Market response to the credit rating announcements

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1 Introduction

Credit rating is a measure of relative creditworthiness of debt issuers and obligations. It has important implications to market participants. Corporations would consider their ratings significantly when they decide on corporate policy. As Graham and Harvey points out (2001), when executives choose capital structure, financial flexibility and credit rating are the most important factors. To the investors, credit ratings provide valuable information in delineating investment policy. Banks use various techniques to analyze information on credit risk to estimate the ability for future contractual obligations. Moreover, regulators use credit ratings as well, or permit these ratings to be used for regulatory purposes.

Credit rating agencies (CRAs) such as Moody's, Standard and Poor's and Fitch Ratings assign such credit ratings and change them to signal improving or deteriorating fundamental credit quality. Early in 1990s, agencies have introduced "rating reviews" or "watchlists" to provide indication of the likely direction and timing of future credit rating changes.[1] For example, downgrade on rating changes are usually preceded by possible downgrade on watchlists. However, for the financial crises in Asian countries and ensuing Enron scandals, credit rating agencies did little to warn financial markets. Independent and unregulated rating agencies have been asserted to blame for Enron debacle. The roles of agencies have come under scrutiny and sharp crititism. Many researches have investigated information contents of rating change news announcement. In detail, they have focused on stock market responses around rating change announcement dates using event study methodology.

[1] We will use both watchlists and rating reviews interchangeably in this paper.

In this study, we examine the informativeness of credit rating announcements in terms of information timeliness and contents. Specifically, we investigate whether both rating changes and watchlists have information contents. If so, is such information released to the market on a timely basis? By nature of credit rating process, rating changes are preceded by rating reviews, implying that rating change announcements are more likely to be anticipated than watchlists news release. In addition, we make groups according to the credit risk profiles. Then, we analyze whether lower rated category shows more pronounced response to the up or down rating announcements. Our study extends to not only stock market but also bond market to check whether there is any structural difference between bond and stock market.

Few researches study bond market responses. It may be due to limited data availability. Katz (1974), Hettenhouse and Sartoris (1976) used monthly yield changes and Hite and Warga (1977) employed monthly bond returns. Wansley et al (1992) used weekly abnormal bond returns. As far as we know, Hand et al (1992) is the first paper to document bond market responses using daily abnormal returns.

However, their paper has some drawbacks. First, sample size is small since number of bond is 215 and number of firms is 104. Second, their estimation of excess abnormal bond return is defined as the bond's return less the return on a long term U.S. Treasury bond. As a benchmark, U.S. Treasury bond is not appropriate because it does not match with corporate bond returns. Third, data is somewhat out of date. Its' period is from 1981 to 1983 by Moody's and from 1977 and 1982 by Standard and Poor's.

Extant studies mainly focus on stock market reactions surrounding announcements on rating dates. For the stock market responses, Pinches and Singleton (1978) show negative reaction after downgrades. Holthausen and Leftwich (1986) examine 1014 stock market

responses to rating changes of Moody's and S&P and 250 additions to S&P Credit watch using daily abnormal stock returns. They find that there is significantly negative performance after downgrades while no significant abnormal reaction for upgrades. In addition, Goh and Ederington (1993) and Dichev and Martell (1997) reported similar empirical results. On the other hand, Katz (1974), Wansley et al. (1992), Hite and Warga (1997) studied bond market reactions using monthly or weekly abnormal returns. Their findings are consistent with those of stock market. Particularly, Hull et al (2004) investigate credit default swap (CDS) market. Prior studies show that negative rating announcements are associated with statistically negative price movement while positive rating news gives rise to weakly or insignificant positive price changes.

We obtain 3-day window period cumulative abnormal returns (CAR) around both Moody's watchlist and rating action dates. Our result shows that on watch dates, the averages CAR of bond market for down and up watches are -1% and 0.09%, respectively. For the stock market cases, the corresponding figure is -5.96% and 2%. Based on rating change dates, the mean CAR of bond market for down and up rating change announcements are -0.70% and -0.01% while we have -3.72% and 0.19% for the stock market. Thus, it seems that watchlists contain more information content than rating actions for both bond and stock market. It is because watchlists play a role to provide signals about next credit ratings and information on rating announcement dates is already expected from rating reviews. Numerous papers already show asymmetric responses to the downgrade and upgrade in terms of returns. Likewise, we also observe the asymmetric reactions to the downgrade and upgrade news events.

We also find that the magnitude of cumulative abnormal returns is greater for the lower

rated securities than for the higher rated ones. For example, when there are possible downgrade watchlists news announcements, mean CAR for letter A rated bonds is -0.30% while it is -11.20% for letter C rated bonds.[2] We find similar and more prominent results for the stock market, too. For the downgrade watchlists events, the mean cumulative abnormal returns for letter A rated bonds is -3.22% while corresponding value is -14.65% for the letter C rated bonds.

When we partition watch types conditional on future rating changes (or watch resolutions), we obtain more striking results. On the watch start dates, up (down) watchlists followed by rating up (down) are associated with average cumulative abnormal returns of -1.7% (0.11%) for corporate bond market. The corresponding figure is -6.29% (2.49%) for the stock market.

We perform the cross sectional regression analysis of cumulative abnormal returns on credit rating levels, multinotch and fallen angel (rising star) by controlling issue characteristics such as coupon rate, face value, time to maturity, price, trade size and issuer size.[3] Our results indicate that as the credit risk increases, the cumulative abnormal returns are less likely to decrease to the downgrade and less likely to increase to the upgrade news events. When we perform the regression test for the stock market, we obtain similar results. In addition, we find interesting results of fallen angel (rising star) effect. When credit rating changes from investment (non-investment) grade to non-investment (investment) grade, greater market responses are observed.

This study makes several contributions. First, it investigates informativeness of rating

[2] We include Aaa, Aa1, Aa2, Aa3, A1, A2 and A3 for letter A category, Baa1, Baa2, Baa3, Ba1, Ba2, Ba3, B1, B2, and B3 for letter B and Caa1, Caa2, Caa3, Ca and C for letter C group.

[3] For stock market, we control for leverage, trading volume, number of trades, volatility and issuer size.

agency's announcement, separating credit watch and rating actions. Prior studies ignore the role of rating reviews. Hand et al (1992) just combined watchlists and rating actions together and performed empirical tests. Using the rating process algorithm suggested by Moody's, we test for separate rating reviews and rating actions, shedding light on information content of watchlists and CRAs' rating process.

Second, we perform empirical tests for both bond and stock market. Extant studies mainly concentrate on stock market. However, main purpose of issuing credit ratings is to assign creditworthiness to each bond issue, so that rating news is more likely to be directly related with bond market. Unlike stock market, the data availability and paucity of transaction give rise to serious problem in analyzing bond market. Therefore, financial economists have made use of Treasury bond data, ignoring corporate bond market. Even if prior studies are interested in corporate bond, many of them employ monthly or weekly data, which makes it hard to examine short term behavior of investors surrounding announcement dates.[4] With the help of corporate bond transaction data, TRACE (Trade Reporting and Compliance Engine), we could perform empirical tests on corporate bond market and present results of comparison tests between bond and stock markets.

Third, we further investigate whether investors show different behaviors associated with rating announcements according to the credit rating levels. For example, to the bondholders with quality graded bond, a minor change of upgrade or downgrade credit rating announcements may not be influence their holding strategy since the news may not have significant impact on default probability and they may be investors with long-term horizon. However, to the speculative grading bondholders, the same news may have different

[4] See Katz (1976), Hottenhouse and Sartoris (1976), Wansley (1992) and Hite and Warge (1997).

implications. However, extant researches have not presented any tests with regard to this issue. This study may be the first one to perform the empirical tests on this issue.

