Implication of mergers and acquisitions on stock returns before and during the 2007–2009 credit crunch: An event study

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Abstract

Considering the 2007–2009 financial situation, one cannot help but wonder how the crisis affected the wealth associated with merger and acquisition (M&A) announcements. This article examines the impact of such announcements on the stock returns (performance) of public companies during financial and non-financial crisis periods. Specifically, the article seeks to compare the effects these announcements have on the stock returns of bidder firms during a crisis period and a non-crisis period. The financial crisis period considered announcements made between October 2007 and February 2009, while that of the non-financial crisis was between January 1999 and October 2007. Data were collected from Reuters Business Database, Bloomberg Database, Thomson Datastream and other web-based sources. With the use of event study methodology, the study reveals that there are no significant modifications in the stock return of a bidder firm's shares, either during or before a global economic crisis.

Keywords: economic crisis, non-economic crisis, M&As, event study, stock returns

1 Introduction

In spite of the 2007–2009 economic crisis, which has been interpreted by economists as *the* crisis for economics (Alagidede & Adu, 2012), worldwide merger and acquisition (M&A) markets still reached $3.280bn in 2008, which represents a downturn of 29 per cent from 2007, according to the *Financial Times* (2008, December), driven mainly by bearish markets, increased volatility in valuation, and widespread uncertainty. Arguments abound as to the causes of the recently ended economic crisis – prominent among them is a failure to use economic models. Alagidede and Adu (2012) summarise the arguments under the headings: realism of assumption, mathematical formalism, and empiricism and falsification.

Researchers over the years have carried out studies on the effect of M&A on the value of both the bidder and the target firms. Evidence shows that stockholders of target firms earn significant abnormal returns around the announcement periods and also in the weeks following such announcements (Sudarsanam & Mahate, 2003; Fauzias & Rashidah, 2004; Razitis, 2008; Liargovas & Repousis, 2011). Jarrell and Poulsen (1989) recorded an average abnormal return of 28 per cent around M&A announcements to target firms after reviewing 663 tender offers made between 1962 and 1985. Furthermore, other papers (e.g., Siems, 1996) present evidence of an

increase in stock prices prior to the announcement day, which suggests either leaked information about the deals or a very sensitive financial market.

On the other hand, the repercussions on the bidder firm's stock prices around the announcement day are contradictory, as empirical studies have shown mixed results. Desai and Stove (1985), Bauer *et al.* (2009), Dodd (1980), Ruback (1977) and Cornett and De (1991), among others, reported positive abnormal returns to bidding firms. However, Yeh and Hoshino (2002), Agrawal *et al.* (1992), Houston and Ryngaert (1994) and Nelly (1987) reported negative abnormal returns to bidders.

The recent economic crisis had a huge impact on global financial markets, and has therefore attracted significant research activity in that direction, but the field of M&A is no exemption. Mosley and Singer (2009) and Sharma and Mathur (1989) have shown that capital market performance has a direct link with M&A activities. Martynova and Renneborg (2008) highlight the fact that M&A waves are ended by a financial crisis or by a major regulatory change, thus confirming that M&As are strongly influenced by the overall economic environment. Malmendier and Tate (2005) have also proven that the behavious of the Romanian M&A market during the 2007–2009 financial crisis contradicted theoretical and empirical evidence that M&A markets contract during a crisis.

What is not clear, however, is whether these studies would show the same results if they were done separately, during 'clean' economic periods, using the same methodologies. For more than 30 years, academics, consulting firms and the business press have analysed the effects M&As have on stock prices, from every possible angle. From literature, it appears that the effect of the underlying economic environment on the performance of firms upon M&A announcements being made, has not been determined in any other academic paper. Therefore, this article seeks to determine such effects by

i. confirming or rejecting the claim that the impact of M&A announcements on the cumulative abnormal returns of bidder firms is zero;
ii. establishing whether the impact of M&A announcements on the cumulative abnormal returns of bidder firms in an economic crisis period is significantly different from a non-economic crisis period.

