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What Can Twitter Tell Us about the Stock Price? Evidence from the UK

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Abstract

The announcement of a certain event taking place is important and effective for the stock market and shares returns even more than the effectiveness and significance of the event itself. The aim of this thesis is to test the effect of financial events announcements via social media, specifically Twitter on share prices and returns for a sample of the top 100 companies listed in London stock exchange (FTSE 100). Our research questions had been tested on a sample of 833 event date observations retrieved from official Twitter accounts for two years (1st of January 2014 - 16th of February 2016). The test is concerned about tracking the stock return behavior around events announcements, through calculating abnormal return (AR), average abnormal return (AAR), cumulative average abnormal return (CAAR) and t-test on the event day (day 0), the pre-event window and post-event window using the event-study methodology. This study had found out that there is a significant relationship between the events announced via Twitter, the type of tweets, news categories and tweeting intensity of the company and share prices, while classifying based on the industry of the announcing company has an insignificant relationship with share returns.

Keywords *Abnormal returns, Events announcements, Share prices*.

JEL Codes G120, G400

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1. Introduction

Stock market is a very sensitive financial market, where any event taking place can affect it and as a result affect share prices of various stocks. But still what is more important and effective for the stock market and the shares' returns than the events taking place is their announcement. The effects of a certain event announcement on share prices have been a major topic in the research of finance and have always been known as "event studies". These studies were aiming at first to detect whether capital markets are efficient or not, while at the same time consider the trading decisions of investors after the announcement of corporate events (Ramesh and Nimalathasan, 2011; Sharma, 2011; Dragota and Oprea, 2014; Rajamohan and Muthukamu, 2014). The event study methodology may seem complicated in its application although it is very simple in concept. This method is one of the econometrics' branches and the most commonly used techniques in financial researches. It is also the most effective and commonly used method in testing how stock prices and returns' behavior respond to certain events announcements (Schweitzer, 1989; Dulwich, 2006; Beverley, 2008; Asamoah, 2010; Sharma, 2011; Stankevičienė and Akelaitis, 2014).

Firms' dealings with their investors have been greatly affected these days after the great shifts that have taken place in the communication technology world and specially the online communication. It is now easier for companies to provide investors with more information through publishing them on their websites, making them available on Google for easy search and through the internet stock message boards discussions. Not only such means that have affected investors relations and firms' communications, but also some new technologies have appeared providing companies with additional networks called Direct-Access Information Technologies (DAITs) or social media (Blankespoor, Miller and White 2013). Twitter(one of the social media tools) and its rapid popularity, have opened up several prospects for business firms to enhance their investors' relations, through reaching them and their consumers in a dialogue way in which they are adapted to. Its short texts feature (tweets) have made it the most popular social media tool in investors' relations; as it allows firms to shortly announce about any corporate news, and to be connected with its stakeholders and investors in real time (Dixit, 2011; Thoring, 2011; Blankespoor et al., 2013; Ranco et al., 2015).

From the articles reviewed and the previous researches studied, it has been agreed that events announcements do affect shares' prices. To the extent of my knowledge, most of the existing researches have only taken one type of events into consideration when studying market reaction. Very few researches have studied the effect of all types of financial events announcements collectively on share price. Even these studies were only concerned with the formal and traditional announcement techniques and not those announced via social media (Twitter). Thus our research gap and the objective of this study is investigating the effect of financial events announced via social media (Twitter) by the FTSE 100 companies on their share returns and investigating the link between the intensity of tweeting (announcing events via social media – a proxy for companies' activity) and the magnitude of market reaction. The study will test this through statistical analysis

of the relationship between the events announcements (the independent variable) and share price (the dependent variable). The aim of this research is to find whether investors can receive abnormal returns from price movements or not by investigating if there is any effect on share returns from the different types of events announcements and the tweeting intensity. Thus our research questions will be:

RQ1: Do financial events announcements via social media affect companies' share prices?

RQ2: Does the intensity of events announcements via social media affect the magnitude of market reaction?

The structure of the paper is as follows: Chapter 2, reviews the literature review behind the topic and pre-mentioned theories had been developed, Chapter 3 discusses the hypotheses based on previous studies. Chapter 4 is about the research design, sample under study and the methodology used. The findings and analysis have been presented after that in chapter 5. And finally in chapter 6, a summary and conclusion for the whole research had been presented along with the study's limitations and recommendations for future research.

2. Literature Review

2.1 Share Price

Many investors are using the changes in share prices as an indication of the company's performance; since it should be reflecting information about its profitability and effectiveness, and also should be an indication of how certain events can affect the company and its share price. The share market price can be defined as the current or present price available in the stock exchange trading market and by which the share is traded. It should be a reflection of the share's true value given all available public information. Thus, when new information become available in the market concerning certain stocks, their share price should be adjusted (either increase or decrease) according to the new news (Anderson-Weir, 2010; Asamoah, 2010; Vardavaki and Mylonakis, 2013; Geetha and Swaaminathan, 2015; Sharif, Purohit and Pillai, 2015).

Investors and institutions usually compare the share market price with an estimated value of the company's share to help them in deciding whether they should buy or sell (all or part of) the company's shares. Also, share prices and their movements - pre and post certain events - can help in understanding how effective was such an event to the company through analyzing the direction and the magnitude of share returns (Anderson-Weir, 2010; Asamoah, 2010; Ramesh and Nimalathasan, 2011; Sharif et al., 2015).

Many factors can affect shares' values, which all can be categorized into two main groups, which are Market–wide factors (external factors – factors that are related to the whole market) and the firm–specific factors (internal factors – factors that are related to a specific company only). The market–wide factors can be simply defined as the factors that affect all companies in the market and their shares' returns, and hence are called systematic risk. This risk is what creates a

risk premium for the market return above the risk free rate. Those factors are like the market conditions, natural disasters, political events like strikes, business cycle, government regulations, and investors' attitudes. While on the other hand, firm specific factors are mainly factors related to the performance of a specific company, its internal decisions and structure. There are many factors related to specific companies and their internal organization that affects their market share returns, most significant of which are for example its board structure, dividends per share, dividends yield, earnings per share, book value of the share, book value of the firm, its profitability as for example its return on equity ratio, asset position, debt to asset ratio and price earnings ratio while taking into consideration firm size. A mixture of both market and firm specific factors affect shares' returns (London stock exchange, 2013; mi Choi, 2014; Geetha and Swaaminathan, 2015; Sharif et al., 2015).

2.2 Events Announcements

Stock market is a very sensitive financial market, where any event taking place can affect it and as a result affect share returns of various stocks, but still what is more important and effective for the stock market and shares prices than the events taking place is their announcement (Ramesh and Nimalathasan, 2011; Sharma, 2011; Dragota and Oprea, 2014; Rajamohan and Muthukamu, 2014). Events are short-term occasions, were some are planned for while others can be unexpected. Each event has its own time, duration and execution. For an occasion to be considered as an event, some criteria should be met. First, they should not occur frequently in the year (usually just once). Second, they should be announced to the public in order to increase stakeholders' awareness about the firm. Corporate events term is usually referred to the actions were the company or the firm carries out in order to accomplish a certain goal and will have an effect on the firm's market value and thus its share value. (Savolainen and Davidsson, 2005; Mirić and Petrović, 2013; Vardavaki and Mylonakis, 2013).

Corporate events have many types, were the most popular are: Dividends and bonus announcements, earnings announcements, financial reports announcement, stock issuance or stock split and mergers and acquisition. There have been several approaches for classifying different types of events and information (Kotane, 2012). Some researchers as (Meek, Roberts and Gray, 1995) have classified events into three major categories: financial, non-financial and strategic, further classifying them into twelve minor categories. Others as (Phillips and Louvieris, 2005) have classified events into 4 main categories: financial, innovation, internal business processes and customer events. While some have simply classified events into two general categories: financial and non-financial events. Events can further be classified into two categories or classes: negative events and which are events conveying bad news and positive events were good news are conveyed (Fama, 1970; Kadiyala and Rau, 2004; Cuellar, Fuertes and Lainez Gadea, 2006; Kotane and Kuzmina-Merlino, 2012; Kim and Abdullah, 2013; Rajamohan and Muthukamu, 2014).

It is now easier for companies to provide investors with more information through publishing them on their websites, making them available on Google for easy search, through the internet

stock message boards discussions and the different Direct-Access Information Technologies (DAITs). DAITs or what is known a social media is a growing group of online tools that aids in online participation and communication through its different technologies and sites such as: social networks (e.g. Facebook and Twitter), blogs and micro-blogs, wikis, news sites with interactive or comment features, virtual worlds and media-sharing sites. These networks are called DAITs as they allow firms to reach investors directly. DAITs use the "push" technology, where information is sent from the firm to investors without the need for investors to request for it. DAITs, social media and new online technologies as Twitter can decrease information asymmetry problem when firms disclose information to investors directly and immediately instead of relying on a third party (Merrill et al., 2011; Thoring, 2011; Blankespoor et al., 2012; Blankespoor et al., 2013; Ranco et al., 2015).