The remainder of this paper is organized as follows. Section 2 presents credit rating process and hypotheses developments. Section 3 show data and descriptive statistics. Section 4 measures abnormal bond and stock returns. Section 5 provides unconditional and conditional tests of market impacts on bond and stock market. Section 6 analyzes regression analysis of abnormal returns around watchlists dates for bond and stock market. Section 7 analyze cross sectional analysis of anticipation hypothesis. Section 8 provides concluding remarks

2. Credit rating process and hypotheses development

2.1 Credit rating and Watchlists

Credit ratings are designed to measure the probability that the issuing firms will default on its promised payments. So, the term "high grade" means low credit risk, or high probability of future payments. The highest-grade bonds are denoted by Moody's as the letters Aaa. The next highest grade is Aa. To provide narrower credit quality breakdown within each class, Moody's uses 1, 2 and 3. For example, there are three sub-grades Aa1, Aa2 and Aa3 within Aa grade category.[5] The border line for investment grade is Baa3. If credit ratings downgrade from Baa3 to Ba1, the ratings become speculative grade. Thus, letter Baa securities are belong to

[5] Alphanumeric modifiers for the Caa category were introduced in June 1997. Specifically, before June 1997, only Caa grade existed. Since then, Caa1, Caa2 and Caa3 were used. But, Ca and C rating categories are, still, used without alphanumeric modifiers.

investment grade while Ba and B are belong to speculative grade.[6]

Although ratings are the primary means by which Moody's expresses its opinion of an obligor's credit quality, watchlists are supplemental tools to communicate potential changes. When an obligor's credit quality has changed to the point that its rating need to be revised upward, or downward, it is placed on Moody's watchlists as on review for possible upgrade (UPG), on review for possible downgrade (DNG), or review with direction uncertain (UNC). Rating reviews are concluded either by changing the issuer's credit rating or confirming its existing credit rating. Following the conclusion of a rating review, the issuer may again be placed on the watchlist if another rating change is anticipated.

2.2 Credit rating agencies' practices and objectives

Rating management practices seek to limit rating changes if there is a high likelihood that they might be reversed over a short period of time and to dampen rating change volatility by moving ratings in a gradual, even predictable, fashion in response to changes in fundamental credit quality. When an obligor's credit risk profile appears to have shifted, only fundamental credit quality changes that are believed to be permanent should result in a credit rating action. Therefore, many market participants believe that agency ratings are slow in responding to changes in corporate credit quality.[7]

On the other hand, some investors want to keep their portfolio rebalancing as less frequently as possible and desire some level of rating stability. They do not want ratings to be changed to reflect small changes in financial condition.

Rating agencies face these conflicting objectives – rating timeliness and rating stability.

[6] Refer to appendix 1.
[7] See Altman et al. (2004) or survey conducted by the Association for Financial Professional (2002)

While they are expected to relaease accurate ordinal ranking of credit risk, they are also expected to achieve stability, lowering the sensitivity of rating changes to short term fluctuations in credit quality. To mitigate mutual tension between two objectives of the credit rating, watchlists play an important role. Watchlists are usually followed by official rating changes later. Furthermore, as a rule, rating reviews and ensuing rating changes are consistent with the direction indicated by watchlists. Therefore, watchlists provide more timely information to the market and maintain rating stability.

2.3 Testable hypotheses

2.3.1 Information contents between rating reviews versus rating actions

Given that credit rating agencies manage issuer's ratings toward minimizing abrupt changes in rating levels, agencies would not issue information with regard to rating changes unless it reveals a potential change in an issuer's relative creditworthiness. So, both rating reviews and rating changes announcements are expected to have information content. Since rating changes are preceded by watchlists and directions of rating changes are generally consistent with those in watchlists, actual rating changes are more or less expected from precedent rating reviews information. Hence, watchlists are expected to have more information contents than rating changes events.

H1: Both rating reviews and rating actions contain information contents. And we expect rating reviews to have greater price change than rating change events.

2.3.2 Market impact on categorical credit rating levels

Credit rating news may have different implication to the investors with different investment purposes. To the bondholders with long term horizon and low default probability bond, minor rating change of either downgrade or upgrade may not affect their short term investment behaviors since those investors pursue fixed income. On the other hand, even though a high-yield bond has a higher risk of default or other adverse credit events, it could be attrative to some investors because it pays higher yields than better quality bond. To the speculative investors, downgrade or upgrade may have greater impact on their investment strategy.

H2: Bondholder with speculative rated bond may show greater market response than those with investment grade bond to the rating news announcements.

2.3.3 Bond market versus stock market

Since a credit rating is a rating agency's credit quality assessment of a debt issuer or a specific debt obligation (SEC 2005), bondholders seems to be more directly related to the rating announcements. So, it is natural to assume that bond market will show more pronounced reactions to the rating news than stock market. However, stockholders may be more sensitive to the rating change information because bondholders inherently face less risky profile than stockholders. Equity holders have a residual claim to the firm's future cash flows and bondholders have priority over stockholders in case a company is liquidated. Market efficiency is also an important factor to compare market reactions of both markets to news announcements. In terms of market liquidity and transparency, stock market is more efficient.

Bond market has been recognized as less liquid than stock market because bond market is less frequently traded. In addition, bond market is less transparent than stock market. Trading information is not reported to the public as fast and frequently as stock market. If the latter prevails, following hypothesis will be possible.

H3: Market reaction to the rating news is greater in the stock market than bond market.

2.3.4 Conflict of interests hypothesis

Since ratings are widely used by the investment groups and raging changes influence significant impact on the market prices, as an independent institution, rating agency appears to issue credit rating in objective way. However, some argue that main revenue source for the rating agency is to charge issuers for their credit ratings. And the issuers are willing to pay fees because they benefit from ratings.[8] Thus, there is a criticism that rating agencies' dependence on fees from issuers may encourage to issue more favorable ratings and to be less diligent in probing for negative information. To the extent that interests of conflicts hold, following hypothesis can be suggested.

H4: Agencies tend to delay downgrade announcement for the big client. So, market anticipation will be positively related with the issuer size.

3. Data and descriptive statistics

[8] Refer to Cantor and Packer (1994)

To analyze both bond and stock markets, we make two separate sample files for each market. For the issuer credit ratings and ratings reviews data, we use Moody's Default Risk Service database. This provides access to Moody's complete proprietary default database featuring on rating actions at the issuer and issue levels. In addition, Moody's database provides access to credit histories for over 10,000 issuers and 200,000 individual issues, including other relevant information such as size, maturity, debt class, and coupon rate for each debt issue. In addition to the ratings history, the database includes rating reviews information, which can be understood as an interim review by credit rating agencies toward future rating changes. Moody's assign one of the following 3 categories to the issue it is reviewing: possible upgrade (UPG), possible downgrade (DNG) and uncertain (UNC).

To obtain the bond returns, the corporate bond transaction data are acquired from a comprehensive database recently made available by the Trade Reporting and Compliance Engine (TRACE). The TRACE system was established on July 1st, 2002 to disseminate corporate bond prices for all bonds traded in the over-the-counter (OTC) market. The stated purpose of creating this database is to improve the transparency of the corporate bond market. The unique and comprehensive dataset of TRACE offers an unparalleled opportunity for bond transaction related studies. It consists of the price and trade size (quantity) and time. Stock returns are obtained from CRSP and issuer characteristics are from the Compustat, respectively.