The article will look at how stock prices react to M&A announcements during non-economic crises and during economic crises (2007–2009 credit crunch) for bidder firms[1] using 80 M&A cases[2] covering the period January 1999 to February 2009. The financial crisis period saw 40 M&A announcements made between October 2007 and February 2009, while that of the non-financial crisis was between January 1999 and pre-October 2007.

1 These bidder firms are public companies listed on major exchanges where data on stock returns were available.

2 The cases considered for the analysis were randomly selected from the US, UK, Australia, Japan and some advanced markets in Europe.

In order to determine the success of M&A activity during and after the economic crisis, one of the most common methods of measurement, the short-term stock performance of the acquirer, was used around the announcement day. This method is regarded as the most reliable proof of value creation based on the efficient market hypothesis (Fama, 1970). Indeed, according to Fama's theory, the stock price rapidly adjusts its value to market information that predicts the expected return of the M&A. Rather than considering the present stock returns obtained around the announcement day, these past studies have concentrated on abnormal returns.

The remainder of the article is structured as follows: The second section reviews literature which presents the main findings on the M&A effects. Section three shows the methodology, which looks at developing the hypotheses to be tested, and presents the sample data selection criteria as well as the event study methodology used in the investigations. The fourth section is dedicated to the results obtained from the empirical analysis, while section five discusses the results of my findings. Finally, section six entails the conclusion of the article.

2 Literature review

McGowan and Sulong (2007) examined the effect of M&A completion announcements on the stock price behaviour of two anchor banks in Malaysia, namely Hong Leong Bank and Arab Malaysian Bank Berhad. Their study analysed the impact of the M&A on the operational performance of these banks during the period 1998–2003, by using event study methodology. Their findings show that M&A completion announcements in the banking industry had a positive impact based on the perception of the market.

Liang (2009) carried out a study on the stock returns of bidding firms upon M&A announcements using US companies listed on the New York Stock Exchange (NYSE) and Chinese companies listed on the Shanghai and Shenzhen stock exchanges. Using event study methodology, he found that the effect of the M&A announcements were not significant over the event period (-10, 10) for the companies listed on the NYSE. However, the Chinese companies registered significant abnormal returns over the same event window. Flugt (2009), who researched the value generated to bidder and target firms as a result of M&A announcements on some European Union companies (mainly companies from the UK, France and Germany), from 2000–2008, found that the target firms recorded cumulative abnormal returns, while the bidder firms earned an average of zero abnormal returns.

Jensen and Ruback (1983), who reviewed 13 studies (mainly from the US and the UK) on abnormal returns around M&A announcements, found that the abnormal returns to target firms' shareholders were 30 per cent and 20 per cent for successful tender offers and mergers respectively. Bidding firms' shareholders gained an average of four per cent around tender offers, but no abnormal returns around mergers – which confirms the findings of Ruback (1977), Kummer and Hoffmeister (1978) and Al-Sharkas *et al.* (2008). However, similar studies conducted by Dodd

and Ruback (1977), Asquith and Kim (1983), Cornett and Tehranian (1992), Kennedy and Limmack (1996), and Beur *et al.* (2009) showed that bidding firms' shareholders recorded zero or negative abnormal returns.

Cernat-Gruici *et al.* (2009) looked at several changes induced by the financial crisis in the M&A market in Romania and several European Union countries, by showing how the number of bids during the 2007–2009 crisis was affected, compared to a preceding ten-year period of reference. They observed a change in the number of both completed and failed deals, before and during the financial crisis. Their work contradicts the theoretical and empirical evidence that M&A markets contract during periods of crisis. They found out that the market actually grew in volume during the crisis of which 30 per cent of the total number of deals from 2000–2009 were recorded between 2008 and 2009 period.

3 Data and methodology

In determining the profitability of M&As, two principal methodologies are implemented: the event study methodology and the accounting-based approach.

