significance using t-statistics.

4.2.2.2 JSE MID CAP

The test result for cumulative average abnormal result for JSE Mid Cap in table 4.2.2.2 indicates that stock returns of the firms included in the index are significantly affected by the earnings announcements. There is significant change before and after the event date.

Before Event
For good news the t-values are mostly significant in pre earnings announcements as we can see from table 4.2.2.2 Panel A and Panel B. The t-statistics in the short term before the event are strongly significant. T-statistics in the short term are 1.78 for the window frame [-1, -1], 2.53 for [-2,-1] and 2.43 for [-3,-1]. As we can see from the table the t-statistics in the long term are mostly significant. T-statistics for long term are 2.47 for the time frame [-10,-1],

1.85 for [-30,-1] and 1.51 for [-50,-1]. For the bad news t-values are totally insignificant in the short term period, as we can see in table 4.1.21.2 Panel A. T-statistics are -2.23 for the window frame [-2,-1], -3.00 for [-3,-1] and -03.05 for [-4,-1]. T-statistics for bad news for long term before the announcement are 0.22 for [-20,-1], 0.66 for [-30,-1] and 0.29 for [-50,-1] in panel B.

After Event

For good news the t-values are strongly significant as we can see from table 4.2.2.2 Panel A and Panel B. The t-statistics for good news in the short term are mostly significant. T-statistics in the short term are 9.28 for the time frame [1, 0], 8.07 for [3, 0] and is 7.26 for [4, 0]. As we can see from table 4.1.2.2 Panel B, the t-statistics are mostly significant. T-statistics for long term are 5.37 for the time frame [10, 0], 2.91 for [40, 0] and 1.94 for the time frame [70, 0].

For bad news after the event t-values are strongly significant in the short term, as we can see in table 4.1.2.1 Panel A. T statistics in the short term are -7.46 for the time frame [1, 0], -5.68 for [2, 0] and -2.77 for [5, 0]. The t-statistics in the long term are totally insignificant. T statistics for bad news in the long term are -1.08 for the time frame [20, 0], -0.36 for the time frame [40, 0] and -0.44 for the time frame [50, 0] in panel B.

Overall there are positive reactions happening for the good news and negative reaction for bad news. The largest abnormal returns happen on day 0 with t statistic equal to 9.77 for good news firms and on day 1 with t statistic are -7.46 for bad news firms. For long term, stock prices continue to change after earnings announcements until the end of 90 day for good news firms. There is no reaction for bad news firms in the long term as the bad news ends quickly. Possibly there is a liquidity effect caused by earnings announcements for the good news company in the long term.

Table 4.2.2.2.Aggregate Abnormal Returns around JSE MID CAP index earnings announcements

Panel A. Short-term Abnormal Returns

GOOD NEWS			**BAD NEWS**		
Event day	CAAR	t-statistic	Event day	CAAR	t-statistic
[-5, -1]	0.015	3.34***	[-5, -1]	-0.013	-2.90***
[-4, -1]	0.013	3.09***	[-4, -1]	-0.012	-3.05***
[-3, -1]	0.009	2.43***	[-3, -1]	-0.011	-3.00***
[-2, -1]	0.007	2.53***	[-2, -1]	-0.006	-2.23**
[-1, -1]	0.004	1.78*	[-1, -1]	-0.003	-1.35
[0, 0]	0.020	9.77***	[0, 0]	-0.015	-7.23***
[1, 0]	0.027	9.28***	[1, 0]	-0.022	-7.46***
[2, 0]	0.028	8.02***	[2, 0]	-0.020	-5.68***
[3, 0]	0.033	8.07***	[3, 0]	-0.015	-3.60***
[4, 0]	0.033	7.26***	[4, 0]	-0.014	-3.02***
[5, 0]	0.035	6.95***	[5, 0]	-0.014	-2.77***

* Significant at 10% level
** Significant at 5% level
*** Significant at 1% level

Panel B. Long-term Abnormal Returns

GOOD NEWS			**BAD NEWS**		
Event day	CAAR	t-statistic	Event day	CAAR	t-statistic
[-89, -1]	0.015	0.78	[-89, -1]	-0.006	-0.30
[-80, -1]	0.012	0.65	[-80, -1]	0.002	0.10
[-70, -1]	0.012	0.70	[-70, -1]	0.006	0.35
[-60, -1]	0.016	1.02	[-60, -1]	0.003	0.21
[-50, -1]	0.022	1.51	[-50, -1]	0.004	0.29
[-40, -1]	0.023	1.77*	[-40, -1]	0.001	0.11
[-30, -1]	0.021	1.85*	[-30, -1]	0.007	0.66
[-20, -1]	0.020	2.16**	[-20, -1]	0.002	0.22
[-10, -1]	0.016	2.47***	[-10, -1]	-0.004	-0.65
[10, 0]	0.036	5.37***	[10, 0]	-0.011	-1.56
[20, 0]	0.037	3.93***	[20, 0]	-0.010	-1.08
[30, 0]	0.040	3.49***	[30, 0]	-0.009	-0.77
[40, 0]	0.038	2.91***	[40, 0]	-0.005	-0.36
[50, 0]	0.037	2.53***	[50, 0]	-0.006	-0.44
[60, 0]	0.033	2.05**	[60, 0]	-0.005	-0.34
[70, 0]	0.033	1.94*	[70, 0]	-0.005	-0.29
[80, 0]	0.037	2.02**	[80, 0]	-0.010	-0.56
[90, 0]	0.042	2.16**	[90, 0]	-0.005	-0.28

* Significant at 10% level
** Significant at 5% level
*** Significant at 1% level

In the table above the sample consists of 60 stocks listed on JSE Mid Cap index with data available Cumulative average abnormal returns CAAR are computed using the market model and the standard event study methodology. The estimation window for computing the market model parameters is the event time interval [-90, 90]. CAAR is tested for significance using t-statistics.

4.2.2.3 JSE SMALL CAP

The test result for cumulative average abnormal returns for JSE Small Cap indicates that stock returns of firms included in the index are significantly affected by the earnings announcements; there is significant change before and after the event date.

Before Event
For good news the t-values are totally significant in the short term in pre earnings announcements as we can see from table 4.2.2.3 Panel A. T-statistics in the short term are 2.91 for the window frame [-4, -1], 2.69 for [-2,-1] and 2.02 for [-1,-1]. For the t-statistics in

the long term there is no significant change in the stock returns. T-statistics for long term are 0.77 for the window frame [-40,-1], 0.98 for [-30,-1] and 1.47 for [-20,-1].

For the bad news t-values are totally significant in the short term period, as we can see in table 4.2.2.3 Panel A. T-statistics are -3.33 for the window frame [-5,-1], -2.57 for [-3,-1], -2.19 for [-2,-1] and -0.66 for [-1,-1]. The t-statistics in the long term for bad news show no significant changes in the stock returns. T-statistics for long term are 0.75 for the window frame [-80,-1], 1.28 for [-50,-1] and -0.62 for [-10,-1]

After Event
For good news the t-values are strongly significant as we can see from table 4.2.2.3 Panel A and Panel B. The t-statistics in the short term after the announcement are mostly significant. T statistics in the short term are 9.64 for the time frame [1, 0], 8.02 for [3, 0] and is 7.49 for [4, 0]. The t-statistics after the announcement are strongly significant. T-statistics for long term are 5.05 for the time frame [10, 0], 2.99 for [40, 0] and 1.88 for [70, 0].

For bad news t-values are strongly significant in the short term, as we can see in table 4.2.2.3 Panel A. T statistics in the short term are -5.37 for the time frame [1, 0], -4.23 for [2, 0] and -2.49 for [5, 0]. The t-statistics for bad news in the long term show no significant changes except in the end of the study period. T statistics for the long term are -0.98 for [20, 0], -1.38 for [40, 0] and -1.81 for [70, 0].

Similar to JSE Mid Cap, for JSE Small Cap there is reaction in the pre-announcement period for both good and bad news in the short term. There is no significant change in the long term for bad news. The reactions are significant for both the news in the short term. In the long term pre and post event there is no reaction for the bad news.

Overall there are positive reactions happening for the good news and negative reaction for bad news. The largest average abnormal return is on the event day 0 for good news firms and on day 1 for bad news firms with t statistic is 10.18 and -5.37 in the short term respectively. For long term, stock prices continue to drift after earnings announcements up to 90 days post earnings announcement for good news firms; however there is no significant evidence of price reaction for the bad news firms after 5 days. There is possibility of change in liquidity due to the announcement, especially with good news firms.

Table 4.2.2.3.Aggregate Abnormal Returns around JSE Small Cap index earnings Announcements

Panel A. Short-term abnormal Returns

GOOD NEWS			**BAD NEWS**		
Event day	CAAR	t-statistic	Event day	CAAR	t-statistic
[-5, -1]	0.017	3.34***	[-5, -1]	-0.014	-3.33***
[-4, -1]	0.013	2.91***	[-4, -1]	-0.010	-2.78***
[-3, -1]	0.010	2.49***	[-3, -1]	-0.008	-2.57***
[-2, -1]	0.009	2.69***	[-2, -1]	-0.006	-2.19**
[-1, -1]	0.005	2.02**	[-1, -1]	-0.001	-0.66
[0, 0]	0.023	10.18***	[0, 0]	-0.009	-4.79***
[1, 0]	0.031	9.64***	[1, 0]	-0.014	-5.37***
[2, 0]	0.034	8.84***	[2, 0]	-0.014	-4.23***
[3, 0]	0.036	8.02***	[3, 0]	-0.012	-3.34***
[4, 0]	0.037	7.49***	[4, 0]	-0.014	-3.34***

[5, 0]	0.037	6.68***	[5, 0]	-0.011	-2.49***

* Significant at 10% level
** Significant at 5% level
*** Significant at 1% level

Panel B. Long-term Abnormal Returns

GOOD NEWS			**BAD NEWS**		
Event day	CAAR	t-statistic	Event day	CAAR	t-statistic
[-90, -1]	-0.004	-0.17	[-90, -1]	0.013	0.72
[-80, -1]	0.000	0.01	[-80, -1]	0.012	0.75
[-70, -1]	0.005	0.27	[-70, -1]	0.018	1.18
[-60, -1]	0.012	0.67	[-60, -1]	0.017	1.19
[-50, -1]	0.008	0.51	[-50, -1]	0.017	1.28
[-40, -1]	0.011	0.77	[-40, -1]	0.007	0.61
[-30, -1]	0.012	0.98	[-30, -1]	0.010	0.97
[-20, -1]	0.015	1.47	[-20, -1]	0.009	1.06
[-10, -1]	0.016	2.21**	[-10, -1]	-0.004	-0.62
[10, 0]	0.037	5.05***	[10, 0]	-0.008	-1.36
[20, 0]	0.035	3.44***	[20, 0]	-0.008	-0.98
[30, 0]	0.039	3.16***	[30, 0]	-0.010	-0.97
[40, 0]	0.043	2.99***	[40, 0]	-0.016	-1.38
[50, 0]	0.044	2.77***	[50, 0]	-0.015	-1.14
[60, 0]	0.039	2.25**	[60, 0]	-0.025	-1.77*
[70, 0]	0.035	1.88*	[70, 0]	-0.028	-1.81*
[80, 0]	0.041	2.03**	[80, 0]	-0.036	-2.16**
[90, 0]	0.046	2.13**	[90, 0]	-0.042	-2.40**

* Significant at 10% level
** Significant at 5% level
*** Significant at 1% level

In the table above the sample consists of 60 stocks listed on JSE Small Cap index Cumulative average abnormal returns CAAR are computed using the market model and the standard event study methodology. The estimation window for computing the market model parameters is the event time interval [-90, 90]. CAAR is tested for significance using t-statistics.

4.2.2.4 DOW JONES INDUSTRIAL AVERAGE (DJIA)

The test result for cumulative average abnormal returns for the DJIA in Table 4.2.2.4 indicates that stock returns of firms included in the DJIA are strongly affected by the earnings announcements.

Before Event

For good news the t-values are totally insignificant in the short term in pre earnings announcements as we can see from table 4.2.2.4 Panel A. T-statistics in the short term are 0.84 for the window frame [-4, -1], 0.41 for [-2,-1] and 0.02 for [-1,-1]. The t-statistics in the long term before the event are totally insignificant as we can see from the Panel B. T-

statistics for long term before the event are -0.45 for the window frame [-80,-1], -0.19 for [-30,-1] and -0.25 for [-20,-1].

For the bad news t-values are mostly insignificant in the short term period, as we can see in table 4.1.2.5 Panel A. T-statistics are 0.31 for the window frame [-5,-1], 0.25 for[-3,-1] and -0.14 for [-2,-1]. In panel B, the t-statistics in the long term for bad news show no significant changes in the stock return. T-statistics for long term are 0.36 for the window frame [-80,-1], 0.60 for [-50,-1] and 0.27 for [-10,-1].

After Event

For good news the t-statistics in the short term after the announcement are mostly significant. T statistics in the short term are 5.75 for the time frame [1, 0], 3.92 for [3, 0] and is 3.68 for [4, 0]. The t-statistics after the announcement in the long term are mostly significant. T-statistics for long term are 2.33 for the time frame [10, 0], 2.11 for [40, 0] and 0.66 for [70, 0].

For bad news t-values are strongly significant in the short term, as we can see in table 4.2.2.4 Panel A. T statistics in the short term are -6.29 for the time frame [1, 0], -4.69 for [2, 0] and -3.22 for [5, 0]. The t-statistics for bad news after the announcement period show no reaction at all .T statistics for the long term are -1.07 for the window frame [20, 0], -1.24 for [40, 0] and 0.26 for [70, 0].

Overall, similarly as other previous indices, stock prices drift significantly after earnings announcement, as t value reject null hypothesis. Largest abnormal return happened on day 1 for both news with t statistic is 5.75 for good news firms and is – 6.29 for bad news firms. There is evidence of change in liquidity in the short term for both types of news; however, the evidence of abnormal returns happens only for good news up to 50 days post earnings announcement. In addition, as expected, many firms in the US have earnings announcement at the end of the day after market close, and that is the reason why it has been observed that the reaction is most significantly on the day 1 instead of day 0 as in SA.

Table 4.2.2.4. Aggregate Abnormal Returns around DJIA index earnings announcements

Panel A. Short-term Abnormal Returns

GOOD NEWS			**BAD NEWS**		
Event day	CAAR	t-statistic	Event day	CAAR	t-statistic
[-5, -1]	0.006	1.03	[-5, -1]	0.002	0.31
[-4, -1]	0.004	0.84	[-4, -1]	0.002	0.39
[-3, -1]	0.005	1.11	[-3, -1]	0.001	0.25
[-2, -1]	0.002	0.41	[-2, -1]	-0.001	-0.14
[-1, -1]	0.000	0.02	[-1, -1]	-0.002	-0.62
[0, 0]	0.011	4.19***	[0, 0]	-0.011	-3.89***
[1, 0]	0.022	5.75***	[1, 0]	-0.026	-6.29***
[2, 0]	0.021	4.47***	[2, 0]	-0.024	-4.69***
[3, 0]	0.021	3.92***	[3, 0]	-0.024	-4.06***
[4, 0]	0.022	3.68***	[4, 0]	-0.024	-3.66***
[5, 0]	0.022	3.35***	[5, 0]	-0.023	-3.22***

* Significant at 10% level
** Significant at 5% level
*** Significant at 1% level

Panel B. Long-term Abnormal Returns

GOOD NEWS			BAD NEWS		
Event day	CAAR	t-statistic	Event day	CAAR	t-statistic
[-90, -1]	-0.014	-0.54	[-90, -1]	0.014	0.49
[-80, -1]	-0.011	-0.45	[-80, -1]	0.009	0.36
[-70, -1]	-0.013	-0.58	[-70, -1]	0.010	0.42
[-60, -1]	-0.004	-0.18	[-60, -1]	0.013	0.58
[-50, -1]	0.010	0.53	[-50, -1]	0.012	0.60
[-40, -1]	0.002	0.09	[-40, -1]	0.006	0.32
[-30, -1]	-0.003	-0.19	[-30, -1]	0.016	0.98
[-20, -1]	-0.003	-0.25	[-20, -1]	-0.003	-0.22
[-10, -1]	0.008	1.01	[-10, -1]	0.002	0.27
[10, 0]	0.020	2.33***	[10, 0]	-0.015	-1.55
[20, 0]	0.024	2.02**	[20, 0]	-0.014	-1.07
[30, 0]	0.027	1.86*	[30, 0]	-0.020	-1.20
[40, 0]	0.036	2.11**	[40, 0]	-0.023	-1.24
[50, 0]	0.035	1.86*	[50, 0]	-0.023	-1.11
[60, 0]	0.028	1.35	[60, 0]	-0.009	-0.40
[70, 0]	0.015	0.66	[70, 0]	0.006	0.26
[80, 0]	0.022	0.91	[80, 0]	0.019	0.72
[90, 0]	0.031	1.21	[90, 0]	0.005	0.19

* Significant at 10% level
** Significant at 5% level
*** Significant at 1% level

In the table above the sample consists of 40 stocks listed on DJIA index. Cumulative average abnormal returns CAAR are computed using the market model and the standard event study methodology. The estimation window for computing the market model parameters is the event time interval [-90, 90]. CAAR is tested for significance using t-statistics.

4.2.2.5 NASDAQ100

The test result for cumulative average abnormal returns in table 4.2.2.5 indicate that cumulative average abnormal return significantly changed after the earnings announcement event in the short term event windows.

Before Event
For good news the t-values are totally insignificant in the short term in pre earnings announcements as we can see from table 4.1.2.6 Panel A. T-statistics in the short term are 1.36 for the window frame [-4, -1], 0.88 for [-2,-1] and 1.08 for [-1,-1]. For the t-statistics in the long term before the event there is no significant change in stock return. T-statistics for long term are 1.42 for the window frame [-70,-1], 0.55 for [-40,-1] and 1.73 for [-10,-1].

For the bad news t-values are totally insignificant in the short term period, as we can see in table 4.1.2.6 Panel A. T-statistics are -0.66 for the window frame [-5,-1], -0.29 for [-3,-1] and -0.46 for [-1,-1]. The t-statistics in the long term for bad news show no significant changes in the stock return. T-statistics for long term are 0.40 for the window frame [-80,-1], 0.32 for [-50,-1] and -0.32 for [-10,-1]

After Event

For good news the t-statistics in the short term after the announcement are mostly significant. T statistics in the short term are 9.19 for the time frame [1, 0], 6.27 for [3, 0] and is 5.63 for [4, 0]. The t-statistics after the announcement in the long term show no significant changes except for up to 20 days after the event. T-statistics for long term are 3.47 for the time frame [10, 0], 0.96 for [40, 0] and 1.17 for [70, 0].

For bad news t-values are strongly significant in the short term, as we can see in table 4.2.2.5 Panel A. T statistics in the short term are -8.97 for the time frame [1, 0], -7.71 for [2, 0] and -5.80 for [5, 0]. The t-statistics for bad news in the long term show significant changes. T- Statistics for the long term are -3.47 for [20, 0], -2.64 for [40, 0] and -1.99 for [70, 0].

Overall, the largest abnormal return happens on day 1 with t statistic being 9.19 for good news firms and -8.97 for bad news firms. Similarly as explained above in the DJIA index, most of the US firms hold earnings announcement presentation at the end of the day after market close, therefore we expect the largest effects on day 1 unlike firms in the SA, the strongest effect happens on the same day with earnings announcements. In the long term, there is evidence of price response to earnings announcements.

Table 4.2.2.6. Aggregate Abnormal Returns around NASDAQ100 index earnings Announcements

Panel A. Short-term Abnormal Returns

	GOOD NEWS			**BAD NEWS**	
Event day	CAAR	t-statistic	Event day	CAAR	t-statistic
[-5, -1]	0.012	1.57	[-5, -1]	-0.006	-0.66
[-4, -1]	0.009	1.36	[-4, -1]	-0.006	-0.72
[-3, -1]	0.004	0.78	[-3, -1]	-0.002	-0.29
[-2, -1]	0.004	0.88	[-2, -1]	-0.005	-0.93
[-1, -1]	0.004	1.08	[-1, -1]	-0.002	-0.46
[0, 0]	0.012	3.69***	[0, 0]	-0.014	-3.65***
[1, 0]	0.043	9.19***	[1, 0]	-0.050	-8.97***
[2, 0]	0.039	6.71***	[2, 0]	-0.053	-7.71***
[3, 0]	0.042	6.27***	[3, 0]	-0.055	-6.98***
[4, 0]	0.042	5.63***	[4, 0]	-0.054	-6.13***
[5, 0]	0.043	5.22***	[5, 0]	-0.056	-5.80***

* Significant at 10% level
** Significant at 5% level
*** Significant at 1% level

Panel B. Long-term Abnormal Returns

GOOD NEWS			BAD NEWS		
Event day	CAAR	t-statistic	Event day	CAAR	t-statistic
[-90, -1]	0.041	1.28	[-90, -1]	0.019	0.50
[-80, -1]	0.034	1.13	[-80, -1]	0.014	0.40
[-70, -1]	0.039	1.42	[-70, -1]	0.022	0.65
[-60, -1]	0.023	0.89	[-60, -1]	0.006	0.18
[-50, -1]	0.023	0.97	[-50, -1]	0.009	0.32
[-40, -1]	0.012	0.55	[-40, -1]	0.004	0.18
[-30, -1]	0.011	0.58	[-30, -1]	0.001	0.06
[-20, -1]	0.017	1.11	[-20, -1]	0.002	0.09
[-10, -1]	0.018	1.73	[-10, -1]	-0.004	-0.32
[10, 0]	0.038	3.47***	[10, 0]	-0.058	-4.44***
[20, 0]	0.033	2.16**	[20, 0]	-0.063	-3.47***
[30, 0]	0.030	1.60	[30, 0]	-0.051	-2.31**
[40, 0]	0.020	0.96	[40, 0]	-0.067	-2.64***
[50, 0]	0.028	1.19	[50, 0]	-0.071	-2.50***
[60, 0]	0.040	1.55	[60, 0]	-0.058	-1.87*
[70, 0]	0.033	1.17	[70, 0]	-0.066	-1.99**
[80, 0]	0.035	1.17	[80, 0]	-0.062	-1.76*
[90, 0]	0.043	1.35	[90, 0]	-0.050	-1.32

* Significant at 10% level
** Significant at 5% level
*** Significant at 1% level

In the table above the sample consists of 96 stocks listed on NASDAQ100 index. Cumulative average abnormal returns CAAR are computed using the market model and the standard event study methodology. The estimation window for computing the market model parameters is the event time interval [-90, 90]. CAAR is tested for significance using t-statistics.

4.2.2.6 S&P100

The test result for cumulative average abnormal returns in table 4.2.2.6 for the S&P 100 index indicates that stock returns of the firms included in the index are significantly affected by the earnings announcements. There is significant change before and after the event date.

Before Event
There is little evidence that for good news prices react before the event in the short term. T-statistics in the short term showing reactions are 2.76 for the window frame [-5, -1] and 2.07 for [-4,-1]. The t-statistics showing no significant reaction three days before the event are 1.55 for the time frame [-3,-1], 0.55 for [-2,-1] and 0.48 for [-1,-1]. The t-statistics in the long term before the event show no significant reaction except for ten days prior to the event day. T-statistics for long term are 0.53 for the window frame [-70,-1], 0.43 for [-40,-1] and 2.43 for [-10,-1].

