THE INFORMATION CONTENT OF THE UK CORPORATE BOND RATING REVISION ANNOUNCEMENTS

Hasniza Mohd Taib

Senior Lecturer,
School of Economics Finance and Banking
UUM College of Business
Universiti Utara Malaysia
Phone:0134213424/04-9286876
Fax: 04-9286752

Abstract

This study examines the information value of rating changes announcements in the United Kingdom (UK). The study focuses on the bond rating changes assigned by S&P Corporation and Moody's Corporation in the UK between 1997 and 2006. The main purpose of this study is to determine whether there is significant support for the private information hypothesis based on evidence of bond rating changes announcements and their impact drawn from this period. Based on a standardised cross-sectional parametric t-test, as proposed by Boehmer, Musumeci and Poulsen (1991), on 299 corporate bond rating changes announced by S&P and Moody's, based on sub-period analysis, no abnormal share return is detected in the UK. However, the rating downgrade announcements show significant negative market reaction. A multivariate regression analysis revealed that the rating agencies have a significant influence on abnormal return on the day of upgrade and downgrade announcements. The result also shows that the market participants had no anticipation of the downgrade news, and the negative pressure on the share price will be less if the rating downward are within the grade (i.e. from AA+ to AA).

Keywords: Bond Rating Changes, Information Content

1. INTRODUCTION

Corporate bond ratings published by rating agencies play an important role for both companies and market participants because they provide information about the quality and marketability of various bond issues. For this reason, the rating changes announced by rating agencies must be carefully examined to assess their relevance and usefulness to market participants. During the announcement of corporate bond rating changes, the market participants may react differently to the announcements of rating agencies. This view has been rigorously examined in previous research, but so far no uniform answer has been provided (see, for example Abad-Romero & Robles-Fernandez, 2006; Dichev & Piotroski, 2001; Goh & Ederington, 1993; Howton, Howton,

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& Perfect, 1998; Kliger & Sarig, 2000). All issuers pay to be rated by rating agencies despite the fact that the ratings are costly. Investors are also very keen to purchase these rating reports to keep informed of their investment's current rating. The rationale for placing a high value on rating information is that issuers disclose inside information to rating agencies, who assign ratings that reflect this information without disclosing the specific underlying details to the public at large. Therefore, a surprise rating change can be considered as a significant signal that can trigger market reaction.

Hence, the objective of this study is to examine whether bond rating changes announcements contain pricing relevant information, and this objective is supported by two specific aims. The first aim of this study is to thoroughly examine the UK market reaction based on subperiod observations in order

to discover whether there is support for the private information hypothesis during the corporate bond rating revision. Although the UK is one of the largest bond markets in the world, only one study to date has analysed the UK data (see Barron, Clare, & Thomas, 1997). The most intensely studied market in this area of research is the US. In order to verify and generalise the findings of past research in the US on the behaviour of share prices during rating reclassification, there is a requirement to look at other developed capital markets, such as the UK market. The second aim of this paper is to investigate the factors that cause the abnormal reaction to the upgrade and downgrade announcements in the UK. Hence, this paper contributes to the finance field through the investigation of factors including both bond characteristics and company-unique characteristics that may influence the abnormal performance of shares in the UK in response to the announcements of S&P and Moody's.

2. LITERATURE REVIEW

The rating assigned by rating agencies to the bond issued by a company can reflect its issuer's creditworthiness, which represents the ability of the issuer to meet its future obligations. Much of the literature examines the impacts of rating changes announcements on share prices and their subsequent influence on the shareholders' wealth.

The US market provides a favourable testing ground for developed capital markets since it is the most comprehensive and the most competitive financial market in the world. Most of the research concentrates on examining share price reactions to bond rating changes. These changes can be either an upgrade or a downgrade. Initially, studies by Weinstein(1977) and Wakeman(1981) found that there is no significant market reaction during a rating upgrade or downgrade, which supported the efficient market hypothesis.

Nonetheless, other researchers (see, for example Goh & Ederington, 1993; Hand, Holthausen, & Leftwich, 1992) suggest that the rating downgrade can trigger more movement in share prices compared to bond upgrades. Hand, Holthausen and Leftwich (1992) examined the bond and share price reactions based on 1100 events of bond rating changes in the US from 1977 to 1982. They discovered a weaker price reaction of both shares and bonds to rating upgrade announcements. Goh and Ederington(1993) and Dichev and Piotroski(2001) similarly concluded from their event study that the market reactions towards upgrades of bonds are not significant.

Furthermore, Hand, Holthausen and Leftwich (1992) and Schweitzer, Szewczyk and Varma (2001) found significant negative excess bond and share returns observed at the time of downgrades. Goh and Ederington(1993) investigated 428 rating changes announced by Moody's between 1984 and 1986. They found that there are negative market reactions when the rating agency downgraded the bond for reasons of deterioration in the company's or industry's financial prospects. Dichev and Piotroski(2001) found similar results.