The former is based on the Efficient Market Hypothesis (EMH) developed by Fama (1970) and introduced by Brown and Werner (1985). The methodology was used extensively by other researchers to examine the value of both the buyers' and sellers' stock prices around the date of the merger announcement (Cybo-Ottone & Murgia, 2000; Houston *et al*., 2001; Scholtens & De-Wit, 2004; Campa & Hernando, 2006 and 2008; Cornett *et al*., 2006; Altunbas & Marques, 2008; Crouzille *et al*., 2008; Petmezas, 2008). It is assumed that the stock market is efficient and hence abnormal scurrility returns for both the acquiring and the target companies, controlling for movements in the market in general and the systematic risk of the company, represent the economic impact of the M&A event (Mylonidis & Kelnikola, 2005). Typically, the capital asset pricing model (CAPM) is used as a measurement instrument to ascertain the percentage to which M&As are able to create economic value (Sudanrsanam & Mahate, 2003). The 'cumulative abnormal returns' of stock prices are characterised by a higher increase in the stock value around the announcement date than during the preceding period (see, e.g., Weston *et al*., 2001; Bauuer *et al*., 2009). The theory that motivates such an observation is based on the shareholders' prediction of positive future cash flows. This method offers the necessary elements in determining that a positive return has been created by the M&A (Warren-Boulton & Dalkir, 2001). Looking at previous papers which concentrated on the distribution of wealth (Datta, Pinches & Narayanan, 1992) one is able to understand that in the majority of these cases the acquired company absorbs most of the capital. The findings reported in these event studies are still puzzling. Investors' predictions of future profit are not always sustained by convincing evidence, because the share price on the stock market might also be influenced by phenomena unrelated to the impact of M&As (Copeland *et al.*, 2005).

The second method used in empirical studies shifts the attention from short-term results to those of longer-term performances of M&As. The accounting methodology uses performance indicators and market share data which were regressed against different factors, to determine the financial results for three to five years (Krishman, Miller & Judge 1997; Altunbas & Ibanez, 2004; Knapp *et al.*, 2006). Spathis, Kosmidou and Doumpos (2002) investigated the endogenous factors of Greek banks from their financial statements over the period 1990–1999, using financial ratios that affect the classification of banks according to their ratios. They revealed that large banks are more efficient than the small ones. The performance of the companies were measured based on assets return. Some researchers who used the accounting-based approach yielded inconsistent results in terms of operational performance. While some reported losses, others recorded gains and most showed mixed or insignificant results (Ghosh, 2001; Sharma & Ho, 2002; Yeh & Hoshino, 2002; Halkos & Salamouris, 2004; Kosmidou & Zopounidis, 2008). However, the accounting methodology suffers from major limitations, for instance, the stock return might be influenced by factors other than the M&A. Furthermore, the financial statements used in determining performance reflect the past, rather than the present financial performance (DeLong & DeYoung, 2007).

For the purpose of this study, the event-study methodology was selected, despite its problems. Regardless of the method applied by the practitioner, one has to examine the results while taking into consideration all of the factors that may influence the outcome. For example, in the case of event studies, one should analyse whether or not a fluctuation of one or two per cent in the share price over a few days around the announcement day would also have occurred during an economic crisis.

This analysis is focused on the abnormal stock market returns around the announcement day during periods affected by the 2007–2009 financial crisis, as well as during a non-crisis period. The research was based on 80 randomly selected M&A cases which took place in the UK, the USA, Canada, Germany, Japan and France, between January 1999 and February 2009 (data collected from Thomson Datastream and other sources). The sample covers various types of industries, including energy (BP), industry producers (Boeing), communication providers (AT&T), banking (BoA), and financial institutions (AIG). Therefore, the sample meets the requirements needed for the study. For each M&A case the announcement date and the daily stock price around the announcement day were determined.

All the cases were classified into two groups according to the general economic environment. One category (40 cases) comprised the M&A cases concluded before the sub-prime crisis, but after the IT bubble period. The second class (also 40 cases) contained M&A cases that took place between October 2007 and February 2009. Furthermore, in order to adapt to the new types of merger activities, all the cases were mainly studied from the acquirer's point of view.