Place Table 1 here

Panel A in Table 1 describes issue characteristics of 6426 samples according to letter credit

ratings. Over our sample period, 11686 securities are identified. But after filtering, only 6426 bonds with prices both before and after the announcements dates remain.[9] As expected, coupon rates are negatively associated with bond ratings. Bonds with higher ratings were issued with lower coupon rates. For example, coupon rate is 6.46% for the highest rated bond, Aaa while corresponding rate is 9.81% for the lowest rated bond, C. If we assume that credit risk is embedded into coupon rate, the poor rated bonds need to pay higher coupon rate to compensate their high risk. Maturity is calculated by subtracting bond issue date from maturity date. On average, bond maturities across the ratings are 12 years which is reasonable in that intermediate term bonds are viewed with a maturity between 5 and 12 years.[10] And bonds with investment grade seem to have longer maturity. When it comes to the debt seniority, we classified issues into 3 categories: Secured, Subordinated and Others.[11] If Moody's debt description includes a phrase equivalent to "subordinated" we classified it as subordinated. If a phrase similar to "secured" or "senior" appears, bond is classified as Secured. Naturally, the rest are classified as others. The proportion of subordinated bonds increases as credit rating deteriorates. Lastly, we provide nationality of bond, which is defined as market in which debt was issued. Result shows that bonds with high credit ratings are more likely to be issued in U.S. rather than Europe.

Panel B in Table 1 describes issuer characteristics such as firm size, tobinq, leverage, market capitalization, and ROA. Some variables show linear function of credit ratings. As expected, firm size, market capitalization is positively related to the credit ratings while leverage is negatively associated with them. It is a matter of course that firms with poor grade

[9] We only pick up samples that are detected around the announcement event dates.
[10] We report days in the table, instead of years.
[11] Moody's lookup data file defines 16 subgroups such as senior secured, Junior subordinated, senior unsecured and so forth

are more likely to be small companies with heavy debt. In the letter C rating groups (Caa3, Caa2, Caa1, Ca, and C), the leverage is above 40%. On the other hand, corresponding figure is below 20% to the letter A groups(Aaa, Aa1, Aa2, Aa3, A1, A2, and A3).

Place table 2 here

Panel A in Table 2 presents the matrix of transition grouped by rating modifiers and rating reviews for the issues and the results are expected. With few exceptions, possible upgrade in watchlists leads to an upgrade more frequently than possible downgrade, uncertain or watchlist case. Possible downgrade in rating reviews is associated with a downgrade in the following rating action announcements. However, in no watchlist or uncertain cases, we could not find such strong correlation between watchlists and real rating actions. We could find similar results for issuer cases in Panel B in Table 2. More than 98 percent of the subsequent rating changes are consistent with the directions indicted by rating reviews, which seem to support the stability of rating agency's practices and we could confirm role of watch reviews.

4. Measurement of abnormal bond and stock returns

4.1 Measurement of abnormal bond returns

To obtain the bond returns, we first calculate daily raw return of bond issues from the end of day prices in Trace. Then, we combine return data with credit rating histories in Moody's database between July 1st, 2002 and May 26th 2006. To calculate the abnormal bond returns, we subtracted the Citigroup corporate bond index. Specifically, we matched credit rating and

the maturity of each bond with the index and then subtracted daily index return from the daily raw return of the bond.[12] We used Citigroup Broad Investment Grade (BIG) bond Index for investment grade issues (Baa3 or higher) and Citigroup High Yield Market Index for non-investment grade issues. The Citigroup Index has subcategories such as AA, A, BBB, BB, B, CCC and 4 different maturities: 1-3, 3-7, 7-10, 10+ years. For each bond issue, we find the Citigroup bond index with corresponding credit rating and maturity. Then, we subtract bond index daily return from the bond raw return to obtain abnormal return.

$$R_{it} = F_{it}/ F_{it-1} \text{ and } F_{it} = K_{it} + (C_i/365)V_i \quad (1)$$

where R_{it} is the holding period return of bond i between closing day t-1 to closing day t, F_{it} is the flat price of bond i at day t, C_i is the coupon payment paid to holders of bond i, K_{it} is the closing day price of bond i at day t, and V_i is the number of days elapsed since the last coupon payment of bond i. The abnormal return is calculated as the difference between the bond's return and the return of the benchmark:

$$AR_{it} = R_{it} - R_{Bt} \quad (2)$$

where R_{Bt} is the holding period return of the benchmark bond between closing day t-1 to closing day t, and AR_{it} is the abnormal return of bond i between closing day t-1 to closing day t.

[12] Hand et al, use long term U.S. Treasury bond for the benchmark bond return. But it does match with corporate bond in obtaining abnormal bond return. In addition, they did not consider maturities. In our study, accrued interest is added to the price change to calculate the bond's return.

This eliminates the influence of daily changes in the expectations of real rates of inflation and of daily changes in the form of yield curve. We also calculated mean abnormal returns and cumulative mean abnormal returns for whole sample and for specific subsample:

$$AR_t = 1/N \Sigma_i AR_{it} \text{ and } CAR = \Sigma_\tau AR_t \quad (3)$$

Where AR_t is the mean abnormal return at day t, N is the number of observations in the portfolio, CAR(τ) is the cumulative mean abnormal return between day t=υ and day t=τ.

4.2 Measurement of abnormal stock returns

For the issuer abnormal returns, we use traditional methodology to measure abnormal equity return AR_{it} for issuer i on day t. Abnormal returns are residuals from the standard market model estimated over days (-255, -46), where CRSP equal-weighted returns are used for the market return. We also calculate the cross-sectional mean of the market model residuals across the issuer rating changes in each subsample on each event day t to form an average abnormal return Art. In other words, $AR_t = \Sigma_i AR_t/N$. We then sum the abnormal returns across the return window to calculate the across-time summation of Art, and call it $CAR(\tau) = \Sigma\tau AR_t$, where Στ denotes the summation over t=υ through τ, where υ and τ are, respectively, the beginning and ending day of each CAR(τ) calculation.

Place Figure 1 here

Based on cumulative abnormal returns in the bond and stock market, we provide graphical

results of market reactions to the credit rating announcements. Figure 1 displays the CAR patterns, ranging back from -30 to 30 days around both watchlists dates and rating changes dates. We can easily see how cumulative abnormal returns behave around the event day. Whether cumulative abnormal returns are based on rating changes dates or watchlists dates, patterns look similar. To the downgrade news, both bond and stock market reacts in advance and CAR sharply move down around the event day. However, to the upgrade announcements, stock market shows gradual response while bond market does not react much. Clearly, asymmetric responses are observed. For example, for the stock market based on watchlists dates, CAR is about -20% to the downgrade news but it is approximately 3% to the upgrade case around the event day. When it comes to the market anticipation, markets seem to anticipate the events, especially to the downgrade news announcements. However, for the upgrade news announcements, bond market does not show any particularly noticeable pattern. After the rating announcements, CARs of both markets seem to be stable.