Previous extensive research on how rating announcements affect US market participants has motivated other researchers to investigate this issue in other countries (see, for example Abad-Romero & Robles-Fernandez, 2006; Barron, et al., 1997; Joo & Pruitt, 2006; Matolcsy & Lianto, 1995; Poon & Chan, 2008). According to Elayan, Hsu and Meyer (2003), a smaller capital market may react differently to rating changes announcements in comparison to the US, as a result of factors such as scarcity of information, liquidity premiums, or maybe the analysts overlooking significant factors.

Similar to the results from the US, most of the findings on other countries indicate that rating downgrades contain informational value. However, no significant reaction has been found for upgrade announcements. Barron, Clare and Thomas(1997) investigated the UK market reactions to rating announcements on short-term debts, long-term debts, and newly issued debts in the UK for the period 1984–1992. Based on 14 long-term downgrades and 9 long-term upgrades, they identified significant negative reaction to the downgrade announcements but no significant reaction to the upgrade announcements. Note that their findings are based on a small number of observations, which could affect the generalisation of the results. Up till now, no further research has been carried out in the UK to clarify this matter.

In Australia, few studies have been carried out to examine the share price reaction to rating changes announcements. The first study was conducted by Matolcsy and Lianto in 1995, and was based on rating changes announced by S&P for the period 1982–1991. Their results revealed that the weekly share prices showed significant negative reactions during periods of downgrade, but insufficient conclusions could be derived for the upgrade announcements. Creighton, Gower and Richards conducted a comprehensive study on Australian bond rating changes in 2006. Based on rating changes announced by both S&P and Moody's from January 1990 to July 2003, they found significant positive movement in share prices during upgrade announcements and negative share price movement during downgrade announcements. Their results on the market reaction

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during upgrade announcements thus contradicted the findings of Matolcsy and Lianto(1995). Creighton, Gower and Richards (2007) also found that the share price effect was larger for small companies and for bonds that were downgraded from the investment to the speculative grade.

Other capital markets like those of China, New Zealand, Korea and Malaysia also show interesting results. In China, Poon and Chan (2008) compiled rating data on 170 bonds issued from 2002 to July 2006. The shares listed on the Shenzhen Stock Exchange showed significant negative reactions to downgrade announcements. Their investigation on the initial rating announcements reveals that the speculative grade bond triggered a larger negative effect on the share price compared to the positive reaction to the investment grade. Elayan, Hsu and Meyer (2003) also found that the rating agencies do provide valuable information through their bond rating changes announcements in New Zealand. Based on rating announcements for New Zealand companies from July 1990 to June 2000, significant market reaction was observed to bond upgrade and downgrade announcements. Their findings are quite similar to those of a study undertaken byCreighton, Gower and Richards(2007)in Australia—indicating that both markets are less efficient that the US market. The shares do not instantaneously adjust to the information provided to the market, thus allowing an abnormal return to occur in response to both the rating upgrade and downgrade.

3. METHODOLGY

3.1 Data

The analysis of the announcement of corporate bonds rating changes is based on data from S&P and Moody's for the period 1 January 1997 to 31 December 2007. This study concentrates on bond revisions issued for UK companies and sold on the local market. The companies in the sample are listed on the London Stock Exchange. All daily share prices are obtained from the DataStream. The original database obtained from S&P contained 1086 announcements of corporate bond ratings issued by UK local companies from 1997 to 2006, while Moody's had 3135 rating changes announcements.

The data on announcements by S&P and Moody's was treated as a contaminated sample that required filtering to ensure accurate findings. The filtering process[1] in this study is adapted from

[1]The filtering process includes the following steps:

i. All initial bond rating announcements are eliminated from the sample.
ii. Companies with double rating changes in the same year for the same bond issue are excluded from the sample.
iii. Issuing companies categorised as private companies are excluded from the sample.
iv. Announcements related to the same issuing companies which issued different types of bonds on the same date are also eliminated.

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that used in several past studies (see, for example Akhigbe, Madura, & Whyte, 1997; Barron, et al., 1997; Dichev & Piotroski, 2001; Goh & Ederington, 1999; Hand, et al., 1992). The filtering process produced a final sample of 105 rating changes events (30 rating upgrades and 75 downgrades) by S&P, and 194 unique rating changes announcements upgrades, and 141 downgrades) by Moody's. For S&P events, 22 companies experienced bond upgrades and the other 45 companies had bond downgrades. For Moody's sample, 38 companies experienced an announcement of bond upgrade, and 79 companies experienced a downgrade. However, there are some situations where companies experienced both a bond rating upgrade and downgrade. The exact number of companies observed is 154 for both samples (S&P: 57 companies and Moody's: 97 companies)

3.2 Methods of Analysis

1) Event Study

This research implements an event study in order to examine the value of the information content of the corporate bond rating changes announcements for market participants.