The statistical analysis is intended to accomplish two basic objectives: 1) to determine whether the merger announcement had a statistically significant effect

on the stock returns of the acquiring firms (bidder); and 2) to compare and contrast statistically significant differences that may arise due to the financial crisis on merger or acquisition deals.

These objectives were met by conducting an event study of the M&A deals using the daily stock returns of the firms selected (80 firms in both the crisis and non-crisis periods) and regressing cumulative standardised abnormal returns on several explanatory variables.

Event window periods of 41 days, 31 days, 17 days, seven days and three days were sampled from the 80 securities (firms) before and during the financial crisis. For a firm to be included in the sample, it had to have been listed on major stock exchanges in any of the markets identified, and had to have at least 200 daily stock returns with no missing return data before and after the merger announcement.

3.1 Computing normal returns

A statistical model called the Market-Return Model (which is the most widely used in event study) was adopted to measure the normal returns of the stocks for the pre-event period. The Market Return Model relates the return of any given firm to the returns of the market portfolio. Its linear specification follows from the assumed joint normality of asset returns. For every security i, the normal returns for each day in every event period is estimated using the expression:

$$R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it} \qquad (1)$$

where ε_{it} is the statistical error term with $E(\varepsilon_{it}) = 0$ and $Var(\varepsilon_{it}) = \sigma^2$ constant through time and R_{mt} is the market return (stock exchange index) on day t, α_i measures the mean return over the period not explained by the market and β_i measures the sensitivity of firm *i* to the market which is the measure of risk. The β_i was determined by running a regression on 150 stock returns chosen from a clean period prior to any event window (also called the estimation period).

3.2 Computing abnormal returns

The abnormal returns are now estimated for the market model for various times *t* on the event window based on the estimated model for the normal returns using:

$$AR_{it} = R_i - E(R_{it}) \qquad = R_{it} - \alpha_i - \beta_i R_{mt}, \qquad (2)$$

where α_i and β_i are the parameters of the market model estimates which are determined from the pre-event period for firm *i* using OLS (linear regression) as described above.

3.3 Cumulative abnormal returns (CARs)

The next step was to determine the CARs, which are the sum of all the returns for all the acquiring firms over the various event periods. The CARs were calculated using

five windows {41 days (-20,+20), 31 days (-15,+15), 17 days (-8,+8), 7 days (-3,+3), and 3 days (-1,+1)} which allowed for the analysis and comparison of various results as the event window broadened. The CAR for a specific window for every security was determined as follows:

$$CAR(i,t) = \sum_{i=1}^{t} AR_{i,t} \tag{3}$$

Finally, this was aggregated across all 40 firms to obtain the mean CAR by dividing the sum of the CARs by the total number of the firms, given as:

$$\overline{CAR} = \frac{1}{N}\sum_{i=1}^{N} CAR_{i,N} \tag{4}$$

where N is the total number of firms for each period.

3.4 Generalised Sign Test

There are several statistical tests for analysing such data. However, for the purpose of this article, the Generalised Sign Test was used. These statistical test procedures seek to test for the statistical significance of the CARs of the acquiring firms during both the non-crisis and the crisis period.

This test is a refined form of the sign test which allows the null hypothesis to be different from 0.5. This is implemented by first determining the proportion of stocks in the sample that should have ARs under the hypothesis of abnormal performance. The value for the null is estimated as the average fraction of stocks with negative ARs in the estimation period. Moreover, if the ARs are independent across the firms, under the null hypothesis the number of non-negative values of ARs has a binomial distribution with parameter p. The alternative hypothesis, for any level of abnormal performance is that this proportion is different from the null hypothesis. This test, which takes into consideration the evidence of skewness in security returns, was introduced by Sanger and McConnell (1986) and used extensively by Cowen and Sergeant (1996) in their analyses.

The Generalised Sign Test statistics which have an approximate unit normal distribution are given as:

$$Z = \frac{Abs(p_0 - p)}{\sqrt{p(1-p)/N}} \tag{5}$$

where p_0 is the observed fraction of positive returns computed across stocks in one particular event day and p is the number of stocks in the event window for which the cumulative abnormal return is positive.