Place Figure 2 and 3 here

Figure 2 and 3 display the corporate bond and stock CAR patterns to the credit rating announcements according the different risk profiles. It can be seen that lower rated bonds and stocks react to the news in much more active way. For the letter A group, the cumulative abnormal returns show the meager patterns around the announcement date. In addition, any particular pattern is not observed before and after the event day. However, letter C category actively reacts to the downgrade (upgrade) news with negative (positive) CAR. These results are consistent with our conjecture that credit rating events do affect on the lower rated

speculative bondholders who are more likely to actively trade their bonds with short term horizon. On the other hand, bondholders with quality bonds are not affected by the rating events since they are more likely to pursue fixed income with long term horizon.

5. Unconditional (unconditional) market impacts on bond and stock market

5.1 Unconditional tests of market impacts on bond and stock market

In this section, we report several unconditional 3 day cumulative daily abnormal returns surrounding rating action and rating review dates for both bond and stock market. Specifically, we test whether the bond price move differently around between rating change and watchlists dates.

Place Table 3 here

Panel A in Table 3 shows the results for bond market. For rating change announcements, mean CAR for the downgrade event is -0.7% and statistically significant. But for the upgrades, it is 0.014% and statistically insignificant. When credit rating news is measured around watchlists, we obtain more pronounced results of -1% for downgrade and 0.09% for upgrade, respectively. Since watchlists are unexpected news events, the effect is stronger. When we further test for letter A, letter B and letter C groups, we obtain striking results that most of information content comes from the letter C group. For example, based on watch event date, the mean CARs of group A, B and C are -0.3%, -1% and -11.2% respectively to the downgrade news. The magnitude of CAR in group C is 10 times greater than group B and

almost 40 times bigger than group A. It seems that risky bonds are more susceptible to the default risk, the downgrade news is worse for the letter C group. Similar pattern is detected in the upgrade news events with smaller magnitude. For the upgrade watchlists, the mean CARs are 0.02%, 0.26% and 2.29% for letter A, B and C group, respectively. The riskier issues appear to react more sensitively to the good news, too.

We also performed empirical test, separating our sample into issues that are either investment or non-investment grade before a rating change. Speculative grade bonds show much stronger market responses to the rating news events across all the categories, which is consistent with letter grade test results. Nonparametric sing test based on the percentage of positive abnormal returns reveals similar findings with less significance. Mainly, we focus on downgrade (upgrade) news announcements.

However, it is interesting to note market reaction to the "Uncertain" watchlists. As the definition implies, the fact that rating is put on the uncertain watchlists indicates uncertain future direction of rating changes. Hence, it should not contain any particular information content. Our test result shows that mean CAR for the case of uncertain rating reviews is just -0.09% with -0.12 test statistics in the bond market and corresponding figure for the stock market is -0.02% and 0.02 respectively. Notwithstanding statistical insignificance, its figure is too small to be ignored, economically. It is confirmed that both market does not show reactions when rating agency announces uncertain watch news.

Lastly, we test how the rating news events affect when issues change from investment grade to non-investment grade or the other way around. Crossing the investment grade barrier seems associated with a greater market price effect. A significant portion of corporate bonds are possessed by insurance companies. Insurance industry is known as one of the heavily

restricted by the regulation, requiring minimum percentage of investment grade bonds. That is, regulated investors may be forced to sell the downgraded bonds if they are downgraded from investment grade to speculative grade. Therefore, "fallen angels" or "rise star" (downgraded from investment to non-investment grade, upgraded from non-investment grade to investment grade) may significantly affect their investment strategy. In the bond market, signs are as expected but when it comes to the statistical significance, results are mixed. For the downgrades, cumulative abnormal return is statistically significant on watch beginning dates while it is not the case based on rating change dates. For the upgrades, mean CAR is not statistically significant based on both rating changes and watchlist dates. In case of the stock market, CAR is negative and significant for downgrades on both watch dates and rating dates. For upgrades, we obtain positive sign with statistical insignificance.

5.2 Conditional tests of market impacts on bond and stock market

This section presents evidence on three day CARs surrounding watch beginning dates and rating change dates conditional on watch resolutions. According to the Moody's credit rating process, ratings placed on watchlists for possible upgrade, possible downgrade or uncertain will be resolved with a rating change, a confirmation, a rating withdrawal, or a continuation of review status.[13]

Place table 4 here

[13] Refer to Keenan, Fons and Carty (1998). Rating confirmation is defined that agencies confirm tha the existing rating is still in effect. Rating is withdrawn when Moody's removes rating for an obligation/issuer on which it previously maintained a rating. Continuation of watch is defined that the credit rating agency considers current credit watch resolved, and issues temporary confirmation of the original rating, while acknowledging that uncertainties leading to the initial placement on watch remain unresolved, and that the issuer remains on watch.

As we see unconditional results in Table 3, we show strong evidence that credit watch reviews contain significant information contents. Panel A shows results based on rating changes dates. Downgrade (upgrade) watchlists followed by rating downgrades (upgrades) are associated with mean cumulative abnormal returns of -0.4% (0.04%) in the bond market. Similar conditional tests on the watch beginning dates are reported in Panel B in Table 4. As expected, the magnitudes of cumulative abnormal returns across the categories vary much stronger than those on the rating changes dates. Downgrade (upgrade) watchlists followed by rating downgrades (upgrades) are associated with mean cumulative abnormal returns of -1.7% (0.11%). The results are consistent with our hypothesis. It is reasonable because if the market expects the rating agencies to change the rating once the ratings are put on watchlist, the information is already conveyed in the announcement of the watchlists and thus, there is less information in the rating change itself.

Panel C and D in Table 4 report the conditional cumulative returns for stock market. The results are similar with those in Panel A and Panel B. Panel C shows that downgrade (upgrade) watchlists followed by rating downgrades (upgrades) are associated with mean cumulative abnormal returns of -4.21% (0.22%). Similar conditional tests on the watch beginning dates are reported in Panel D. As expected, the magnitudes of cumulative abnormal returns across the categories vary much stronger than those on the rating changes dates. Downgrade (upgrade) watchlists followed by rating downgrades (upgrades) are associated with mean cumulative abnormal returns of -6.29% (2.49%). In addition, overall, we can see that stock market react to the news in much greater magnitude than bond market. For example, based on watch beginning dates, the cumulative abnormal returns for down (up) watches followed by

down (up) rating changes are -1.7% (0.11%) for the bond market. The corresponding values are -6.29% and 2.49%, respectively.

One noticeable point is that the CARs conditional on “nowat” shows much greater numerical value. We define “nowat” as the rating changes not preceded by watchlist information. When rating agencies change the ratings, the direction is already anticipated by the watchlist information. Therefore, we conjecture that watchlist news may have more information content because it is unexpected announcement. However, if information regarding the rating changes is released without watchlist news, such rating changes are also unexpected event and may have greater information content. In our test result, our conjecture is confirmed. For example, in the bond market of Panel A, the mean of CARs to the downgrade news without watchlists is -2.1% while corresponding value with down wachlists is -0.4%. These results are reasonable since rating changes announcements without watchlists are more likely to be unexpected news than rating changes with prior watchlists news. In the stock market of Panel C, the mean of CARs to the downgrade news without watchlists is -5.31% while corresponding value with down wachlists is -4.21%, which also confirms our conjecture.

6. Regression analysis of abnormal returns around watchlists dates

In this section, we run the cross sectional regressions to test which factors affect the cumulative abnormal bond and stock returns to the possible downgrade or upgrade watchlist news announcement.

Place Table 5 here

Panel A in Table 5 presents results from estimation of a regression model for the corporate bonds, where the three day cumulative abnormal returns around the watchlist start date is the dependent variable and the independent variables include the followings:

Issuer size: Natural logarithm of issuer's total assets. Issuer size is as of the most recent fiscal year-end preceding the rating change.