Based on capital market efficiency, the present share price should accurately reflect the available information in the market. The market model introduced by Sharpe (1964) and Lintner (1965) is considered to be the most popular method in calculating abnormal return. Expected return for share i at time t is calculated as follows:

$$E(\tilde{R}_{it}|\phi_{t-1}, R_{mt}) = \alpha_i + \beta_i R_{mt} \quad (1)$$

where $\tilde{R}_{it}$ is the returns on share i, R_{mt} is the return on the market, $\beta_i = \text{cov}(\tilde{R}_{it}, \tilde{R}_{mt}) / \sigma^2(\tilde{R}_{mt})$, and the information specified by ϕ_{t-1} is the bond rating revision. This study follows the common practice of converting the one factor model in equation 3 to the following regression model:

$$\tilde{R}_{it} = \hat{\alpha}_i + \hat{\beta}_i \tilde{R}_{mt} + \tilde{\in}_{i,t} \quad (2)$$

The estimated parameters $\hat{\alpha}_i$ and $\hat{\beta}_i$ can vary from share to share, and $\tilde{\in}_{i,t}$ is a random disturbance. It is assumed that the random disturbance term satisfies the assumptions of the

v. In order to obtain uncontaminated samples, other company-specific announcements (i.e. dividend announcements and profit and loss announcements) are sourced using Factiva for two weeks surrounding the rating changes events. If company-specific announcements occur in this two-week period, the event is eliminated from the sample.

ordinary least squares regression model: that is, $E(\tilde{\in}_{i,t})$=0; $E(\tilde{\in}_{i,t}, \tilde{\in}_{i,t+1})$=0; and $E(\tilde{\in}_{i,t}, \tilde{R}_{mt}) = 0$, for all *t*. Thus, equation 4 represents the daily rate of return on an individual share as a linear function of the corresponding return for the market. Based on previous studies (see, for example, Pinches & Singleton, 1978) the return data from the period surrounding the specific information event (20 days before and 20 days after the announcement) is omitted in obtaining $\hat{\alpha}_i$ and $\hat{\beta}_i$.

The symbol $\in_{i,t}$ represents the unsystematic risk component or error term (also known as residual) which incorporates the impact of a company-specific event announcement (assuming that the information signal and the return on the market are independent). Measurement of abnormal return is introduced if $\in_{i,t}$ is moved to the left side of the equation. Using the regression coefficients $\hat{\alpha}_i$ and $\hat{\beta}_i$ estimated from Eq. (4) and the concurrent values R_{it} and R_{mt}, the predicted disturbance terms (residuals) are calculated for 20 days before and 20 days after the bond rating changes announcements, where

$$\text{AR}_{\text{i,t}} = \in_{i,t} = \text{R}_{\text{i,t}} - \hat{\alpha}_i - \hat{\beta}_i R_{mt} \qquad (3)$$

and t is constrained to the period t_{-20} through t_{+20}.

The next step is to compute the daily cross-sectional average abnormal returns (AAR_t) for a specific day, t. This is done by summing all of the daily abnormal returns for the whole event period and dividing them by the number of observations.

$$\text{AAR}_t = \sum_{i=1}^{N} AR_{i,t} / N_t \qquad (4)$$

where N_t is the number of observations on event day t

Next, the cross-sectional average abnormal return is summed. This is done by adding the daily average abnormal returns in time periods t_1 and t_2. The formula used is as follows:

$$\text{CAR}_{\text{t}} = \sum_{k=t-T}^{t} AAR_t \qquad (5)$$

where T is some number of event days prior to day t

The parameter of the market model for this study is around 100 days, which is estimated based on 6 months of daily return observations beginning 120 days through to 21 days before the corporate bond rating changes announced to the public. The event period ranges from 20 days before to 20 days (41 days in total) after the rating revision. The test statistic for the abnormal return is based on the standardised cross-sectional t-test as proposed by Boehmer, Musumeci and Poulsen (1991). The same method has also been used by Brooks et al. (2004), who studied the impact of sovereign bond ratings changes on the share price.

To compute the standardised abnormal returns (SAR_t) for a specific day, t, is as follows

$$SAR_{it} = AR_{it} / \hat{\sigma}_i \sqrt{1 + \frac{1}{T_i} + \frac{(R_{mt} - \overline{R}_m)^2}{\Sigma_{E=-120}^{-21} (R_{mt} - \overline{R}_m)^2}} \tag{6}$$

where $\hat{\sigma}_i$ is market i's standard deviation of the risk-adjusted abnormal share price return during the estimation period; T_i is the number of trading days in the estimation period for company i; and $\overline{R}_m$ is the average market return (FTSE All Share/ MSCI Europe Index) during the estimation period.