Twitter is considered as one of the social media categories and a popular social networking website. It is a free micro-blogging site on the internet, maybe the most famous of them all, with many social networking features. It is considered the best tool used when referring to other websites when online information is required. Twitter and its rapid popularity, have opened up several prospects for business firms to enhance their investors' relations, through reaching them and their consumers in a dialogue way in which they are adapted to. Its short texts feature have made it the most popular social media in investors' relations too; as it allowed firms to shortly announce about any corporate news, and to be connected with its stakeholders and investors in real time. Consequently, those responsible for firms' investors' relations choose Twitter's technology as their social media tool through which they can disclose their news in real time, promoting events to their stakeholders and announcing extensions and offers to them (Dixit, 2011; Merrill et al., 2011; Thoring, 2011; Blankespoor et al., 2012; Blankespoor et al., 2013; Ranco et al., 2015).

2.3 Theoretical Framework

For more than forty years, it has been argued about how promptly share prices can reflect their real values, responding to the available information. It has been proved in many previous papers throughout the past decades, both theoretically and empirically, that stock markets are efficient markets. While on the other hand, some researchers argue that abnormal returns can be earned as investors did not get the same amount of information at the same points of time due to the presence of information asymmetry (Fischel, 1978; Chan, 2003; Biràu, 2011; Blankespoor et al., 2013). This leads to the herding behavior as some investors think that they are less informed than others and as a result follows their actions. They observe how other investors had interpreted a certain signal and follow them affecting share prices movements and accumulating the market at one side(Connelly, Certo, Ireland and Reutzel, 2011; Burke, Schultz and Tobler, 2012; Cipriani and Guarino, 2012; Boortz, Jurkatis, Kremer and Nautz, 2013). In this section, four different theories underlying our topic will be explained which are: the efficient market theory, the information asymmetry theory, the signaling theory and the herding theory.

In 1969 and 1970, when Eugene Fama published his article "Efficient Capital Markets: a review of theory and empirical work", the articulation of the efficient market theory was made. Fama (1970) in his article has described the efficient market theory by the words "fair game". Efficient markets are those where prices fully, accurately and instantly reflect all available and newly announced public information, to all investors, and which cannot be beaten by investors even in the long-run. It can also be simplified by saying that an efficient market can be determined by two simple conditions: First, the intrinsic value of a share should be equal to its market price or at least following its same trend, which indicates that all of the past and present announced information are reflected in the price. And second, when all investors can equally and correctly assess all the market shares and as a result no abnormal returns can be earned by anyone (Fama, 1970;Fischel, 1978; Schweitzer, 1989; Dimson and Mussavian, 1998; Asamoah, 2010; Biràu, 2011; Jayakumar, Thomas and Ali, 2012; Stankevičienė and Akelaitis, 2014; Dragota and Oprea, 2014).Social media aids in achieving its definition by allowing firms to instantly announce its corporate events to all investors at the same time.

Akerlof's (1970) in his paper "The Market for "Lemons": Quality Uncertainty and the Market Mechanism" has first introduced the information asymmetry theory. The information asymmetry theory was mainly grounded from the agency theory. Information asymmetry theory is about having a group of participants who are more informed than or pre-informed before another group of participants. The reason behind such theory is that managers (the informed group) usually surpass information about the company over investors (the uninformed group). Also, not all investors get the same amount of information and at the same points of time, resulting in different investors' attitudes, expectations and decisions, affecting the company's performance. This is due to the limited sources of information that investors can reach in a limited time. As a result, firms should disclose all of its information in more channels that are highly visible to investors; to ensure that they reach a broad set of investors and that the information asymmetry problem is decreased (McColgan, 2001; Auronen, 2003; Marcel, Oran and Otgon, 2010; Blankespoor et al., 2013; Black et al., 1930).Social media helps investors to overcome the problem of having limited sources of information and firms to ensure that their information have reached a broad set of investors as it is highly visible.

Asymmetric information theory and the problem of management being more informed than investors about the future performance of the company has led to the development of the signaling theory. Signaling theory is mainly concerned with reducing the information asymmetry problem between both agents (insiders and investors). Insiders usually give signals to investors through their observable actions. If insiders take specific actions concerning the firm, which had not been communicated or noticed by investors, they should not be considered as signals. Insiders must not only focus on what information should they communicate and how their actions can give signals about the firm, but they should also focus on how to communicate such signals to investors. If the communication medium between insiders and investors reduces the extent of observing the signal, environmental distortions problem occurs. Information distortion may affect share prices as they

affect investors' interpretation and thus their decision making process. Investors should focus on how they should interpret such signals and make decisions accordingly (BliegeBird et al., 2005; Connelly et al., 2011; Nguyen, 2011). Social media helps broadening the observation of insiders' signals by investors and thus increasing the signals' effectiveness and aiding investors in their decision making process

The performance of financial markets is significantly threatened by the herding behavior among investors. Theoretical literature about the herding theory, its causes and consequences had first been introduced by Banerjee (1992), Bikhchandani et al. (1992) and Welch (1992). Herding behavior had become a critical financial term after the widespread of several financial crises. It had been mentioned that it causes distortions in the financial markets as informational inefficiency and higher volatility rates in stock returns (Bikhchandani and Sharma, 2001; Cipriani and Guarino, 2012; Boortz et al., 2013). Insiders usually take decisions based on known private information. When the same action is repeated by several agents, other following agents usually consider it as a signal, imitating their behavior and following their decision, disregarding their own interpretations. Investors may also change their inferences about certain information after observing insiders' actions. Herding behavior is defined as the switch in investors' interpretations and actions with a tendency to follow the crowd and accumulate at one side of the market affecting movements in share returns (Burke et al., 2012; Cipriani and Guarino, 2012; Boortz et al., 2013). Social media helps decreasing the herding problem, as all information are instantly announced allowing all investors to access them and correctly assess assets' values and returns and as a result be certain about their interpretations and make their own decision instead of imitating others' behaviors.

Reed Hasting, the CEO of Netflix had once posted that Netflix's monthly online viewing hours had surpassed the one billion on his personal Facebook account. The market had intensively reacted to such online announcement and the company's share price had increased by 6.2% on the same day. Since then, a new investigation had been conducted and it had been declared that all regulations controlling online (companies' official websites) announcements and disclosures should also be applied on social media websites for their effect on share prices (Zhou, Lei, Wang, Fan and Wang, 2014). DAITs or what is known a social media is a growing group of online tools that aids in online participation and communication through its different technologies and sites such as: social networks (e.g. Facebook and Twitter), blogs and micro-blogs, wikis, news sites with interactive or comment features, virtual worlds and media-sharing sites. These networks are called DAITs as they allow firms to reach investors directly using the "push" technology, where information is sent from the firm to investors directly and on real-time basis without the need for investors to request for it (Thoring, 2011; Blankespoor et al., 2013).

Businesses have taken a great advantage of social media through easily accessing and reaching the largest number of investors and stakeholders. Social media has played a great role in public broadcasts and information disclosures that can now reach a large number of people, whether potential or current customers, investors or shareholders. Now public information about firms can

be disclosed online and through social media tools, specifically Twitter as it had become the most popular micro-blogging tool for financial information, achieving the timeliness goal as information are announced by time events take place (Rahman and Debreceny, 2010; Merrill et al., 2011; Thoring, 2011; Blankespoor et al., 2013).

Twitter is considered as one of the social media categories and a popular social networking website. It is a free micro-blogging site on the internet with many social networking features. It was created and launched in October 2006 being one of the largest social networking websites nowadays. It is considered the best tool used when referring to other websites when online information is required. It is mainly about allowing people to communicate and share information about the things they are interested in with other users using text messages called "Tweets". Tweets are small text messages limited to only 140 characters. And in order to increase users' interactivity, Twitter users are also allowed to share links (information), reply to someone's tweet, tweet it again – retweet –, or even categorize tweets. So, firms can benefit from their official Twitter accounts' followers by posting instant news and thus spreading the announcements of new events(Dixit, 2011; Merrill et al., 2011;Thoring, 2011; Blankespoor et al., 2013; Zhou et al., 2014).

Based on the articles reviewed and the previous researchers studied, it had been agreed that events announcements do affect shares' prices. To the best of my knowledge, most of the existing research had only taken one type of events into consideration when studying market reaction. Very few researches had studied the effect of all types of financial events announcements collectively on share price. Even these studies were only concerned with the formal and traditional announcement techniques and not those announced via social media (Twitter). Moreover, the only paper conducted by Sprenger&Welpe (2011) that had tested market reaction to Twitter events announcements had been investigating the effect of investors' tweets concerning the companies under study but not with those events announced by the enterprise itself. In addition to that this paper was not published. Thus the objective of this thesis is to examine the effect of events announcements via social media and specifically Twitter on share prices and to investigate the link between the intensity of events announcements and the magnitude of market reaction.In this section and after reviewing our literature, various hypotheses had been conducted and are aimed to be tested.

3. Hypotheses Development

As previously mentioned, publicly announced information like those in official press-releases and professional traditional newspapers affect share prices. Recently, a new approach to identify information and events affecting market reaction and share prices had been used instead of the traditional sources and which is the online stock forums (Sprenger&Welpe, 2011; Tucker, Guermat and Prasert, 2013).It had been proved that news announced specifically on Twitter and especially those supported with links connected to traditional press-releases reduces the information asymmetry problem and facilitates the spread of announced information to all investors (Zhou et al., 2014). A study conducted by Zhou et al. (2014) had mentioned that it takes

only 5 minutes for investors to be engaged with the announced news on Twitter and 10 minutes to respond to them. It had also been mentioned that Twitter is more focused on facilitating the spread of information to investors and decreasing information asymmetry.