4 Empirical results

4.1 Summary statistics

After separating the 80 samples into two groups based on the economic environment, the samples were summarised by time, country and type (see Table 1).

Table 1: Descriptive statistics

Type of M&A	No. of M&As	Ex-ante mean volume	Ex-post mean volume	Ex-ante mean CAR	Ex-post mean CAR
Before crisis					
Domestic	33	6 554 007	7 275 806	-0.02513	-0.01764
Cross-border	7	14 040 986	12 298 474	-0.00089	-0.00045
During crisis					
Domestic	29	18 635 934	28 237 766	0.01003	-0.04168
Cross-border	11	10 775 462	7 154 348	-0.00048	-0.00086

Table 1 shows the number of samples, and the mean volume of the trading stocks for domestic and cross-border mergers. At first glance, it is evident that the announcements indeed affect the behaviour of the buyers, as the mean volume of the trading stocks apparently changed after the announcement date.

The cross-border mergers exhibited a decreasing trend in volume over the announcement period, while the domestic mergers experienced an increase in trading volume. Additionally, for the domestic group, the CAR for the samples during the crisis period had an ex-ante value which is obviously larger than the ex-post value. These facts may, to some extent, explain that most of the time, M&A announcements indeed motivate trading behaviour.

Table 2: Summary of the merger cases

Country/ Type of firm	USA	UK	Other	Public	Private
Before crisis					
Acquirer	37	2	1	40	0
Target	34	1	5	13	27
During crisis					
Acquirer	31	2	7	40	0
Target	29	3	8	10	30

Table 2 displays summary statistics for the sample of 80 M&As taking place before and after the financial crisis. As previously mentioned, most of the firms are from the USA and UK markets. The ex-ante and ex-post mean volume are computed 20 days before and after the announcement respectively. All of the acquirers are public companies, with slightly more private firms involved during the crisis period compared to the earlier non-crisis period.

4.2 Impact on returns

Tables 3 and 4 show CARs and the test results for the stocks (for each economic period) using the Generalised Sign Test for various event windows lengths.

Table 3: Before crisis–Generalised Sign Test

Window period	CAR	Z value	Remarks
± 20	-0.0236	-0.2669	Insignificant (No abnormal returns)
± 15	-0.01959	-0.3978	Insignificant (No abnormal returns)
± 8	-0.01839	-0.2873	Insignificant (No abnormal returns)
± 3	-0.0059	-0.1134	Insignificant (No abnormal returns)
± 1	0.00286	-1.897*	Significant (Positive returns)

* denotes statistical significance in 2-tailed test at 10% level

Table 4: During crisis–General Sign Test

Window period	CAR	Z value	Remarks
± 20	-0.06800	-0.2666	Insignificant (No abnormal returns)
± 15	-0.03410	-0.1294	Insignificant (No abnormal returns)
± 8	-0.01430	-0.0635	Insignificant (No abnormal returns)
± 3	-0.00102	0.1345	Insignificant (No abnormal returns)
± 1	-0.10540	-0.0239	Insignificant (No abnormal returns)

When comparing the test results shown in the two tables, one theme is evident and runs through both periods (during and prior to crisis). Each event window for the two periods indicates a negative CAR with small Z-values for the test results, except for the (-1,+1) window for the non-crisis period which was significant at ten per cent levels. This implies that generally there has been some increase in the share prices of bidder firms immediately after the announcement. One interesting discovery about these results is the fact that there is consistency in investor behavior, irrespective of economic instability.

The significant abnormal returns recorded one day after M&A announcements during the non-economic crisis period is consistent with the findings of Cowan (1992) and other research results.

5 Discussion

The returns to target shareholders are always positive, as indicated by numerous research papers on the subject (see, e.g., Liargovas & Repousis, 2011). However, for bidder firms (the firms which were of interest to this author) it is not really clear whether the excess returns are positive or negative. If the market for corporate control is perfectly competitive, we expect the excess return to the shareholders of a bidding firm to be zero. In others words, bidders will earn normal returns under competition, otherwise overall M&A activities will be value-increasing, which confirms the results given in earlier papers (see, e.g., Jensen & Ruback, 1983; Jarrel, Brickley & Netter, 1988; Schwert, 1996).