For each day in the event period, the cross-sectional standard deviation of the SARs is calculated and this can be written as:

$$\sigma_{SAR_t} = \sqrt{\frac{\Sigma_{i=1}^{N} (SAR_{it} - \Sigma_{i=1}^{N} SAR_{it} / N)^2}{N(N-1)}} \tag{7}$$

The test statistic for the standardised cross-sectional is as follows:

$$Z = \frac{\Sigma_{i=1}^{N} SAR_{it} / N}{\sigma_{SAR_t}} \tag{8}$$

The individual SARs are assumed to be cross-sectionally independent and normally distributed. The distribution of the sample average SARs will converge to normality according to the Lindberg-Levy and Lindberg-Feller central limit theorems.

2) Cross-Sectional Regression of Abnormal Performance

Multivariate regressions are employed in this chapter to examine the cross-sectional variation of the abnormal returns surrounding the event of rating changes announcements in the UK from 1997 to 2006. Various attributes are examined to identify their contribution in influencing the abnormal performance of share prices during the rating changes (see, for example Avramov et al. 2009; Hand, Holthausen & Leftwich 1992; Holthausen & Leftwich 1986; Poon & Chan 2008). Hence, this chapter tests both company characteristic variables and bond characteristic variables to determine the importance of these factors in impacting on the performance of the abnormal return during the event of corporate rating revision.

Based on studies by Elayan, Maris and Young (1996) and Elayan, Hsu and Meyer (2003), variables for company characteristics such as size and liquidity are included in the multivariate regression. The natural log of the market valuation ($\log MV_i$) is used to examine whether the size of the company is significantly related to the market reaction during the rating changes event. The other key company characteristic that is tested in the multivariate regression is the company's leverage. This chapter uses debt to total asset ratio (DTA_i) as a proxy for company's leverage, which is also employed by Elayan, Hsu and Meyer (2003). When leverage increases, the risk of the company will also increase. Higher levels of leverage can cause an increase in both the volatility of share prices and the default risk.. The share price of high-leverage companies has a greater impact in terms of share price reactions to corporate bond upgrade and downgrade announcements compared to low-leverage companies. Hence, we can expect a positive (negative) sign for the coefficient of DTA_i during upgrade (downgrade) announcements.

Furthermore, the multivariate analysis also examines the factors that associate with the bond rating characteristics, which are: (i) the pre-event abnormal return; (ii) the rating agency that assigns the rating revision; (iii) rating changes within the riskier grade; (iv) rating changes within the class; and (v) rating changes across the grade.

The pre-event abnormal return (CAR_i) is the CAR measured over the pre-event period from day -20 to day -1. This variable is examined to see whether there is an effect of anticipation (Brooks, et al., 2004) before the rating agencies announce the rating changes. If there is an anticipation effect, the share price performance during the pre-event period will be positive (negative) before the upgrade (downgrade) announcement. If rating changes announcements are anticipated by market participants, the share price reaction on the day of the announcement will be small. Moreover, an unanticipated downgrade occurs if the market experiences positive or zero share price reaction in the pre-event period, which results in larger abnormal share performance during the announcement period. During an unanticipated downgrade and upgrade, the pre-event return should have an inverse relationship with the announcement return (Goh & Ederington, 1999). Thus, the rating changes announcement is considered as 'surprise news' if the sign for the coefficient for the pre-event period is negative during corporate bond upgrade and downgrade announcements.

The dummy variable for rating agencies ($DMoody's_i$) is included in the multivariate regression to measure its impact on the abnormal performance of shares during the rating changes announcement. Another factor measured in the regression is the dummy variable for bonds that experience changes within the speculative grade ($DSpec_i$). According to Hand, Holthausen and Leftwich (1992) and Goh and Ederington(1999), the changes of rating within the speculative grade should have a greater impact on the share performance compared to changes within the investment grade. The dummy variable for bonds that experienced rating changes within the speculative grade ($DSpec_i$) is included in the regression analysis with the expectation of a direct relationship with the announcement return. There should be a greater impact on the announcement return if the coefficient for $DSpec_i$ is positive (negative) during upgrade (downgrade) announcements.

The severity of abnormal share performance is smaller if the bond rating changes occur only within the class (for example from A+ to A) in comparison to bonds that experience changes across the grade (Barron, et al., 1997). DWC_i is the dummy variable for bonds that experience rating changes within the class, and the DCG_i is the dummy variable for bonds that experienced changes across the grade during rating changes (either move from speculative to investment grade or drop from investment to speculative grade). The sign of the coefficient for both DCG_i and DWC_i is estimated to be positive during upgrade announcements and negative during downgrade announcements.