The disclosure of sensitive news to which the market reacts had been recently announced through the social media networks (eg. earnings announcements). Companies had started disclosing their financial information, annual reports and other sensitive events on their official social accounts (Zhou et al., 2014). It had been investigated that stock prices react to such events once announced as they convey essential information to investors. Investors do not only acknowledge such announced events, but on the other hand they understand it, change their expectations about the firm and as a result react to them and affecting their share prices (Tucker et al., 2013). The announcement of financial information had been the most increasing category of corporate-related news announced by the firms on their official Twitter accounts. Although it is still accounting for only 30% of corporate news announced as mentioned by Zhou et al. (2014), such increasing behavior proves that firms prefer Twitter when announcing financial information.

H_1: Financial events announcements via social media has an effect on share returns

Most of the previously conducted event studies were neutrally dealing with information and events without differentiating whether such news was positive or non-positive. In some studies the type of information and events under study is the most important feature when dealing with stock returns and should explicitly be noticed and taken into consideration for its obvious effect even if the study is only focusing on one event type. While in some other cases the effect of classifying events by type is not of a great importance as it may not affect stock returns differently (eg. Takeover announcement) (Sprenger&Welpe, 2011).The announcement of positive events usually leads to positive stock returns, while the announcement of negative events on the other hand causes a decrease in stock returns as hypothesized by Suleman (2012) in his paper. This hypothesis had been tested and supported by studying the effect of political events announced on share prices of the KSE 100 index.

On the other hand, Sprenger&Welpe (2011) in their study had classified events into three types: positive, negative and ambiguous. It had been stated in their paper that positive abnormal returns are investigated after the announcement of positive events, while negative abnormal returns had been investigated after the announcement of negative events. It had also been stated that the announcement of ambiguous news do not produce any abnormal returns and the marker did not react to it. Most papers classify events into positive or negative based on the differences between the events announced and the investors' expectations using an econometric estimation method. Other studies use a linguistic method - the tone of different events announced to discover whether they are positive or negative - to classify announced events under study (Sprenger&Welpe, 2011; Wang and Wu, 2013). Thus, in order to appropriately investigate the effect of events announcements via social media on share prices, the events under study should be classified into positive and non-positive (Tucker et al., 2013).

H₂: The type of events announced via social media has an effect on share returns

Most of the previously conducted event studies were focusing only on one specific news category of events announcements and its effect on share prices; trying to investigate the form of efficiency of the market under study. The market reacts differently to different categories of events announced and thus stock returns incorporating different categories of events should also be different. Such analysis had been ignored in most of the previously conducted studies and only few researches had tested the simultaneous effect of various events. Thus, in order to appropriately investigate the effect of events announcements via social media on share prices and if the market reaction is consistent with the efficient market hypothesis or not, various events categories should be observed in one collaborate study (Sprenger&Welpe, 2011; Tucker et al., 2013).

H3: The news categories of events announced via social media has an effect on share returns

Industry classification is one of the most used methods in researches when dividing firms (sample under study) into homogeneous groups is required; as many studies had stated that a large portion of abnormal stock returns are influenced by industry differences (Bhojraj and Oler, 2003; Chan, Lakonishok and Swaminathan, 2007). In Chan et al. (2007) it had been mentioned that asset managers and consultants usually use industry classification when conducting quantitative risk models, and that whenever managers seek to structure a portfolio, the stock's industry must be taken into consideration as it affects stock return behavior. Sprenger and Welpe(2011) had mentioned that such industry classification for both scholars and financial practitioners is important. Industry classification helps capturing the effect of firm specific risk on share returns (Kothari, 2001). Unfortunately, many of the existing researches in the area of finance had heavily contempt such classification effect especially those conducted using the event-study methodology (Sprenger and Welpe, 2011).

In financial research, the scheme used for classifying companies among industries had always been a long-standing problem; as there are many to follow. The most popular schemes are the Standardized Industry Classification (SIC) code which had been conducted in 1939, the North American Industry Classification System (NAICS) code, the Fama and French (1997) code and the Global Industry Classifications Standard (GICS) scheme. The GICS had been widely accepted in the financial research as it usually significantly explains the variation in returns across firms. The GICS also solves most of the industry classification problems as its scheme is simply based on the companies' operations and main line of business (Bhojraj and Oler, 2003; Chan et al., 2007). As a result, it was assumed that although its importance, industry classification had not been taken into consideration in most of the researches to simplify their results and make them more easily conducted (Sprenger&Welpe, 2011).

H4: There is a relationship between the industry of the company announcing the events and the effect on share returns

Asset prices behavior and the flow of information is one of the key issues in finance. The intensity of events announcements by a company and its effect on share prices and stock returns

had been a substantial topic in the area of behavioral finance. The intensity of announcing events to investors seems to be responsible for an important portion of the changes in share prices (Cousin and de Launois, 2006). Also when classifying events by types or news categories, the frequency of occurrence of each category affects its impact on share prices (Neuhierl, Scherbina and Schlusche, 2013). A significantly positive relationship between the intensity of events announcements and changes in stock returns had been consistently proven. It had been argued that events announced had got a valuable information to the market and thus as more events are announced, stock returns are affected (Cousin and de Launois, 2006).

H5: The intensity of events announcements via social media has an effect on share returns

4. Methodology

The sample contains the top one hundred companies – based on company size and market capitalization – listed in London stock exchange (FTSE 100). The data had been collected over a two year period representing the most recent two years which was from the 1st of January 2014 and till the 16th of February 2016. Share prices (dependent variable) and market prices had been obtained on daily basis from Thomson Reuters DataStream for the period under study. The events announcements (independent variable) data source was twitter collecting all news tweeted by the companies during the same period. Each company's website had been individually and manually searched for and checked to investigate if there are available links to twitter accounts on the website. All companies that do not have official twitter accounts available on their official website were excluded from the sample ending up with only 67 companies under study.

Tweets had been collected via website's application programming interface (API) and retrieved from **www.greptweet.com.** Twitter API has got a limitation to the number of tweets accessed; as on any retrieval day only the latest 3200 released tweets for each account can be accessed. Another limitation was that the used website in tweets' retrieval does not allow for retrieving all of the companies' tweets at the same time, so each company's tweets should had been individually retrieved and converted to excel which had wasted a lot of time and effort. Also, a sample of the retrieved tweets using the website had been taken to check for the reliability of the source, through comparing the retrieved tweets with those available on the official twitter accounts. The number of retrieved tweets during the period under study had been **75154** English language tweets, after manually removing all retrieved re-tweets. They had been after that **manually** classified into financial and non-financial; as our research is only concerned with financial tweets

Only **1747** tweets were financial. Financial tweets had been further classified **manually** into positive and non-positive(where the non-positive category contains both negative and non-classified tweets), and then to different categories based on the type of news category announced in consistence with **Meek et al. (1995) and Cuellar et al. (2006) classification schemes**. All tweet duplicates (more than one tweet on the same day) were manually removed, ending up with **854** financial tweets. Such manual classification was a must as reviewing the types of tweeting duplicates before removing them was important; as whenever a company tweets different types of

news on the same day (positive and non-positive), the tweet left and taken into consideration in our study was considered non-positive.Twenty one more observations had been excluded from the sample due to the lack of availability of share price data on such event dates ending up with only **833** event dates under study.

Tweets will be considered our events (independent variable), where the event day (day 0) is the day of announcing the news on the companies' official twitter accounts if it was tweeted before 4:30 pm (official closing time for London stock exchange) or on the other hand the event day (day 0) is the day following the tweeting day if it was tweeted after 4:30 pm. Daily returns had been calculated for both the market and FTSE 100 companies stocks using equation (1):

$$\textbf{Daily return} = \frac{\textbf{P}_t - \textbf{P}_{t-1}}{\textbf{P}_{t-1}}$$

(1)

Where, Pt: is the current day's share price
Pt-1: is the previous day's share price

This research study will follow the same methodology technique used in earlier studies and which is the event-study methodology. For any researcher, and in order to conduct a good event study methodology, some basic steps should be followed: First, "the event of interest" should be identified, and which recognizes the specific type of event you are testing its effect. In our study, the events of interest are the financial events announced on companies' official twitter accounts. Second, "the event window", which is the number of days around the announcement day, will be settled on. In our study, it will be five days. AR should then be investigated at this stage for the event window by getting the difference between the stock's actual return and the expected return for that stock as follows in equation (2):

$$\textbf{AR}_{it} = \textbf{R}_{it} - \textbf{E(R)}_{it}$$

(2)

Where, AR_{it}: is the abnormal return of stock (i) at time (t)
R_{it}: is the actual normal return of stock (i) at time (t)
$E(R)_{it}$: is the expected return of stock (i) at time (t)

Stock expected return can be estimated using two different models: the simple market model and the risk-adjusted market model. Using the simple market model the expected return for stock (i) at time (t) is the overall return of the market on the same day. The risk-adjusted market model on the other hand, takes both alpha (α) and beta (β) into consideration while calculating the stocks expected return based on its risk level. The risk-adjusted market model is shown in equation (3):

$$\textbf{E(R)}_{it} = \alpha_i + \beta_i \, \textbf{R}_{mt}$$

(3)

Where, $E(R)_{it}$: is the expected return of stock (i) at time (t)
αi: is estimated parameter for the intercept of the regression model