For the bad news t-values are totally insignificant in the short term period, as we can see in table 4.2.2.6 Panel A and Panel B. T-statistics is -0.33 for the window frame [-5,-1], -0.63 for [-3,-1] and -0.58 for [-1,-1]. The t-statistics in the long term for bad news show no significant

changes in the stock returns. T-statistics for long term are 0.54 for the window frame [-80,-1], 0.17 for [-50,-1] and -0.20 for [-10,-1].

After Event
For good news the t-statistics in the short term after the announcement are mostly significant for both short and long term. T statistics in the short term are 8.31 for the time frame [1, 0], 6.69 for [3, 0] and is 6.49 for [4, 0]. The t-statistics after the announcement in the long term are strongly significant. T-statistics for long term are 5.09 for the time frame [10, 0], 3.32 for [40, 0] and 3.14 for [70, 0].

For bad news t-values are strongly significant in the short term, as we can see in table 4.2.2.6 Panel A. T statistics in the short term are -7.76 for the time frame [1, 0], -5.74 for [2, 0] and -3.84 for [5, 0]. The t-statistics for bad news in the long term show no significant changes. T statistics for the long term are -1.50 for [20, 0], -0.98 for [40, 0] and -0.55 for [70, 0].

Overall, the largest abnormal returns happen on day 1 with t statistic for good news firm is 8.31 and for bad news firms is-7.76. There is significant positive abnormal return that persists over the long term for good news firms but for bad news firms this ends very quickly.

Table 4.2.2.6. Aggregate Abnormal Returns around S&P100 index earnings announcements

Panel A. Short-term Abnormal Returns

GOOD NEWS			**BAD NEWS**		
Event day	CAAR	t-statistic	Event day	CAAR	t-statistic
[-5, -1]	0.012	2.76***	[-5, -1]	-0.001	-0.33
[-4, -1]	0.008	2.07**	[-4, -1]	-0.001	-0.35
[-3, -1]	0.005	1.55	[-3, -1]	-0.002	-0.63
[-2, -1]	0.002	0.55	[-2, -1]	-0.002	-0.89
[-1, -1]	0.001	0.48	[-1, -1]	-0.001	-0.58
[0, 0]	0.012	5.83***	[0, 0]	-0.011	-5.54***
[1, 0]	0.023	8.31***	[1, 0]	-0.021	-7.76***
[2, 0]	0.026	7.62***	[2, 0]	-0.019	-5.74***
[3, 0]	0.028	6.96***	[3, 0]	-0.022	-5.77***
[4, 0]	0.029	6.49***	[4, 0]	-0.019	-4.38***
[5, 0]	0.030	6.22***	[5, 0]	-0.018	-3.84***

* Significant at 10% level
** Significant at 5% level
*** Significant at 1% level

Panel B. Long-term Abnormal Returns

GOOD NEWS			**BAD NEWS**		
Event day	CAAR	t-statistic	Event day	CAAR	t-statistic
[-90, -1]	0.018	0.94	[-90, -1]	0.016	0.86
[-80, -1]	0.018	1.02	[-80, -1]	0.009	0.54
[-70, -1]	0.009	0.53	[-70, -1]	0.005	0.34
[-60, -1]	0.006	0.42	[-60, -1]	0.004	0.27
[-50, -1]	0.014	0.96	[-50, -1]	0.002	0.17
[-40, -1]	0.005	0.43	[-40, -1]	0.002	0.13

[-30, -1]	0.008	0.70	[-30, -1]	0.009	0.89
[-20, -1]	0.007	0.80	[-20, -1]	0.005	0.54
[-10, -1]	0.015	2.43***	[-10, -1]	-0.001	-0.20
[10, 0]	0.033	5.09***	[10, 0]	-0.016	-2.46***
[20, 0]	0.039	4.30***	[20, 0]	-0.013	-1.50
[30, 0]	0.045	4.05***	[30, 0]	-0.012	-1.13
[40, 0]	0.049	3.84***	[40, 0]	-0.012	-0.98
[50, 0]	0.047	3.32***	[50, 0]	-0.011	-0.83
[60, 0]	0.049	3.15***	[60, 0]	-0.012	-0.81
[70, 0]	0.052	3.14***	[70, 0]	-0.009	-0.55
[80, 0]	0.062	3.47***	[80, 0]	-0.007	-0.41
[90, 0]	0.062	3.25***	[90, 0]	-0.007	-0.36

* Significant at 10% level
** Significant at 5% level
*** Significant at 1% level

The sample consists of 100 stocks listed on S&P100 index. Cumulative average abnormal returns CAAR are computed using the market model and the standard event study methodology. The estimation window for computing the market model parameters is the event time interval [-90, 90]. CAAR is tested for significance using t-statistics.

4.2.2.7 CAC40

The test result for cumulative average abnormal returns in Table 4.2.2.7 for CAC 40 index indicates that stock returns of the firms included in the index are significantly affected by the earnings announcements. There is significant change before and after the event date.

Before Event
For good news there are significant changes in the short term and long term period. T-statistics in the short term are 3.65 for the time frame [-5,-1], 1.96 for [-2,-1] and 1.86 for [-1,-1]. The t-statistics in the long term before the event are mostly significant. T-statistics for long term are 2.19 for the window frame [-70,-1], 1.90 for [-40,-1] and 2.16 for [-10,-1].

For the bad news t-values are totally insignificant in the short term and long term period, as we can see in table 4.2.2.7 Panel A and Panel B. T-statistics is -1.57 for the window frame [-5,-1], -0.31 for [-3,-1] and -0.68 for [-1,-1]. The t-statistics in the long term for bad news show no significant changes in the stock returns. T-statistics for long term are 0.68 for the window frame [-80,-1], -0.01 for [-50,-1] and -0.70 for [-10,-1].

After Event
For good news the t-statistics in the short term after the announcement are totally significant. T statistics in the short term are 4.70 for the time frame [1, 0], 4.14 for [3, 0] and is 3.50 for [4, 0]. The t-statistics after the announcement in the long term show significant changes up to thirty days after the event day and later no significant changes. T-statistics for long term showing significant changes are 3.00 for the time frame [10, 0], 3.32 for [20, 0] and 2.55 for [30, 0]. The t-statistics showing no significant change are 1.52 for the time frame [40, 0], 0.69 for [60, 0] and 1.12 for [80, 0].

For bad news t-values are strongly significant in the short term, as we can see in table 4.1.2.8 Panel A. T statistics in the short term are -6.03 for the time frame [1, 0], -4.30 for [2, 0] and

-4.09 for [5, 0]. The t-statistics for bad news in the long term show significant changes up to forty days and then after that no significant changes till the study period. T statistics for the long term are -2.20 for the time frame [20, 0], -2.26 for [30, 0], -2.04 for [40, 0], -0.69 for [60, 0] and -0.41 for [70, 0].

Overall, in the short term, the largest abnormal returns happen on day 1 for both news with t statistics is 4.70 for good news firms and is -6.03 for bad news firms. In the long term, there is evidence of pre-announcement abnormal return for the good news firms.

In the CAC 40 index, earnings announcements play less of a role as information is conveyed to the market much earlier, which is normal in a code law country. However when collecting data, I chose the earnings announcement day as the day that the news is first released instead of the day that formal presentations are made. The results are the same as above indices in the US and the SA except the fact that stocks prices react even before the first piece of news were available through public channel.

Table 4.2.2.7. Aggregate Abnormal Returns around CAC40 index earnings announcements

Panel A. Short-term Abnormal Returns

GOOD NEWS			BAD NEWS		
Event day	CAAR	t-statistic	Event day	CAAR	t-statistic
[-5, -1]	0.020	3.65***	[-5, -1]	-0.011	-1.57
[-4, -1]	0.018	3.74***	[-4, -1]	-0.008	-1.29
[-3, -1]	0.013	3.09***	[-3, -1]	-0.002	-0.31
[-2, -1]	0.007	1.96**	[-2, -1]	0.001	0.19
[-1, -1]	0.005	1.86*	[-1, -1]	-0.002	-0.68
[0, 0]	0.007	2.75***	[0, 0]	-0.016	-5.10***
[1, 0]	0.016	4.70***	[1, 0]	-0.027	-6.03***
[2, 0]	0.018	4.15***	[2, 0]	-0.024	-4.30***
[3, 0]	0.020	4.14***	[3, 0]	-0.029	-4.52***
[4, 0]	0.019	3.50***	[4, 0]	-0.028	-3.91***
[5, 0]	0.021	3.52***	[5, 0]	-0.032	-4.09***

* Significant at 10% level
** Significant at 5% level
*** Significant at 1% level

Panel B. Long-term Abnormal Returns

GOOD NEWS			BAD NEWS		
Event day	CAAR	t-statistic	Event day	CAAR	t-statistic
[-90, -1]	0.055	2.39***	[-90, -1]	0.024	0.78
[-80, -1]	0.054	2.46***	[-80, -1]	0.019	0.68
[-70, -1]	0.045	2.19**	[-70, -1]	0.011	0.41
[-60, -1]	0.035	1.85*	[-60, -1]	0.005	0.21
[-50, -1]	0.032	1.86*	[-50, -1]	0.000	-0.01
[-40, -1]	0.029	1.90*	[-40, -1]	0.012	0.60
[-30, -1]	0.036	2.73***	[-30, -1]	0.007	0.43
[-20, -1]	0.020	1.80*	[-20, -1]	0.004	0.29
[-10, -1]	0.017	2.16***	[-10, -1]	-0.007	-0.70

[10, 0]	0.024	3.00***	[10, 0]	-0.036	-3.44***
[20, 0]	0.037	3.32***	[20, 0]	-0.032	-2.20**
[30, 0]	0.035	2.55***	[30, 0]	-0.040	-2.26**
[40, 0]	0.024	1.52	[40, 0]	-0.042	-2.04**
[50, 0]	0.016	0.89	[50, 0]	-0.021	-0.93
[60, 0]	0.013	0.69	[60, 0]	-0.017	-0.69
[70, 0]	0.009	0.43	[70, 0]	-0.011	-0.41
[80, 0]	0.025	1.12	[80, 0]	-0.011	-0.37
[90, 0]	0.033	1.43	[90, 0]	-0.017	-0.57

* Significant at 10% level
** Significant at 5% level
*** Significant at 1% level

The sample in above table consists of 40 stocks listed on CAC40 index. Cumulative average abnormal returns CAAR are computed using the market model and the standard event study methodology. The estimation window for computing the market model parameters is the event time interval [-90, 90]. CAAR is tested for significance using t-statistics.

4.2.3. Summary

In summary, the results from this part of my analysis show that, in a code law country such as France, the pre-earnings announcements indicates stock price react since earnings news is conveyed to the markets before the earnings announcement date. In the common law countries such as US and SA, we see some evidence of pre-earnings announcement reaction however this happens very close to the announcement date.

Besides that, in most cases the strongest reaction happened on the event day (0), the exceptions being some cases in the US with the strongest reaction happened on day (1). Note that in the US there are number of companies who released earnings news in the morning before market open and a number of companies who released earnings news in the afternoon after the market close. The noises in the results between day 0 and day 1 are due to this fact.

The strength level of reaction is still very strong in the short-term window periods, but reduced over time. In the long-term, we could see that good news reaction last longer and bad news end quicker for most indices except the NASDAQ 100. For example in the Johannesburg Stock Exchange, good news reactions in the case of JSE Top 40, JSE Mid Cap, JSE Small cap, are up to the whole studied period of 90 days post announcement; in the US, good news reactions for the DJIA are up to 50 days, for the S&P100 good news reactions are up to the whole studied period of 90 days; As for bad news, in the Johannesburg Stock Exchange, JSE Top 40 reacts up to 10 days, JSE Mid Cap, JSE small cap react within 5 days after earnings announcements in the US, the DJIA react within 5 days, S&P bad news react up to 10 days. The two cases that are different are NASDAQ 100 and CAC 40. NASDAQ100 has good news reaction lasting up to 20 days while bad news reaction lasting up to 80 days. In France, the CAC 40 good news reacted up to 30 days and bad news react within 40 days.

In addition, the increases and decreases in price are permanent. After the change has taken place, prices do not go back up or down the original level as shown statistically.

Finally, with good prospects, for the good news firms, this allows the price to continue to drift up in the long time. Meanwhile on the psychological side, there is not much room for the investors to act with the bad news, hence their reactions end quickly, as it was explained by Debont and Thatler (1990) among others. The case of the NASDAQ looks a bit different. The fact that NASDAQ contains 100 high tech firms could be an answer, more weight for the bad news than for the good news, thus it leads to longer reaction. The case of the CAC 40 in France releases its news before the actual announcement day; however, stocks still react strongly and most vigorously on the earnings announcement day than on any prior day.

The situation in the French market relates to the fact that France is a code law accounting system, where earnings news is released to the markets through different channel before the official earnings announcement. The uncertainty therefore has been digested since pre-earnings announcement period. As mentioned in chapter three data selection process, the event day for French market is defined not by the date of the official earnings announcement but the day of the first unofficial release of even partial news regarding the earnings of a firm. The possibility of partially implies that the different reaction of the French market to the arrival of earnings news compared to the US and the SA markets may be a statistical artefact caused by the definition of event date. In the other words it might be possible that if the French market received full information on the event day it might well react in the same way as the SA and the US market, this leading to the cumulative abnormal returns behaviour in this chapter.

4.3. Spread effect of earnings announcement

4.3.1. Empirical specification

According to Van Horne (1970), Beinesh and Gardner (1995), Hedge and McDermott (2003), and Gregoriou and Ioannidis (2006) in their studies explained that Information Cost Liquidity Hypothesis is a good information that creates significant improvement in stock performance. Given that there is a richer information environment, this part aims to examine whether there is increase/decrease in market liquidity.

Stock market liquidity is measured by the quoted, relative, and effective bid-ask spreads. Quoted bid-ask spread is defined as the ask price minus the bid price. Relative bid-ask spread is defined as the ask price minus the bid price divided by the quoted mid-price. Effective bid -ask spread is defined as twice the absolute value of the difference between the transaction price and the mid-price in effect at the time of the trade. All ratios in the table are computed as the ratio of the average bid-ask spreads of each individual stock over the indicated event time period to the average bid-ask spreads measure on day -90. The null hypothesis state that the mean of the reported ratio is equal to 1 is tested using a standard t-statistic.

To analyse the impact of earnings announcement on the short term liquidity of indices, ratios of the three daily averages bid-ask spreads over the various interval event windows pre and post earnings announcements. Quoted bid-ask spreads is defined as the ask price minus the bid price. Relative bid-ask spreads is measured as the ask price minus the bid price divided by the quoted mid-price. Effective bid-ask spreads is measured as twice the absolute value of the difference between the transaction price and the mid-price in effect at the time of the trade. I compute all three ratios for quote bid-ask spreads, relative bid-ask spreads and effective bid-ask spreads because each ratio has its own shortcomings. Relative bid-ask spreads is not an accurate method to measure the stock liquidity as trades often occurs

between the quoted ask price and the bid price. This shortcoming was observed by Lee and Ready (1991) they explained relative spread over states the trading cost of a stock for its failures to take in to account the price increase tendency after a purchase, and a decrease tendency after a sale also using only relative and effective bid-ask spreads only. These two measures will face the problem of price increasing around earnings announcements. The effective spread which is computed will reduce the shortcoming of the other two measures.

All spread ratios are computed as the ratio of the average bid-ask spreads of each individual stock over the indicated event time period to the average bid-ask spreads measure over the 90 day pre earnings announcement. The null hypothesis that the mean of the reported ratio is equal to 1 is tested using a standard t statistics. Results are reported in table 4.3.2.1 to 4.3.2.3. Effective spread is the best indicator in some cases when three ratios show different results for the shortcoming of the other two measures mentioned above.

The results showed that, spread ratios increased significantly around the earnings events then gradually decrease for the JSE Top 40, and the JSE Small Cap, on the Johannesburg Stock Exchange and DJIA, NASDAQ100 and S&P100 in the American Stock Exchanges (except two cases: the JSE Mid Cap and the CAC 40). This implies that for these indices, stock market liquidity decreases in the short term, and then gradually increases when the news ceases. Earnings announcement provides more uncertainty to the market. The informed traders' trade when there is the earnings news; this causes the market makers to increase spreads. In the long term, there are no more uninformed traders; that results in the spread going down. However, notice that even if the spread goes down in many cases at the end of this period, it is still greater than the average of the 90 days prior the event.

The CAC40, spread decreases both in the short term and long term compared to the average of 90 days before the event in Euronext Paris for CAC40. This implies that market liquidity increased after earnings announcements both in the short and long term. However, the longer the event window period, the lower the ratio is. This implies that even though market liquidity increased due to the impacts of announcement in the short term, liquidity continues to increase by time in the long term.

4.3.2. Results and explanations for short and long term effects of earnings announcement on stock market liquidity.

4.3.2.1. Results and explanations of short and long term effect of earnings announcements on stock liquidity in the Johannesburg stock exchange.

The results of the changes in liquidity of Johannesburg Stock Exchange stocks pre and post earnings announcement can be seen in table 4.3.2.1. There is clear evidence from this table that spread increases significantly for stocks in Johannesburg Stock Exchange after the earnings announcement. For example, on the actual day of the event, for firms in the JSE Top 40, the aggregate quote spread ratios compared to an average of 90 day pre earnings announcement is 1.36, and thus highly significant. This indicates that the mean quoted spread is increased by 36% on that day compared to an average of 90 days pre event. In the [-5,+5] event window, the mean quoted spread ratio is 1.09, increased by 9%, and highly significant, this indicates that spreads are significantly increased over the 11 trading day period centred on the event day. For the relative and effective spread ratios in the FTSE100, the increases on event day are 19% and 44%, and the increases on [-5, 5] window periods are 4% and 6% respectively.

Another important thing to report here is, that the spread ratios between post and pre earnings announcement period decreased gradually. As we observed from table 4.3.2.1, at the beginning, spread ratios between day 0 and average of 90 day pre earnings announcement are 1.36, 1.19, and 1.44 for quote, relative and effective bid asks respectively. After 30 days post earnings announcement period, spread ratios between average of 30 day post event and average of 90 day pre event reduce to 1.04, 0.95 and 1.03 for quote, relative and effective bid asks respectively. In the long term after 90 days post earnings announcement period, the 90 days pre/post earnings announcement spread ratios were reduced to 1, 0.92 and 0.99. This led to another conclusion; though there is decrease compared to pre earnings announcement period, stock liquidity has increased over time.

For firms in the JSE Mid Cap the aggregate quote spread on day 0 compared to an average of quote spread of 90 days pre earnings announcement is 1.10, and is highly significant. This indicates that the mean quote spread increased 10% on the event day. In the [-5,+5] event period, the mean quote spread is 1.02, increased by 2%, and highly significant, this indicates that spreads are significantly increased over the 11 trading day period centred on the event day. For the relative spread ratios in the JSE Mid Cap, there is an 11% increase on the event day, and 1% increase over [-5,5] event period. However for effective spread, the change is not clear, the increase is insignificant around day of earnings announcement and only significant on the day after.

Again, another important thing to report here is, that the spread ratios between post and pre earnings announcement period decreased over time for quoted and relative spread and in almost all event periods of effective spread. This led to another conclusion, indicating a decrease compared to the pre earnings announcement period, resulting in an increase in stock liquidity over time. In the long term at the end this ratio was slightly lower than 1 for all of the three spread ratios.

For firms in the JSE Small Cap, the quote spread ratios when compared between aggregate average on day 0 and an average of 90 days pre earnings announcement is 1.18, and highly significant. This indicates that the mean quote spread increases by 18% on that day compared to an average of 90 days pre event. In the [-4,+4] event window, the mean quote spread is 1.03, increased by 3%, and is highly significant, this indicates that spreads have significantly increased over the 9 trading day period centred on the event day. The results also show the significant increase in the mean relative and effective spreads in short term: 5% and 14% increase on the event day for the relative and effective ratios respectively; and 2% over 5 trading day centred on event for relative ratio, 6% increase over 11 trading day centred on the event for effective ratio. In the long term, the spread ratios between post and pre earning announcement period also decreased over time, a few cases are not significant for quote spread but the rest are highly significant, especially for relative and effective spreads.

4.3.2.2. Results and explanations of short and long term effect of earnings announcements on stock liquidity in the United States of America stock exchange.

The results of the changes in liquidity of the US stock exchanges pre and post earnings announcement can be seen in table 4.3.2.2. There is clear evidence from this table that spread increases significantly for stocks in the US markets after the earnings announcement. For example, for firms in DJIA the quote spread ratios compared between mean quote spread on event day to an average quote spread of 90 day pre earnings announcement is 1.72, and is highly significant. This indicates that the mean quoted spread increases by 72% on that day

compared to an average of 90 days pre event. In the [-5,+5] event period , the mean quoted spread ratio is 1.13, increased by 13%, and is highly significant, which indicates that spreads are significantly increased over the 11 trading day period centred on the event day. For the relative and effective spread ratios in the DIJA, the increases on event day are 67% and 76%, and the increases on [-5, 5] event periods are 11% and 44% respectively.

Similar to the Johannesburg Stock Exchange, it was observed that the spread ratios between post and pre earnings announcement period decrease with time in the long term. The ratios between mean spreads on the day 0 and that of average of 90 days pre earnings announcement are 1.72, 1.67 and 1.76 for quote, relative and effective bid ask spread respectively. Mean relative spread ratio between 90 days post and pre earnings announcement period reduced to 0.96. Those for quote and effective spreads reduced as well but only clearly (Significantly) up to day 10. This led to another conclusion, due to the impact of earnings announcement, in the short term, stock market liquidity decreases compared to pre earnings announcement period. In the long term stock liquidity increased gradually though the Increase does not last long as compared to the Johannesburg Stock Exchange.

For firms in the NASDAQ100, the quote spread ratios compared to an average of 90 day pre earnings announcement is 1.38, and is highly significant. This indicates that the mean quoted spread increase was 38% on that day compared to an average of 90 days pre the event. In the [-5, +5] event window, the mean quoted spread ratio is 1.07, increases 7%, and is highly Significant, this indicates that spreads are significantly increased over the 11 trading day period centred on the event day. For the relative and effective spread ratios in the DIJA, the increases on event day are 35% and 57%, and the increase on [-5, 5] window periods are 8% and 8% for each.

Similar to the DIJA, another important thing to report for NASDAQ100 is, the spread ratios between post and pre earnings announcement period decreased with time over the long term. This led to a conclusion; though there is decrease compared to pre earnings announcement period, stock liquidity has increased over time. Over the long term at the end the spread ratio is slightly lower than 1, for effective spread mean ratio and still higher than 1, for quote spread mean ratio.

For firms in the S&P100 the quote spread ratios compared to an average of 90 days pre earnings announcement is 1.81, and highly significant. This indicates that the mean quoted spread increased 81% on that day compare to average of 90 days pre event. In the [-5,+5] event window, the mean quoted spread ratio is 1.13, increased by 13%, and highly significant, this indicates that spreads are significantly increased over the 11 trading day period centred on the event day. For the relative and effective spread ratios in DIJA, the increase on the event day are 66% and 99%, and the increase on the [-5, 5] event window periods are 10% and 24% respectively.