Time to maturity: Natural logarithm of the difference between the transaction date and the maturity date (in days).

Rising star: 1 for "rising star' (issuers upgraded from speculative to investment grades), and 0 otherwise.

Fallen Angel: 1 for "fallen angels' (issuers downgraded from investment to speculative grades), and 0 otherwise.

Multinotch: 1 if rating change is greater than one notch, and 0 otherwise.

Watchlength: Natural logarithm of number of calendar days between watch start date and rating change date for rating changes preceded by a credit watch, and 0 otherwise.

Level: Numerical number assigned to each credit rating.

We regress $CAR_{i,t}$, three-day cumulative abnormal returns for bond i on day t, on the following explanatory variables.

$$CAR_{i,t} = \beta_0 + \beta_1\ IssuerSize_{i,t} + \beta_2\ Level_{i,t} + \beta_3\ CouponRate_{i,t} + \beta_4\ FaceValue_{i,t} + \beta_5\ TimeToMaturity_{i,t} + \beta_6\ Price + \beta_7\ Number\ of\ Trades + \beta_8\ WatchLength_{i,t} + \beta_9\ MultiNotch_{i,t} + \beta_{10}\ FallenAngel_{i,t}\ (or\ RisingStar_{i,t}) + \varepsilon_{i,t} \quad (4)$$

The regression model is estimated for downgrade and upgrade watches separately. We find that the cumulative abnormal returns for the downgrade watchlist news are negatively associated with FallenAngel and Mutlinotch, consistent with the general notion that Multinotch and FallenAngel will have greater market impact than were it not so. For the upgrade, we have positive signs which is also expected result but those are not statistically significant, indicating that upgrade news have a meager market impact. The coefficient of variable, Level, is positive (negative) for downgrade (upgrade) watchlists and statistically significant. That is, bonds with quality credit ratings show smaller market impact to the news events, which is consistent with our conjecture.

The variable, Issuer Size, has positive (negative) coefficient and statistically significant for downgrade (upgrade), implying similar statistical result and interpretation. If we assume that large size of issues are more likely to be high rated bonds, as the issuer size increases, the market impact will be smaller. The estimated coefficient for the coupon rate is negative for the downgrade and positive for the upgrade, implying that as the coupon rate increases, market impacts are greater. It is also consistent to our prior findings. Since coupon rate are positively related to the credit risk, cumulative abnormal returns are greater for the higher coupon rated bonds. We also find interesting result that the coefficient for the number of trade is negative and highly significant for the downgrade. We infer that the more frequently traded bonds react more actively to the negative news announcements.

For the stock market, we employ the following model.

$$CAR_{i,t} = \beta_0 + \beta_1 IssuerSize_{i,t} + \beta_2 Level_{i,t} + \beta_3 MarketCap_{i,t} + \beta_4 TobinQ_{i,t} + \beta_5 Leverage_{i,t} + \beta_6 Price + \beta_7 ROA + \beta_8 WatchLength_{i,t} + \beta_9 MultiNotch_{i,t} + \beta_{10} FallenAngel_{i,t} \text{ (or } RisingStar_{i,t}) + \varepsilon_{i,t} \quad (5)$$

Panel B shows that the cumulative abnormal returns for the downgrade (upgrade) watchlists news are negatively (positively) associated with FallenAngel (RisingStar) and Mutlinotch, which is the similar result to the bond market. The coefficient of variable, Level, is positive (negative) for downgrade (upgrade) watchlists and statistically significant. Like the bond market, stocks with quality credit ratings show smaller market impact to the news events. The variable, Issuer Size, has positive (negative) coefficient, which is consistent with our conjecture but statistically insignificant for both downgrade and upgrade announcements.

7. Cross sectional analysis of anticipation hypothesis

Rating agencies face potential conflicts of interests. As independent and objective financial intermediaries, they have an incentive to build reputation by releasing reliable information. However, they are paid by the issuers. Furthermore, agencies are picked up by the issuers. Therefore, if companies feel that they are under-rated by the rating agencies and are treated unfairly by the market, they can switch agency to another. If latter story prevails, they are more likely to delay bad news for the large issuers because large issuers are big

customers and main fee suppliers. We measure delay by the anticipation index. It is the ratio of the two weeks' CAR prior to event date over the whole monthly CAR. So, if all of the cumulative abnormal returns occur in first two week, anticipation index would be 1.[14] If rating agencies delay downgrade news for the big issuers and market reacts to it efficiently, we expect that the firm size will be positively associated with anticipation index to the downgrade announcement. The coefficient of variable, IssuerSize, is positive but test statistic is negligibly low for both bond and stock market, indicating that there is no evidence of conflict of interest hypothesis.

8. Conclusions

This paper presents effect of credit rating announcements by Moody's on the returns in corporate bond markets as well as stock markets. Using the traditional event methods, we calculate three daily cumulative abnormal returns (CAR) to test whether there is an announcement effect around the credit review and credit change dates. We report that cumulative abnormal bond and stock returns are positive (negative) and significant to the upgrade (downgrade). We also find more pronounced phenomenon among the lower credit rating bonds. That is, bonds with poorer credit quality respond more actively to the news announcement, which is also observed in stock market. We also report that the magnitude of CAR is greater for the test based on watchlist dates rather than that on rating change dates. We interpret this result as supporting our conjecture that rating review conveys significant

[14] Covitz and Harrison (2003) measure delay as the degree to which ratings changes are anticipated by the bond market, where anticipation is defined as the ratio of an issuer's bond yield spread change over the five months preceding the month of the rating change to the total spread change over those five month of the rating change itself. They use the monthly bond yield database.

information to the market participants. Moreover, since it is unexpected event, it affects market in greater magnitude than real rating change that is relatively expected event. We obtain the similar results when we partition the rating changes into 5 categories. Downgrades of credit rating are associated with liquidity amelioration while upgrades are with liquidity changes for the worse.

To check whether the positive (negative) cumulative abnormal returns to the possible downgrade (upgrade) watchlist events are driven by other factors, we run the cross sectional regression analysis. We find that our results are not driven by bond (stock) specific factors.

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Exhibit 1
Summry of corporate bond ratings systems and symbols with brief definitions

Moody's employ numerical modifiers 1, 2 and 3 in each rating category from Aa to Caa. The modifier 1 indicates that the entity is in the higher end of its letter rating category; the modifier 2 indicates a mid-range ranking; the modifier 3 indicates that it is in the lower end of the letter category. Refer to Moody's (2004)

Moody's symbol	Brief Definitions	Numerical Value
Investment Grade: High Creditworthiness		
Aaa	Highest quality, minimal credit risk	21
Aa1		20
Aa2	High grade, low credit risk	19
Aa3		18
A1		17
A2	Upper Medium grade, low credit risk	16
A3		15
Baa1		14
Baa2	Lower medium grade, moderate credit risk	13
Baa3		12
Speculative grade: Low Creditworthiness		
Ba1		11
Ba2	Low grades, substantial credit risk	10
Ba3		9
B1		8
B2	Speculative element, high credit risk	7
B3		6
Caa1		5
Caa2	Poor standing, very high credit risk	4
Caa3		3
Ca	Highly speculative, likely in or near future default	2
C	Typically default, with litte prospect for recovery	1

Table 1
Panel A: Characteristics of sample corporate bonds

We group our sample into each credit risk profile. Letter Aa include Aa1, Aa2 and Aa3, A does A1, A2 and A3, Baa does Baa1, Baa2 and Baa3, Ba does Ba1,Ba2 and Ba3, B does B1, B2 and B3, and Caa comprise Caa1, Caa2 and Caa3. For each bond variable, we report mean, standard deviation, 1 and 99 percentile values.