βi: is estimated parameters for the slope of the regression model
Rmt: is the actual normal market return at time (t)

In our study we are going to calculate the expected return using both models for robustness check. AAR should then be calculated for each individual day by summing up all abnormal returns for all stocks on a certain day and dividing the total with the number of observations as follows in equation (4):

$$AAR_t = \frac{1}{N} \sum_{i=1}^{N} AR_{it}$$

(4)

Where, AAR_t: is the average abnormal return for day (t)
N: is the number of abnormal return observations on day (t)
AR_{it}: is the abnormal return for stock (i) on day (t)

And finally, the CAAR should also be calculated for pre- and post-event windows by summing up average abnormal returns for all days during the event window as follows in equation (5):

$$CAAR = \sum_{t=K}^{L} AAR_t$$

(5)

Where, CAAR: is the cumulative average abnormal return for pre or post event-window from day K and till day L

In our study the CAAR will be calculated twice, once for the pre-event window by summing up the AAR from day -5 to -1 and once for the post-event window by summing up the AAR from day 1 to 5. From the calculated values, the hypothesis should be rejected or not, based on the significance of the t-statistic which is calculated as follows in equation (6):

$$t-value = \frac{\bar{\bar{R}}}{S_d/\sqrt{N}}$$

(6)

Where, R: is the average return for a certain period or a certain day
S_d: is the standard deviation for the average return
N: is the number of observations

The significance levels used here in this study are 1%, 5%, and 10%. These levels identify the significance of the findings. If the value was equal to or more than 1.645, then it is significant at 10%. If the value is equal to or more than 1.96, then it is significant at 5%. And if the value is equal to or more than 2.576, then it is significant at 1%.

5. Findings and Analysis

Out of FTSE 100 companies under study, 67% of the companies tweet financial information while 33% do not as depicted in figure 1. Table 1below shows the AAR for day 0 using both models. It is shown from the calculated value and the below graphs (figure 2) that there is a significant AAR after the announcement of financial tweets and thus we can conclude that there is a significant relationship between the announcement of financial events via twitter and the effect on share prices and thus hypothesis 1 is not be rejected.

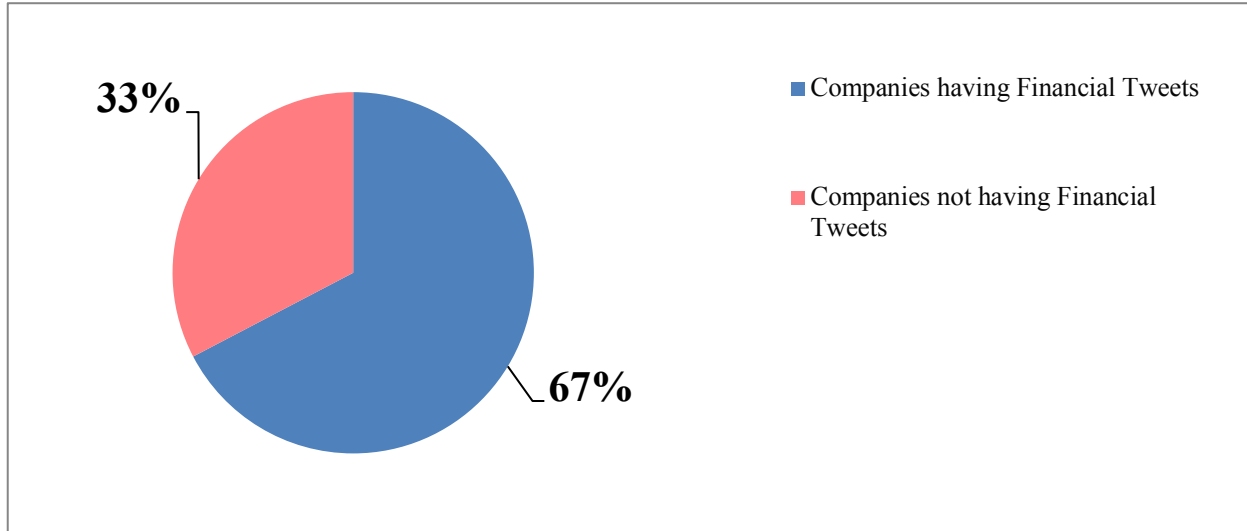**Figure 1: Availability of financial information for the FTSE 100 companies**

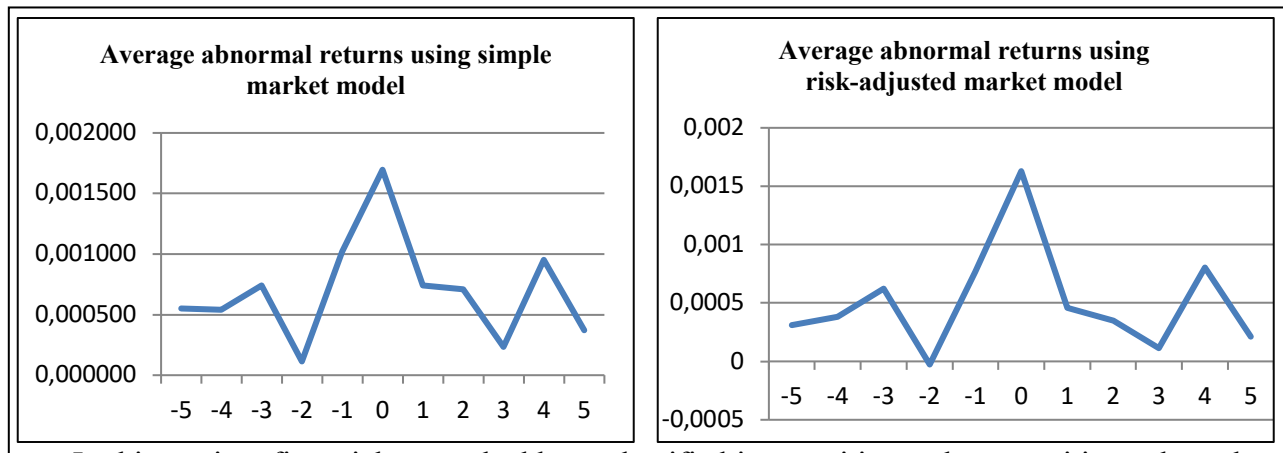**Table 1: Market reaction to the announcement of financial tweets**

	Day 0	
Observation	**AAR**	**T-value**
Simple market model	0.00170*	1.88340
Risk-adjusted market model	0.00163*	1.79621

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

Figure 2: Market reaction to the announcement of financial tweets

In this section, financial tweets had been classified into positive and non-positive, where the positive tweets represent 67% of the financial tweets while the non-positive represents only 33% as depicted in figure 3. This small number of non-positive tweets shows that companies tend not to announce non-positive news as they are aware of its effect on share prices. From the calculated values in table 2 and the graphs presented in figure 4, it is shown that there is a positive after the announcement of positive tweets while a negative AAR had resulted after the announcement of non-positive tweets. So, we can conclude that there is a significant relationship between the type of events announced and its effect on share prices and thus hypothesis 2 is not rejected.