As stated earlier, the statistical values for the returns of bidder firms after an M&A announcement both during and after the economic crisis exhibited similar patterns and results. The main difference was the positive abnormal return (0.00286) for the window (-1,+1) during the non-crisis period, which is significant at the ten per cent level. This finding is rather interesting because it violates the Efficient Market Hypothesis. The only explanation for such a phenomenon could be the responsiveness of investors to leaked information during the non-crisis period when M&A announcements are made.

This discussion could be based on the assumption that investors react faster to M&A announcements during a non-economic crisis period, than those during a crisis period. It is interesting to observe that the CARs for window (-3,+3) were as low as -0.006 before the crisis and -0.001 during the crisis. The value increases sharply for the window (-8,+8), then continues to increase as the length of the event window increases. This could be attributed to panic on the market as a result of the announcements.

Investors would need time to analyse the profitability of an M&A deal before continuing to invest in a firm by trading in its shares. Others might want to sell off their share to instead acquire shares in the target firm, since there is a high possibility of positive returns. These factors may be responsible for fluctuations around M&A announcement dates. Suffice to state here that there could be other

technical explanations for these results. However, fluctuations on the market when announcements are made are not statistically significant enough to alter the stock return of bidder firms.

Merger activities and their effects are closely associated with the business cycle. Nelson (1959), Melicher *et al.* (1983) and Milionis and Papanagiotou (2008) at different instances investigated the lead and lag relationships between merger activities and the general business cycle, industrial production, interest rates, business incorporations, stocks and stock trading. Their findings show that changes in merger activities and changes in stock prices both lead to changes in industrial production, and vice versa. This suggests that the effect of merger activities is altered (affected) in response to changes in economic and business conditions, as stated above. If these changes occur randomly, merger activities will also be characterised by randomness. Besides, mergers occur to capture investment opportunities. If these findings are anything to go by, it could be inferred that these investment opportunities will definitely be affected by various economic variables. Hence, investor behaviour in favourable economic situations should have a greater impact on the effects of merger activities as far as stock prices are concerned. This is, to some extent, a direct contradiction to my findings of merger effects on stock prices in favourable economic environments (non-crisis) and in unfavourable economic situations.

6 Conclusion

This article closely examined the impact of merger announcements on the stock returns of bidder firms of publicly listed companies during both economic crisis and non-crisis periods (mainly in the UK and the USA). Eighty firms were randomly sampled across all industries (manufacturing, communication, finance, etc). The study period was grouped into two time periods: effects during non-economic crisis periods (January 1999–May 2007) and effects at the heart of the economic crisis (October 2007–February 2009). The data were analysed using the event study methodology and by critically subjecting the cases to statistical tests.

From the test results it could be inferred that, on average, the abnormal returns to bidder firms during an economic crisis and during a non-crisis period are not significantly different from zero. Therefore, the economic environment does not create short-term abnormal returns to bidder firms.

It can be observed that the abnormal returns (despite not being significant) for each period (crisis and non-crisis) increased as the event window period increased. This could mean that the markets were not good at timeously assessing the benefits of the deals. Hence, a long-term effect analysis will be beneficial. Interestingly, while abnormal returns on the three-day event (-1,+1) for non-crisis is less than positive 1%, that of the crisis period recorded a higher negative value, which simultaneously increased with that of the non-crisis as the window increased. This suggests that the markets react better to M&A deals during an economic crisis than during a non-economic crisis.

Overall, the results suggest that the economic situation does not significantly influence how players on the M&A market reacts to announcement deals. Hence, there would not be a need for special regulations to control the market during crisis periods. However, an abnormal return on the (-1,1) window suggests enhanced institutional mechanisms to deal with possible information leakage during non-economic crisis periods.