The dependent variables used in the multivariate regression are the AR (day 0) and CAR (day 0 to +1). The regressions are estimated separately for upgrade and downgrade announcements. The full model, which is presented below, is used to test the explanatory variables for rating changes announcements.

$$AR_i = \alpha_0 + \beta_1(\log MV_i) + \beta_2(DTA_i) + \beta_3(CAR_i) + \beta_4(DMoody's_i) + \beta_5(DSpec_i)$$

$$+ \beta_6(DWC_i) + \beta_7(DCG_i) + \varepsilon_i$$

where

AR_i = abnormal return for observation i in day 0 / cumulative abnormal return in the window day 0 to day +1;

$\log MV_i$ = natural logarithm of market valuation of company i;

DTA_i = debt to total asset ratio for company i;

CAR_i = cumulative abnormal return in the window day -1 to day -20;

$DMoody's_i$ = dummy variable equal to unity if the rating changes is announced by Moody's, zero if the announcements are from S&P

$DSpec_i$ = dummy variable equal to unity if the bond changes within the speculative grade, zero otherwise;

DWC_i = dummy variable equal to unity if the bond experiences changes within a class (i.e. BB+ to BB), zero otherwise;

DCG_i = dummy variable equal to unity if the rating changes move the bonds from speculative to investment grade for upgrade, and for bonds that drop from investment to speculative grade during downgrade, zero otherwise.

When the dummy variable (i.e. $DMoody's_i$) has the value of 1, the other three dummy variables should be zero. When regressing the base group of this model $(AR_i = \alpha_0 + \beta_1(\log MV_i) + \beta_2(DTA_i) + \beta_3(CAR_i) + \varepsilon_i)$, the other dummy variables should be equal to zero. This chapter utilised an F-test to verify the value of the model estimated and a t-test is used to verify the significance of the parameters of the regression model. The R-squared and adjusted R-squared are also presented in the findings. R-squared is used to measure the proportion of variation in the model which can be explained by the independent variable, while the adjusted R-squared is useful for comparing the goodness-of-fit of regression equations that have a different number of coefficients.

4. FINDINGS

4.1 Moody's vs. S&P: Analysis of Market Reactions Based on Subperiods

There is a degree of uncertainty about the exact time of the day when the corporate bond changes announcements are made. These conflicting rating revisions are either announced early in the trading day or towards the end of trading. Because of this timing uncertainty, there is a possibility that the estimation of the market reaction will not be precise. Furthermore, there is the possibility that the market will react prior to the announcements date, during the event date or after the announcement date. Table 2.9 presents the results on the market's reaction based on subperiods for both bond downgrade and upgrade announcements by Moody's and S&P using two different markets: the FTSE All Share and the MSCI Europe Index. The full sample period is divided into three phases. The first phase is the pre-announcement period which contains 3 subperiods[2]: (a) *t*=-20 to *t*=-1; (b) *t*=-20 to *t*= -15 and; (c) *t*=-10 to *t*=-1. The second phase covers the period surrounding the event announcement which extends from *t*=-1 to *t*=0. The final phase contains 2 subperiods: (a) from *t*=+1 to *t*=+10; and (b) from *t=+1* to *t*=+20, thereby enabling an examination of the post-announcement market reaction to rating revision.

The results on the market reaction to rating upgrades announced by S&P are reported in Panels A of Table1 . There is only one favourable significant positive reaction observed in subperiod -1 to 0 (S&P announcement) in Panel A of Table 1. However, no conclusion could be derived on the effect of private information since other subperiods show significant negative reactions (refer to: (i) subperiod -20 to -15 of S&P announcements; and (ii) subperiod -1 to 0 as announced by Moody's in Panel A); which is contrary to theoretical expectations. Furthermore, there is no evidence of significant CAR values observed in the other subperiods.

Panel B of Table 1 show a more pronounced market reaction than observed in the downgrade analysis. All samples in Panel B report evidence of strong negative market reaction during the downgrade announcements (see subperiod -1 to 0). These results are consistent with the expectation that 'bad' news has a negative impact on the market.

Table 1 Market reactions to corporate bond rating revision

CAR according to subperiod (days)	**Upgraded Companies**			
	Panel A: Upgraded Companies		**Panel B: Downgraded Companies**	
	S&P (N=30)	**Moody's (N=53)**	**S&P (N=75**	**Moody's (N=141)**
-20 to -1	-0.014	-0.025	-0.011	-0.017
	(-0.988)	(-0.874)	(-0.211)	(0.030)
-20 to -15	-0.004***	-0.010	0.002	0.000
	(-3.510)	(-1.026)	(-0.342)	(-0.581)
-10 to -1	-0.006	-0.014	-0.025	-0.014
	(-0.254)	(-0.624)	(-1.242)	(0.124)

[2] The selection of subperiods was based on the results discussed in the previous section, in particular the subperiod -20 to -15 in which a strong market reaction was observed.