Figure 3: Positive versus non-positive financial information announced on companies' official Twitter accounts (after removing tweet duplicates and missing data)
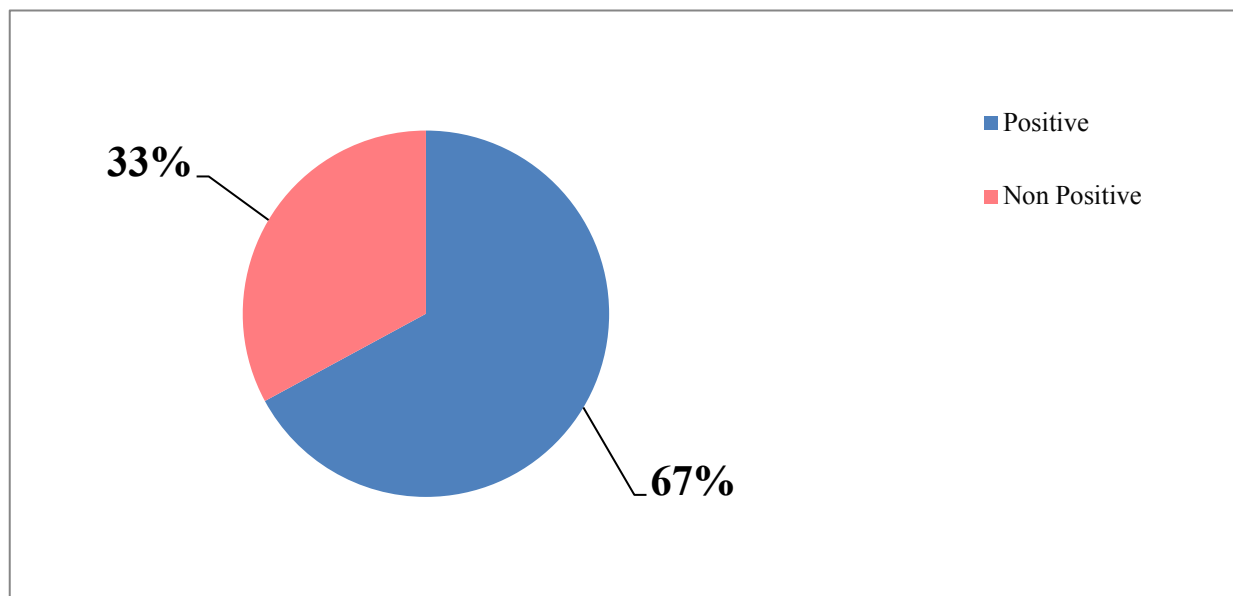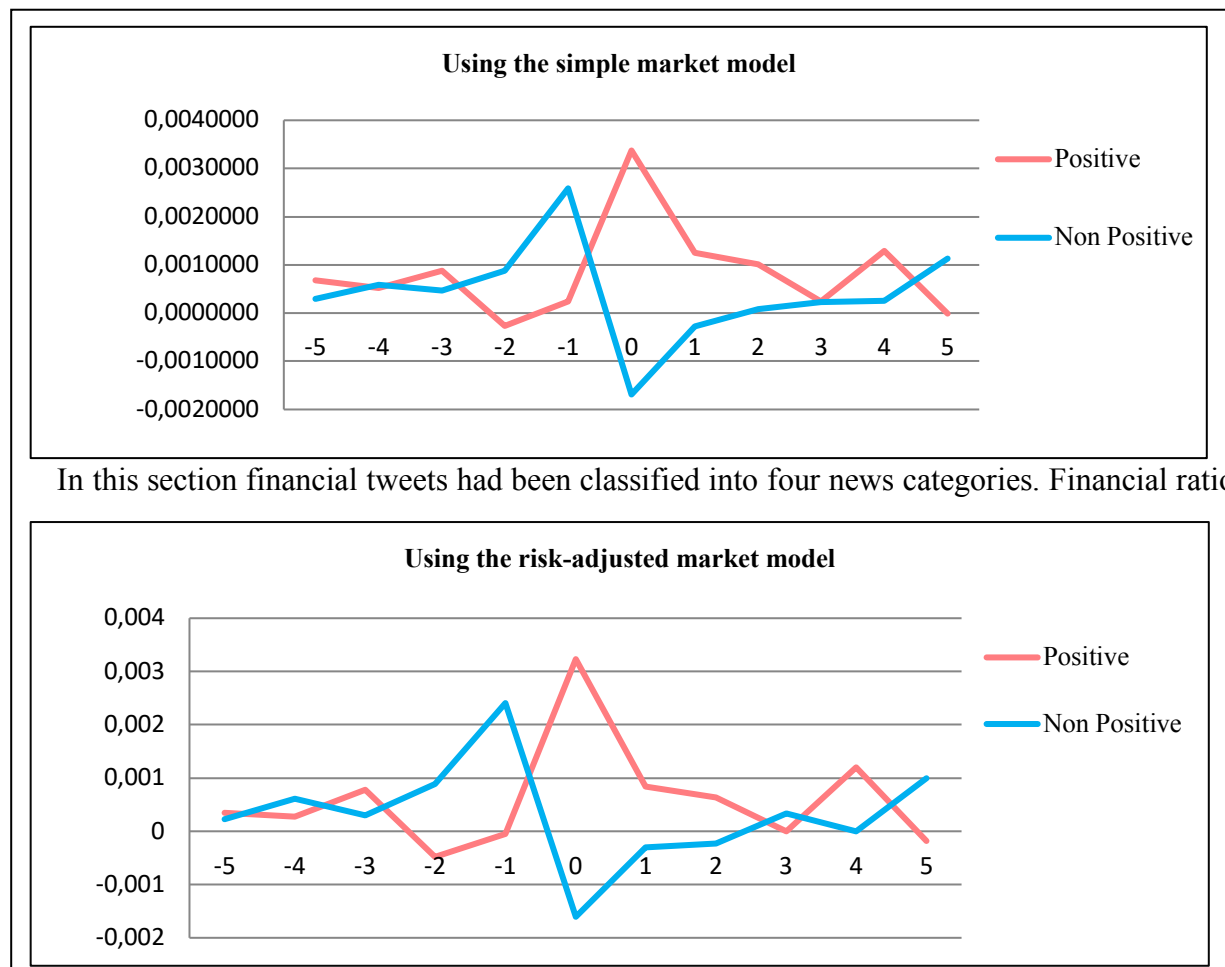

Table 2: Market reaction to the announcement of different types of tweets

Observation	Positive tweets	Non-Positive tweets

Day 0	AAR	T-value	AAR	T-value
Simple market model	0.00337***	3.48206	-0.00169	-0.90126
Risk-adjusted market model	0.00323***	3.31317	-0.00161*	-1.64594

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

Figure 4: Market reaction to the announcement of different types of tweets

In this section financial tweets had been classified into four news categories. Financial ratios

represent 95% of the financial tweets under study, macroeconomic factors represent 3% of the tweets and both the segmental information and stock price information categories represent 1% each as depicted in figure 5. The following statistics tests are based on categorizing the tweets to only two news categories, financial ratios and other financial data. This had been done due to the fact that financial ratios' tweets represent most of the tweets under study and thus comparing the four categories will not be consistent, as a result the three other categories had been grouped in

one category which is other financial data. Also, the tweets in each news category had further been classified into positive or non-positive

From the calculated values in table 3and the graphs presented in figure 6, it is shown that all results are consistent, where the AAR after the announcement of positive tweets is always higher than the AAR after the announcement of non-positive tweets. Also there is a difference between the AAR for financial ratios and other financial data which makes us conclude that there is a significant relationship between the news categories of the events announced and the effect on share price and thus hypothesis 3 is not rejected.

Figure 5: Classification of financial tweets based on news category (after removing duplicates and missing data)
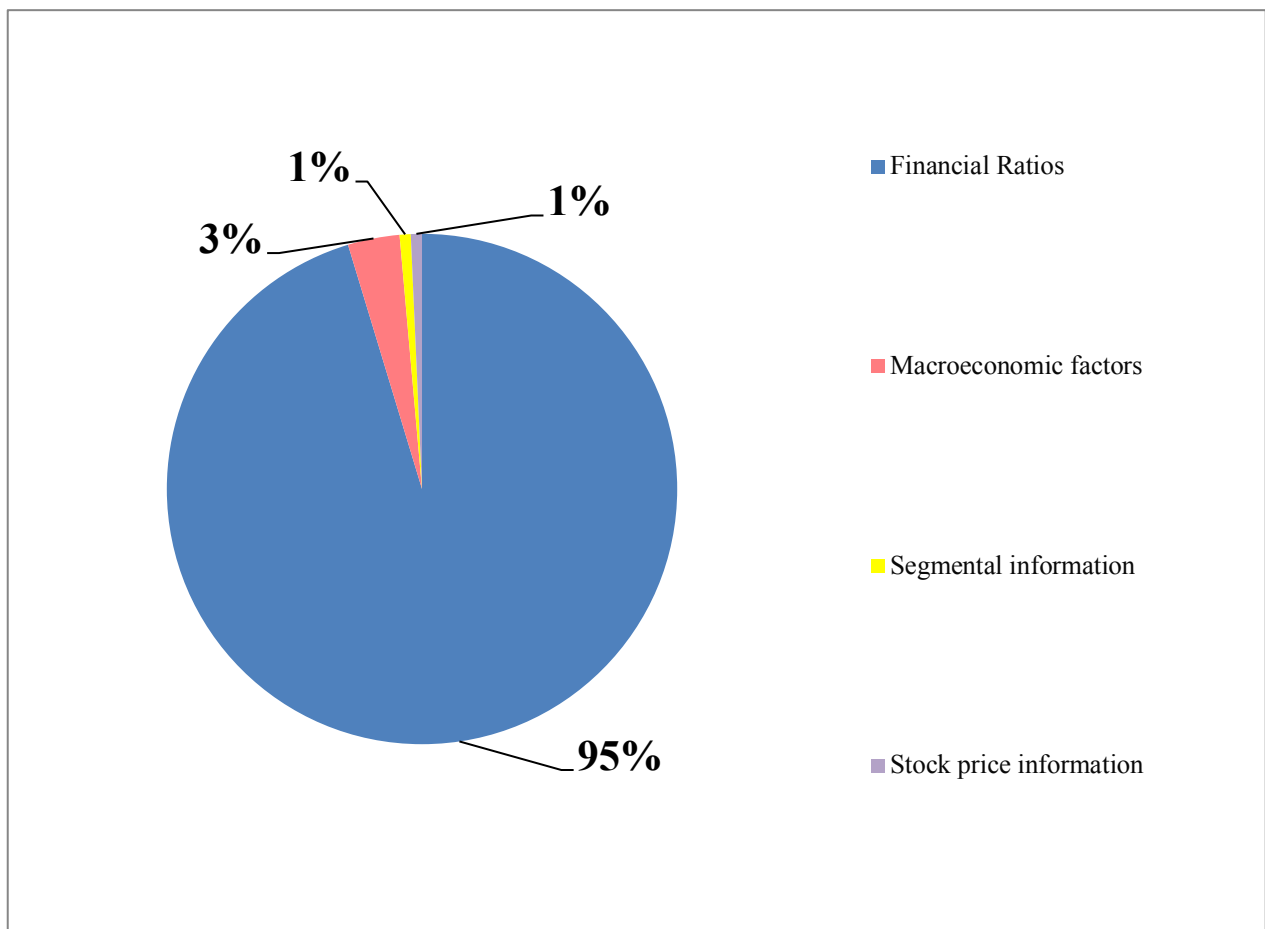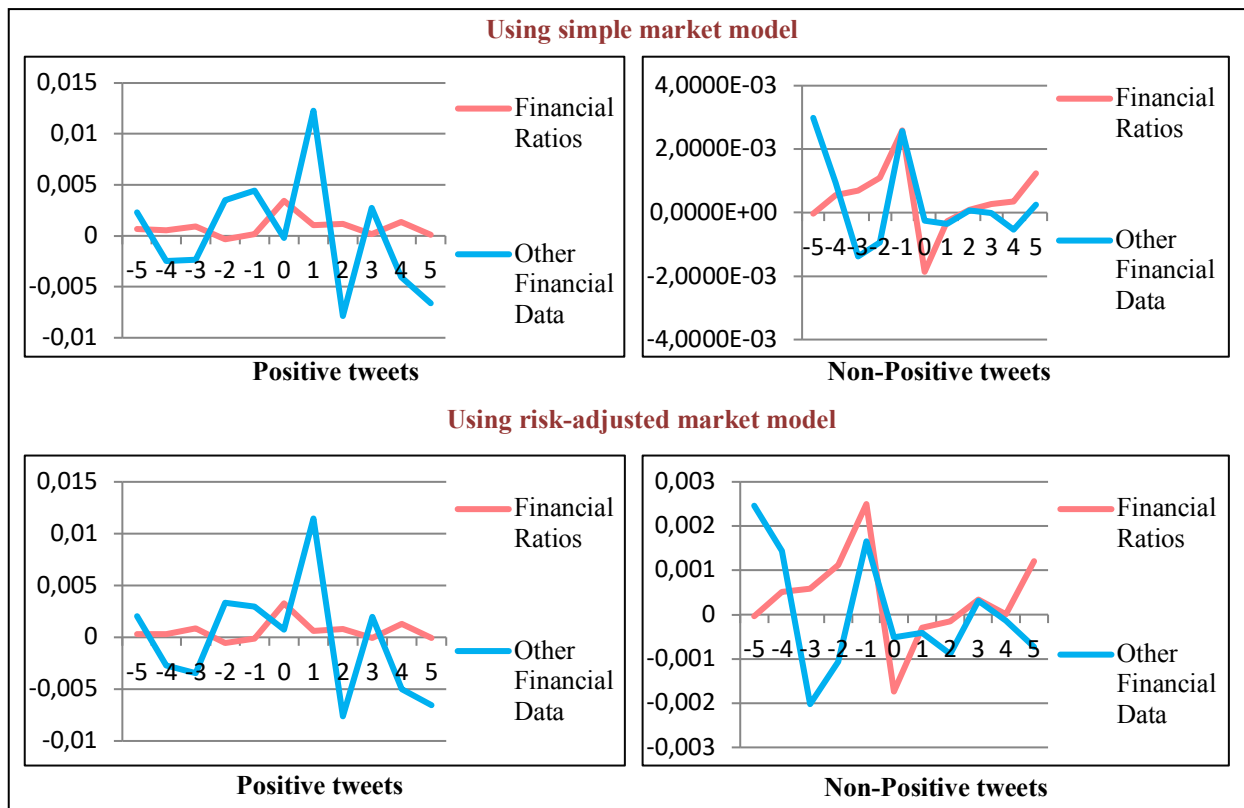