This work would not be complete without documenting some problems and limitations. First, the procedure used to estimate the test statistics is a quite simple way to illustrate the calculation of statistical significance. In using the market model to estimate regression coefficients, the residuals could involve some prediction errors. In addition, what was not taken into consideration is the possible changes in variance outside the estimation period, nor were time dependency or non-normality in the returns considered. More so, there is the possibility of cross-correlation in abnormal returns resulting, for instance, from a government regulation policy or other internal or external factors that simultaneously had an impact on a number of different securities.

Biographical note

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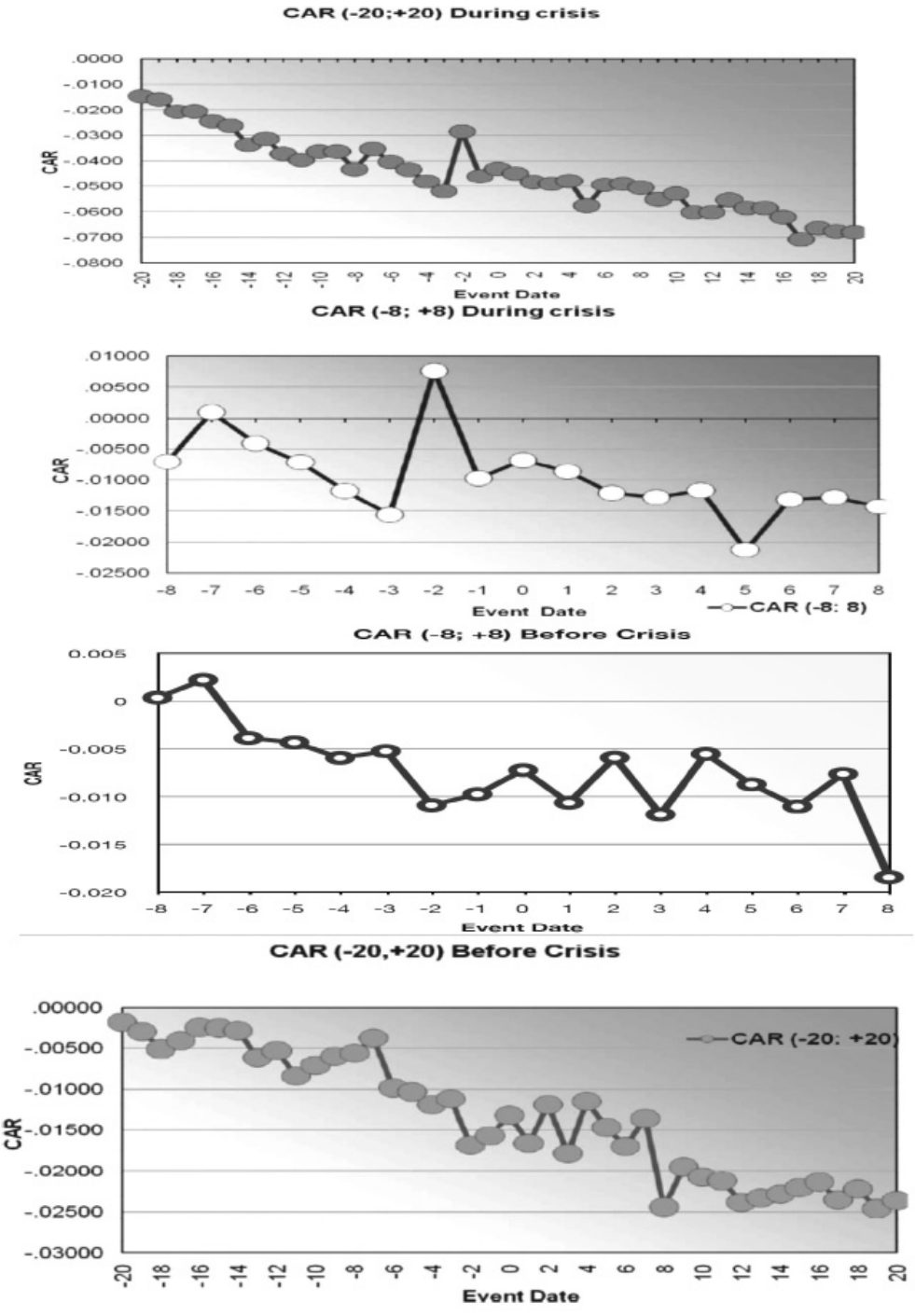
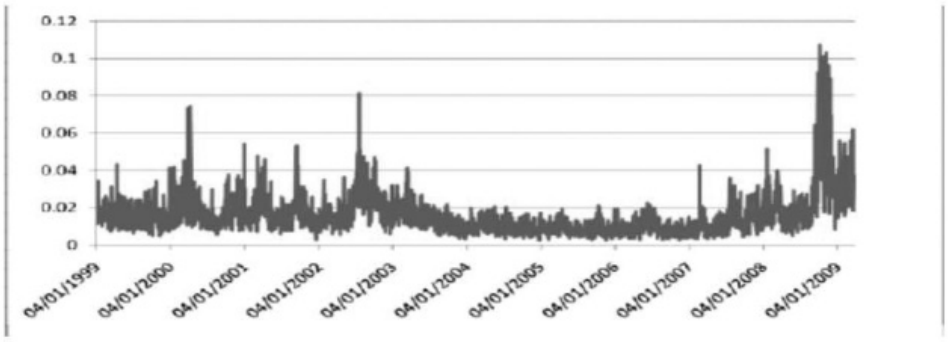
Appendix 1: CAR distributions