	Aaa	Aa	A	Baa	Ba	B	Caa	Ca	C
Coupon rate									
Mean	6.46	5.62	6.38	5.90	6.22	7.64	8.53	7.36	9.81
S.D.	1.24	1.52	1.42	1.43	1.66	1.91	2.36	2.81	0.27
Min	2.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.63
Max	8.88	10.00	10.75	10.63	12.50	13.50	13.50	12.00	10.00
Face amount									
Mean	296	329	728	205	219	466	386	474	163
S.D.	303	517	716	503	514	417	317	515	88
Min	1	0	2	0	0	1	75	25	100
Max	1,750	2,850	5,500	6,500	6,500	3,000	2,030	2,030	225
Maturity									
Mean	6,389	4,110	4,553	3,496	3,736	5,129	3,847	4,414	3,655
S.D.	4,448	3,376	3,692	2,825	3,325	3,176	2,070	2,294	1
Min	1,101	648	644	537	538	1,104	1,468	1,836	3,654
Max	18,268	36,528	36,534	36,534	36,534	16,440	10,964	10,962	3,655
Debt Seniority									
Secured									
number	48	573	1,001	2,744	1,363	291	84	47	1
proportion	0.96	0.85	0.99	0.99	0.97	0.80	0.77	0.90	0.50
Subordinated									
number	2	99	8	14	37	71	24	5	1
proportion	0.04	0.15	0.01	0.01	0.03	0.20	0.22	0.10	0.50
Others									
number	0	0	0	5	5	2	1	0	0
proportion	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00
Market Type									
USD									
number	46	562	581	2,551	1,231	192	46	31	2
proportion	0.92	0.84	0.58	0.92	0.88	0.53	0.42	0.60	1.00
EUR									
number	4	110	425	212	174	172	63	21	0
proportion	0.08	0.16	0.42	0.08	0.12	0.47	0.58	0.40	0.00
Others									
number	0	0	3	0	0	0	0	0	0
proportion	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	50	672	1,009	2,763	1,405	364	109	52	2

Table 1 (Continued)
Panel B: Characteristics of sample stocks

We group our sample into each credit risk profile. Letter Aa include Aa1, Aa2 and Aa3, A does A1, A2 and A3, Baa does Baa1, Baa2 and Baa3, Ba does Ba1,Ba2 and Ba3, B does B1, B2 and B3, and Caa comprise Caa1, Caa2 and Caa3. For each bond variable, we report mean, standard deviation, 1 and 99 percentile values.

	Aaa	Aa	A	Baa	Ba	B	Caa	Ca	C
Firm size									
Mean	221,735	436,043	123,611	44,678	31,369	14,216	9,845	12,942	816
S.D.	146,169	321,543	217,979	92,344	123,509	60,730	34,012	13,721	806
Min	20,966	2,436	4	331	253	12	12	87	108
Max	387,798	1,264,032	1,179,017	647,483	1,264,032	602,843	448,507	31,686	1,757
Mktcap									
Mean	121,221	98,357	37,371	14,669	6,540	2,877	1,975	2,896	228
S.D.	84,079	63,029	45,341	24,166	21,318	5,826	3,480	4,061	204
Min	9,713	1,341	57	117	4	1	1	6	2
Max	269,533	250,318	311,755	311,755	250,318	59,962	30,011	13,077	428
Tobinq									
Mean	1.45	1.28	1.45	1.41	1.38	1.38	1.39	1.21	1.54
S.D.	0.64	0.49	0.93	0.68	0.57	0.80	0.55	0.23	0.39
Min	1.16	1.01	0.69	0.90	0.69	0.70	0.81	0.85	0.94
Max	2.75	3.67	14.17	7.58	6.07	11.30	3.83	1.65	1.88
Leverage									
Mean	0.21	0.18	0.19	0.28	0.31	0.35	0.43	0.48	0.33
S.D.	0.09	0.10	0.13	0.16	0.17	0.17	0.19	0.25	0.25
Min	0.05	0.02	0.01	0.02	0.00	0.00	0.00	0.04	0.03
Max	0.29	0.77	0.77	0.75	0.89	0.82	0.82	0.82	0.67
ROA									
Mean	0.09	0.06	0.11	0.11	0.11	0.10	0.08	0.08	0.00
S.D.	0.04	0.07	0.07	0.07	0.08	0.08	0.07	0.07	0.05
Min	0.04	0.01	-0.26	-0.05	-0.05	-0.13	-0.19	-0.09	-0.07
Max	0.15	0.29	0.34	0.63	0.57	0.46	0.40	0.23	0.07
Number	6	149	297	532	449	534	185	20	5

Table 2
Panel A: Transition Matrix for corporate bonds

Panel A in Table2 shows the migration of credit rating changes conditional on the watchlists grouped by rating modifiers for corporate bonds. The numbers are obtained by counting the rating changes after put on the watchlists. We also report the cases of no watch conditions. That is, rating changes are announced without prior notice of watchlists. Panel B is the result for stocks.

	Rating changes after watchlists																				
Watchlists	Aaa	Aa1	Aa2	Aa3	A1	A2	A3	Baa1	Baa2	Baa3	Ba1	Ba2	Ba3	B1	B2	B3	Caa1	Caa2	Caa3	Ca	C	Total
Upgrade																						
Aaa																						0
Aa1	2																					2
Aa2		56																				56
Aa3		5	9																			14
A1			3	457																		460
A2				2	502																	504
A3		4			8	74																86
Baa1		2					62															64
Baa2					4		8	34														46
Baa3							1	15	42													58
Ba1										42												42
Ba2										6	20											26
Ba3			1				1		4	5	2	28										41
B1											3	3	16									22
B2													8	11								19
B3														10	8							18
Caa1										2						3						5
Caa2															3	9	3					15
Caa3																		1				1
Ca																						0
C																						0
Total	2	67	13	459	514	74	72	49	46	55	25	31	24	21	11	12	3	1	0	0	0	1,479
Downgrade																						
Aaa			22																			22
Aa1			8																			8
Aa2				54	7																	61

Aa3					129	23															152
A1						126	68	19													213
A2	25						126	32	29	2											214
A3								1,276	755	2											2,033
Baa1									1,722	52	2										1,776
Baa2										613	1,212										1,825
Baa3											47	646	7								700
Ba1												29	61	2	2						94
Ba2													13	81	15	12					121
Ba3														46	12	3					61
B1															32	12					44
B2														3		82	24	3			112
B3																	12	2		6	20
Caa1																		8		20	28
Caa2																			3	3	6
Caa3																				19	19
Ca																					0
C																					0
Total	25	0	30	54	136	149	194	1,327	2,506	669	1,261	675	81	132	61	109	36	13	3	48	0	7,509
Uncertain																					
Aaa																					0
Aa1																					0
Aa2																					0
Aa3																					0
A1																					0
A2																					0
A3																					0
Baa1																					0
Baa2																					0
Baa3																					0
Ba1												2	2								4
Ba2													3		4						7
Ba3															0						0
B1															14						14
B2												5									5
B3																					0