Table 3: Market reaction to the announcement of different news categories

	Financial Ratios	Other Financial Data
Observation	Simple market model	

Day 0	AAR	T-value	AAR	T-value
Positive tweets	0.00344***	3.52554	-0.00021	-0.02544
Non-Positive tweets	-0.00187	-0.89653	-0.00025	-0.09616
		Risk-adjusted market model		
Positive tweets	0.00328***	3.33591	0.00075	0.08915
Non-Positive tweets	-0.00174	-0.82739	-0.00052	-0.21482

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

Figure 6: Market reaction to the announcement of different news categories

Here the tweets had been classified into 10 groups based on the industry of the announcing company as depicted in figure 7. It is shown that the average number of tweets per industry is almost consistent. From the calculated values in table 4 it is shown that 9 out of the 10 industries had got positive AAR after the announcement of positive news using both models while only 1

(health care) had got a negative AAR. While on the other hand only 5 industries had got a negative AAR after the announcement of non-positive news.

This may be due to the fact that non-positive tweets contain both negative and non-classified tweets as pre mentioned, where some investors may have interpreted our non-classified tweets as positive and thus positively reacted to them. Also the duplicated tweets were considered as non-positive when both types of news were announced, where still some positive news had been announced although neglected and maybe had affected share prices. Finally this may be due to the overlapping of tweets as many companies announce financial news on consecutive days were their effect may have been extended throughout the event window.

We can also investigate that very few AAR are significant and thus we can conclude that even if there is a relationship between the industry of the company announcing the events and the effect on share price, it is insignificant. Although this insignificant relationship may be due to the small number of financial news announced by each industry on official Twitter accounts, hypothesis 4 is rejected.

Figure 7: Average number of financial tweets per industry (after removing duplicates and missing data)
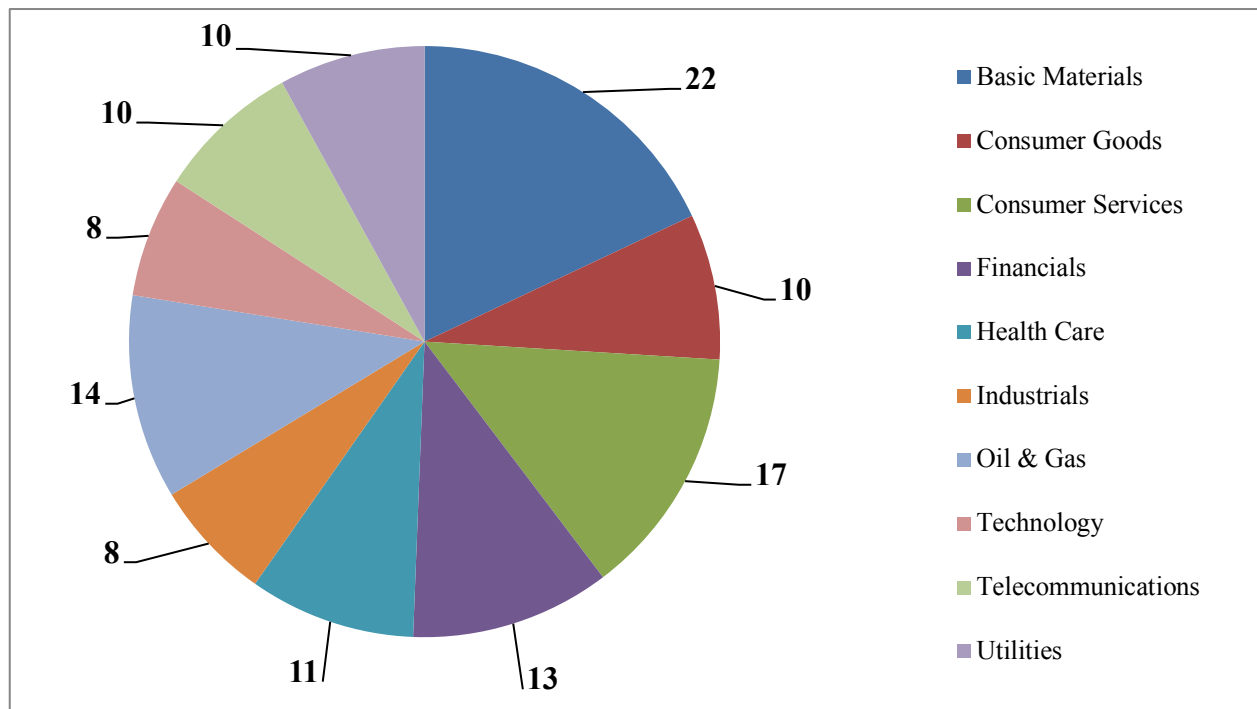
Table 4: Market reaction to the announcement of financial tweets across different industries

	Positive tweets		Non-positive tweets		Positive tweets		Non-positive tweets	
Observation	Simple market model				Risk-adjusted market model			
Day 0	AAR	T-value	AAR	T-value	AAR	T-value	AAR	T-value
Basic Materials	0.00438	1.42660	0.00588	0.75032	0.00581*	1.79568	0.00843	0.96876
Consumer Goods	0.00554**	2.09292	0.00037	0.06726	0.00529**	2.01942	0.00022	0.04100
Consumer Services	0.00416***	2.76596	-0.00462	-0.75079	0.00385**	2.53429	-0.00528	-0.85197
Financials	0.00179	1.02935	-0.00181	-0.71369	0.00155	0.90565	-0.00179	-0.71058
Health Care	-0.00145	-0.26576	0.00795	1.23953	-0.00147	-0.26708	0.00784	1.21795
Industrials	0.00281	0.69209	-0.01087*	-1.65108	0.00195	0.48046	-0.01076*	-1.65870
Oil & Gas	0.00203	0.52727	0.00151	0.24706	0.00144	0.38763	0.00202	0.34527
Technology	0.01155	0.74594	0.00558	0.25244	0.00983	0.62387	0.00497	0.22493
Telecommunications	0.00781	0.82730	-0.00903	-1.08958	0.00774	0.83273	-0.00968	-1.25360
Utilities	0.00046	0.08696	-0.00490	-0.74407	0.00010	0.01807	-0.00415	-0.62813

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

Finally, financial tweets had been classified based on the intensity of tweeting. First it had been classified for testing the market reaction for the 25th and 75th percentiles. From the calculated values in table 5 and the graphs shown in figures 8 and 9, it is shown that after the announcement of both positive and non-positive tweets, the AAR for the most tweeting companies is much stronger and had got a higher magnitude than that of the least tweeting companies.