Similarly as in the above indices in Johannesburg Stock Exchange, the DJIA and NASDAQ100, the spread ratios between post and pre earnings announcement period decreased with time over the long term. This led to a conclusion, though there is decrease compared to pre earnings announcement period, stock liquidity increases over time. Over 90 days spread ratios for this index are still higher than 1, it means that stock liquidity level has not recovered its original average level after 90 days.

4.3.2.3. Results and explanations of short and long term effect of earnings announcements on stock liquidity in the Euro next Paris stock exchange.

The results of the changes in liquidity of the Euronext Paris stock exchange pre and post earnings announcement can be seen in table 4.3.2.3. There is clear evidence from this table that the spread decreased significantly for stocks in the CAC40 markets after earnings announcement. For example, on the day of the event, for firms in the CAC40 the quote spread ratios compared to an average of 90 days pre earnings announcement is 0.80, and is highly significant. This indicates that the mean quoted spread decreased by 20% on that day compare to average of 90 days pre event. In the [-5,+5] event window, the mean quoted spread ratio is 0.72, decreased by 28%, and is highly significant, this indicates that spreads are significantly decreased over the 11 trading day period centred on the event day. For the relative and effective spread ratios in the CAC40, the decreases on event day are 16% and 33%, and the decreases on [-5, 5] event periods are 23% and 27% respectively.

Similarly as in the US and the SA markets it was observed, the spread ratios between post and pre earnings announcement period decreased with time in the long term. This led to the conclusion, though stock liquidity already increased compare to pre earnings announcement period, it increases by time. In the long term in the end spread ratios decrease up to 34% significantly.

Table 4.3.2.1. Short-term and long-term effects of earnings announcements on Stock Market Liquidity – Johannesburg Stock Exchange

Quote		**Relative**			**Effective**	
Ratio	**t-statistic**	**Ratio**	**t- statistic**		**Ratio**	**t- statistic**
JSE TOP 40						
[0, 0]	1.36***	47.08	1.19***	23.52	1.44***	49.74
[-1, 1]	1.31***	40.19	1.23***	28.01	1.26***	29.5
[-2, 2]	1.19***	25.06	1.12***	14.81	1.15***	17.23
[-3, 3]	1.15***	19.61	1.09***	10.67	1.11***	12.35
[-4, 4]	1.12***	15.49	1.06***	7.59	1.08***	8.68
[-5, 5]	1.09***	11.42	1.04***	4.69	1.06***	7.2
[0, 10]	1.04***	5.9	0.98***	-2.25	1.04***	4.87
[0, 30]	1.04***	5.18	0.95***	-5.91	1.03***	2.84
[0, 60]	1.01	1.23	0.94***	-7.6	1	-0.38
[0, 90]	1	-0.54	0.92***	-9.27	0.99	-1.38
JSE Mid Cap						
[0, 0]	1.10***	11.7	1.11***	12.2	1	-0.1
[-1, 1]	1.13***	14.62	1.12***	13.51	1.03***	2.59
[-2, 2]	1.03***	3.73	1.04***	4.77	0.97***	-2.69
[-3, 3]	1.05***	6.08	1.04***	4.3	1.01	0.88
[-4, 4]	1.05***	6.23	1.03***	3.13	1.02	1.74
[-5, 5]	1.02***	2.78	1.01	1.33	0.99	-0.97
[0, 10]	1	-0.45	0.97***	-3.02	0.95***	-4.51

[0, 30]	0.96***	-5.07	0.95***	-6.1	0.92***	-7.17
[0, 60]	0.98***	-2.41	0.93***	-7.7	0.96***	-3.68
[0, 90]	0.95***	-6.14	0.90***	-11.57	0.93***	-6.12
JSE Small Cap						
[0, 0]	1.18***	20.74	1.05***	10.5	1.14***	8.8
[-1, 1]	1.03***	3.76	1.02***	3.54	1.04***	2.66
[-2, 2]	1.02***	2.91	1.02***	3.44	1.07***	4.63
[-3, 3]	1.04***	4.87	1	0.49	1.10***	6.4
[-4, 4]	1.03***	3.99	1	0.07	1.11***	7.27
[-5, 5]	1.01	0.95	1	-0.49	1.06***	4.09
[0, 10]	0.99	-1.08	0.96***	-8.3	0.96***	-2.56
[0, 30]	1.01	0.65	0.95***	-11.14	1.01	0.7
[0, 60]	0.98***	-2.02	0.96***	-8.2	0.96***	-2.37
[0, 90]	0.98**	-1.91	0.97***	-6.15	0.98	-1.41

* Significant at 10% level
** Significant at 5% level
*** Significant at 1% level

In the table above Stock market liquidity is measured by the quoted, relative, and effective bid-ask spreads. Quoted bid-ask spread is defined as the ask price minus the bid price. Relative bid-ask spread is defined as the ask price minus the bid price divided by the quoted mid-price. Effective bid-ask spread is defined as twice the absolute value of the difference between the transaction price and the mid-price in effect at the time of the trade. All ratios in the table are computed as the ratio of the average bid-ask spreads of each individual stock over the indicated event time period to the average bid-ask spreads measure on day -90. The null hypothesis state that the mean of the reported ratio is equal to 1 is tested using a standard t-statistic.

Table 4.3.2.2- Short-term and long-term effects of earnings announcements on Stock Market Liquidity – The US markets.

Quoted spread			**Relative spread**		**Effective spread**	
	ratio	**t-statistic**	**ratio**	**t-statistic**	**ratio**	**t-statistic**
DJIA						
[0, 0]	1.72***	56.36	1.67***	57.61	1.76***	35.74
[-1, 1]	1.48***	37.72	1.47***	40.47	1.88***	41.47
[-2, 2]	1.30***	23.29	1.28***	24.34	1.56***	26.38
[-3, 3]	1.19***	15.04	1.19***	16.51	1.50***	23.74
[-4, 4]	1.16***	12.27	1.14***	11.9	1.42***	19.9
[-5, 5]	1.13***	10.38	1.11***	9.68	1.44***	20.69
[0,10]	1.05***	4.27	1.02*	1.85	1.14***	6.58
[0, 30]	0.98	-1.46	0.96***	-3.66	1.02	0.73
[0, 60]	0.97**	-1.98	0.95***	-4.69	0.99	-0.62
[0, 90]	1.01	0.94	0.96***	-3.17	1.03	1.56
NASDAQ100						
[0, 0]	1.38***	20.48	1.35***	21.57	1.57***	39.42

[-1, 1]	1.31***	17.03	1.29***	18.14	1.43***	29.41
[-2, 2]	1.23***	12.62	1.18***	11.09	1.24***	16.58
[-3, 3]	1.17***	9.29	1.17***	10.33	1.19***	12.78
[-4, 4]	1.12***	6.42	1.11***	7.1	1.13***	9.02
[-5, 5]	1.07***	3.67	1.08***	4.91	1.08***	5.47
[0, 10]	1.09***	5	1.11***	7.1	1.02	1.34
[0, 30]	1.10***	5.45	1.14***	8.88	0.93***	-4.56
[0, 60]	1.20***	10.59	1.23***	14.07	0.90***	-7.07
[0, 90]	1.30***	15.99	1.30***	18.43	0.90***	-6.78
S&P100						
[0, 0]	1.81***	84.34	1.66***	53.59	1.99***	57.45
[-1, 1]	1.50***	51.76	1.45***	36.69	1.76***	44.23
[-2, 2]	1.29***	29.69	1.24***	19.89	1.41***	23.63
[-3, 3]	1.22***	22.64	1.18***	14.8	1.34***	20.01
[-4, 4]	1.16***	17.12	1.13***	10.31	1.28***	16.05
[-5, 5]	1.13***	14.03	1.10***	7.95	1.24***	13.92
[0, 10]	1.08***	7.83	1.18***	15.05	1.20***	11.52
[0, 30]	1.01	1	1.04***	2.99	1.08***	4.72
[0, 60]	1.01	1.38	1.01	0.75	1.04***	2.53
[0, 90]	1.05	4.88	1.02	1.33	1.07	4.29

* Significant at 10% level
** Significant at 5% level
*** Significant at 1% level

In the table above Stock market liquidity is measured by the quoted, relative, and effective bid-ask spreads. Quoted bid-ask spread is defined as the ask price minus the bid price. Relative bid-ask spread is defined as the ask price minus the bid price divided by the quoted mid-price. Effective bid-ask spread is defined as twice the absolute value of the difference between the transaction price and the mid-price in effect at the time of the trade. All ratios in the table are computed as the ratio of the average bid-ask spreads of each individual stock over the indicated event time period to the average bid-ask spreads measure on day -90. The null hypothesis state that the mean of the reported ratio is equal to 1 is tested using a standard t-statistic.

Table 4.3.2.3. Short-term and long-term effects of earnings announcements on Stock Market Liquidity in the Euronext Paris stock exchange

	quoted spread		**Relative spread**		**Effective spread**	
	Ratio	**t-statistic**	**Ratio**	**t-statistic**	**Ratio**	**t-statistic**
[0, 0]	0.80***	-10.58	0.84***	-8.88	0.67***	-17.04
[-1, 1]	0.73***	-14.59	0.85***	-8.7	0.72***	-14.82
[-2, 2]	0.72***	-14.81	0.78***	-12.21	0.70***	-15.76
[-3, 3]	0.75***	-13.64	0.80***	-11.27	0.74***	-13.77
[-4, 4]	0.70***	-16.05	0.76***	-13.79	0.70***	-15.85
[-5, 5]	0.72***	-15.16	0.77***	-12.89	0.73***	-14.31

[0, 10]	0.64***	-19.17	0.69***	-17.37	0.66***	-17.69
[0, 30]	0.61***	-20.74	0.66***	-19.41	0.63***	-19.45
[0, 60]	0.64***	-19.28	0.66***	-18.93	0.65***	-18.3
[0,90]	0.66***	-18.29	0.66***	-19.23	0.66***	-17.59

* Significant at 10% level
** Significant at 5% level
*** Significant at 1% level

In the table above Stock market liquidity is measured by the quoted, relative, and effective bid-ask spreads. Quoted bid-ask spread is defined as the ask price minus the bid price. Relative bid-ask spread is defined as the ask price minus the bid price divided by the quoted mid-price. Effective bid-ask spread is defined as twice the absolute value of the difference between the transaction price and the mid-price in effect at the time of the trade. All ratios in the table are computed as the ratio of the average bid-ask spreads of each individual stock over the indicated event time period to the average bid-ask spreads measure on day -90. The null hypothesis state that the mean of the reported ratio is equal to 1 is tested using a standard t-statistic.

4.4 MULTI-VARIATE ANALYSIS OF THE LONG TERM IMPACT OF EARNINGS ANNOUNCEMENT ON STOCK MARKET LIQUIDITY

A multi-variate analysis of the long-term impacts of earnings announcements on stock market liquidity is carried out to control for some possible explanatory factors that was not obvious in the event study.

This empirical analysis is derived from the approach used by Hedge and Mc Dermott (2003) and Gregoriou (2008) in their studies of the effect of addition to and deletion from an index on stock liquidity. A test was implemented using a log-linear panel regression model with GMM estimator. Gregoriou et al (2005) used this model in their studies and observed that the bid-ask spread increase with return volatility and decrease with stock price and trading volume in London Stock Exchange. Atkins and Dyl (1997) also used the model reported a similar relationship for the stock in NYSE and NASDAQ. After controlling for volatility of stock returns, average stock price and trading volume. This model will explores whether the average market liquidity of stock increase after earnings announcements.

$$\text{Liquidity}_{it} = \propto_i + \beta_1 D_1 + \beta_2 lnvolume_{it} + \beta_3 lnvolume_{it} * D_t + \beta_4 (\ln price_{it} * D_t) + \beta_6 Stsev_{it} + \varepsilon_{it}$$

Where,
i = 1, 2.... Number of stock in each sample index.

t = 1, 2; where t = 1 corresponds to the pre earnings announcements [-90,-1], t = 2 correspond to the post earnings announcements period, [0, 90].

$liquidity_{it}$ Refers to either the natural logarithm of quoted, relative or effective bid-ask spreads for stock i at closing market at time t.

$lnVolume_{it}$ represents natural logarithm of trading volume for stock i at time t. Trading volume is calculated as the product of the average of high prices and low prices on the day times the number of shares traded on the day.

$lnPrice_{it}$ refers to natural logarithm of daily closing price for stock i at time t.

$Stdev_{it}$ refers to moving standard deviation of daily returns for stock i with n=5 data points.
The Dummy variable is equal to 1 in the post earnings announcements and equal to 0 pre earnings announcements.

αj capture the time-invariant unobserved stock specific fixed effect.

In this model, an intercept dummy variable will be employed to discover any change in the stock liquidity due to the event. Trading volume and also an interaction term between the dummy and trading volume would be included to analyse the impact of earnings announcements on stock liquidity, I am mainly concerned with $\beta 1$, the change in slope of dummy variable and $\beta 3$, the change in the slope of trading volume, and $\beta 5$, the change in the slope of stock price before and after the event.

The estimation outputs using GMM method are presented from table 4.4.1.1 to 4.4.1.7

4.4.1 Test and explanation of empirical results of multivariate analysis of the long term impact of earnings announcement on stock market liquidity in the Johannesburg, US and France equity markets.

Table 4.4.1.1. JSE Top 40. Multi-variate analysis of the long term impact of earnings announcement on stock market liquidity

Coefficient	Variables	Quote Bid-ask spreads	Relative Bid-ask spreads	Effective Bid-ask spreads
Constantαj	Ai	-1.56***	-1.56***	-2.51***
β1	Dt	0.30*	0.30*	0.38***
β2	lnVolume	-0.25***	-0.25***	-0.19***
β3	lnVolume*Dt	-0.02*	-0.02*	-0.03***
β4	lnPrice	0.83***	-0.17***	0.79***
β5	lnPrice*Dt	0.0003	0.0003	0.0004
β6	Moving StDev	12.56***	12.56***	10.39***
αj		[0.00]	[0.00]	[0.00]
AR(1)		[0.00]	[0.00]	[0.00]
J statistic		11	35	16
Sargan test		[0.28]	[0.28]	[0.56]
NORM(2)		0	0	0

Adjusted R2	0.56	0.24	0.53

* Significant at 10% level
** Significant at 5% level
*** Significant at 1% level

The sample in the above table consists of 40 JSE TOP 40 firms that have data available for 181 days around earnings announcement date in the financial year 2010-2011. A log linear panel fixed effects regression model estimated with the use of Arellano and Bond (1991) GMM estimator is used. The panel is used to determine whether the average market liquidity of the stock change after earnings announcement after controlling for stock prices, trading volume and volatility of stock returns. In addition, $\beta 3$ and $\beta 5$ test if the slope coefficients on trading volume and price have changed following earnings announcement. The model has following specification:

$\text{Liquidity}_{it} = \propto_i + \beta_1 D_1 + \beta_2 lnvolume_{it} + \beta_3 lnvolume_{it} * D_t + \beta_4 (\ln price_{it} * D_t) + \beta_6 Stsev_{it} + \varepsilon_{it}$

For j=1, 2 ….90 and t=1, 2; where t=1 corresponds to the pre-earnings announcement of 40 firms on the JSE TOP40, [0,-90], and t=2 corresponds to the post earnings announcement of 40 firms on the JSE TOP40, [0, +90]. The dependant variable $liquidityit$ correspondent to either quoted, relative or effective bid ask spread for stock j at time period t. Quoted spread is defined as the difference between the ask price and the bid price. Relative bid ask spread is defined as the ask price minus the bid price divided by the quoted mid-price. Effective bid ask spread is defined as twice as much as the absolute value of the difference between the transaction price and the mid-price in effect at the time of the trade. $Volume_{it}, price_{it} standard\ deviation_{it}$ Represent the traded volume in money, closing price and return volatility for stock j at time t. The dummy variable Dt is equal to 1 in the post earnings announcement period, and is equal to 0 otherwise. All the variables apart from Dt are taken in their natural logarithms. αj capture the time-invariant unobserved stock specific fixed effects. AR (1) is the first order Lagrange Multiplier test performed on the first difference of the residuals because of the transformations involved. Sargan test follow a Chi-squared distribution with r degree of freedom under the null hypothesis of valid instruments. NORM (2) is the p-value for the Jarque-Bera normality test. The endogenous explanatory variables (all variables apart from Dt) in the panel are GMM instrumented setting z≥1.

4.4.1. Empirical result and explanation for Johannesburg stock exchange

4.4.1. Empirical result and explanation for JSE Top 40

The constant αi for JSE Top 40 is significant in the entire three bids-ask spreads, which means that the differences in the initial levels of liquidity of the stocks are captured by GMM estimators.

After controlling for the impact of trading volume, share prices and volatility, in the effective spread model, the significance of intercept dummy coefficient *β1* shows that the quote and relative bid-ask spreads increase (liquidity decrease) on average by 0.30% after earnings announcements; the effective spread increases on average 0.38% after earnings announcements. *β2* indicates that quote and relative bid-ask spreads decrease by 0.25%, the effective bid-ask spreads decrease by 0.19% when average trading volume increases by 1%. The interaction term *β3* is significant in three spread models showing that in the long term the decrease in quote, relative and effective bid-ask spreads due to 1% trading volume change are 0.02%, 0.02%, and 0.03 % respectively. The interaction term *β5* is statistically insignificant

in three spread models showing that the change due to event (associated with intercept dummy) is constant effect.

β4 and *β6* are significant for three measures of bid-ask spread, which shows that stock liquidity is explained by the price and price volatility.
The J statistic is simply the Sargan statistic and the instrument rank larger than the number of estimated coefficient; Sargan statistics is also used as a test to detect over identifying restrictions. Under the null hypothesis that the over-identifying restrictions are valid, the Sargan statistic is distributed as a $\chi 2$, $(p-k)$, where *k* is the number of estimated coefficients and *p* is the instrument rank. The *p*-value of 0.28, 0.28 and 0.63 in this example do not rejects null hypothesis of over-identifying instrumental variables, which is the error term is uncorrelated with the instruments. The *R2* indicates that 56% of the variation in the liquidity is explained by the quote spread model; 24% for relative spread model and 53 % for the effective spread model.
The panel does not pass the test of the residual serial correlation, and the normality test.

Table 4.4.1.2. Mid Cap. Multi variate analysis of the long term impact of earnings announcement on stock market liquidity

Coefficient	**Variables**	**Quote Bid-ask spreads**	**Relative Bid-ask spreads**	**Effective Bid-ask spreads**
Constant αj	Ai	1.13***	1.13***	-0.23**
β1	Dt	0.53***	0.53***	0.43***
β2	lnVolume	-0.48***	-0.48***	-0.38***
β3	lnVolume*Dt	-0.04***	-0.04***	-0.04**
β4	LnPrice	0.92***	-0.08***	0.86***
β5	LnPrice*Dt	-0.0001	-0.0001	-0.0002
β6	Moving StDev	12.74***	12.74***	12.05***
αj		[0.00]	[0.00]	[0.00]
AR(1)		[0.00]	[0.00]	[0.00]
J statistic		56	56	41
Sargan test		0.24	0.23	0.47
NORM(2)		0	0	0
Adjusted R2		0.56	0.3	0.31

* Significant at 10% level
** Significant at 5% level
*** Significant at 1% level

The sample in the table above consists of 60 JSE mid cap firms that have data available for 181 days around earnings announcement date in the financial year 2010-2011. A log linear panel fixed effects regression model estimated with the use of Arellano and Bond (1991) GMM estimator is used. The panel is used to determine whether the average market liquidity of the stock change after earnings announcement after controlling for stock prices, trading volume and volatility of stock returns. In addition, $\beta 3$ and $\beta 5$ test if the slope coefficients on trading volume and price have changed following earnings announcement. The model has following specification:

$\text{liquidity}_{it=} \propto_i + \beta_1 D_1 + \beta_2 lnvolume_{it} + \beta_3 lnvolume_{it} * D_t + \beta_4 (\ln price_{it} * D_t) + \beta_6 Stsev_{it} + \varepsilon_{it}$

For j=1, 2 ….90 and t=1, 2; where t=1 corresponds to the pre-earnings announcement of 60 firms on the JSE mid cap, [0,-90], and t=2 corresponds to the post earnings announcement of 40 firms on the JSE mid cap, [0, +90]. The dependant variable $liquidityit$ correspondent to either quoted, relative or effective bid ask spread for stock j at time period t. Quoted spread is defined as the difference between the ask price and the bid price. Relative bid ask spread is defined as the ask price minus the bid price divided by the quoted mid-price. Effective bid ask spread is defined as twice as much as the absolute value of the difference between the transaction price and the mid-price in effect at the time of the trade. $Volume_{it}, price_{it} standard\ deviation_{it}$ Represent the traded volume in money, closing price and return volatility for stock j at time t. The dummy variable Dt is equal to 1 in the post earnings announcement period, and is equal to 0 otherwise. All the variables apart from Dt are taken in their natural logarithms. αj capture the time-invariant unobserved stock specific fixed effects. AR (1) is the first order Lagrange Multiplier test performed on the first difference of the residuals is because of the transformations involved. Sargan test follow a Chi-squared distribution with r degree of freedom under the null hypothesis of valid instruments. NORM (2) is the p-value for the Jarque-Bera normality test. The endogenous explanatory variables (all variables apart from Dt) in the panel are GMM instrumented setting z≥1.

4.4.1.2. Empirical result and explanation for JSE mid cap

The constant αi for the JSE Mid Cap is significant in all three the bid-ask spreads, which means that the difference in the initial levels of liquidity of the stocks is captured by the GMM estimators.

After controlling for the impact of trading volume, share prices and volatility, in the effective spread model, the significance of intercept dummy coefficient β1 shows that the quote and relative bid-ask spreads increase (liquidity decrease) on average by 0.53% after earnings announcements and the effective bid-ask spreads increase by 0.43%. β2 indicates that quote and relative bid-ask spreads decrease 0.48% and effective spread decrease 0.38% when trading volume increases by 1%. The interaction term β3 is significant showing that the bid-ask spreads due to 1% trading volume change are even further decreased by 0.04% for all the models: quote, relative and effective bid-ask spread models, due to the impact of earnings announcements. The interaction term *β5* is statistically insignificant in three spread models showing that the change due to event (associated with intercept dummy) is constant effect.

β4 and *β6* are significant for three measures of bid-ask spread, which shows that stock Liquidity is explained by the price and price volatility. The Sargan test is insignificant, which means that the error term is uncorrelated with the instruments, in the other words, it rejects the possibility of over-identifying instrumental variables. The *R2* indicates that 56% of the variation in the liquidity is explained by the quote bid-ask spreads model, 30% is explained by relative spread model and 31% by the effective model.

However, the panel does not pass the normality test and the test of the first order residual serial correlation, which means a non-linear relationship exist between the variables.