Caa1																					0
Caa2																1					1
Caa3																			2		2
Ca																					0
C																					0
Total	0	0	0	0	0	0	0	0	0	0	0	7	5	0	18	0	1	0	0	2	0	33
No Watch																						
Aaa		25				1																26
Aa1	12		6			0																18
Aa2	0	12		20		0																32
Aa3	3	5	32		8	22																70
A1	38		22	25		57																142
A2	10				12		66	26	1													115
A3					5	13		29	2													49
Baa1							24		109	53												186
Baa2							3	46		103	7	2										161
Baa3							0		105		87	97	36		18	8						351
Ba1							0		4	14		14	15		0							47
Ba2							0			10	69		28	6	6							119
Ba3							0				11	77		41	2	4						135
B1							0					11	27		59	21	4					122
B2							4					2	0	42		55	31					134
B3												0	3	18	29		17	12	13	23		115
Caa1												0			7	33		15	10	10		75
Caa2												9			10	3	3		51	27		103
Caa3																0		3		3		6
Ca																6		8	5		4	23
C																			4			4
Total	63	42	60	45	25	93	97	101	221	180	174	212	109	107	131	130	55	38	83	63	4	2,033

Table 2 (Continued)
Panel A: Transition Matrix for corporate bonds

	Rating changes after watchlists																				
Watchlists	Aaa	Aa1	Aa2	Aa3	A1	A2	A3	Baa1	Baa2	Baa3	Ba1	Ba2	Ba3	B1	B2	B3	Caa1	Caa2	Caa3	Ca	C	Total
Upgrade																						
Aaa																						0
Aa1	2		1																			3
Aa2		3																				3
Aa3		1	6																			7
A1		0	1	19																		20
A2		0	1	3	21																	25
A3		1	0	1	4	18																24
Baa1		1	0		0	2	19															22
Baa2			1		2	0	5	32														40
Baa3					0	1	1	10	27													39
Ba1					1	0	0		2	26												29
Ba2						0	0		1	4	15											20
Ba3						1	1		1	4	4	19										30
B1											2	10	17									29
B2											2		9	11			1					23
B3								1				1	1	7	12							22
Caa1										1			1		4	3						9
Caa2									1				1		1	5	1					9
Caa3																1	2	3				6
Ca															1		1		1			3
C																				0		0
Total	2	6	10	23	28	22	26	43	32	35	23	30	29	18	18	9	5	3	1	0	0	363
Downgrade																						
Aaa			1																			1
Aa1	1		2		1																	4
Aa2				30	4																	34
Aa3					26	9	2															37
A1	1					26	13	3														43
A2							41	22	5	1												69
A3								40	19	3	1											63

Baa1									62	19	3											84
Baa2										55	21	4	1	1								82
Baa3											34	5	11	1	1			2				54
Ba1												17	18	6	3		2					46
Ba2													15	14	6	4						39
Ba3														22	17	6	1	1				47
B1															26	12	7					45
B2														2		22	9	5				38
B3															3		8	5	1	2		19
Caa1																		3	4	3	1	11
Caa2																	1		2	5		8
Caa3																				4	1	5
Ca																					1	1
C																						0
Total	2	0	3	30	31	35	56	65	86	78	59	26	45	46	56	44	28	16	7	14	3	730
Uncertain																						
Aaa																						0
Aa1																						0
Aa2																						0
Aa3																						0
A1																						0
A2																						0
A3																						0
Baa1										1												1
Baa2												1										1
Baa3																						0
Ba1													2		1							3
Ba2													1		1							2
Ba3												1										1
B1															1	1						2
B2													1	1								2
B3																						0
Caa1																						0
Caa2																	1					1
Caa3																		1		1		2
Ca																						0

C																					0
Total	0	0	0	0	0	0	0	0	0	1	0	2	4	1	3	1	1	1	0	1	0	15
No Watch																						
Aaa		7				1																8
Aa1	3		21																			24
Aa2	1	5		16																		22
Aa3	2	1	14		24	7																48
A1	1		3	19		23		3														49
A2					10		26	9	2													47
A3					5	11		22	3													41
Baa1					1		16		40	11	1											69
Baa2		2					4	18		48	7	5		1								85
Baa3					1		1	1	40		34	21	12	8	2	1						121
Ba1						1			4	26		25	13	8								77
Ba2			1					1		7	23		21	10	9		4					76
Ba3						1				3	8	36		33	10	3						94
B1								1	1	1	1	10	61		57	11	11					154
B2							1					1	1	83		50	26	2	1	1		166
B3													3	14	39		34	20	10	7		127
Caa1														1	10	34		20	17	10		92
Caa2												1			2	7	16		16	5	2	49
Caa3																2	6	9		9	4	30
Ca															1	4	1	4	6		4	20
C																	1		1			2
Total	7	15	39	35	41	44	48	55	90	96	74	99	111	158	130	112	99	55	51	32	10	1,401

Table 3
Panel A: Unconditional tests of three day cumulative abnormal spreads for corporate bonds

Using the event study methods, we obtain three day (-1,0,1) cumulative abnormal spreads around the credit rating announcements. $R_{it} = F_{it}/ F_{it-1}$ and $F_{it} = K_{it} + (C_i/365)V_i$ where R_{it} is the holding period return of bond i between closing day t-1 to closing day t, F_{it} is the flat price of bond i at day t, C_i is the coupon payment paid to holders of bond i, K_{it} is the closing day price of bond i at day t, and V_i is the number of days elapsed since the last coupon payment of bond i at day t, Ci is the coupon payment paid to holders of bond i, K_{it} is the closing day price of bond i at day t and Vi is the number of days elapsed since the last coupon payment of bond i. The abnormal return is calculated as the difference between the bond's return and the return of the benchmark.
* Significant at the 5% level
** Significant at the 1% level

Announcement Type	Types of credit risk						
On rating dates (down)	Overall	Letter A	Letter B	Letter C	Investment	Speculative	FallenAngel
Obs	2,357	288	2,038	94	1,995	1,315	335
Mean	-0.70%	-0.09%	-0.50%	-5.00%	-0.60%	-0.50%	-0.10%
T-stat	-7.46	-0.69	-6.13	-4.66	-8.13	-2.88	-0.46
% Positive	0.42	0.45	0.43	0.22	0.40	0.48	0.41
Sign test	-7.56	-1.60	-6.34	-5.84	-9.30	-1.20	-3.99
On rating dates (up)	Overall	Letter A	Letter B	Letter C	Investment	Speculative	RisingStar
Obs	954	504	438	16	689	270	39
Mean	-0.01%	-0.10%	0.12%	0.46%	-0.06%	0.10%	0.39%
T-stat	-0.19	-1.19	1.46	0.62	-0.64	0.81	2.09
% Positive	0.43	0.36	0.61	0.63	0.45	0.53	0.55
Sign test	-7.75	-6.38	3.91	0.84	-8.38	1.29	0.69
On Watch dates (down)	Overall	Letter A	Letter B	Letter C	Investment	Speculative	FallenAngel
Obs	2,127	212	1,919	24	1,799	1,166	350
Mean	-1.00%	-0.30%	-1.00%	-11.20%	-0.70%	-0.80%	-0.90%
T-stat	-10.52	-2.09	-9.90	-3.65	-9.93	-5.49	-3.15
% Positive	0.40	0.43	0.40	0.15	0.39	0.45	0.42
Sign test	-9.60	-2.02	-9.15	-4.00	-9.22	-3.72	-3.08
On Watch dates (up)	Overall	Letter A	Letter B	Letter C	Investment	Speculative	RisingStar
Obs	912	700	204	8	821	93	30
Mean	0.09%	0.02%	0.26%	2.29%	0.02%	0.69%	0.30%
T-stat	1.32	0.23	1.85	3.13	0.33	3.25	0.77
% Positive	0.42	0.41	0.43	0.88	0.40	0.53	0.40
Sign test	-5.48	-5.38	-2.01	2.12	-5.95	0.60	-1.10
On Watch dates (unc)	Overall	Letter A	Letter B	Letter C	Investment	Speculative	
Obs	9	N/A	8	1	N/A	9	N/A
Mean	-0.09%	N/A	-0.40%	2.05%	N/A	-0.09%	N/A
T-stat	-0.12	N/A	-0.44	N/A	N/A	-0.12	N/A
% Positive	0.56	N/A	0.50	1.00	N/A	0.56	N/A
Sign test	0.33	N/A	0.00	1.00	N/A	0.33	N/A