For robustness the intensity classification had been repeated but this time using the 30th and 70th percentiles and the results is depicted in table 6 and figures 10 and 11. Also the same results had occurred but with even stronger magnitude for the most tweeting companies and higher differences in AARs. This may be explained as whenever the number of announced financial tweets by companies is low, investors usually do not highly monitor the announced news on twitter by such companies, and as a result they do not usually react to these tweets. While on the other hand, the intensely tweeting companies are highly monitored by investors and thus they react to the announced news through twitter affecting share prices of such companies. So, we can conclude that there is a significant relationship between the intensity of events announcements and the effect on share prices and thus hypothesis 5 is not rejected.

Table 5: Market reaction to the announcement of different types of financial news in the 25th and 75th percentiles

25%	Least tweeting companies		Most tweeting companies	
Obs	**Positive tweets**			
Day 0	**AAR**	**T-value**	**AAR**	**T-value**
Simple market model	0.00069*	0.16861	0.00319***	2.63646
Risk-adjusted market model	-0.00048	-0.11922	0.00324***	2.62427
	Non-Positive tweets			
Simple market model	0.00663	1.10446	-0.00097	-0.29395
Risk-adjusted market model	0.00643	1.07396	-0.00040	-0.11524

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

Figure 8: Market reaction to the announcement of different types of financial news in the 25th and 75th percentiles using simple market model
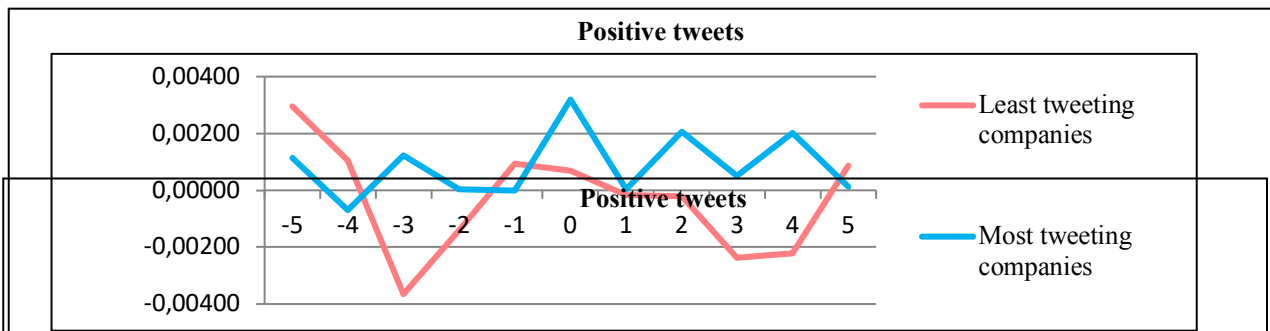

Positive tweets

Figure 9: Market reaction to the announcement of different types of financial news in the

Non-Positive tweets

25th and 75th percentiles using risk-adjusted market model
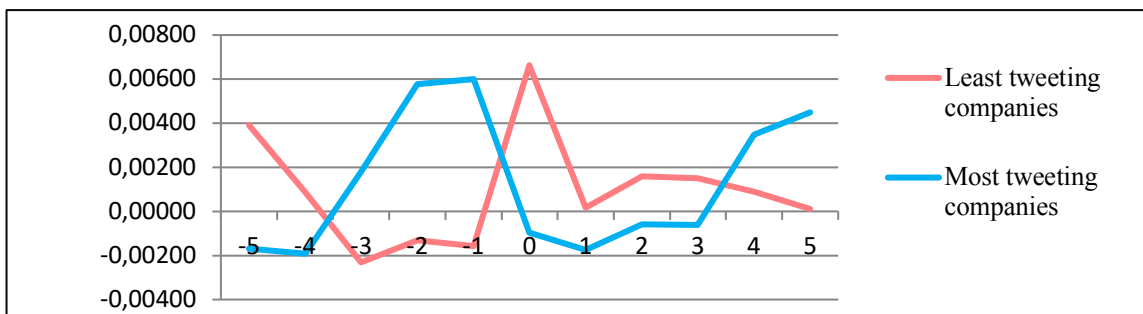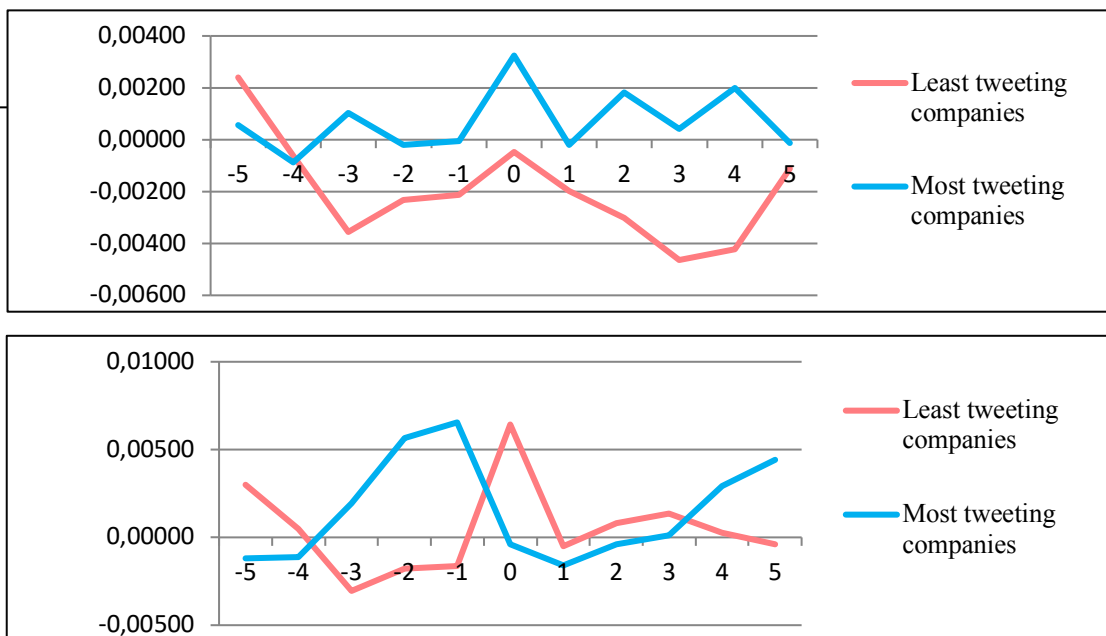

Table 6: Market reaction to the announcement of different types of financial news in the 30th and 70th percentiles

30%	Least tweeting companies		Most tweeting companies	
Observation	**Positive tweets**			
Day 0	**AAR**	**T-value**	**AAR**	**T-value**
Simple market model	0.00094	0.31049	0.00295**	2.52221
Risk-adjusted market model	-0.00018	-0.05958	0.00302**	2.54196
	Non-Positive tweets			
Simple market model	0.00682	1.44342	-0.00342	-1.05065
Risk-adjusted market model	0.00658	1.39881	-0.00263	-0.77786