Table 4.4.1.3 JSE small cap. Multi variate analysis of the long term impact of earnings announcement on stock market liquidity

Coefficient	Variables	Quote Bid-ask spreads	Relative Bid-ask spreads	Effective Bid-ask spreads
Constant αj	Ai	0.76***	0.73***	-1.33***
β1	Dt	0.55**	0.54**	0.36*
β2	lnVolume	-0.47***	-0.47***	-0.23***
β3	lnVolume*Dt	-0.06*	-0.06*	-0.03*
β4	LnPrice	0.94***	-0.06***	0.75***
β5	LnPrice*Dt	-0.0006	-0.0007	-0.0047
β6	Moving StDev	15.49***	15.41***	13.89***
αj		[0.00]	[0.00]	[0.00]
AR(1)		[0.00]	[0.00]	[0.00]
J statistic		24	24	7.55
Sargan test		0.17	0.17	0.23
NORM(2)		0	0	0
Adjusted R2		0.45	0.31	0.31

* Significant at 10% level
** Significant at 5% level
*** Significant at 1% level

The sample in the above table consists of 60 JSE Small Cap firms that have data available for 181 days around earnings announcement date in the financial year 2010-2011. A log linear panel fixed effects regression model estimated with the use of Arellano and Bond (1991) GMM estimator is used. The panel is used to determine whether the average market liquidity of the stock change after earnings announcement after controlling for stock prices, trading volume and volatility of stock returns. In addition, $\beta 3$ and $\beta 5$ test if the slope coefficients on trading volume and price have changed following earnings announcement. The model has following specification:

$$\text{Liquidity}_{it} = \propto_i + \beta_1 D_1 + \beta_2 lnvolume_{it} + \beta_3 lnvolume_{it} * D_t + \beta_4 (\ln price_{it} * D_t) + \beta_6 Stsev_{it} + \varepsilon_{it}$$

For j=1, 2 ….90 and t=1, 2; where t=1 corresponds to the pre-earnings announcement of 60 firms on the JSE small cap, [0,-90], and t=2 corresponds to the post earnings announcement of 60 firms on the JSE small cap, [0, +90]. The dependant variable $liquidityit$ correspondent to either quoted, relative or effective bid ask spread for stock j at time period t. Quoted spread is defined as the difference between the ask price and the bid price. Relative bid ask spread is defined as the ask price minus the bid price divided by the quoted mid-price. Effective bid ask spread is defined as twice as much as the absolute value of the difference between the transaction price and the mid-price in effect at the time of the trade. $Volume_{it}, price_{it} standard\ deviation_{it}$ Represent the traded volume in money, closing price and return volatility for stock j at time t. The dummy variable Dt is equal to 1 in the post earnings announcement period, and is equal to 0 otherwise. All the variables apart from Dt are taken in their natural logarithms. αj capture the time-invariant unobserved stock specific fixed effects. AR (1) is the first order Lagrange Multiplier test performed on the first

difference of the residuals is because of the transformations involved. Sargan test follow a Chi-squared distribution with r degree of freedom under the null hypothesis of valid instruments. NORM (2) is the p-value for the Jarque-Bera normality test. The endogenous explanatory variables (all variables apart from Dt) in the panel are GMM instrumented setting z≥1.

4.4.1.3. Empirical result and explanation for JSE small cap

The constant αi for the JSE Small Cap is significant in the entire three bids-ask spreads, which means that the differences in the initial levels of liquidity of the stocks are captured by GMM estimators.

After controlling for the impact of trading volume, share prices and volatility, in the effective spread model, the significance of intercept dummy coefficient β1 shows that the quote bid-ask spreads increase (liquidity decrease) on average by 0.55%, the relative bid-ask spreads increase by 0.54% and the effective bid-ask spreads increase by 0.36% the after earning announcements. β2 indicates that quote and relative bid-ask spreads decrease by 0.47% and effective bid-ask spreads decrease by 0.23% when trading volume increases by 1%. The interaction term β3 is significant, showing that the decrease in bid-ask spreads due to 1% trading volume change caused by the impact of earnings announcements are 0.06%, 0.06%; 0.03% for quote spread, relative spread and effective spread respectively. Finally, the interaction term $\beta 5$ is statistically insignificant in three spread models showing that the change due to event (associated with intercept dummy) is constant effect.

$\beta 4$ and $\beta 6$ are significant for three measures of bid-ask spread, which shows that stock Liquidity is explained by the price and price volatility.

The Sargan test is insignificant, rejects the possibility of over-identifying instrumental variables, which means that the instruments are valid. The *R2* indicates that 45% of the variation in the liquidity is explained by the quote model, 37% is explained by relative model, and 31% is explained by the effective model.

However, the panel does not pass the normality test and the test of the first order residual serial correlation, proposes a non-linear relationship between variables.

Table 4.4.2.1 DJIA Multi variate analysis of the long term impact of earnings announcement on stock market liquidity

Coefficient	Variables	Quote Bid-ask spreads	Relative Bid-ask spreads	Effective Bid-ask spreads
Constant αj	Ai	-3.86***	-3.86***	-8.83***
β1	Dt	0.58	0.58**	2.06

β2	lnVolume	-0.17***	-0.17***	0.36**
β3	lnVolume*Dt	-0.04***	-0.04**	-0.15
β4	LnPrice	0.65***	-0.35***	-0.18
β5	LnPrice*Dt	0.13	0.13	-0.07
β6	Moving StDev	6.67***	6.67***	10.03
αj		[0.00]	[0.00]	[0.00]
AR(1)		[0.00]	[0.00]	[0.02]
J statistic		21	21	19
Sargan test		0.62	0.62	0.38
NORM(2)		0.01	0	0
Adjusted R2		0.38	0.26	0.17

* Significant at 10% level
** Significant at 5% level
*** Significant at 1% level

The sample consists of 30 DJIA firms that have data available for 181 days around earnings announcement date in the financial year 2010-2012. A log linear panel fixed effects regression model estimated with the use of Arellano and Bond (1991) GMM estimator is used. The panel is used to determine whether the average market liquidity of the stock change after earnings announcement after controlling for stock prices, trading volume and volatility of stock returns. In addition, $\beta 3$ and $\beta 5$ test if the slope coefficients on trading volume and price have changed following earnings announcement. The model has following specification:

$$\text{Liquidity}_{it} = \propto_i + \beta_1 D_1 + \beta_2 lnvolume_{it} + \beta_3 lnvolume_{it} * D_t + \beta_4 (\ln price_{it} * D_t) + \beta_6 Stsev_{it} + \varepsilon_{it}$$

For j=1, 2 ….90 and t=1, 2; where t=1 corresponds to the pre-earnings announcement of 30 firm [0,-90], and t=2 corresponds to the post earnings announcement of 30 firms [0, +90]. The dependant variable $liquidityit$ correspondent to either quoted, relative or effective bid ask spread for stock j at time period t. Quoted spread is defined as the difference between the ask price and the bid price. Relative bid ask spread is defined as the ask price minus the bid price divided by the quoted mid-price. Effective bid ask spread is defined as twice as much as the absolute value of the difference between the transaction price and the mid-price in effect at the time of the trade. $Volume_{it}, price_{it} standard\ deviation_{it}$ Represent the traded volume in money, closing price and return volatility for stock j at time t. The dummy variable Dt is equal to 1 in the post earnings announcement period, and is equal to 0 otherwise. All the variables apart from Dt are taken in their natural logarithms. αj capture the time-invariant unobserved stock specific fixed effects. AR (1) is the first order Lagrange Multiplier test performed on the first difference of the residuals is because of the transformations involved. Sargan test follow a Chi-squared distribution with r degree of freedom under the null hypothesis of valid instruments. NORM (2) is the p-value for the Jarque-Bera normality test. The endogenous explanatory variables (all variables apart from Dt) in the panel are GMM instrumented setting z≥1.

4.4.2. Empirical result and explanation for US stock exchange

4.4.2.1 Empirical result and explanation for DJIA

The constant αi for DJIA is significant in all three bids-ask spreads, which means that the differences in the initial levels of liquidity of the stocks are captured by GMM estimators.
After controlling for the impact of trading volume, share prices and volatility, in the quote and effective spread model, intercept dummy *β1* is insignificant and shows that the effective bid-ask spreads are persistent over the long term after earnings announcements. However, the quoted and relative bid ask spreads increase (liquidity decrease) significantly due to the earnings announcement. The interaction term *β3* in effective spread model is insignificant showing that the bid-ask spreads does not change due to trading volume change after earnings announcements. However, the interaction terms *β3* for quoted and relative spread model are significant and shows that quoted and relative spreads decrease (stock liquidity increase) by 0.04% due to the interaction of 1% increase in trading volume. Finally, the interaction term *β5* is statistically insignificant in three spread models showing that the change due to event (associated with intercept dummy) is constant effect.
β4 and *β6* are significant for three measures of bid-ask spread, which shows that stock liquidity is explained by the price and price volatility.
The Sargan test is insignificant, shows the appropriateness of the instrumental variables. The *R2* indicates that 38% of the variation in the liquidity is explained by the quote model, 26% is explained by relative model, and 17% is explained by the effective model.
Models might suffer from auto-correlation and outlier in data based on the result of first order Lagrange Multiplier test performed on the first difference of the residuals, and Jacque-Berra test for normality.

Table 4.4.2.2 NASDAQ 100. Multi variate analysis of the long term impact of earnings announcement on stock market liquidity

Coefficient	**Variables**	**Quote Bid-ask spreads**	**Relative Bid-ask spreads**	**Effective Bid-ask spreads**
Constant αj	Ai	-4.82***	-4.82***	-5.73***
β1	Dt	0.59***	0.59***	0.74***
β2	lnVolume	-0.09***	-0.09***	0.03***
β3	lnVolume*Dt	-0.05***	-0.05***	-0.07***
β4	LnPrice	0.51***	-0.49***	0.47***
β5	LnPrice*Dt	0.045	0.045	0.018
β6	Moving StDev	3.10***	3.11***	6.70***
αj		[0.00]	[0.00]	[0.00]
AR(1)		[0.00]	[0.00]	[0.00]
J statistic		15.9	15.9	11.98
Sargan test		0.42	0.42	0.33
NORM(2)		0	0	0
Adjusted R2		0.35	0.35	0.13

* Significant at 10% level
** Significant at 5% level
*** Significant at 1% level
The sample in the table above consists of 96 NASDAQ 100 firms that have data available for 181 days around earnings announcement date in the financial year 2010-2012. A log linear panel fixed effects regression model estimated with the use of Arellano and Bond (1991)

GMM estimator is used. The panel is used to determine whether the average market liquidity of the stock change after earnings announcement after controlling for stock prices, trading volume and volatility of stock returns. In addition, $\beta 3$ and $\beta 5$ test if the slope coefficients on trading volume and price have changed following earnings announcement. The model has following specification:

$$\text{Liquidity}_{it} = \propto_i + \beta_1 D_1 + \beta_2 \text{lnvolume}_{it} + \beta_3 \text{lnvolume}_{it} * D_t + \beta_4 (\ln \text{price}_{it} * D_t) + \beta_6 \text{Stsev}_{it} + \varepsilon_{it}$$

For j=1, 2 ….90 and t=1, 2; where t=1 corresponds to the pre-earnings announcement of 96 firms on NASDAQ 100, [0,-90], and t=2 corresponds to the post earnings announcement of 96 firms on NASDAQ 100, [0, +90]. The dependant variable $liquidityit$ correspondent to either quoted, relative or effective bid ask spread for stock j at time period t. Quoted spread is defined as the difference between the ask price and the bid price. Relative bid ask spread is defined as the ask price minus the bid price divided by the quoted mid-price. Effective bid ask spread is defined as twice as much as the absolute value of the difference between the transaction price and the mid-price in effect at the time of the trade. $Volume_{it}, price_{it} standard\ deviation_{it}$ Represent the traded volume in money, closing price and return volatility for stock j at time t. The dummy variable Dt is equal to 1 in the post earnings announcement period, and is equal to 0 otherwise. All the variables apart from Dt are taken in their natural logarithms. αj capture the time-invariant unobserved stock specific fixed effects. AR (1) is the first order Lagrange Multiplier test performed on the first difference of the residuals is because of the transformations involved. Sargan test follow a Chi-squared distribution with r degree of freedom under the null hypothesis of valid instruments. NORM (2) is the p-value for the Jarque-Bera normality test. The endogenous explanatory variables (all variables apart from Dt) in the panel are GMM instrumented setting z≥1.

4.4.2.2. Empirical result and explanation for NASDAQ100

The constant αi for the NASDAQ100 is significant in the entire three bid-ask spreads, which means that the differences in the initial levels of liquidity of the stocks are captured by GMM estimators.

After controlling the impact of trading volume, share prices and volatility, the significance of *β1* shows that the bid-ask spreads increased (liquidity decrease) on an average by 0.59%, 0.59%, and 0.74% for quoted spread model, relative spread model and effective spread models respectively, after earnings announcements. *β2* indicates that bid-ask spreads increases by 0.03% when trading volume increases by 1%. Finally the interaction term *β3* is significant showing that the decrease in bid-ask spreads due to a 1% trading volume change is 0.05%, 0,05% and 0.07% in quote spread model, relative spread model, and effective spread model respectively due to the long term impact of the earnings announcements. Finally, the interaction term *β5* is statistically insignificant in three spread models showing that the change due to event (associated with intercept dummy) is constant effect.

β4 and *β6* are significant for three measures of bid-ask spread, which shows that stock liquidity is explained by the price and price volatility.

The Sargan test rejects null hypothesis of over-identifying instrumental variables shows the appropriateness of the instrumental variables. The *R2* indicates that 35% of the variation in the liquidity is explained by the quoted spread model; 35% is explained by the relative spread model, and 13% is explained by an effective spread model.

However, the panel does not pass the normality test and the test of the first order residual serial correlation, propose a non-linear relationship between variables. The test for normality also does not pass, thus propose outliers in the data set.

Table 4.4.2.3. S&P 100. Multi variate analysis of the long term impact of earnings announcement on stock market liquidity

Coefficient	**Variables**	**Quote Bid-ask spreads**	**Relative Bid-ask spreads**	**Effective Bid-ask spreads**
Constant αj	Ai	-4.75***	-4.75***	-11.96***
β1	Dt	0.09***	0.09***	0.35***
β2	lnVolume	-0.09***	-0.09***	-0.40***
β3	lnVolume*Dt	-0.01	-0.01	-0.26***
β4	LnPrice	0.63***	-0.37***	0.65***
β5	LnPrice*Dt	0.055	0.055	-0.006
β6	Moving StDev	-1.74	-1.74	10.92**
αj		[0.00]	[0.00]	0.04***
AR(1)		[0.00]	[0.00]	[0.00]
J statistic		44	44	41
Sargan test		0.31	0.31	0.49
NORM(2)		0	0	0
Adjusted R2		0.27	0.14	0.04

* Significant at 10% level
** Significant at 5% level
*** Significant at 1% level

The sample in the table above consists of 100 S&P firms that have data available for 181 days around earnings announcement date in the financial year 2010-2012. A log linear panel fixed effects regression model estimated with the use of Arellano and Bond (1991) GMM estimator is used. The panel is used to determine whether the average market liquidity of the stock change after earnings announcement after controlling for stock prices, trading volume and volatility of stock returns. In addition, $\beta 3$ and $\beta 5$ test if the slope coefficients on trading volume and price have changed following earnings announcement. The model has following specification:

$$\text{Liquidity}_{it} = \propto_i + \beta_1 D_1 + \beta_2 lnvolume_{it} + \beta_3 lnvolume_{it} * D_t + \beta_4 (\ln price_{it} * D_t) + \beta_6 Stsev_{it} + \varepsilon_{it}$$

For j=1, 2 ….90 and t=1, 2; where t=1 corresponds to the pre-earnings announcement of 100 firms on the S&P, [0,-90], and t=2 corresponds to the post earnings announcement of 100 firms on the S&P, [0, +90]. The dependant variable $liquidityit$ correspondent to either quoted, relative or effective bid ask spread for stock j at time period t. Quoted spread is defined as the difference between the ask price and the bid price. Relative bid ask spread is defined as the ask price minus the bid price divided by the quoted mid-price. Effective bid ask spread is defined as twice as much as the absolute value of the difference between the transaction price and the mid-price in effect at the time of the trade. $Volume_{it}, price_{it} standard\ deviation_{it}$ Represent the traded volume in money, closing price and return volatility for stock j at time t. The dummy variable Dt is equal to 1 in the post earnings announcement period, and is equal to 0 otherwise. All the variables apart from Dt are taken in their natural logarithms. αj capture the time-invariant unobserved stock specific fixed effects. AR (1) is the first order Lagrange Multiplier test performed on the first difference of the residuals is because of the transformations involved. Sargan test follow a Chi-squared distribution with r degree of freedom under the null hypothesis of valid instruments. NORM (2) is the p-value for the Jarque-Bera normality test. The endogenous explanatory variables (all variables apart from Dt) in the panel are GMM instrumented setting z≥1.

4.4.2.3. Empirical result and explanation for S&P100

The constant αi for the S&P100 is significant in the entire three bids-ask spreads, meaning that the differences in the initial levels of liquidity of the stocks are captured by GMM estimators.

After controlling for the impact of trading volume, share prices and volatility, in the three measures of spread model, the significance of intercept dummy coefficient $\beta 1$ shows that the quoted bid-ask spreads increased (liquidity decrease) on an average by 0.09% in quoted and relative spread model and 0.35 in effective spread model after earnings announcements. $\beta 2$ indicates that bid-ask spreads decreased (liquidity increase) 0.09%, 0,09%, and 0.40% in quote, relative and effective spread models respectively when trading volume increases by 1%. Finally the interaction term $\beta 3$ is significant in all of the three spread models showing that the decrease in bid-ask spreads (increase in liquidity) due to 1% trading volume change are 0.01%, 0.01%, and 0.26% for quoted, relative, and effective spread model respectively due to t impact of earnings announcements. The interaction term $\beta 5$ is statistically insignificant in three spread models showing that the change due to event (associated with intercept dummy) is single effect.

$\beta 4$ and $\beta 6$ are significant for three measures of bid-ask spread, which shows that stock liquidity is explained by the price and price volatility.

The Sargan test is insignificant, shows the appropriateness of instrumental variables. The *R2* indicates that 27% of the variation in the liquidity is explained by the quote model; 14% of the variation in the liquidity is explained by relative spread model and 4% by effective spread model.

However, the panel does not pass the normality test and the test of the first order residual serial correlation, propose a non-linear relationship between variables.

Table 4.4.3.1 CAC 40. Multi variate analysis of the long term impact of earnings announcement on stock market liquidity

Coefficient	Variables	Quote Bid-ask spreads	Relative Bid-ask spreads	Effective Bid-ask spreads
Constant αj	Ai	-4.76***	-4.76***	-5.36***
β1	Dt	1.67***	1.67***	2.55***
β2	lnVolume	-0.17***	-0.17***	-0.15***
β3	lnVolume*Dt	-0.18***	-0.18***	-0.25***
β4	LnPrice	0.84***	-0.16***	0.91***
β5	LnPrice*Dt	-0.52	-0.52	-0.44
β6	Moving StDev	7.37**	7.38**	-1.51
αj		[0.00]	0.282366	[0.00]
AR(1)		[0.00]	[0.00]	[0.00]
J statistic		36	36	11
Sargan test		0.19	0.21	0.33
NORM(2)		0	0	0
Adjusted R2		0.48	0.26	0.06

* Significant at 10% level
** Significant at 5% level
*** Significant at 1% level

The sample in the table above consists of 40 CAC40 firms that have data available for 181 days around earnings announcement date in the financial year 2010-2012. A log linear panel fixed effects regression model estimated with the use of Arellano and Bond (1991) GMM estimator is used. The panel is used to determine whether the average market liquidity of the stock change after earnings announcement after controlling for stock prices, trading volume and volatility of stock returns. In addition, $\beta 3$ and $\beta 5$ test if the slope coefficients on trading volume and price have changed following earnings announcement. The model has following specification:

$$\text{Liquidity}_{it} = \propto_i + \beta_1 D_1 + \beta_2 lnvolume_{it} + \beta_3 lnvolume_{it} * D_t + \beta_4 (\ln price_{it} * D_t) + \beta_6 Stsev_{it} + \varepsilon_{it}$$

For j=1, 2 ….90 and t=1, 2; where t=1 corresponds to the pre-earnings announcement of 40 firms on the CAC40, [0,-90], and t=2 corresponds to the post earnings announcement of 40 firms on the CAC40, [0, +90]. The dependant variable $liquidityit$ correspondent to either quoted, relative or effective bid ask spread for stock j at time period t. Quoted spread is defined as the difference between the ask price and the bid price. Relative bid ask spread is defined as the ask price minus the bid price divided by the quoted mid-price. Effective bid ask spread is defined as twice as much as the absolute value of the difference between the transaction price and the mid-price in effect at the time of the trade. $Volume_{it}, price_{it} standard\ deviation_{it}$ Represent the traded volume in money, closing price and return volatility for stock j at time t. The dummy variable Dt is equal to 1 in the post earnings announcement period, and is equal to 0 otherwise. All the variables apart from Dt are taken in their natural logarithms. αj capture the time-invariant unobserved stock specific fixed effects. AR (1) is the first order Lagrange Multiplier test performed on the first difference of the residuals is because of the transformations involved. Sargan test follow a Chi-squared distribution with r degree of freedom under the null hypothesis of valid instruments. NORM (2) is the p-value for the Jarque-Bera normality test. The endogenous

explanatory variables (all variables apart from Dt) in the panel are GMM instrumented setting z≥1.

4.4.3. Empirical result and explanation for Euro next Paris

4.4.3.1. Empirical result and explanation for Euro next Paris

The constant αi for the Euro next Paris is significant in the entire three bids-ask spreads models, which means that the differences in the initial levels of liquidity of the stocks are captured by GMM estimators.
After controlling for the impact of trading volume, share prices and volatility, in the three measures of spread models, the significance of $\beta 1$ shows that the bid-ask spreads increase (liquidity decrease) on average by 1.67% after earnings announcements in quoted spread model, 1.67% in relative model, and 2.55% in effective spread model. $\beta 2$ indicates that bid-ask spreads decrease (liquidity increase) by 0.17%% associated to 1% trading volume increase in quoted and relative spread models, and 15% in the effective spread model. Finally the interaction term $\beta 3$ is significant, showing that the decrease in bid-ask spreads due to 1% trading volume change are 0.18%, 0.18%, and 0.25% in the quoted, relative and effective spread models respectively due to the impact of earnings announcements. The interaction term $\beta 5$ is statistically insignificant in three spread models showing that the change due to event (associated with intercept dummy) is a single effect. $\beta 4$ and $\beta 6$ are significant for three measures of bid-ask spread, which shows that stock liquidity is explained by the price and price volatility. The Sargan statistic is insignificant, rejects the possibility of over identifying instrument variables. The *R2* indicates that 48% of the variation in stock liquidity is explained by the quoted spread model, 26% of the variation in stock liquidity is explained by the relative spread model and only 6% of the variation in stock liquidity is explained by the effective spread model. The panel does not pass the normality test and the test of the first order residual serial correlation, which means theirs, is a non-linear relationship between variables and outlier in data set.

4.5. Does information asymmetry account for changes in post earnings announcements drifts?

4.5.1. Bid ask spread decomposition and Information asymmetry component

This part aims at decomposing the bid-ask spread into trading cost and information asymmetry components. As discussed previously in chapter two, it is usually considered that the spread helps to cover three different costs: The order processing cost, which includes any cost associated with order execution; the inventory holding cost, which includes any cost bearing the inventory risk; and finally the information asymmetry cost or adverse selection cost, which includes any cost bearing the risk of inferior information compared to other parties. Over the last several decades, there are two important models by Lin, Sanger and Booth (1995) and Huang and Stoll (1997) which have been used in empirical studies for various purposes.