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-1 to 0	0.002**	-0.011*	-0.024***	-0.011***
	(2.682)	(-1.723)	(-7.930)	(-18.946)
+1 to +10	-0.002	-0.021	-0.002	-0.020
	(-0.073)	(1.336)	(-0.908)	(-0.361)
+1 to +20	0.000	-0.039	0.013	-0.039
	(0.328)	(0.414)	(0.612)	(-1.255)

This table shows the cumulative average return (CAR) over selected subperiods. The standard errors are estimated using SARs but only the AAR is reported. A rating change occurs when S&P and Moody's announce a rating change.

* indicates statistical significance at 10% level of confidence

** indicates statistical significance at 5% level of confidence

*** indicates statistical significance at 1% level of confidence

inally, several insights are provided by this subperiod analysis of the UK market. First, there is insufficient evidence to suggest that upgrade announcements result in positive reactions in share price. In contrast, when considering downgrades, all samples indicate that downgrade announcements are considered to be significant by the market during the subperiod -1 to 0. This finding concurs with the results of previous studies, such as those of Barron, Clare and Thomas (1997), Dichev and Piotroski(2001) and Matolcsy and Lianto(1995), who observed reliable information on rating downgrades but not for rating upgrades. Furthemore, there is no significant evidence to suggest that data from S&P outperforms that of Moody's in terms of signalling information to the public. These findings are consistent with the results identified by Hite and Warga(1997) and Kish, Hogan and Olson (1999), who compared the market reactions to S&P and Moody's bond rating change announcements and found no significant evidence indicating that the public values information provided by one agency over that provided by the other.

4.2 Results of Cross-Sectional Regression Analysis

The multiple regression analysis is based on two separate dependent variables: (i) the abnormal return on the day of the rating changes announcement (AR(0)); and (ii) the cumulative abnormal return that covers two days surrounding the announcements (CAR (0,+1)).

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As stated earlier, when a dummy variable (i.e. DWC) is assigned as 1, the other three dummy variables should be denoted to zero. When weregress the base group $(AR_i = \alpha_0 + \beta_1(\log MV_i) + \beta_2(DTA_i) + \beta_3(CAR_i) + \varepsilon_i)$ as in Model 1 (refer to all Panels in Table 2), the other dummy variables should be equal to zero. Furthermore, two separate regressions were run for upgrade and downgrade announcements. To address the problem of heteroskedasticity, the White (1980) test is applied.

The coefficients for each of the multivariate regressions for rating changes announcements are shown in Table 2. The original number of observations for the rating upgrade is 83 based on the announcements of both S&P and Moody's, but the multivariate regression is carried out based on 77 observations after excluding the missing data. Panel A of Table 2 represent the regression results when using the AR(0) as the dependent variable, while Panel B correspond to the usage of CAR(0,+1) as the dependent variable. There is no independent variable found to be significant except for the rating agency variable (DSP), which is found to be significant at a 10% confidence level in Panel A. The coefficient sign for DSP is positive which means that Moody's rating upgrades are associated with positive abnormal returns at 1.23% higher than the base case on the day of the announcement. This finding is consistent with the work of Brooks et al. (2004), who found that rating agencies such as Thomson have a significantly positive impact on the abnormal return performance during the upgrade announcements, while Fitch IBCA have a significant negative influence on the share price performance during downgrade announcements. No other individual variables were found to be significant. This finding is expected, as no significant positive reaction was found during the upgrade announcement as discussed in previous section. The value of R-squared, adjusted R-squared, the F-test value and the Jarque-Bera are poor, which can be observed in each of the models and all the panels.

Panel C and D of Table 2 presents the value of the coefficient for the regression analysis of the downgrade announcements. There were 216 observations for the downgrade regression, yet only 209 were deemed to be usable after eliminating the missing values. Since the Jarque-Bera value of all the regression tests for downgrade was extremely high, the outliers were identified and removed, which resulted in a final sample size of 207 downgrade events.[3] Although the Jarque-Bera for all of the tests was still high it has improved. Hence, the results shown in Panel C and D ofTable 2 are acceptable because this analysis includes a large sample size (N=207), which means that the values of the t-test have approximate normal distribution. Furthermore, the F-test

[3]Refer to Appendix 4.2 which presents the coefficient value for the downgrade announcement when the sample size is equal to 209. Note that the results of the coefficients for the regressions during downgrade presented in Table 4.10 are quite similar to the resultspresented in Appendix 4.2. The only difference is that the DWC is found to be strongly significant in all panels in Table 4.10 and DMoody's is found to be significant in Panel B of Table 4.10, while only DSpec is found to be significant in Panel A and Panel B of Appendix 4.2.

value is significant as identified in Panels C and D of Table 2, which means the regression as a whole has explanatory power.