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

Figure 10: Market reaction to the announcement of different types of financial news in the 30th and 70th percentiles using simple market model
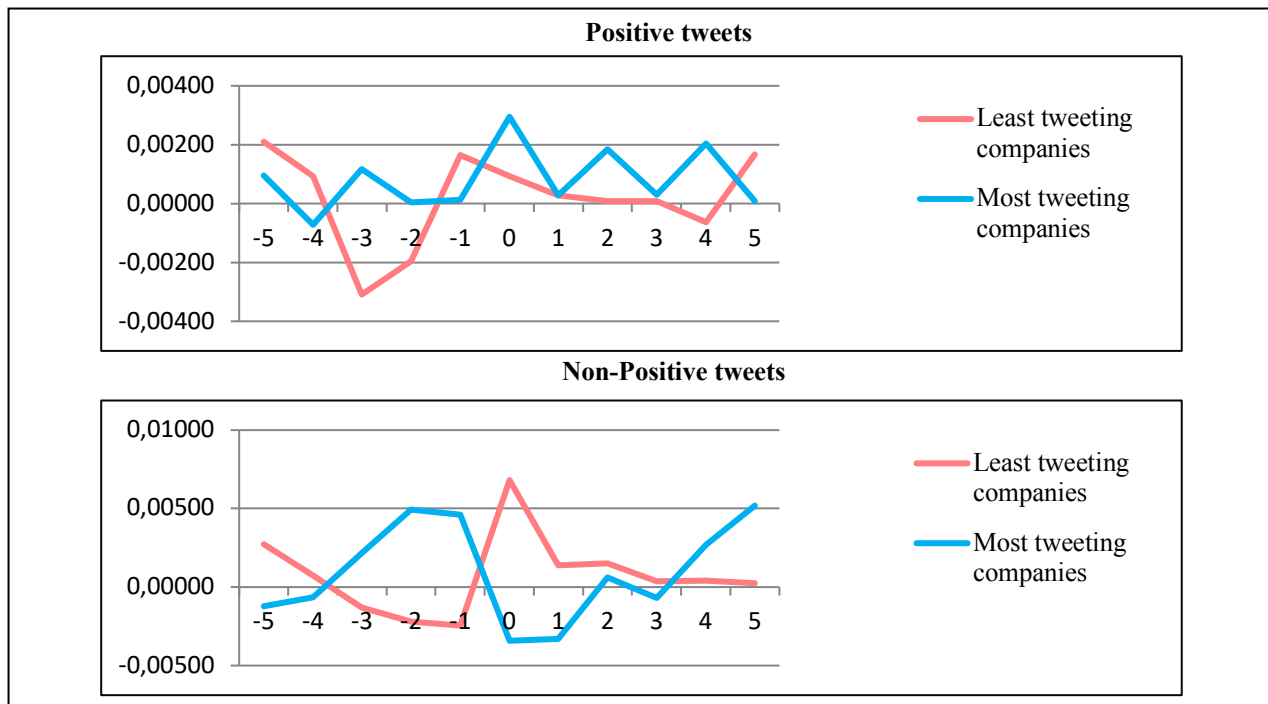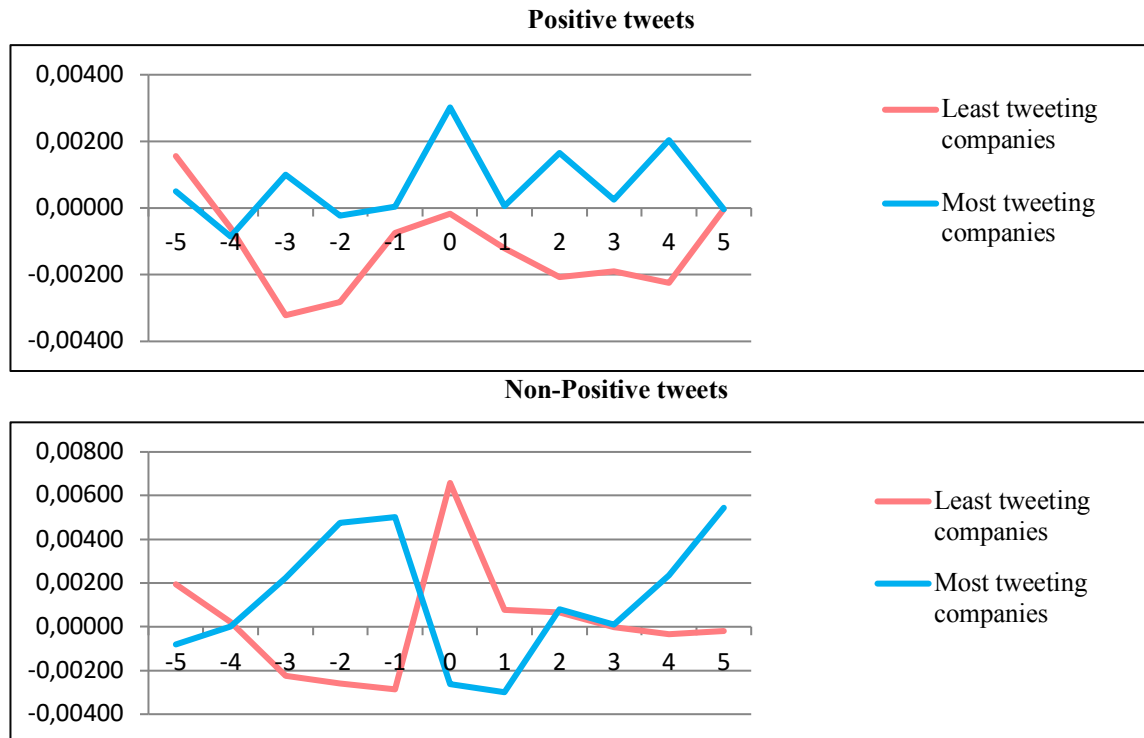

Figure 11: Market reaction to the announcement of different types of financial news in the 30th and 70th percentiles using risk-adjusted market model

Positive tweets

Non-Positive tweets

6. Summary and Conclusion

The effect of events announcements on share prices had been tested in many previous researches and studies. Events or more specifically corporate events refer to short-term occasions that the company carries out in order to achieve a certain goal. Such events should be announced to the public in order to increase investors' awareness about the company and help them decide whether to buy, sell or hold their shares. The announcement of corporate events had got valuable information to the market and as a result affects share prices and returns, a topic which had been substantially discussed in the area of behavioral finance. Now public information about firms can be disclosed online and through social media tools, specifically Twitter as it had become the most popular micro-blogging tool for financial information, achieving the timeliness goal as information are announced by time events take place. Twitter had opened up several prospects for business firms to enhance their investors' relations; as it allowed firms to shortly announce about any corporate news, and to be connected with its stakeholders and investors in real time.

The aim of this study is to test the effect of financial events announcements via social media, specifically Twitter on share prices among the top 100 companies listed in London stock exchange (FTSE 100). It had been agreed that events announcements do affect shares' prices but very few researches had studied the effect of financial events announcements specifically on share price, and even those whom had tested it before were only concerned with the formal and traditional announcement techniques and not those announced via social media (Twitter). Moreover, the only paper conducted by Sprenger & Welpe (2011) that had tested market reaction to Twitter events

announcements had been investigating the effect of investors' tweets concerning the companies under study but not with those events announced by the enterprise itself.

After reviewing previous literature and studies, a research gap had been identified and two research questions had been developed which are "Do financial events announcements via social media affect companies' share prices?" and "Does the intensity of events announcements via social media affect the magnitude of market reaction?" and are aimed to be answered. Our research questions had been tested on a sample of 67 companies with 833 event date observations retrieved from their official Twitter accounts for the most recent two years which was from the 1st of January 2014 and till the 16th of February 2016.

The study finds that based on the results generated from the tests conducted, it was concluded that that financial events announcements via social media have a significant effect on share returns. Also, it had been concluded that throughout the following different types of classifications (based on the types of events announcements (whether positive or non-positive), based on news categories of events, and based on the tweeting intensity of the company announcing the events), share prices had reacted differently and a significant relationship between these classifications and share prices had been found. Finally, the results had shown that classification of events announced based on the industry of the company announcing the events had got an insignificant relationship with its effect on share prices.

In conclusion, events announced via social media and specifically Twitter affect share prices. Investors nowadays tend to deal more with social media platforms, and especially young investors and as a result view the announced events by the companies and react to them. Accordingly, governments should start setting new regulations for the usage of social media to protect investors.

This study is the first to test the effect of enterprise events announcements via Twitter on share prices; thus it was not capable to test all areas in this research and as a result some limitations are present. To start with, it was not able to detect the exact effect of individual events on share prices for two main reasons. First, some companies announce both positive and non-positive events on the same day which should be affecting share prices oppositely and as a result may had affected our interpretation. As, in this case the company was considered to be announcing a non-positive event which may have affected our non-positive results and the interpretation of its effect on share prices even on the event day (day 0). Second, most of the companies announce too many events on Twitter on consecutive days. This overlapping of events during the event window affects the interpretation of share prices and returns.

Another limitation in our study is related to sample under study. The number of events collected and the companies under study was limited. This was mainly due to the fact that the period under study was narrow; as Twitter had not been into active use by companies except recently and even some companies do not have Twitter accounts yet. Also this was due to the API restriction of allowing the access of the latest 3200 tweets for each account only. Thus future

researches should take this into consideration and increase the sample size of the companies or the number of years under study. Another limitation associated with our sample is related to the classification of events into financial and non-financial and afterwards into news categories. Our sample classification was based on Meek et al. (1995) and Cuellar et al. (2006) classification schemes. In those studies neither the mergers and acquisitions nor the share buyback events were considered as financial events. These events had been considered as strategic events although they have got a great impact on the companies' financials and share prices.

Moreover, this study did not consider the level of investors' (followers) engagement and its effect on share prices. Users' engagement measure can be tested by two methods. First, the number of re-tweets of the events announced and their re-tweeting period and their effect on share prices. Not all investors are following the companies' official Twitter accounts and many of them view the announced events after being re-tweeted by one of whom they are following. This is one of the main characteristics of Twitter and which had encouraged companies to use social media and Twitter in specific to announce their events on. Such re-tweeting may extend for days and thus share prices may not only respond on the event day (day 0) but as long as there is a re-tweeting action that had been viewed by investors. This makes us move to the second method and which is the number of views/ likes/ comments for each tweet. The announcement of an event on Twitter does not mean that investors had viewed such tweet and thus share prices should not react to it, which was not taken into consideration in this study.

Future researches should take into consideration the level of engagement (both the re-tweeting effect and the number of views/ likes/ comments) for each tweet in order to get a more accurate interpretation about the effect of events announcements via Twitter on share prices. Furthermore, we had analyzed that the different types of events, news categories and tweeting intensity affects share prices differently. In our study we had tested only the effect of different classifications on share prices but the reasons behind such differences were not examined. Future studies should try to detect the reasons behind such differences. And finally, not only the effect of events announcements via social media on share prices should be tested but the overall market reaction to such announcements. This means that also the effect of events announcements via social media on shares' liquidity should be tested and analyzed which was not able to be conducted in this study.

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