The Huang and Stoll model (1997), partitions the total effective spread into informed trading, order processing and inventory holding cost components. The model has the following characteristics: $\Delta PRICEi, = \beta_{1i} Q_{it} + \beta_{2iQi,-1} + \beta_{3QA,t-1} + ei,t$ In this model, Huang and Stoll (1997) denote ΔPRICEi, t for a change from the previous retained trade Qit equals 1 if the trade at time t was a *sale,* and equals -1 if the trade at time t was a buy. Trades at prices

higher than the prevailing quote midpoint are defined as market maker sells (Qit=1) and trades at prices below the prevailing quote midpoint as market maker buys (Qit=−1).

In this model, trades at mid-point are excluded. The QA, t−1 is the aggregate indicator for buy and sell, which is equal to 1, -1, or 0 if the sum of Qi, t−1 across all sample stocks is positive, negative or zero accordingly to capture market wide pressure on market makers inventory levels. The estimate of β1, i is one half the estimated effective spread, and the estimated adverse selection component is equal to $2(\beta 2, _i+\beta 1, _i)$. , is the error term.

The tables below presents the results of coefficient regression from the Huang and Stoll (1997) model used to decompose bid ask spread in different window period after earnings announcement for indices in the Johannesburg Stock Exchange. The model has the following specification: $\Delta PRICEi, t=\beta_{1i}Qit+\beta_{2i}Qi,t-1+\beta_3 Q_A,t-1+e_i,t$ Where the dependent variable ΔPRICEi,t is the daily closing price change. Qit equal 1 (-1) if the trade at time t was a sell (buy). Trades at price above the prevailing quote midpoint as market maker sells (Qit=1) and trades at prices below the prevailing quote midpoint as market maker buys (Qit=−1). In this model trades at midpoint are excluded. The QA,t−1 is the aggregate indicator for buy and sell, which equal 1, -1, or 0 if the sum of Qi,t−1 across all sample stocks is positive, negative or zero accordingly to capture market-wide pressure on market makers inventory levels. The estimate of β1, coefficient is one-half of the estimated effective spread. According to Huang and Stoll (1997), in their model explained that the estimated adverse selection component equal $2(\beta 1+\beta 2)$. HS information asymmetry cost components are reported in percentage.

Table 4.5.1.1. Spread decomposition base on Huang and Stoll model – South Africa equity market.

Period after earnings announcement	**10 days**	**20 days**	**30days**	**60days**	**90 days**	**180 days**
JSE TOP 40						
$\beta 1$	1.826*** [0.00]	1.661*** [0.00]	1.636*** [0.00]	1.328*** [0.00]	1.291*** [0.00]	1.008*** [0.00]
$\beta 2$	-0.545*** [0.00]	-0.384** [0.03]	-0.378** [0.02]	-0.444*** [0.00]	-0.362*** [0.00]	-0.231*** [0.00]
HS information asymmetry component	2.562	2.554	2.516	1.768	1.858	1.554
Number of obs. (unbalanced panel)	15	20	25	30	35	40
JSE MID CAP						
$\beta 1$	0.863*** [0.00]	0.807*** [0.00]	0.796*** [0.00]	0.697*** [0.00]	0.690*** [0.00]	0.662*** [0.00]
$\beta 2$	-0.357*** [0.00]	-0.391*** [0.00]	-0.40*** [0.00]	-0.360*** [0.00]	-0.351*** [0.00]	-0.315*** [0.00]

HS information asymmetry component	1.012	0.832	0.79	0.674	0.678	0.694
Number of obs. (unbalanced panel)	20	25	30	35	45	60
JSE SMALL CAP						
$\beta 1$	0.417*** [0.00]	0.422*** [0.00]	0.383*** [0.00]	0.397*** [0.00]	0.346*** [0.00]	0.323*** [0.00]
$\beta 2$	-0.307*** [0.00]	-0.295*** [0.00]	-0.24*** [0.00]	-0.255*** [0.00]	-0.228*** [0.00]	-0.214*** [0.00]
HS information asymmetry component	0.22	0.252	0.28	0.284	0.236	0.218
Number of obs. (unbalanced panel)	20	25	30	35	45	60

*, **, *** indicate two tailed statistical significance at the 10%, 5% and 1% levels, respectively.

Table 4.5.1.1 presents that the information asymmetry component in bid-ask spread decreases over time in the SA equity market for large stock index such as the JSE Top 40 and JSE mid cap. In the JSE top40, the information asymmetry components for time frames: k=10, 20, 30, 60 and 90 days are 2.562, 2.554, 2.516, 1.768, 1.858, 1.55469 respectively. In the JSE mid cap, the information asymmetry component for time frames of: 10, 20, 30, 60, and 90 days are 1.012, 0.832, 0.790, 0.674, 0.678, 0.694 respectively. For the smaller indices like the JSE Small Cap the information asymmetry component does not change much.

Table 4.5.1.2. Spread decomposition base on Huang and Stoll model – US equity market

Period after earnings announcement	**10 days**	**20 days**	**30 days**	**60 days**	**90 days**	**180 days**
DJIA						
$\beta 1$	0.027 [0.30]	0.028 [0.21]	0.030 [0.16]	0.019 [0.18]	0.008 [0.51]	0.024*** [0.00]
$\beta 2$	0.009 [0.49]	0.014 [0.31]	0.011 [0.49]	-0.003 [0.81]	-0.017* [0.07]	-0.022*** [0.00]
HS information asymmetry component	0.072	0.084	0.082	0.032	0.018	0.004
Number of obs. (unbalanced panel)	254	465	687	1338	2022	3760

NASDAQ 100						
$\beta 1$	0.062*** [0.00]	0.048*** [0.00]	0.050*** [0.00]	0.029*** [0.00]	0.026*** [0.00]	0.020*** [0.00]
$\beta 2$	-0.014* [0.08]	0.004 [0.56]	0.003 [0.61]	0.004 [0.36]	-0.002 [0.54]	-0.004 [0.24]
HS information asymmetry component	0.096	0.104	0.106	0.066	0.048	0.032
Number of obs. (unbalanced panel)	923	1574	2583	5110	7672	13899
S&P100						
$\beta 1$	0.035** [0.02]	0.027** [0.02]	0.038*** [0.00]	0.031*** [0.00]	0.028*** [0.00]	0.033*** [0.00]
$\beta 2$	-0.006 [0.58]	0.006 [0.45]	0.009 [0.24]	-0.002 [0.80]	-0.015*** [0.01]	-0.022*** [0.00]
HS information asymmetry component	0.058	0.066	0.094	0.058	0.026	0.022
Number of obs. (unbalanced panel)	866	1587	2348	4598	6966	12808

*, **, *** indicate two tailed statistical significance at the 10%, 5% and 1% levels, respectively.

In the US equity market, table 4.5.1.2 shows that the information asymmetry component in bid ask spread also seems to decrease over time, however, it is not as clear as in the SA equity market. Initially in the 10 days' time frame, the information asymmetry components are not as large as they are in a 20 days period. After the 20 days period, the information component decreased for all the three indices DJIA, NASDAQ100, and S&P100.

Table 4.5.1.3. Spread decomposition base on Huang and Stoll model – French equity market

Period after earnings announcement	**10 days**	**20 days**	**30 days**	**60 days**	**90 days**	**180 days**
CAC 40						
$\beta 1$	0.094*** [0.00]	0.083*** [0.00]	0.069*** [0.00]	0.068*** [0.00]	0.058*** [0.00]	0.050*** [0.00]
$\beta 2$	-0.035* [0.07]	-0.019 [0.28]	-0.037** [0.01]	-0.030*** [0.00]	-0.032*** [0.00]	-0.024*** [0.00]

HS information asymmetry component	0.118%	0.128%	0.064%	0.076%	0.052%	0.026%
Number of obs. (unbalance panel)	401	773	1111	2131	3268	6484

*, **, *** indicate two tailed statistical significance at the 10%, 5% and 1% levels, respectively.

In the French equity market the Hung and Stoll model information asymmetry component also decreases over time. In a 10 , 20, 30 60 and 90 days window time frames, information asymmetry components are 0.118; 0.128; 0.064, 0.076, 0.052, 0.026 respectively . Overall it was noticed that the information asymmetry component is quite small in the case of JSE Small Cap, US market, and the CAC 40.

4.5.2. Does information asymmetry explain post earnings announcements drifts?

As discussed in chapter two, over the four decades literature documented that stock prices drift after the earnings news, and the size of earnings surprises are directly related to the size of drift. Ng et al (2008) reported that size of PEAD is related to size of earnings surprise, stock volatility and transaction cost. Ng et al (2008) approach presents that there are strong evidences of the relationship between price drift and earnings surprises, stock liquidity, and stock volatility. To explore the role of information asymmetry cost component in bid ask spread, in this section the panel estimated general least squared regression will be used as follows:

$$Marketrespone = CAR_0^i k$$
$$= \beta_0 + \beta_1 UE_{i,0} \beta_2 UE_{i,k} + \beta_3 UE_{i,0} Volatility_{-90,-21} + \varepsilon_i$$

Where, Market response is cumulative abnormal return of stocks i from event day 0 to day k.

UEi, 0 is earnings surprise on the event day 0.

News is the average adverse selection or information asymmetry component of stock i's effective bid ask spread, from event day to day k, calculated based on Huang and Stoll (1997) model, presented in tables shown in above section 4.5.2.1. It is calculated as the percentage of effective spread time effective spread.

Volatility is the standard deviation of stock i during 70 days pre-earnings announcement, from day -90 to day -21.

εi is error term.

This model uses panel estimated general least squared method. Its characteristics are almost similar as the model 4.5.1.1, except the two facts that i) liquidity variable was replaced by news; which is the information asymmetry component of the bid ask spread and ii) news are

allowed to vary over time instead of taking them as at the time of the event; i.e. news are associated with variation in event window length. By allowing news lengthening the post event window we capture more changes in the earnings related news. We are mainly concern with $\beta 1$, the coefficient on the earnings surprise main effect, and $\beta 2$, the interaction term between earnings surprise and news.
To evaluate the impact of news on the PEAD, we are mainly concerned with $\beta 2$ the coefficient of the interaction between earnings surprise and news.

The tables below present the results of earnings response coefficient regression to examine the market reaction to earnings news for different time frames. The dependent variable is cumulative abnormal return of each counter period [0, 10]; [0, 20]; [0, 30]; [0, 60]; [0, 90] after the earnings announcement. Surprise is observed when the earnings surprise is measured as unexpected earning on the event day UEi, 0 with the indices that have the abnormal returns and trading volume reach its peak on day 1 there will be earnings surprise measured as unexpected earnings on day 1, due to many companies releasing information at the market close, leading to the largest reaction happening on day 1. News is the information asymmetry component in the bid ask spread infer from Huang and Stoll (1997) spread decomposition model, Volatility is standard deviation of stock return pre-earnings announcement during the period [-90,-20]. This panel fixed effect regression uses General Least Square method.

The results are presented from table 4.5.2.1 to 4.5.2.7. Overall, the results for the SA and French equity markets are consistent with hypothesis that firms with higher information asymmetry costs have higher market response. The interaction between information variable and earnings surprises are significant in SA and French, however there are mixed results between positive and negative in the US markets, showing that the impact of information asymmetry component in this market is unclear. This might be due to the bias in the earnings measurement method or unknown market conditions. As mentioned before, at least we do not have specific time of earnings release for firms in the US. The weak results from the US stock markets could be a function of a measurement error in the unexpected earnings/earnings surprise.

As expected, earnings surprise main effects are positive and significant in the SA; however earnings surprise main effects are not clear in France. The main effects of earnings surprise in the US are strong for NASDAQ100 and S&P 100 but not quite strong for DJIA in the US.

Table 4.5.2.1. JSE TOP 40 Market response to earnings announcement and information asymmetry cost.

Window Period after earnings announcement	**10days**	**20days**	**30days**	**60days**	**90days**
Constant	0.0004 [0.42]	0.003*** [0.00]	0.005*** [0.00]	0.012*** [0.00]	0.017*** [0.00]
$UE0$	0.740*** [0.00]	0.738*** [0.00]	0.562*** [0.00]	0.115** [0.02]	-0.147*** [0.00]
$UE_{i,0}*News$	0.021*** [0.00]	0.035*** [0.00]	0.040*** [0.00]	0.053*** [0.00]	0.071*** [0.00]
$UE_{i,0}*Volatility$	17.750*** [0.00]	13.643*** [0.00]	21.533*** [0.00]	50.442*** [0.00]	67.449*** [0.00]
$R2$	0.89	0.76	0.63	0.48	0.33
Number of Observation	15	20	25	30	40

*, **, *** indicate two tailed statistical significance at the 10%, 5% and 1% levels, respectively.

In table 4.5.2.1. The interaction term between earnings surprise and news is positive and significant; showing that the variation in news interacts with earning surprise can explain the change in stock reaction after earnings announcement. Other variable coefficients such as that of earnings surprise and the interactions term between earnings surprise and stock volatility are positive and significant in different event window lengths. The main effect of earning surprise in JSE Top40 is small compared to other indices. As expected, main effect of earnings surprise reduces over time.

Table 4.5.2.2. JSE Mid Cap Market response to earnings announcement and information asymmetry cost.

Window Period after earnings announcement	**10days**	**20days**	**30days**	**60days**	**90days**
Constant	0.004*** [0.00]	0.005*** [0.00]	0.005*** [0.00]	0.007*** [0.00]	0.008*** [0.00]
$UE0$	1.280*** [0.00]	1.392*** [0.00]	1.442*** [0.00]	1.395*** [0.00]	1.199*** [0.00]
$UE_{i,0} * News$	0.005*** [0.00]	0.005*** [0.00]	0.006*** [0.00]	0.012*** [0.00]	0.009*** [0.00]
$UE_{i,0} * Volatility$	-14.670*** [0.00]	-19.191*** [0.00]	-21.523*** [0.00]	-21.669*** [0.00]	-12.617*** [0.00]
$R2$	0.76	0.71	0.64	0.51	0.36
Number of Observation	25	30	35	45	60

*, **, *** Indicate two-tailed statistical significance at the 10%, 5% and 1% levels, respectively

In table 4.5.2.2. The interaction terms between earnings surprise and news are positively significant; showing that the variation in news interacts with earning surprise can explain the change in stock reaction after earnings announcement. Other variables, earnings surprise main effect coefficient is positive and significant in different event window lengths until the end of period of 90 days post earnings announcement. The interaction terms between earnings surprise and stock volatility are negative and significant. Earnings surprise main effects are larger than in the case of JSE Top 40.

Table 4.5.2.3. JSE Small Cap - Market response to earnings announcement and information asymmetry cost.

Window Period after earnings announcement	**10days**	**20days**	**30days**	**60days**	**90days**
Constant	0.003*** [0.00]	0.003*** [0.00]	0.004*** [0.00]	0.003*** [0.00]	0.002*** [0.00]

$UE0$	1.268*** [0.00]	1.414*** [0.00]	1.434*** [0.00]	1.590*** [0.00]	1.656*** [0.00]
$UE_{i,0}*News$	-0.002*** [0.00]	-0.003*** [0.00]	-0.004*** [0.00]	-0.004*** [0.00]	-0.004*** [0.00]
$UE_{i,0}*Volatility$	-5.224*** [0.00]	-8.885*** [0.00]	-8.418*** [0.00]	-10.336*** [0.00]	-12.424*** [0.00]
$R2$	0.75	0.64	0.56	0.47	0.39
Number of Observation	25	30	35	45	60

*, **, *** Indicate two-tailed statistical significance at the 10%, 5% and 1% levels, respectively

In table 4.5.2.3, the interaction terms between earnings surprise and news are negative and significant, showing that the variation in news when interacts with earnings surprise can explain the change in stock reaction after earnings announcement. Earnings surprise main effects and interaction with volatility is significant in different event window lengths. Earnings surprise main effects are larger compared to JSE Top 40 and JSE Mid Cap.

Table 4.5.2.4 DJIA

Window Period after EA	**10days**	**20days**	**30days**	**60days**	**90days**
Constant	0.0001 0.76	-0.002*** 0.00	-0.001 0.15	0.001 0.19	0.004*** 0.00
$UE0$	1.273*** [0.00]	1.006*** 0.00	0.500*** 0.00	-0.490*** 0.00	-0.751*** 0.00
$UE_{i,0}*News$	-0.195* 0.07	0.201 0.63	0.447 0.34	1.067* 0.09	-0.666 0.43
$UE_{i,0}*Volatility$	-5.460 0.49	13.895 0.15	65.409*** 0.00	156.465*** 0.00	166.255*** 0.00
$R2$	0.83	0.70	0.62	0.47	0.28
Number of Observation	326	610	901	1769	2643

*, **, *** Indicate two-tailed statistical significance at the 10%, 5% and 1% levels, respectively

In table 4.5.2.4, the interaction terms between earnings surprise and news are negative and significant over a 10 day window period, and positive and significant over a 60-day period; however over a 20, 30 and 90 day period, the interaction terms coefficients are insignificant. The results are mixed, providing that the variation in news do not explain for the market response after earnings announcement. Earnings news main effect and interaction between earnings news and volatility also have mix results. This could be due to the bias in the earnings surprise measurement in the US markets. The results provides no evidence that information asymmetry cost component can explain PEAD in this sub set of sample.

Table 4.5.2.5 NASDAQ100

Window Period after earnings announcement	**10days**	**20days**	**30days**	**60days**	**90days**
Constant	0.001 0.16	-0.002*** 0.01	-0.002*** 0.00	-0.006*** 0.00	-0.007*** 0.00
$UE0$	1.073*** 0.00	1.254*** 0.00	1.299*** 0.00	1.159*** 0.00	0.519*** 0.00
$UE_{i,0}*News$	-0.234 0.39	-0.248 0.33	-0.099 0.71	0.206 0.34	1.275*** 0.00

$UE_{i,0}*Volatility$	5.793*** 0.00	-3.064* 0.09	-6.183*** 0.00	1.956 0.33	29.652*** 0.00
$R2$	0.81	0.70	0.62	0.46	0.25
Number of Observation	1029	1953	2878	5669	8454

*, **, *** Indicate two-tailed statistical significance at the 10%, 5% and 1% levels, respectively

As presented in table 4.5.2.5. main effect of earnings surprises are positive and significant, however, the interaction terms between news and earning surprise in this regression output are not significant for most event window periods, providing no evidence that information asymmetry cost component can explain the variation in market response after earnings announcement. The interaction terms between earnings surprise and volatility also have mixed results. We found no evidence that information asymmetry cost component can explain the PEAD in NASDAQ100. Again, the errors in earnings surprises measurement have not been taken into account.

Table 4.5.2.6 S&P100

Window Period after earnings announcement	**10days**	**20days**	**30days**	**60days**	**90days**
Constant	0.002*** 0.00	0.004*** 0.00	0.007*** 0.00	0.011*** 0.00	0.016*** 0.00
$UE0$	0.825*** 0.00	0.797*** 0.00	0.764*** 0.00	0.569*** 0.00	0.155** 0.02
$UE_{i,0}*News$	0.022 0.46	0.093 0.29	1.44 0.13	0.362 0.16	0.159 0.40
$UE_{i,0}*Volatility$	21.658*** 0.00	18.653*** 0.00	22.141*** 0.00	32.961*** 0.00	56.360*** 0.00
$R2$	0.74	0.64	0.56	0.37	0.21
Number of Observation	1078	2020	2989	5894	8799

*, **, *** Indicate two-tailed statistical significance at the 10%, 5% and 1% levels respectively.

Table 4.5.2.6 shows that main effects of earnings surprise are positive and significant; the interactions between earnings surprise and volatility are also positive and significant; however, the coefficient of interaction terms between news and earning surprise are insignificant, providing that the interaction between information asymmetry cost component and earnings surprise cannot explain the variation in the market response to earnings announcement.

Table 4.5.2.7 CAC40

Window Period after earnings announcement	**10days**	**20days**	**30days**	**60days**	**90days**
Constant	0.001*** 0.00	0.004*** 0.00	0.005*** 0.00	0.005*** 0.00	0.005*** 0.00
$UE0$	0.333*** 0.02	0.078 0.41	0.331*** 0.00	-0.713*** 0.00	-0.642 0.00
$UE_{i,0}*News$	-1.392** 0.02	0.489** 0.04	1.749*** 0.00	1.564*** 0.00	0.930*** 0.00
$UE_{i,0}*Volatili$	62.634***	75.348***	58.788***	156.534***	143.671***

ty	0.00	0.00	0.00	0.00	0.00
R2	0.78	0.71	0.58	0.52	0.38
Number of Observation	440	835	1207	2333	3526

*, **, *** Indicate two-tailed statistical significance at the 10%, 5% and 1% levels, respectively

Table 4.5.2.7 shows a significant positive relationship between the interaction term and dependent variable, providing that the variation between information asymmetry components could provide explanation to the variation in the market response to earnings news. However, the single effects of earnings surprise are not clear in 20-day and 90-day window lengths. The situation in the French suit to the fact that France is a code law accounting system, where earnings news are released to the markets through different channel before the official earnings announcement. The uncertainty therefore has been digested in a longer time and since pre-earnings announcements period. As mentioned in chapter three in data selection process, the event day for French market is defined not by the date of the official earnings announcement but the days of the first unofficial release of even partial news regarding the earnings of a firm. The interaction between earnings surprise and volatility in French are positive and significant.

4.6. Summary

In summary, this part of research investigates if earnings announcement creates a new information environment and how earnings news affects stock liquidity in different markets. My expectation is that with an improvement in the information environment, the stocks should be traded more and become more liquid. This part of the study however, shows that in post earnings announcement period, at first, bid ask spread increases (liquidity decrease) in the SA and the US markets. While bid ask spread decreases (liquidity increase) in the French market. The reason why bid ask spread increases (liquidity decrease) in the SA and US equity market is that, when news is released, not everyone react to news the same way and also there will be some investors who have advantages over other groups of investors. Therefore, earnings news once released will create a gap between informed and uninformed traders. This gap has usually been referred to as information asymmetry component in the bid ask spread. When the earnings news is released, this gap increases and it will in turn make the total bid ask spread increase. The uninformed traders can infer the extra information the insiders have by observing whatever they buy or sell.

Another reason for this is that bid ask spread can be decomposed into the information asymmetry component and cost of trading component (which includes inventory holding cost and order processing cost) it can also be observed that earnings news not only affect trading volume leading to the reduction in the cost of trading, but also increases the information asymmetry component in the bid ask spread.

The overall impact of earnings news on the bid ask spread will be the total of the above two effects. If the increase in information asymmetry component is dominant, then the total bid ask spread will increase (stock liquidity decreases). If the decrease in cost of trading component is dominant, then the total bid ask spread will decrease (stock liquidity increases). What happened on the Johannesburg Stock Exchange and the US markets suggests that the information asymmetry component dominates bid ask spread (stock liquidity) in those two common law countries; what happened on the Euronext Paris market suggests that the cost of trading component dominated bid ask spread (stock liquidity) in French market. This happened exactly as we expected from a code law country where earnings information is

released through different channel before the earnings announcement, and so it plays a less dominant role.