Panel C of Table 2 shows that the variable for the pre-event CAR in all of the models exhibits a negative sign for the coefficient, which is statistically significant at the 10% confidence level. This means that the abnormal return on the day of the downgrade event is negative, while the pre-event abnormal return was positive in the 20 days before the downgrade announcement. This demonstrates that the market participants in general did not anticipate the arrival of the downgrade rating news. In fact, the downgrade was considered a surprise since the pre-event abnormal return was positive before the announcement day of the rating downgrade. This result, however, conflicts with the observations of Brooks et al. (2004) and Goh and Ederington(1999), who found that there is a positive relationship between the pre-event CAR and the AR(0) during the downgrade announcements which implies that the market had anticipated the arrival of the downgrade before the rating agencies announced the events.Moreover, Holthausen and Leftwich (1986) found significant positive pre-event reaction for the upgrade announcements and significant negative pre-event reaction prior to the downgrade announcements, which indicates that the market participants had already predicted that the upgrade or downgrade would occur.

The results of the rating agency (DSP) were found to have weak significance level as shown in Panel D (Model 2), and to have a negative coefficient. This suggests that, on average, the downgrade announcements made by S&P are 1.88% points lower than the base case of negative abnormal return on the day of the event. No other evidence of DSP shown in Panel C of Table 2 was found to be significant. Surprisingly, the dummy variable for rating changes within class (DWC) is found to have a strong positive relationship with the abnormal return during the downgrade announcements. Based on Panel C and Panel D of Table 2, on average the rating changes within the class were found to be significant at 1%, which has an influence that is 1.76% point, 2.65% point and 1.85% point lower than the base case of negative abnormal return on the day of the event announcement, while Panel D shows that the DWC is 2.25% points lower than the base case which is significant at the 5% confidence level. This means that, on average, if the rating changes announcements involve changes within grade, this will reduce the amount of negative abnormal reaction to the event of the downgrade. However, there is no significant evidence found for the dummy variable that involves rating changes among the speculative grade (DSpec) or for the dummy variable that involves changes in grade from the investment grade to the speculative grade (DCG).

Table 2: Regression results of average returns (ARs) and cumulative average returns (CARs) during the rating changes (N=77)

	Rating Upgrades (N=77)									
Independent Variables:	**Panel A: Dependent Variable =AR (0)**					**Panel B: Dependent Variable=CAR (0,+1)**				
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 1	Model 2	Model 3	Model 4	Model 5
Constant	0.0036	-0.0038	-0.0074	0.0010	0.0057	0.0125	0.0043	-0.0023	0.0092	0.0155
	(0.137)	(-0.148)	(-0.336)	(0.0419)	(0.208)	(0.478)	(0.166)	(-0.086)	(0.353)	(0.564)
Market Value (LogMV)	-0.0007	-0.0008	0.0004	-0.0007	-0.0008	-0.0014	-0.0016	-0.0000	-0.0015	-0.0016
	(-0.230)	(-0.294)	(0.161)	(-0.232)	(-0.268)	(-0.513)	(-0.589)	(-0.002)	(-0.509)	(-0.563)
Debt to Total Asset (DTA)	0.0014	-0.0024	0.0011	0.0015	0.0017	0.0016	-0.0026	0.0012	0.0018	0.0020
	(0.567)	(-0.859)	(0.438)	(0.640)	(0.668)	(0.486)	(-0.614)	(0.373)	(0.551)	(0.607)
$CAR_{-20\ to\ -1}$	0.0110	0.0094	0.0122	0.0090	0.0112	0.0293	0.0275	0.0309	0.0267	0.0295
	(0.222)	(0.194)	(0.250)	(0.183)	(0.225)	(0.483)	(0.467)	(0.506)	(0.450)	(0.482)
S&P dummy (DSP)		0.0123*					0.0136			
		(1.885)					(0.010)			
Speculative dummy (DSpec)			0.0057					0.0077		
			(0.702)					(0.710)		
Within Class dummy (DWC)				0.0044					0.0058	
				(0.740)					(0.778)	
Change Grade dummy (DCG)					-0.0068					-0.0097
					(-1.026)					(-1.344)
R-squared (%)	0.59	3.89	1.07	1.18	1.08	1.49	4.12	2.06	2.15	2.14
Adjusted R-squared (%)	-3.49	-1.45	-4.42	-4.31	-4.42	-2.55	-1.21	-3.38	-3.28	-3.29
F-value for test	0.15	0.73	0.20	0.21	0.20	0.37	0.77	0.38	0.40	0.39
Jarque-Bera	90.19	97.79	101.06	94.14	94.32	15.97	14.65	18.38	14.86	16.23