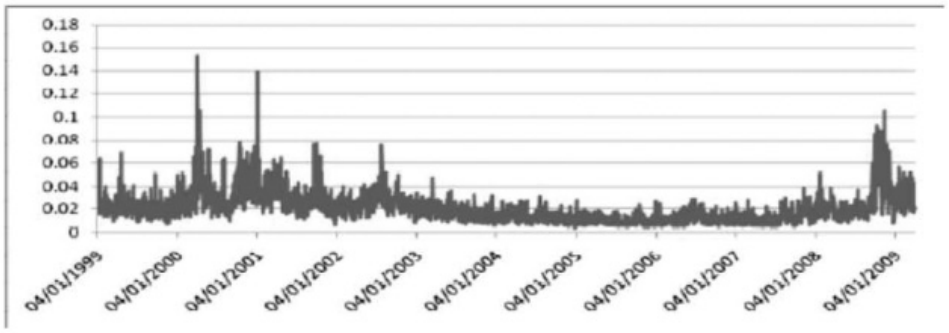


Appendix 2: Daily volatility graph[3]

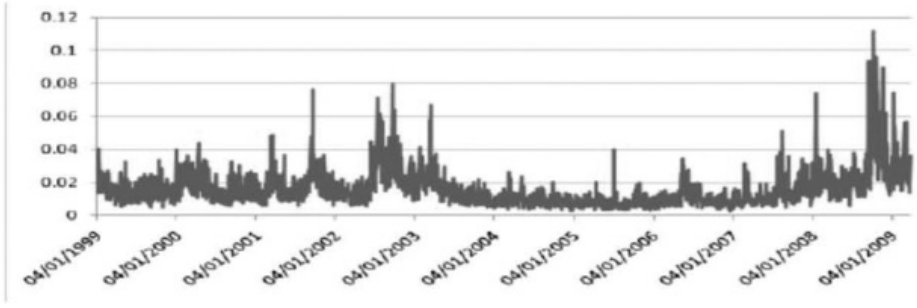
S&P 500 (Jan 1999 to Feb 2009)-USA



NASDAQ (Jan 1999 to Feb 2009)-USA



FTSE 100 (Jan. 1999 to Feb 2009)-UK



3 These are the daily volatility graphs of S&P 500, NASDAQ and FTSE 100 respectively from the 4th of January, 1999 to 30th of March, 2009. These graphs were obtained by subtracting the low price from the high and dividing by the closing price for each day. The obtained values are then plotted against their respective dates. These graphs show the volatility that characterises the financial market during 2007-2009 financial crisis.