Another point of notice in the results is that even though stock liquidity decreases (bid ask spread increases) in the common law countries as US and SA, while stock liquidity increases (bid ask spread decreases) in the code law country as France, for the period of 90 days post earnings announcement, it was observed that over time, stock liquidity increased (bid ask spread decreased) in all the three countries: the SA and the US and French markets. This evidence is seen in the gradual decrease in the bid ask spread ratios if we look at the different short term periods in tables from 4.3.1.1 to 4.3.1.7. The reason for this, as the time passes the information asymmetry in the news have less impact while trading volume still increases due to the news and by its own time linear function, leading to the continuous improvement in liquidity.

From the findings using the multi variate analysis to observe the long term impact of earnings announcement on stock market liquidity it was observed that in the long term there are two side impacts of earnings announcement on stock liquidity and bid ask spread. Earnings announcements increase bid ask spread (decrease stock liquidity) as we observe from a significant positive intercept dummy variable coefficient $\beta 1$. While the trading volume increases due to earnings announcement leading to the decrease in the bid ask spread (or improvement in stock liquidity) as we observe from significant negative $\beta 3$. The overall effect will be the total of both the above effects. This finding holds true in multivariate analysis, and this also explains the results of spread effect on earnings announcements. In the short term, stock liquidity decreases (bid ask increases) due to immediate impacts of earnings announcement. Due to the increase in trading volume after earnings announcement, stock liquidity gradually increases (bid ask spread decrease) by time. This helps to explain both situations in common law countries such as the US and the SA, where the information asymmetry cost component dominates bid ask spread and while in the code law country such as France, cost of trading (inventory holding and order processing cost components) dominates bid ask spread.
From the findings does information asymmetry cost account for changes in earning announcement drift. The regression based on Huang and Stoll (1997) effective spread decomposition model. Huang and Stoll (1997) model directly showed information asymmetry cost component (and cost of trading component) in effective spread, this decreased in percentage over time in JSE top 40 and JSE mid cap, and more or less kept at the same percentage for other indices. The final regression is a panel fixed regression, this regression allows information component to vary by time. This regression examines whether the information component in liquidity play a role in explaining the PEAD. The results from this regression reveal that information asymmetry cost component in the bid ask spread account for post earnings announcement drift in all the four indices in Johannesburg Stock Exchange and for the CAC40 in French market. However, there is very less statistical evidence that information asymmetry cost component have relationship with post earnings announcement drift in the US market. This problem might be due to the earnings surprise measurement on the event as already stated above, that there are a number of firms which announce earnings results at the beginning of the market open, and the remainder release earnings information after market close.

CHAPTER FIVE

CONCLUSIONS AND REMARKS

Post Earnings Announcement Drift is an anomaly that is robust with a longest history in behavioural finance. Over the last four decades, there have been many attempts to solve the question what causes the PEAD, however, the main reason for it remains hidden in literature. Given the importance of a phenomenon that drives the investors' behaviours on their way to exploit benefits through PEAD, in this thesis I have addressed the three issues:

1) Evaluated the impacts of earnings news and the effects it has on stock liquidity
2) Answered the question: Can stock liquidity explain the Post Earnings Announcement Drift? i.e. PEAD.
3) Answered the question does information asymmetry account for change in the Post earnings announcement drift? This can be seen in the difference in behaviour demonstrated by informed and uninformed traders around the new earnings news.

Given the nature of data set that I collected, this thesis mainly uses three measures of bid ask spread to proxy for stock liquidity. The days of earnings announcement were collected with great care, in this study. The data sample of this thesis covers 426 firms listed in different indices from Johannesburg Stock Exchange, NASDAQ, CBOE, S&P and the Euronext Paris. Data samples were collected according to each individual index group with similar characteristics, i.e. factors such as firm size, book to market values are all considered the same in each index when performing analysis. This assumes that there are no cross-sectional variations across firms within one index.

Within the framework of this thesis, not only the highly liquid but also less liquid and illiquid stocks in the Johannesburg Stock Exchange are being covered. Moreover, this thesis makes a comparison between common law accounting countries (US, and SA) and code law accounting country (France). With different characteristics of the two types of accounting systems, earnings news played different roles, the reason being that in the common law system earnings news is released at the announcement date whilst in the code law system, earnings news is conveyed to the market up to 3-4 weeks in advance of the earnings announcement through various channels. However, it is interesting that in this thesis I have observed almost the same types of reactions on the event in both systems: The strongest reaction happened on event day [0] and then gradually reduced over time even in the code law country as France. The differences are: firstly, there is evidence of pre-earnings announcement drift in the code law system; secondly, in the code law system the cost of trading component dominates the bid ask spread and stock illiquidity while in the common law system the information asymmetry component dominates the bid ask spread and stock illiquidity. This thesis has also observed that when the news is released, investors react by trading more with both liquid and illiquid stocks, however, when the news ceases, investors tend to follow the larger stock and few investors follow small and illiquid stocks.

Chapter Four which was based on descriptive statistic, event study and multivariate analysis explores the impact of earnings announcement on stock liquidity in different short term and long term scenarios. The analysis is conducted over a period of 90 days prior to actual earnings announcement and 90 days after earnings announcement date, based on a sample of

426 ordinary 160 common stocks from 3 indices in the Johannesburg Stock Exchange, 226 stocks from three main indices in the United States, and 40 major stocks from Euronext Paris that have data available on Bloomberg and I-Net database. The methodologies employed in this chapter: the market adjusted model of stock returns following traditional event study, Multivariate analysis, using the approach of Hedge and Mc Dermot (2003) and Gregoriou and Ioannidis (2006); the application of Information Cost Liquidity Hypothesis established by Van Horne (1970), Beinesh and Gardner 1995, Hedge and McDermott 2003, and Gregoriou and Ioannidis (2006). And also the Huang and Stoll (1997) model in explaining stock liquidity and PEAD.

Significant positive (negative) stock price reactions to the good (bad) earnings announcements are reported, providing a clear evidence of earrings news's impact on price after earnings announcement. The increases and decreases in price are permanent, after the change has taken place; price does not go down or up to the original level as shown graphically and statistically. The good news has a longer impact while bad news ends quickly, except in the case of the NASDAQ100 where the good news for high tech firms seems to have more weight. Similarly as in the common law countries such as the US and the SA and in the code law country such as France, though earnings information were conveyed to the markets up to one month before the earnings announcement date, the reaction is still strongest on the announcement date and gradually reduces over subsequent days.

Due to earnings announcement, the information environment is richer and stock will be traded more and become more liquid. However, evidence from JSE and from NYSE/NASDAQ/CBOE shows that bid ask spread increases and stock liquidity decreases after the earnings announcement while evidence from Paris Bourse shows that bid ask spread decreases and stock liquidity increases after earnings announcement.

The component of stock liquidity, *information asymmetry cost*, must dominate in the US and SA. Meanwhile, an overall increase in the liquidity in the French market must be dominated by inventory holding cost and order processing cost components (or cost of trading component). The information content in the common law countries such as the US, and SA plays an important role while the information content in stock liquidity in France seems to play a less dominant role. Again, this happens as we expected due to the differences in the common law countries and code law country, earnings announcement provide more uncertainty in the common law system than in the code law system, due to the fact that news is conveyed to the market since 1 month before the announcement date through different channels. However, note be taken that there is still something surprising here, even though the news has been leaked before the announcement, we still see the post earnings announcement drift after the official announcement dates.

In the long term, stock liquidity in both common law and code law systems increases with time after earnings announcement. This is due to the fact that the information content becomes less impacting and diminishes with time, while the trading volume effects caused by earnings news still continues, leading to the continuous improvement in liquidity. In both the cases, it points out that the information asymmetry component plays a less role when news is completely conveyed to the markets.

.

This multivariate analysis proved and confirms earnings announcements provide two directions of impact on stock liquidity. A part of stock liquidity will decrease immediately,

proved by positive sign of intercept dummy variables in the multivariate regression i.e. the regression is with stock illiquidity (natural logarithm of bid ask spread) as dependent variable, leading to a positive sign of the intercept dummy which means there's an increase in stock illiquidity or a decrease in stock illiquidity due to the event, and this result from the increase in information asymmetry during the announcement period. The other part of stock liquidity will improve as the trading volume increases after earnings announcement. This is shown in the negative slope of the dummy coefficient of the interaction term between dummy variable and trading volume i.e. The regression is with stock illiquidity (natural logarithm of bid ask spread) as dependent variable, hence the negative sign of slop coefficient of interact term means that there is a *negative relation*ship in the function of stock illiquidity or a *positive relation*ship in the function of stock liquidity. This conclusion is proven in most of the indices, except for a few cases in the effective spread models where the sign of coefficient is insignificant.

From what we observed, in the long term there are two side impacts of earnings announcement on stock liquidity /bid ask spread. Earnings announcements increase bid ask spread (decrease stock liquidity) as we observed from significant positive intercept dummy variable coefficient $\beta 1$. Meanwhile at the same time, trading volume increases due to earnings announcement leading to the decrease in the bid ask spread (or improvement in stock liquidity) as we observed from the significant negative $\beta 3$. The overall effect will be the total of both the above effects. This finding holds true in the multivariate analysis, and this also explains the results from information cost liquidity hypothesis application. In the short term, stock liquidity decreases (bid ask increases) due to immediate impacts of earnings announcement. Due to the increase in trading volume after earnings announcement, stock liquidity gradually increases (bid ask spread decreases) over time. This helps to explain both the situations that in common law system as the US and the SA, where the information asymmetry cost component dominates bid ask spread, and in the code law system as France, where the cost of trading (inventory holding and order processing cost components) dominates bid ask spread.

Finally, Chapter Four explores the role of information asymmetry cost component in the causes of price drift. It used the regression based on Huang and Stoll (1997) effective spread decomposition model. Huang and Stoll (1997) model directly infer information asymmetry cost component (and cost of trading component) in effective spread, which decreased in percentage by time in the JSE Top 40 and JSE Mid Cap and more or less remained at the same percentage level for other indices. In an attempt to establish a relationship between information asymmetry component and market response, the final regression is a panel fixed effect regression, this regression allows information component to vary over time. This regression examines whether the information component in liquidity plays a role in explaining the PEAD. The results from this regression revealed that information asymmetry cost component in the bid ask spread partially account for post earnings announcement drift in all four indices in the Johannesburg Stock Exchange and for the CAC40 in France. However, there is very little statistical evidence that information asymmetry cost component has a relationship with post earnings announcement drift in the US market. This problem might be due to the earnings surprise measurement of the event as already stated in the previous pages, that there are a number of firms announcing earnings results at the beginning of the market open, and the rest release earnings information after market has closed. The reaction occurs at the time of the event therefore is difficult to calculate correctly.

In the end, I conclude from this thesis that, there is very strong evidence to show the association between earnings announcement and stock liquidity. The PEAD phenomenon therefore can be explained by the change in stock liquidity, the Johannesburg stock Exchange and French equity markets prove that the information component in stock liquidity can account for the change in post earnings announcement drift. The evidence from US market does not prove that conclusively but this may be due to the problem of measurement of earnings surprise.

.

REFERENCES

Abarbanell, J.S. 1991, "Do Analysts' Forecast Incorporate Information in Prior Stock Price changes? *Journal of Accounting & Economics,* vol. 14, pp. 147-165.

Abarbanell, J.S. & Bernard, V.L. 1992, "Tests of Analysts' Overreaction/Underreaction to Earnings Information as an Explanation for Anomalous Stock Price Behaviour", *Journal of Finance,* vol. 47, pp. 1181-1206.

Acharya, V.V. & Perdersen, L.H. 2005, "Asset Pricing with Liquidity Risk", *Journal of Financial Economics,* vol. 77, pp. 375-410.

Acker, D., Stalker, M. & Tonks, I. 2002, "Daily Closing Inside Spreads and Trading Volumes around Earnings Announcements", *Journal of Business Finance and Accounting,* vol. 29, 1149-1179

Admati, A.R. & Pfleiderer, P. 1988, "A theory of Intraday Patterns: Volume and Price Variability", *The Review of Financial Studies,* vol. 1, pp. 3-40.

Afflect-Graves, J., Callahan, C.M. & Chipalkatti, N. 2002, "Earnings Predictability, Information Asymmetry and Market Liquidity", *Journal of Accounting Research,* vol. 40, pp. 561-583.

Ali, A., Hwang, L. & Trombley, M.A. 2003, "Arbitrage Risk and the Book-to-market Anomaly", *Journal of Financial Economics,* vol. 69, pp. 355-373.

Ali, A., Klein, A. & Rosenfeld, J. 1992, "Analysts' Use of Information about Permanent and Transitory Earnings Components in Forecasting Annual EPS", *Accounting Review,* vol. 67, pp. 183-198.

Amihud, Y. 2002, "Illiquidity and Stock Returns: Cross-section and Time Series Effects", *Journal of Financial Market,* vol. 5, pp. 31-56.

Amihud, Y. & Mendelson, H. 1986, "Asset Pricing and the Bid-Ask Spread", *Journal of Financial Economics,* vol. 17, pp. 223-249.

Angelidis, T. & Benos, A. 2009, "The Components of the Bid-Ask Spread: The case of the Athens Stock Exchange", *European Financial Management,* vol. 15, no. 1, pp. 112-144.

Arbel, A., Carvell, S. & Strebel, P. Financial Analysts Journal, "Giraffes, Institutions and Neglected Firms", *1983,* vol. May/June, pp. 4-12.

Arbel, A. & Strebel, P. 1982, "The Neglected and Small Firm Effects", *Financial Review,* vol. 17, pp. 201-218.

Arellano, M. & Bond, S. 1991, "Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations", *The Review of Financial Studies,* vol. 58, no. 2, pp. 277-297.

Arghyrou M. & Gregoriou, A. 2007, “Testing for purchasing power parity correcting for non-normality using the wild bootstrap”, *Economics Letters*, forthcoming.
Aslan, H. 2006, "Uncertainty Risk and Learning about Fundamentals: A Resolution of the Post-Earnings-Announcement-Drift Anomaly?” *Working paper, University of Houston,* .
Asthana S., 2003, “Impact of information technology on post-earnings announcement drift”, *Journal of Information Systems*, vol.17, pp. 1-17.

Atiase, R.K. 1985, "Predisclosure Information, Firms Capitalization, and Security Price behaviour Around Earnings Announcements", *Journal of Accounting Research,* vol. 23, pp. 21-36.

Atkins, A.B. & Dyl, E.A. 1997, "Transactions Costs and Holding Periods for Common Stocks", *Journal of Finance,* vol. 52, no. 1, pp. 309-325.

Avramov, D. & Chordia, T. 2006, "Asset Pricing Models and Financial Market Anomalies", *The Review of Financial Studies,* vol. 19, no. 3, pp. 1001-1040.

Ayers, B.C. & Freeman, R.N. 2000, "Why do larger Firm's Price Anticipate Earnings Earlier than Small Firm's Prices?", *Contemporary Accounting Research,* vol. 17, pp. 191-212.
Ball, R. & Kothari, S.P., Robin, A. "The effect of international institutional factors on properties of accounting earnings", *Journal of Accounting and Economics,* vol. 29, no. 1, pp. 1-51.

Ball, R. 2003, "The Theory of Stock Market Efficiency: Accomplishments and Limitations" in *In the Revolution in Corporate Finance,* ed. Joel M. Stern and Donald H. Chew, Jr., 4th ed., Blackwell, pp. 10-24.

Ball, R. 1992, "The Earnings-price Anomaly", *Journal of Accounting & Economics,* vol. 15, pp. 319-345.

Ball, R. 1978, "Anomalies in Relationships between Securities‟ Yields and Yield-surrogates", *Journal of Financial Economics,* vol. 6, pp. 103-126.

Ball, R. & Bartove, E. 1996, "How Naive is the Stock Market's use of Earnings Information?” *Journal of Accounting & Economics,* vol. 21, pp. 319-337.

Ball, R. & Brown, P. 1968, "An Empirical Evaluation of Accounting Income Numbers", *Journal of Accounting Research,* vol. 6, pp. 159-178.

Ball, R. & Kothari, S.P. 1991, "Security Returns Around Earnings Announcements", *Accounting Review,* vol. 66, pp. 718-738. 177

Ball, R., Kothari, S.P. & Wasley, C.E. 1995, "Can We Implement Research on Stock Trading Rules?” *Journal of Portfolio Management,* vol. 21, pp. 54-65.

Banz, R.W. 1981, "The Relationship Between Return and Market Value of Common Stocks", *Journal of Financial Economics,* vol. 9, pp. 3-18.

Barberis, N., Shleifer, A. & Vishny, R. 1998, "A Model of Investor Sentiment", *Journal of Financial Economics,* vol. 49, pp. 307-343.

Barron, O.E., Byard, D. & Kim, O. 2002, "Change in Analyst' Information around Earnings Announcements", *The Accounting Review,* vol. 77, pp. 821-846.

Bartov, E. 1992, "Pattern in Unexpected Earnings as an Explanation for Post-Announcement Drift", *The Accounting Review*, vol. 67, pp. 307-343.

Bartov, E., Radhakrishnan, S. & Krinsky, I. 2000, "Investor Sophistication and Pattern in Stock Returns after Earnings Announcements", *The Accounting Review,* vol. 75, pp. 43-63.

Basu, S. 1977, "Investment Performance of Common Stocks in Relation to their Price-earnings ratios: A Test of the Efficient Market Hypothesis", *Journal of Finance,* vol. 32, pp. 663-682.

Basu, S. 1983, "The Relationship between Earnings' Yield Market Value and Returns for NYSE Common Stocks", *Journal of Financial Economics,* vol. 12, pp. 129-156.

Bathke A. & Lorek. K. 1984, "The Relationship Between Time Series Models and the Security Market's Expectations of Quarterly Earnings", *The Accounting Review,* vol. 59, pp. 163-176.

Battalio, R.H. and Mendenhall, R.R. (2007) "Post Earnings Announcement Drift: Intra-day timing and Liquidity Costs". Working paper. Available at SSRN: http://ssrn.com/abstract=937257.

Beaver, W.H. 1968, "The Information Content of Annual Earnings Announcements", *Journal of Accounting Research,* vol. 6, pp. 67-92.

Beaver, W.H., Lambert, R.A. & Ryan, S.G. 1987, "The Information Content of Security Prices: A Second Look", *Journal of Accounting & Economics,* vol. 9, pp. 139-157.

Beaver, W., Lambert, R. & Morse, D. 1980, "The Information Content of Security Prices", *Journal of Accounting & Economics,* vol. 2, pp. 3-28.

Bekaert, G., Campbell, H. & Lundblad, C. 2007, "Liquidity and Expected Returns: Lessons from Emerging Market", *The Review of Financial Studies,* vol. 20, no. 6, pp. 1783-1831.

Beneish, M.D. 1991, "Stock Prices and the Dissemination of Analysts' Recommendations", *Journal of Business,* vol. 64, pp. 393-416. 178

Beneish, M.D. & Gardner. J.C. 1995, "Information Costs and Liquidity Effects from Changes in the Dow Jones Industry Average", *Journal of Financial and Quantitative Analysis,* vol. 30, pp. 135-157.

Benston, G.J. and Hagerman. R.L. 1974, "Determinants of bid-ask spread in the over-the counter market", *Journal of Financial Economics* 35, 317-348.

Bernard, V.L., Thomas J. & Wahlen, J. 1997, " Accounting- Based Stock Price Anomalies: Separating Market Inefficiencies from Risk", *Contempory Accounting Research*, Vol. 14, pp. 89-136.

Bernard, V.L. 1993, "Stock Price Reaction to Earnings Announcements: A Summary of Recent Anomalous Evidence ad Possible Explanations" in *Advances in Behavioural Finance*, ed. R. H. Thaler., Russell Sage Foundation, New York, pp. 303-340.

Bernard, V.L. & Thomas, J.K. 1990, "Evidence that Stock Prices Do not Fully Reflect the Implications of Current Earnings for Future Earnings", *Journal of Accounting Research,* vol. 13, pp. 305-340.

Bernard, V.L. & Thomas, J.K. 1989, "Post-Earnings-Announcements Drift: Delayed Price Response or Risk Premium?", *Journal of Accounting Research,* vol. 27, pp. 1-36.

Bernard, V.L., Thomas, J. & Wahlen, J. 1989, "Accounting-based Stock Price Anomalies: Separating Market Inefficiencies from Risk", *Contemporary Accounting Research,* vol. 14, pp. 89-136.

Bessembinder, H. 2003, "Trade Execution costs and Market Quality after Decimalization", *Journal of Financial and Quantitative Analysis,* vol. 38, pp. 747-777.

Bhardwaj, R.K. & Brooks. L.D. 1992, "The January Anomaly: Effects of Low Share Price, Transaction Costs, and bid-Ask Bias", *Journal of Finance,* vol. 47, pp. 553-575.

Bhushan, R. 1994, "An Information Efficiency Perspective on the Post-Earnings Announcement Drift", *Journal of Accounting & Economics,* vol. 18, pp. 45-65.

Bidwell, C. 1979, "A test of Market Efficiency: SUE/PE", *Journal of Portfolio Management,* vol. summer, pp. 53-58.

Bildersee, J., Radhakrishnan, S. & Ronen, J. 1996, "Dispersion of Analysts' Forecasts, Precision of Earnings, and Trading Volume Reaction", *International Review of Financial Analysis,* vol. 15, pp. 99-111.

Blume, L. & Easley, D., O'Hara, M. 1994, "Market Statistics and technical Analysis: The Role of Volume", *Journal of Finance,* vol. 49, pp. 153-181.

Blundell, R. & Bond. S.R. 1998, "Initial Conditions and Moments Restrictions in Dynamic Panel Data Models", *Journal of Econometrics,* vol. 87, pp. 115-143. 179

Booth, G.G., Kallunki, J. & Martikainen, T. 1997, "Delayed Price Response to the Announcements of Earnings and its Components in Finland", *European Financial Management,* vol. 6, pp. 377-393.

Lev, B. & Ohlson, J.A. 1982, "Market-based Empirical Research in Accounting: A review, Interpretation, and Extension, *Journal of Accounting Research,* Vol.20, pp. 249-322.

Branch, B. & Freed. W. 1977, "Bid-Ask Spread on the AMEX and the big board", *Journal of Finance,* vol. 32, pp. 159-163.

Brav, A. & Heaton, J.B. 2002, "Competing Theories of Financial Anomalies", *Review of Financial Studies,* Vol. 15, No. 2, pp. 575–606.

Brennan, M.J., Chordia, T. & Subrahmanyam, A. 1998, "Alternative factor Specifications, Security Characteristics and the cross-Section of Expected Stock Returns", *Journal of Financial Economics,* vol. 49, pp. 345-373.

Brennan, M.J. & Subrahmanyam, A. 1996, "Market Micro Structure and Asset pricing: On the Compensation for Illiquidity in Stock Returns", *Journal of Financial Economics,* vol. 41, pp. 441-464.

Brown, L., Hagerman, R., Griffin, P. & Zmijewski, M. 1987, "An Evaluation of Alternative Proxies for the Market's Assessment of Unexpected Earning", *Journal of Accounting & Economics,* vol. 9, pp. 159-193.

Brown, L.D. 1997, "Analyst Forecasting Errors: Additional Evidence", *Financial Analysts Journal,* vol. 53, no. 6, pp. 81-88.