	Rating Downgrade (N=207)									
Independent Variables:	**Panel C: Dependent Variable =AR (0)**					**Panel D: Dependent Variable=CAR (0,+1)**				
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 1	Model 2	Model 3	Model 4	Model 5
Constant	0.0021	-0.00007	-0.0120	-0.0067	0.0037	-0.0088	-0.0144	-0.0371	-0.0200	-0.0033
	(0.094)	(-0.003)	(-0.523)	(-0.295)	(0.161)	(-0.302)	(-0.486)	(-1.119)	(-0.663)	(-0.107)
Market Value (LogMV)	-0.0004	-0.0007	0.0011	-0.0007	-0.0005	0.0010	0.0002	0.0040	0.0007	0.0005
	(-0.143)	(-0.269)	(0.408)	(-0.252)	(-0.193)	(0.291)	(0.058)	(1.044)	(0.193)	(0.143)
Debt to Total Asset (DTA)	-0.0015	-0.0036	-0.0019	-0.0021	-0.0014	0.0013	-0.0039	0.0006	0.0006	0.0018
	(-0.680)	(-1.099)	(-0.877)	(-0.906)	(-0.600)	(0.395)	(-0.892)	(0.193)	(0.175)	(0.532)
$CAR_{-20\ to\ -1}$	-0.0455*	-0.0453*	-0.0454*	-0.0462*	-0.0456*	-0.0891	-0.0885	-0.0888	-0.0900	-0.0893
	(-1.676)	(-1.699)	(-1.721)	(-1.781)	(-1.684)	(-1.446)	(-1.480)	(-1.476)	(-1.507)	(-1.455)
S&P dummy (DSP)		0.0072					0.0188*			
		(0.951)					(1.778)			
Speculative dummy (DSpec)			0.0109					0.0220		
			(1.063)					(1.583)		
Within Class dummy (DWC)				0.0176***					0.0225**	
				(2.827)					(2.357)	
Change Grade dummy (DCG)					-0.0054					-0.0178
					(-0.741)					(-1.340)
R-squared (%)	8.60	9.03	9.18	12.23	8.67	14.02	15.32	15.05	16.62	14.37
Adjusted R-squared	7.25	7.23	7.38	10.50	6.86	12.75	13.64	13.37	14.97	12.68
F-value for test	6.37***	5.02***	5.10***	7.04***	4.80***	11.03***	9.14***	8.95***	10.06***	8.48***
Jarque-Bera	518.08	506.75	541.06	428.40	525.56	2924.71	2764.33	2727.34	2616.23	2993.12

Note that the value inside the parenthesis is the t-test value :

* indicates statistical significance at 10% level of confidence

** indicates statistical significance at 5% level of confidence

*** indicates statistical significance at 1% level of confidence

Model 1 = Base Model

Model 2 = Base Model + DMoody's

Model 3 = Base Model + DSpec

Model 4 = Base Model + DWC

Model 5 = Base Model + DCG

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Goh and Ederington(1999) and Poon and Chan (2008) found that there is a significant negative relationship for bonds that experience changes within the speculative grade with the abnormal return on the day of the downgrade announcement. The unfavourable result for DCG may be due to the small number of observations of bonds (N=12) that experience rating downgrades from investment to speculative grade from the total sample of 207.

In conclusion, there is some evidence that announcements made by rating agencies influence changes in abnormal returns during the period of upgrade and downgrade announcements. The cross-sectional regression revealed that downgrade announcements are considered surprise news from the viewpoint of market participants, which contradicts the findings of Brooks et al. (2004) and Goh and Ederington(1999). Another variable that was found to be significant is bonds that experience rating changes within the class. The other variables were found not to be statistically significant.

Chapter 2

5.CONCLUSION

In this research, an event study is used to test whether the UK bond rating changes by Moody's and S&P have any informational value to market participants. Based on subperiod observations, there is significant evidence to conclude that the bond downgrade announcements evidenced the private information effect, while there was no evidence of a market reaction to bond upgrade announcements. These results are consistent with the findings of previous research (see, for example, Goh and Ederington(1993) and Dichev&Piotroski(2001)).

Based on the multivariate regression analysis, on average, the announcements made by the rating agencies are considered to be one of the factors that influence the abnormal return of shares during a rating upgrade or downgrade. This abnormal performance of share prices indicates that the public regards announcements of rating changes as meaningful and as potentially containing information that is valuable to the public. It also indicates that the market participants do not predict the forthcoming event of the downgrade. Since the pre-event abnormal return has a negative relationship with the abnormal return on the day of the announcement, on average, the downgrade news was considered a surprise to the markets which conflicts with the findings of Brooks et al. (2004) and Goh and Ederington(1999). Other variables were found not to be significant during the downgrade announcements, except when the rating changes of the bond is within the class, which means that if the downgrade involves the rating changes within the class (i.e. AA to AA-) the negative abnormal return during the downgrade will be less severe.

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