Brown, L.D. 1997, "Earnings Surprise Research: Synthesis and Perspectives. Financial Analysts Journal", *Financial Analysts Journal,* vol. 53, no. 2, pp. 81-88.

Brown, L.D. 1993, "Earnings Forecasting Research: It's Implication for Capital Market Research", *International Journal of Forecasting,* vol. 9, pp. 295-320.

Brown, L.D. & Han, J.C.Y. 2000, "Do Stock prices Fully Reflect the Implications of Current Earnings for Future Earnings for AR1 Firms?", *Journal of Accounting Research,* vol. 38, pp. 149-164.

Brown, L.D., Hargerman, R.L., Griggin, P.A. & Zmijewski, M.E. 1987, "Security Analyst Superiority Relative to Uni-variate Time-series Models in Forecasting Quarterly Earnings", *Journal of Accounting & Economics,* vol. 9, pp. 61-87.

Brown, L.D. & Rozeff, M.S. 1979, "Uni-variate Time-Series Models of Quarterly Earnings per Share: A proposed Model", *Journal of Accounting Research,* vol. 17, pp. 179-189.

Brown, L.D. & Rozeff, M.S. 1978, "The Superiority of Analyst Forecasts as measures of Expectations: Evidence from Earnings", *Journal of Finance,* vol. 33, pp. 1-16.

Brown, P. & Kennelly, J.W. 1972, "The Information Content of Quarterly Earnings: An Extension and Some Further Evidence", *Journal of Business,* vol. 45, pp. 403-415.

Brown, S.J. & Wanner, J.B. 1985, "Using Daily Stock Returns: The Case of Event Studies", *Journal of Financial Economics,* vol. 14, pp. 3-31.

Brown, S.J. & Wanner, J.B. 1980, "Measuring Security Price Performance", *Journal of Financial Economics,* vol. 8, pp. 205-258.

Booth, G., Kallunki, J.P. & Martikainen, T. 1996, "Post-announcement drift and income smoothing: Finnish Evidence" *Journal of Business Finance and Accounting* 23:8, pp. 1207-1221.

Cable, J. & Holland. K. 2000, "Robust vs. OLS Estimation of the Market Model: Implications for event studies", *Economics Letters,* vol. 69, pp. 385-391.

Campbell, J.Y., Lo, A.W. & Mackinlay, A.C. 1997, *The Econometrics of Financial Markets*, Princeton University Press, Princeton New Jersey.

Campbell, J.Y., Grossman, S.J. & Wang, J. 1993, "Trading Volume and Serial Correlation in Stock Returns", *The Quarterly Journal of Economics*, vol. 108, pp. 905-939.

Carhart, M. 1997, "On Persistence in Mutual Fund Performance", *Journal of Finance*, vol. 52, pp. 57-82.

Chambers, D., Jennings, R. & Thompson, R.B. 2004, "Using Earnings Announcement Returns as Evidence of Mispricing: The Important of Information Flow", *Working Paper. Available at SSRN: http://ssrn.com/abstract=557846*

Chan, L.K.C., Jegadeesh, N. & Lakonishok, J. 1996, "Momentum Strategies", *Journal of Finance*, vol. 51, pp. 1681-1713.

Chan, W.A., Frankel, R. & Kothari, S.P. 2004, "Testing Behavioural Finance Theories Using Trends and Consistency in Financial Performance", *Journal of Accounting & Economics*, vol. 38, pp. 3-50.

Chen, Z., Stanzl, W. & Watanabe, M. 2002, "Price Impact Costs and the Limit of Arbitrage" *EFA Berlin Meetings Presented Paper; Yale ICF Working Paper No. 00-66. Available at SSRN: http://ssrn.com/abstract=302065 or doi:10.2139/ssrn.302065*

Choi, W. & Kim, J. 2001, "Under reaction, Trading Volume, and Post Earnings-Announcement Drift", *Working Paper. Available at SSRN: http://ssrn.com/abstract=287817 or DOI: 10.2139/ssrn.287817*

Chordia, T., Goyal, A., Sadka, G., Sadka, R. & Shiva Kumar, L. 2009, "Liquidity and the post-earnings-announcement drift", *Financial Analysts Journal*, vol. 65, no. 4, pp. 31-56.

Chordia, T., Roll, R. & Subrahmanyam, A. 2002, "Order Imbalance, Liquidity, and Market Returns", *Journal of Financial Economics*, vol. 65, pp. 111-130.

Chordia, T., Roll, R. & Subrahmanyam, A. 2001, "Market Liquidity and Trading Activity", *Journal of Finance*, vol. 56, pp. 501-530.

Chordia, T., Roll, R. & Subrahmanyam, A. 2000, "Commonality in Liquidity", *Journal of Financial Economics*, vol. 56, pp. 3-28.

Chordia, T. & Shiva Kumar, L. 2006, "Earnings and Price Momentum", *Journal of Financial Economics*, vol. 80, pp. 627-656.

Chordia, T. & Shiva Kumar, L. 2005, "Inflation Illusion and Post Earnings Announcement Drift", *Journal of Accounting Research*, vol. 43, pp. 521-556.

Chordia, T. & Shiva Kumar, L. 2001, "Earnings Business Cycle and Stock Returns", *Working Paper. Available at SSRN: http://ssrn.com/abstract=281491 or DOI: 10.2139/ssrn.281491*

Chordia, T., Shiva Kumar, L. & Subrahmanyam, A. 2004, "Liquidity Dynamics Across Small and Large Firms", *Economics Notes,* vol. 33, pp. 111-143.

Chordia, T. & Subrahmanyam, A. 2004, "Order Imbalance and Individual Stock Returns: Theory and Evidence", *Journal of Financial Economics,* vol. 72, pp. 485-518.

Chordia, T., Subrahmanyam, A. & Anshuman, V.R. 2001, "Trading Activity and Expected Stock Returns", *Journal of Financial Economics,* vol. 59, pp. 3-32.

Chordia, T. & Swaminathan, B. 2004, "Incomplete Information, Trading Costs and Cross-autocorrelations in Stock Returns", *Economics Notes,* vol. 33, pp. 145-181.

Chordia, T. & Swaminathan, B. 2000, "Trading Volume and Cross Autocorrelations in Stock Returns", *Journal of Finance,* vol. 55, pp. 913-935.

Chung, K.H., Jo, H. & Shefrin, H. 2003, "Trading Volume Information and Trading Costs: Empirical Evidence", *Working Paper. Available at SSRN: http://ssrn.com/abstract=386360 or DOI: 10.2139/ssrn.386360*

Collins, D.W. & Korathi, S.P. 1989, "An Analysis of Intertemporal and Cross-sectional Determinants of Earnings Response Coefficients", *Journal of Accounting and Economics,* vol. 11, pp. 143-181.

Collins, D.W. & Hribar, P. 2000, "Earnings-based and Accrual-based Market Anomalies: One effect or two?", *Journal of Accounting and Economics,* vol. 29, pp. 101-123.

Collins, W.A. and Hopwood, W.S. 1980, "A multivariate analysis of annual earnings forecasts generated from quarterly forecasts of financial analysts and univariate time-series models," *Journal of Accounting Research*, 1, pp. 390 - 406.

Conrad, J., Kaul, G. & Nimalendran, M. 1991, "Components of Short Horizon Individual Security Returns", *Journal of Financial Economics,* vol. 29, pp. 365-384.

Constantinidies, G.M. 1986, "Capital Market Equilibrium with Transaction Costs", *Journal of Political Economy,* vol. 94, pp. 842-862.

Cooper, M. 1999, "Filter Rules Based on Price and Volume in Individual Security Overreaction", *The Review of Financial Studies,* vol. 12, pp. 901-935.

Cooper, R.A., Day, T.E. & Lewis, C.M. 2001, "Following the Leader: A Study of Individual Analysts‟ Earnings Forecasts", *Journal of Financial Economics,* vol. 61, pp. 383-416.

Copeland, T. & Galai, D. 1983, "Information effects on the bid-ask spread", *Journal of Finance* 38, 1457-1469.

Daniel, K. & Titman, S. 1997, "Evidence on the characteristics of Cross-Sectional Variation in Stock Returns", *Journal Of Finance,* vol. 52, pp. 1-33.

Datar, V.T., Naik, N.Y. & Radcliffe, R. 1998, "Liquidity and Stock returns: An Alternative Test", *Journal of Financial Market,* vol. 1, pp. 203-219.

Debondt, W.F.M. & Thaler, R.H. 1990, "Do Security Analyst Overreact?", *American Economic Review,* vol. 80, pp. 52-57.

Demetrescu, M. 2006, "What liquidity do hypothetical price impact curves measure?" *Applied Financial Economics Letters*, Volume 2, Issue 5, pp 301-303

Demsetz, H. 1968, "The cost of transacting", *The Quarterly Journal of Economics* 82, 33-53.

Denis, D.K., Mcconnell, J. J., Ovtchinnikov, A.V. & Yu, Y. 2003, "S&P 500 Index Additions and Earnings Expectations", *Journal of Finance,* vol. 58, no. 5, pp. 1821-1840.

Dhillon, U. & Johnson, H. 1991, "Changes in the Standard and Poor's 500 List", *Journal of Business,* vol. 64, pp. 75-85.

Diamond, D.W. & Verrecchia, R.E. 1987, "Constraints on Short Selling and Asset Price Adjustment to Private Information", *Journal of Financial Economics,* vol. 18, pp. 277-311.

Dichev, I. & Piotroski, J. 2001, "The Long Run Stock Returns following Bond Ratings Changes", *Journal of Finance,* vol. 56, no. 173, pp. 203.

Diether, K.B., Malloy, C.J., Scherbina, A. 2002, "Differences of Opinion and the Cross Section of Stock Returns", *Journal of Finance,* vol 57, pp. 2113-2141. 183

Dimson, E. & Hanke, B. 2002, "The Expected Illiquidity Premium: Evidence from Liquidity Index-linked Bonds", *Working Paper. Available at SSRN: http://ssrn.com/abstract=248617 or DOI: 10.2139/ssrn.248617*

Doukas, J.A., Kim, C. & Pantzalls, C. 2002, "A Test of the Errors-in-expectations Explanation of the Value/Glamour Stock Returns Performance: Evidence from Analysts' Forecasts", *Journal of Finance,* vol. 57, pp. 2143-2165.

Doyle, J.T., Lundholm R.J. & Soliman, M.T. 2006, "The Extreme Future Stock Returns Following I/B/E/S Earnings Surprises", *Journal of Accounting Research,* vol. 44, pp. 849-888.

Easley, D., Hvidkjaer, S. & O'Hara, M. 2002, "Is Information Risk a Determinant of Asset Returns?", *Journal of Finance,* vol. 57, pp. 2185-2221.

Easley, D. & O'Hara, M. 2003, "Microstructure and Asset Pricing" in *Handbook of Financial Economics*, eds. G. Constantinides, M. Harris & R. Stulz, 1st ed., Elsevier, New York, pp. 1021-1051.

Easley, D. & O'Hara, M. 1992, "Adverse Selection and Large Trade Volume: The Implications for Market Efficiency", *Journal of Financial and Quantitative Analysis,* vol. 27, pp. 185-208.

Easley, D. & O'Hara, M. 1992, "Time and Process of Security Price Adjustment", *Journal of Finance,* vol. 47, pp. 577-605.

Easterwood, J.C. & Nutt, S.R. 1999, "Inefficiency in Analysts' Earnings Forecasts: Systematic Miss-reaction or Systematic Optimism?", *Journal of Finance,* vol. 54, pp. 1777-1797.

Eleswarapu, V.R. & Reiganum, M.R. 1993, "The Seasonal Behaviour of the Liquidity Premium in Asset Pricing", *Journal of Financial Economics,* vol. 34, pp. 373-386.

Elgers, P.T., Porter, S.L., and Xu, L.E. 2008, "The timing of industry and firm earnings information in security prices: A re-evaluation", *Journal of Accounting and Economics,* vol. 45, pp 78-93.

Eston, P.D. & Zmijewski, M. 1989, "Cross-Sectional Variation in the Stock Market Response to Accounting Earnings Announcements", *Journal of Accounting & Economics,* vol. 11, pp. 117-141.

Fama, E.F. 1998, "Market Efficiency, Long-term Returns, and Behaviour Finance", *Journal of Financial Economics,* vol. 49, pp. 283-306.

Fama, E.F. 1991, "Efficient Markets: II", *Journal of Finance,* vol. 46, pp. 1575-1617.

Fama, E.F. 1970, "Efficient Capital Markets: A Review of Theory and Empirical Work", *Journal of Finance,* vol. 25, pp. 384-417. 184

Fama, E.F. & French, K.R. 1996, "Multifactor Explanations of Asset Pricing Anomalies", *Journal of Finance,* vol. 51, pp. 55-84.

Fama, E.F. & French, K.R. 1995, "Size and Book-to-market Factors in Earnings and Returns", *Journal of Finance,* vol. 50, pp. 131-155.

Fama, E.F. & French, K.R. 1993, "Common Risk Factors in the Returns on Stocks and Bonds", *Journal of Financial Economics,* vol. 33, pp. 3-56.

Fama, E.F. & French, K.R. 1992, "The Cross-section of Expected Stock Returns", *Journal of Finance,* vol. 47, pp. 427-465.

Fama, E.F. & MacBeth, J.D. 1973, "Risk, Return and Equilibrium: Empirical Tests", *Journal of Political Economy,* vol. 81, pp. 607-636.

Fang, L. & Yasuda, A. 2004, "Analyst Reputation, Underwriting Pressure, and Forecast Accuracy", *Working Paper. The Rodney L. White Centre for Financial Research.*

Forbes, W.P. & Skerratt. L.C.L. 1992. "Analyst Forecast Revisions and Stock Price movements", *Journal of Business Finance and Accounting,* vol.19, pp 555-569.

Foster, F.D. & Vishwanathan, S. 1993, "Variations in Trading Volume, Return Volatility and Trading Costs: Evidence on Recent Price Formation Models", *Journal of Finance,* Vol. 48, pp. 187-211.

Foster, F.D. & Viswanathan, S. 1990, "A Theory of the Intraday Variations in Volume, Variance, and Trading Costs in Securities Markets", *The Review of Financial Studies,* vol. 3, pp. 593-624.

Foster, G. 1977, "Quarterly Accounting Data: Time-Series Properties and Predictive Ability Results", *The Accounting Review,* vol. 52, pp. 1-21.

Foster, G., Olsen, C. & Shevlin, T. 1984, "Earnings Releases, Anomalies, and the Behaviour of Security Returns", *The Accounting Review,* vol. 59, pp. 574-603.

Francis, J., Schipper, K. & Vincent, L. 2002, "Earnings Announcements and Competing Information", *Journal of Accounting and Economics,* vol. 33, pp. 313-342.

Francis, J., Schipper, K. & Vincent, L. 2002, "Expanded Disclosures and the Increased Usefulness of Earnings Announcements", *The Accounting Review,* vol. 77, pp. 515-546.
Freeman, R.N. 1987, "The Association between Accounting Earnings and SecuriSecurities Returns for Large and Small Firms", *Journal of Accounting and Economics,* vol. 9, pp. 195-228.

Freeman, R.N. & Tse, S. 1989, "The Multi-period Information Content of Accounting Earnings: Confirmations and Contradictions of Previous Earnings Reports", *Journal of Accounting Research,* vol. 27, pp. 49-79.

Froot, K.A., Kim, M. & Rogoff, K. 2000, "The Law of One Price over 700 Years", *NBER Working Paper No. W5132. Available at SSRN: http://ssrn.com/abstract=225197*

Gafinkel, J.A. & Sokobin, J. 2006, "Volume, Opinion Divergence, and Returns: A Study of Post-Earnings-Announcement Drift", *Journal of Accounting Research,* vol. 44, pp. 85-103.

Garbade, K.D. 1982, "Pricing Corporate Securities as Contingent Claims", *MIT Press*.

Garman, M.B. & Ohlson, J. A. 1980, "Valuation of Risky Assets in Arbitrage Free Economies with Transaction Costs", *Journal of Financial Economics,* vol. 9, pp. 271-280.

Geert, B., Harvey, C.R. & Lundblad, C. T. 2006, "Liquidity and Expected Returns: Lessons from Emerging Markets". *AFA 2004 San Diego Meetings; EFA 2003 Annual Conference Paper No. 690. Available at SSRN: http://ssrn.com/abstract=424480 or doi:10.2139/ssrn.424480*

George, T.J., Kaul, G. and Nimalendran, M... 1991, "Estimation of the bid-ask spread and its components: A new approach", *The Review of Financial Studies* 4:4, 623-656.

Gervais, S., Kaniel, R. & Mingelgrin, D.H. 2001, "The High Volume Return Premium", *Journal of Finance,* vol. 56, pp. 877-919.

Glaser, M. & Weber, M. 2003, "Momentum and Turnover: Evidence from German Stock Market", *Schmalenbach Business Review,* vol. 55, pp. 108-135.

Gleason, C. & Lee, C. 2003, "Analyst Forecast Revisions and Market Price Discovery", *The Accounting Review,* vol. 78, pp. 1993-225.

Glosten, L. & Milgrom, P. 1985, "Bid, Ask and Transaction Prices in a Specialist Market with Heterogeneously Informed Traders", *Journal of Financial Economics,* vol. 14, pp. 71-100.

Glosten, L.R. & Harries, L.E. 1988, "Estimating the Components of the Bid-ask Spread", *Journal of Financial Economics,* vol. 21, pp. 123-142.

Glostern, L.R. 1987, "Components of the Bid-ask Spread and the Statistical Properties of Transaction Prices", *Journal of Finance,* vol. 42, pp. 1293-1307.

Gregoriou, A. 2009, "Earnings Announcement and the Components of the Vid-Ask Spread: Evidence from the London Stock exchange". *University of East Anglia working paper*.

Gregoriou, A. 2010, "Does Online Trading Increase the Liquidity of Illiquid Stocks: An Application to the FTSE AIM Index", *University of East Anglia working paper*.

Gregoriou, A. & Ioannidis. C. 2006, "Information Costs and Liquidity Effects from Changes in the FTSE 100 List", *European Journal of Finance,* vol. 12, pp. 347-360. 186

Gregoriou. A., Ioannidis, C. & Skerratt, L. 2005, "Information Asymmetry and the Bid-Ask Spread: Evidence from the UK", *Journal of Business Finance and Accounting,* vol. 32, pp. 1801-1826.

Griffin, P.A. 1977, "The Time-series Behaviour of quarterly Earnings: Preliminary Evidence", *Journal of Accounting Research,* vol. 15, pp. 71-83.

Griffin, P.A. & Zmijewski, M.E. 1987, "Securities Analyst Superiority Relative to Univariate Time-series Models in Forecasting Quarterly Earnings", *Journal of Accounting and Economics,* vol. 9, pp. 1-87.

Grossman, S.J. & Miller, M.H. 1988, "Liquidity and Market Structure", *Journal of Finance,* vol. 43, pp. 617-633.

Hana, J.D. & Ready. M.J. 2005, "Profitable Predictability in the Cross Section of Stock Returns", *Journal of Financial Economics,* vol. 78, pp. 463-505.

Hasbrouck, J. 1991, "The Summary Informativeness of Stock Trades: An Econometric Analysis", *The Review of Financial Studies,* vol. 4, pp. 571-594.

Hasbrouck, J. 2005, "Trading Costs and Returns for US Equities: The Evidence from Daily Data", *Working Paper. New York University. Available at SSRN: http://ssrn.com/abstract=388360 or DOI: 10.2139/ssrn.388360,*

Hasbrouck, J. & Seppi, D.J. 2001, "Common Factors in prices, Order Flows, and Liquidity", *Journal of Financial Economics,* vol. 59, pp. 383-411.

Heflin, F. & Shaw, K.W. 2000, "Blockholder Ownership and Market Liquidity", *Journal of Financial and Quantitative Analysis,* vol. 35, pp. 621-633.

Hegde, S.P. & McDermott, J.B. 2003, "The Liquidity Effects of Revisions to the S&P 500 Index: an Empirical Analysis", *Journal of Financial Market,* vol. 6, pp. 413-459.

Hew, D., Skerratt, L., Strong, N. & Warker, M. 1996, "Post Earnings Announcement Drift: Some Preliminary Evidence for the UK", *Accounting and Business Research,* vol. 26, pp. 283-293.
Hirshleifer, D. 2001, "Investor Psychology and Asset Pricing", *Journal of Finance,* vol. 56, pp. 1533-1598.

Hirshleifer, D., Myers, J., Myers, L.A. & Teoh, S.H. 2003, "Do individual investors drive post-earnings announcement drift", *Fisher College of Business, Ohio State University, and University of Illinois at Urbana-Champaign,* .

Hou, K. & Moskowitz, T.J. 2005, "Market frictions, price delay, and cross-section of expected returns", *Review of Financial Studies,* Vol. 18(3):981-1020

Huang, R. & Stoll, H. 1997, "The components of Bid-Ask Spread: A General Approach", *The Review of Financial Studies,* vol. 10, pp. 995-1034.

Huberman, G. & Halka, D. 2001, "Systematic Liquidity", *Journal of Financial Research,* vol. 24, pp. 161-178.

Ikenberry, D., Rankine, G. & Stice, E.K. 1996, "What Do Stock Splits Really Signal?", *Journal of Financial and Quantitative Analysis,* vol. 31, pp. 357-375.

Ikenberry, D., Lakonishok, J. & Vermaelen, T. 1995, "Market Underreaction to Open Market Share Repurchases", *Journal of Financial Economics,* vol. 39, pp. 181-208.

Jackson, A. & Johnson, T. 2006, "Unifying Underreaction Anomalies", *The Journal of Business,* vol. 79, no. 1, pp. 75-114.

Jacob, J., Lys, T.Z. & Neale, M.A. 1999, "Expertise in Forecasting Performance of Security Analysts", *Journal of Accounting and Economics,* vol. 28, pp. 51-82.

Jacob, J., Lys, T.Z. & Sabino, J. 2000, "Autocorrelation Structure of Forecast Errors from Time-series Models: Alternatives Assessments of the Causes of Post-Earnings-Announcement Drift", *Journal of Accounting and Economics,* vol. 28, pp. 329-358.

Jacoby, G., Flower, D.J. & Gottesman, A.A. 2000, "The Capital Asset Pricing Model and the Liquidity Effect: A Theoretical Approach", *Journal of Financial Market,* vol. 3, pp. 9-81.
Jegadeesh, N. & J. Livnat. 2006, "Revenue Surprises and Stock Returns", *Journal of Accounting & Economics,* vol. 41, pp. 147-171.

Jegadeesh, N. 1990, "Evidence of Predictable Behaviour in Security Returns", *Journal of Finance,* vol. 45, pp. 881-898.

Jegadeesh, N. & Titman, S. 1993, "Returns to Buying Winners and Selling Losers: Implications for Stock Market Efficiency", *Journal of Finance,* vol. 48, pp. 65-91.

Jensen, M.C. 1978, "Some Anomalous Evidence Regarding Market Efficiency", *Journal of Financial Economics,* vol. 6, pp. 95-105.

Jiang, G., Lee, C.M.C. & Zhang, Y. 2005, "Information Uncertainty and Expected Returns", *Review of Accounting Studies,* vol. 10, pp. 185-221.

Kanodia, C. 2006, "Discussion of Disclosure of Risk and Price Drift", *Journal of Accounting Research,* Vol 44 no.2.

Lee, C.M.C. & Swaminathan, B. 2000, "Price Momentum and Trading Volume", *The Journal of Finance,* Vol. 4, No. 5, pp. 2017-2069

Li, J. & Wu, C. 2003, "Daily Return Volatility, Bid-Ask Spreads, and Information Flow: Analyzing the Information Content of Volume" *The Journal of Business,* vol. 79, no.5

Johnson, W.B. & Schwartz, J.W.C. 2002, "Evidence that Capital Market Learn from Academic Research: Earnings Surprises and the Persistence of Post Earnings 188 Announcement Drift", *Working Paper. Available at SSRN: http://ssrn.com/abstract=255603 or DOI: 10.2139/ssrn.255603*

Jones, C.M. 2002, "A Century of Stock Market Liquidity and Trading Costs", *Working Paper. Columbia University. Available at SSRN: http://ssrn.com/abstract=313681 or DOI: 10.2139/ssrn.313681*

Jones, C.P. & Litzenberger, R.H. 1970, "Quarterly Earnings Reports and Intermediate Stock Prices Trends", *Journal of Finance,* vol. 25, pp. 143-148.

Joy, O.M. & Jones, C.P. 1979, "Earnings Reported and Market Efficiencies: An Analysis of the Contrary Evidence", *Journal of Financial Research,* vol. 1, pp. 51-63.

Karpoff, J.M. 1987, "The Relation Between Price changes and Trading Volume: A Survey", *Journal of Financial and Quantitative Analysis,* vol. 22, pp. 109-126.

Karpoff, J.M. 1986, "A Theory of Trading Volume", *Journal of Finance,* vol. 41, no. 5, pp. 1069-1087.

Ke, B. & Ramalingegowda, S. 2005, "Do Institutional Investors Exploit the Post-Earnings-Announcement Drift?", *Journal of Accounting and Economics,* vol. 39, pp. 25-53.

Keane, M.P. & Runkle, D.E. 1998, "Are Financial Analysts' Forecasts of Corporate Profits Rational?", *Journal of Political Economy,* vol. 106, pp. 768-806.

Keim, D.B. & Madhavan. A. 1998, "The Cost of Institutional Equity Trades", *Financial Analysts Journal,* vol. 54, pp. 50-69.

Keim, D.B. & Madhavan. A. 1996, "The Upstairs Market for Large-Block Transactions: Analysis and Measurement of Price Effects", *The Review of Financial Studies,* vol. 9, pp. 1-36.

Keim, D. & Madhavan, A. 1997, "Transactions Costs and Investment Style: An Interexchange Analysis of Institutional Equity Trades", *Journal of Financial Economics,* vol. 46, pp. 265-292.

Keim, D.B. 1983, "Size-related Anomalies and Stock Return Seasonality", *Journal of Financial Economics,* vol. 12, pp. 13-32.

Kim, D. & Kim, M. 2003, "A Multifactor Explanation of Post-Earnings-Announcement Drift", *Journal of Financial and Quantitative Analysis,* vol. 38, pp. 383-398.

Kim, O. & Verrecchia, R. E. 2001, "The Relation among Disclosure, Returns, and trading volume Information", *The Accounting Review*, Vol. 76, No.4, pp. 633-654

Kim, O. & Verrecchia. R. E. 1994, "Liquidity and Volume Around Earnings Announcements", *Journal of Accounting & Economics,* vol. 17, pp. 41-67.

Kluger, B.D. & Stephan, J. 1997, "Alternative liquidity measures and stock returns", *Review of Quantitative Finance and Accounting,* vol. 8, no. 1, pp. 19-36.

Knez, P.J. & Ready, M.J. 1997, "On the Robustness of Size and Book-to-Market in Cross-Sectional Regressions", *Journal of Finance,* vol. 52, pp. 1355-1382.

Knez, P.J. & Ready, M.J. 1996, "Estimating the Profits from Trading Stratergies", *The Review of Financial Studies,* vol. 9, pp. 1121-1163.

Korajczyk, R.A. & Sadka, R. 2004, "Are Momentum Profits Robust to Trading Costs", *Journal of Finance,* vol. 59, pp. 1039-1083.

Kothari, S.P. 2001, "Capital Markets Research in Accounting", *Journal of Accounting and Economics,* vol. 31, pp. 105-231.

Kothari, S.P., Lewellen, J.W. & Warner, J.B. 2006, "Stock Returns, Aggregate Earnings Surprises, and Behavioural Finance", *Journal of Financial Economics,* vol. 79, pp. 537-568.
Kothari, S.P. & Sloan, R.G. 1992, "Information in Prices about Future Earnings: Implications for Earnings Response Coefficients", *Journal of Accounting and Economics,* vol. 15, pp. 143-171.

Kothari, S.P. & Warner, J.B. 1997, "Measuring Long-horizon Security Price Performance", *Journal of Financial Economics,* vol. 43, pp. 301-339.

Kraft, A. 1999, "Accounting-based and Market-based Trading Rules", *Unpublished Working Paper. University of Rochester*

Kraus, A. & Stoll, H.R. 1972, "Price impacts of block trading on the New York Stock Exchange", *Journal of Finance,*, pp. 569-588.

Krinsky, I. & Lee, J. 1996, "Earnings Announcement and the Components of the Bid-Ask Spread", *Journal of Finance,* vol. 51, pp. 1523-1535.

Kross, W. & Kim, M. 1999, "Differences Between Market Responses to Earnings Announcements in the 1990's versus 1960's", *Unpublished Working Paper, Purdue University*

Kyle, A.S. 1985, "Continuous Auctions and Insider Trading", *Econometrica,* vol. 53, pp. 1315-1335.

Lakonishok, J., Shleifer, A. & Vishny, R.W. 1994, "Contrarian Investment, Extrapolation and Risk", *Journal of Finance,* vol. 49, pp. 1541-1578.

Landsman, W.R. & Maydew, E.L. 2002, "Has the Information Content of Quarterly Earnings Announcements Declined in the Past Three Decades?", *Journal of Accounting Research,* vol. 40, pp. 797-808.

Latane', H.A. & Jones, C.P. 1979, "Standardized Unexpected Earnings 1971-77", *Journal of Finance,* vol. 34, pp. 717-724
.
Latane', H.A. & Jones, C.P. 1977, "Standardized Unexpected Earnings - A Progress Report", *Journal of Finance,* vol. 32, pp. 1457-1465.

Latane', H.A., Joy, O.M. & Jones, C.P. 1970, "Quarterly Data, Sort-rank Routines, and Security Evaluation", *Journal of Business,* vol. 43, pp. 427-438.

Lee, C.M.C. 2001, "Market Efficiency and Accounting Research: A Discussion of "Capital Market Research in Accounting" by S. P. Kothari", *Journal of Accounting & Economics,* vol. 31, pp. 233-253.

Lee, C.M.C. 1992, "Earnings News and Small Traders", *Journal of Accounting & Economics,* vol. 15, pp. 265-302.

Lee, C.M.C., Mucklow, B. & Ready, M.J. 1993, "Spreads, Depths, and the Impact of Earnings Information: An Intraday Analysis", *The Review of Financial Studies,* vol. 6, pp. 345-374.

Lee, C.M.C. & Ready, M.J. 1991, "Inferring Trade Direction from Intraday Data", *Journal of Finance,* vol. 46, pp. 733-746.

Lee, C.M.C. 2000, "Price Momentum and Trading Volume", *Journal of Finance,* vol. 55, pp. 2017-2069.

Lesmond, D.A., Schill, M.J. & Zhou, C. 2004, "The Illusory Nature of Momentum Profits", *Journal of Financial Economics,* vol. 71, pp. 349-380.

Lesmond, D.A. 2005, "Liquidity of Emerging Markets", *Journal of Financial Economics,* vol. 77, pp. 411-452.

Lesmond, D.A., Ogden, J.P. & Trzcinka, C.A. 1999, "A New Estimate of Transaction Costs", *The Review of Financial Studies,* vol. 12, pp. 1113-1141.

Lev, B. & Ohlson, J. 1982, "Market Based Empirical Research in Accounting: A Review, Interpretation, and Examination", *Journal of Accounting Research, Supplement,* pp. 249-322.

Liang, L. 2003, "Post-Earnings-Announcement Drift and Market Participants' Information Processing bias", *Review of Accounting Studies,* vol. 8, pp. 321-345.

Lin, J., Sanger, G., and Booth. G. 1995, "Trade size and Components of the Bid-Ask Spread", *The Review of Financial Studies* 8, 1153-1183.

Lintner, J. 1965, "The Valuation of Risk Assets and the Selection of Risky Investments in Stock Portfolios and Capital Budget", *Review of Economics and Statistics,* vol. 47, pp. 13-17.

Liu, W. 2006, "A Liquidity-Augmented Capital Asset Pricing Model", *Journal of Financial Economics,* vol. 82, pp. 631-671.

Liu, W. 2000, "Price Momentum in the UK Stock Market", *PhD Dissertation. The University of Manchester*

Liu, W. & Strong, N. 2003, "Post Earnings-Announcement Drift in the UK", *European Financial Management,* vol. 9, pp. 89-116.

Livnat, J. & Mendenhall, R.R. 2006, "Comparing Post-Earnings-Announcements Drift for Surprises Calculated from Analyst and Time-Series Forecasts", *Journal of Accounting Research,* vol. 44, pp. 177-205.

Lo, A.W., Mamaysky, H. & Wang, J. 2004, "Asset Prices and Trading Volume under Fixed Transaction Costs", *Journal of Political Economy,* vol. 112, pp. 1054-1090.

Lo, A.W. & Wang, J. 2000, "Trading Volume: Definitions, Data Analysis and Implications of Portfolio Theory", *The Review of Financial Studies,* vol. 13, pp. 257-300.

Lo, K. & Lys, T.Z. 2001, "Bridging the Gap Between Value Relevance and Information Content", *Sauder School of Business Working Paper. Available at SSRN: http://ssrn.com/abstract=253369 or DOI: 10.2139/ssrn.253369.*

Lys, T. & Sohn, S. 1990, "The Association Between Revisions of Financial Analysts' Earnings Forecasts and Security Price Changes", *Journal of Accounting and Economics,* vol. 13, pp. 341-364.

Madhavan, A., Richardson, M. & Roomans, M. 1997, "Why do security prices change? A transaction-level analysis of NYSE stocks", *Review of Financial Studies,* pp. 1035-1064.

Majois, C. & De Winne, R. 2003, "A comparison of alternative spread decomposition models on Euronext Brussels", *Brussels Economic Review,* vol. 46, no. 4, pp. 91-135.

Masse, I., Hanrahan, R. Kushner, J., & Martinello, F. 2000, "The Effects of Additions to or Deletions from the TSE 300 Index on Canadian Share Prices", *Canadian Journal of Economics,* vol. 33, pp. 341-359.

Mendenhall, R.R. 2002, "How Naive Is the Market's Use of Firm-Specific Earnings Information?", *Journal of Accounting Research,* , pp. 841-863.

Mendenhall, R.R. 2004, "Arbitrage Risk and Post-Earnings-Announcement-Drift", *Journal of Business,* vol. 77, pp. 875-895.

Mendenhall, R.R. 1991, "Evidence on the Possible Underweighting of Earnings-related Information", *Journal of Accounting Research,* vol. 29, pp. 170-179.

Mendenhall, R.R. & Battalio, R.H. 2007, "Post-Earnings-Announcement Drift: Timing and Liquidity Cost", *Working Paper. Available at SSRN: http://ssrn.com/abstract=937257.*

Menyah, K. & Paudyal, K. 2000, "The components of bid-ask spreads on the London Stock Exchange", *Journal of Banking & Finance.,* vol. 24, no. 11, pp. 1767-1785.

Menyah, K. & Paudyal, K. 1998, *The components of bid-ask spreads on the London Stock Exchange,* London Guildhall University, Centre for International Capital Markets.

Merton, R. 1980, "On Estimating the Expected Rate of Return on the Market", *Journal of Financial Economics,* vol. 8, pp. 323-362.

Mikhail, M.B., Walther, B.R. & Willis, R.H. 2003, "The Effect of Experience on Security Analyst Underreaction", *Journal of Accounting and Economics,* vol. 35, pp. 101-116.

Morse, D. 1982, "Wall Street Journal Announcements and the Securities Market Behaviour", *Financial Analysts Journal,* vol. 38, pp. 69-76.

Moskowitz, T.J. 1999, "An Analysis of Risk and Pricing Anomalies", *CRSP Working Paper No. 500. Available at SSRN: http://ssrn.com/abstract=214169 or DOI: 10.2139/ssrn.214169*
.
Newey, W.K. & Kenneth, D.W. 1987, "A Simple, Positive Semi-Definite, Hetroskedasticity and Autocorrelation Consistent Covariance Matrix", *Econometrica,* vol. 55, pp. 703-708.

Ng, J., Rusticus, T. O., & Verdi, R.S. 2008, "Implications of Transaction Costs for the Post Earnings Announcement Drift" *Journal of Accounting Research*. Vol 46 pp. 661-696.

O'Brien, P.C. 1988, "Analysts Forecasts as Earnings Expectations", *Journal of Accounting and Economics,* vol. 10, pp. 53-83.

Ofek, E. & Richardson, M. 2003, "Dotcom Mania: The Rise and Fall of Internet Stock prices", *Journal of Finance,* vol. 58, pp. 1113-1137.

O'Hara, M. 2003, "Presidential Address: Liquidity and Price Discovery", *Journal of Finance,* vol. 58, pp. 1335-1354.

O'Hara, M. & Oldfield, G.S. 1986, "The Microstructure of Market Making", *Journal of Financial and Quantitative Analysis,* vol. 21, pp. 361-376.

Ou, J.A. & Penman, S.H. 1989, "Accounting Measurement, Price Earnings Ratio and the Information Content of Security Prices", *Journal of Accounting Research,* vol. 27, pp. 111-144.

Pastor, L. & Stambaugh, R.F. 2003, "Liquidity Risk and Expected Stock Returns", *Journal of Political Economy*, vol. 111, pp. 642-685.

Penman, S.H. 1987, "The Distribution of Earnings News Over Times and Seasonality's in Aggregate Stock Returns", *Journal of Financial Economics,* vol. 18, pp. 199-228.

Peterson, M.A. & Fialkowshi, D. 1994, "Posted versus Effective Spreads: Good Prices or Bad Quotes?" *Journal of Financial Economics,* vol. 35, pp. 269-292.

Pontiff, J. 2006, "Costly Arbitrage and the Myth of Idiosyncratic Risk", *Journal of Accounting & Economics,* vol. 42, pp. 35-52.

Porter, R.B. 2003, "Measuring Market Liquidity", *Working Paper. University of Florida,*
Rangan, S. & Sloan, R.G. 1998, "Implications of the Integral Approach to Quarterly Reporting for the Post-Earnings-Announcement Drift", *The Accounting Review,* vol. 73, pp. 353-371.

Reinganum, M.R. 1981, "Misspecification of Capital Asset Pricing", *Journal of Financial Economics,* vol. 9, pp. 19-46.

Rendleman, R.J., Jones, C.P. & Latane', H.A. 1987, "Further Insight into the Standardized Unexpected Earnings Anomaly: Size and Serial Correlation Effects", *the Financial Review,* vol. 22, pp. 131-144.

Rendleman, R.J., Jones, C.P. & Latane', H.A. 1982, "Empirical Anomalies Based on Unexpected Earnings and the Importance of Risk Adjustment", *Journal of Financial Economics,* vol. 10, pp. 269-287.

Roll, R. 1984, "A simple implicit measure of the effective bid-ask spread in an efficient market", *Journal of Finance,,* pp. 1127-1139.

Sadka, G. & Sadka. R. 2004, "The Post Earnings-Announcement Drift and Liquidity Risk", *Working paper, Columbia University.*

Sadka, R. 2006, "Momentum and Post-Earnings-Announcement Drift Anomalies: The Role of Liquidity Risk", *Journal of Financial Economics,* vol. 80, pp. 309-349.

Sadka, R. 2004, "Liquidity Risk and Asset Pricing", *Unpublished Working Paper. University of Washington,*

Schadewitz, H.J., Kanto, A.J., Kahra, H.A. & Blevins, D.R. 2005, "Post- announcement drift in an emerging market", *International Journal of Accounting, Auditing and Performance Evaluation AA*, Vol. 2(1), pp..168-185

Scherbina, A. 2006, "Analyst Disagreement, Forecast Bias and Stock Returns", *Harvard Business School Publishing, Forthcoming. Available at SSRN: http://ssrn.com/abstract=894381,*

Schipper, K. 1991, "Analysts' Forecasts", *Accounting Horizons,* vol. 5, pp. 105-121.

Schwert, G.W. 2003, "Anomalies and Market Efficiency" in *Handbook of the Economics of Finance*, eds. G.M. Constantinides, M. Harris & R.M. Stulz, Elsevier, pp. 939-974.

Schwert, G.W. 1983, "Size and Stock Returns, and Other Empirical Regularities", *Journal of Financial Economics,* vol. 12, pp. 3-12.

Seppi, D.J. 1990, "Equilibrium block trading and asymmetric information", *Journal of Finance*, pp. 73-94.

Shanken, J. 1992, "On the Estimation of Beta Pricing Models", *The Review of Financial Studies*, vol. 5, pp. 1-24.

Sharpe, W. 1964, "Capital Asset Prices: A Theory of Market Equilibrium Under Conditions of Risk", *Journal of Finance,* vol. 19, pp. 425-442.

Shin, H.S. "Disclosure Risk and Price Drift", *Journal of Accounting Research.* vol. 44, pp. 351-379.

Shiva Kumar, L. 2006, "Accruals, Cash Flows and the Post-Earnings-Announcement Drift", *Journal of Business Finance and Accounting*, vol. 33, pp. 1-25.

Shleifer, A. 1986, "Do Demand Curves for Stocks Slope Down", *Journal of Finance,* vol. 41, pp. 579-590.

Sloan, R.G. 1996, "Do Stock Prices Fully Reflect Information in Accruals and Cash Flows about Future Earnings", *The Accounting Review*, vol. 71, pp. 289-315.

Smith, B.F., Turnbull, D. A. S. & White. R. W. 2001, "Upstairs Market for Principal and Agency Trades: Analysis of Adverse Selection and Price Effects", *Journal of Finance*, vol. 56, pp. 1723-1746.

Soffer, L.C., Lys, T. & Thomas, J.K. 1999, "Post-Earnings-Announcement Drift and the Dimension of Predictable Information", *Contemporary Accounting Research*, vol. 16, pp. 302-331.

Spiegel, M. & Wang, X. 2006, "Cross-sectional Variation in Stock Returns: Liquidity and Idiosyncratic Risk", *Yale ICF Working Paper No. 05-13; EFA 2005 Moscow Meetings Paper. Available at SSRN: http://ssrn.com/abstract=709781.*

Strong, N. 1992, "Modelling Abnormal Returns: A Review Article". *Journal of Business Finance and Accounting,* vol.19, pp 533-553.

Stange, S. & Kaserer, C. 2008, "The Impact of Order Size on Stock Liquidity-A Representative Study", *CEFS Working Paper No. 2008-9, Available at SSRN: http://ssrn.com/abstract=1292304.*

Stickel, S.E. 1991, "Common Stock Returns Surrounding Earnings Forecasts Revisions: More Puzzling Evidence", *The Accounting Review,* vol. 66, pp. 402-416.

Stickel, S.E. & Verrecchia, R.E. 1994, "Evidence that Trading Volume Sustains Stock Price Changes", *Financial Analysts Journal,* vol. 50, pp. 57-71.

Stoll, H.R. 2000, "Friction", *Journal of Finance,* vol. 56, pp. 1-31
.
Stoll, H.R. 1989, "Inferring the Components of the Bid-Ask Spread: Theory and Empirical Tests", *The Journal of Finance,* vol.44, no.1, pp. 115-134.

Stoll, H.R. 1985, "The Stock Exchange Specialist System: An Economic Analysis" Monograph Series in Finance and Economics, no. 1985-2. *New York University: Salomon Brothers Centre for the Study of Financial Institutions*.

Stoll, H.R. & Whalley, R.H. 1983, "Transaction Cost and the Small Firm Effect", *Journal of Financial Economics,* vol. 12, pp. 57-79.
Stoll, H.R., 1978, "The supply of dealer services in security markets", *Journal of Finance* 33, 1133-1151.

Tinic, S.M., 1972, "The economics of liquidity services", *Quarterly Journal of Economics 86*, 79-83.

Tkac, P.A. 1999, "A Trading Volume Benchmark: Theory and Evidence", *Journal of Financial and Quantitative Analysis,* vol. 34, pp. 89-114.

Van Horne, J.C. 1970, "New Listings and their Price Behaviour", *Journal of Finance,* vol. 24, pp. 783-794.

Van Ness, B.F., Van Ness, R.A. & Warr, R.S. 2001, "How well do adverse selection components measure adverse selection?", *Financial Management,* , pp. 77-98.

Vega, C. 2006, "Stock Price Reaction to Public and Private Information", *Journal of Financial Economics,* vol. 82, pp. 103-133.

Vespro, C. 2006, "Stock Prices and Volume Effects Associated with Compositional Changes in European Stock Indices", *European Financial Management,* vol. 12, no. 1, pp. 103-127.
Vijh, A.M. 1990, "Liquidity of the CBOE equity options", *Journal of Finance*, Vol. 45, 1157-1180

Voetmann, T. 2001, "Changes in The Bid-Ask Components Around Earnings Announcements: Evidence from the Copenhagen Stock Exchange", *Copenhagen Business School, Department of Finance. Working Papers 2000*

Wang, J. 1994, "A Model of Competitive Stock Trading Volume", *Journal of Political Economy,* vol. 102, pp. 127-168.

Watt, R.L. 1978, "Systematic Abnormal Returns after Quarterly Earnings Announcements", *Journal of Financial Economics,* vol. 6, pp. 127-150.

White, H. 1980, "A Hetroskedasticity-consistent covariance matrix estimator and a direct test of Hetroskedasticity", *Econometrica,* vol. 48, pp. 817-838.

Wiggins, J.B. 1991, "Do Misperceptions about the Earnings Process Contribute to Post-Announcement Drift?" *Working Paper. Cornell University.*

Winne, R. and Majois, C. 2007, "A Comparison of Alternative Spread Decomposition Models on Euronext Brussels" *Working paper. Available at SSRN: http://ssrn.com/abstract=421240 or doi:10.2139/ssrn.421240*

Wurgler, J. & Zhuravskays, E. 2002, "Does Arbitrage Flatten Demand Curves for Stocks", *Journal of Business,* vol. 75, pp. 583-609.

Zaromin, P. 1990, "Size, Seasonality and Stock Market Overreaction", *Journal of Financial and Quantitative Analysis,* vol. 25, pp. 113-125.

Zaromin, P. 1989, "Does the Stock Market Overreact to Corporate Earnings Information?" *Journal of Finance,* vol. 44, pp. 1385-1399.

Zhang, X.F. 2006, "Information Uncertainty and Analyst Forecast Behaviour", *Contemporary Accounting Research,* vol. 23, pp. 565-590.

Zhang, X.F. 2006, "Information Uncertainty and Stock Returns", *Journal of Finance,* vol. 61, pp. 105-136.