Table 3 (Continued)
Panel B: Unconditional tests of three day cumulative abnormal spreads for stocks

Using the event study methods, we obtain three day (-1,0,1) cumulative abnormal spreads around the credit rating announcements. Abnormal equity return is measured by the following calculations. Abnormal returns are residuals residuals from the standard market model estimated over days (-255, -46), where CRSP equal-weighted returns are used for the market return.
* Significant at the 5% level
** Significant at the 1% level

Announcement Type				Types of credit risk			
On rating dates (down)	Overall	Letter A	Letter B	Letter C	Investment	Speculative	Fallen Angel
Obs	1,460	276	959	225	638	822	166
Mean	-3.72%	-1.49%	-3.10%	-9.09%	-1.77%	-5.23%	-3.71%
T-stat	-13.80	-2.66	-11.15	-10.35	-6.03	-13.32	-6.04
% Positive	0.38	0.36	0.40	0.33	0.38	0.37	0.36
Sign test	-5.10	-1.62	-4.44	-4.62	-2.63	-5.43	-2.46
On rating dates (up)							RiseStar
Obs	861	199	619	43	396	465	76
Mean	0.19%	0.02%	0.25%	0.04%	-0.02%	0.37%	0.20%
T-stat	0.81	0.05	0.88	0.04	-0.12	0.95	0.51
% Positive	0.51	0.46	0.52	0.51	0.49	0.52	0.43
Sign test	0.75	0.35	0.74	-0.19	0.49	0.58	-0.07
On Watch dates (down)							Fallen Angel
Obs	727	156	504	67	381	346	89
Mean	-5.96%	-3.22%	-5.65%	-14.65%	-4.21%	-7.89%	-2.58%
T-stat	-17.87	-5.60	-14.95	-10.61	-12.10	-14.40	-3.34
% Positive	0.33	0.30	0.34	0.34	0.30	0.37	0.38
Sign test	-5.74	-2.44	-5.55	-3.07	-4.53	-4.51	-2.22
On Watch dates (up)							RiseStar
Obs	337	110	219	8	212	125	36
Mean	2.00%	2.05%	1.97%	2.09%	1.46%	2.92%	1.12%
T-stat	6.63	5.68	4.73	0.60	4.64	4.64	1.57
% Positive	0.55	0.55	0.56	0.63	0.53	0.60	0.53
Sign test	1.66	0.95	1.33	0.35	0.93	1.61	0.34
On Watch dates (unc)							
Obs	57	N/A	12	3	1	14	N/A
Mean	0.02%	N/A	-3.42%	-4.61%	1.44%	-4.03%	N/A
T-stat	0.02	N/A	-1.63	-0.66	0.18	-1.84	N/A
% Positive	0.42	N/A	0.33	0.33	1.00	0.29	N/A
Sign test	-0.66	N/A	-1.57	0.03	0.32	-1.55	N/A

Table 4
3 day cumulative abnormal returns conditional on watch resolutions

Using event study methods, we obtain three day (-1,0,1) cumulative abnormal returns around the credit rating announcements. We partitioned watchlists conditional on watch resolution categories. Ratings placed watchlists for upgrade, downgrade or with direction of uncertain, will be resolved with a rating change a confirmation, a rating withdrawal, or a continuation of review status.
* Significant at the 5% level
** Significant at the 1% level

Panel A: Based on Watch resolution date for the corporate bonds					
Watch type	Rating down	Rating up	Rating Confirmed	Rating Continuation	Rating Withdrawn
Watch Down					
CAR	-0.40%	0.50%	0.10%	4.16%	N/A
t-stat	-4.84**	0.66	0.74	18.62**	N/A
N	1,860	11	208	1,685	2
Watch Up					
CAR	N/A	0.04%	0.72%	0.33%	N/A
t-stat	N/A	0.52	1.51	1.35	N/A
N	N/A	582	43	264	5
Watch uncertain					
CAR	-1.20%	N/A	0.43%	0.93%	N/A
t-stat	-0.75	N/A	1.16	1.02	N/A
N	10	4	6	8	N/A
No watch					
CAR	-2.10%	-0.03%	N/A	N/A	1.10%
t-stat	-5.66**	-0.34	N/A	N/A	0.5
N	354	385	N/A	N/A	39
Panel B: Based on Watch date for the corporate bonds					
Watch type	Rating down	Rating up	Rating Confirmed	Rating Continuation	Rating Withdrawn
Watch Down					
CAR	-1.70%	-0.20%	-0.30%	-1.80%	-0.50%
t-stat	-9.12**	-0.76	-1.71	-14.81**	-0.43
N	1,961	9	225	1,248	6
Watch Up					
CAR	N/A	0.11%	0.82%	1.20%	1.87%
t-stat	N/A	0.95	3.09**	3.07**	0.9
N	N/A	909	46	226	3
Watch uncertain					
CAR	-0.40%	0.60%	-0.01%	-0.70%	N/A
t-stat	-0.4	0.82	-0.02	-1.07	N/A
N	7	3	5	10	N/A

Table 4 (Continued)

Panel C: Based on Watch resolution date for the stocks					
Watch type	Rating down	Rating up	Rating Confirmed	Rating Continuation	Rating Withdrawn
Watch Down					
CAR	-4.21%	-0.26%	0.30%	-0.13%	0.44%
t-stat	-6.85**	-0.09	0.68	-0.25	0.49
N	690	5	206	118	12
Watch Up					
CAR	N/A	0.22%	1.50%	-0.40%	-2.03%
t-stat	N/A	0.72	1.78	-1.32	-0.78
N	1	279	25	112	7
Watch uncertain					
CAR	0.45%	16.99%	3.37%	2.65%	5.11%
t-stat	0.18	4.48**	1.18	2.13*	2.28
N	10	3	14	18	2
No watch					
CAR	-5.31%	0.08%	N/A	N/A	-0.47%
t-stat	-13.85**	0.23	N/A	N/A	-1.38
N	692	499	0	0	334
Panel D: Based on Watch date for the stocks					
Watch type	Rating down	Rating up	Rating Confirmed	Rating Continuation	Rating Withdrawn
Watch Down					
CAR	-6.29%	-0.61%	-0.78%	-3.76%	3.75%
t-stat	-19.72**	-0.61	1.70	-7.84**	4.29**
N	659	8	217	122	21
Watch Up					
CAR	N/A	2.49%	1.03%	0.27%	8.09%
t-stat	N/A	6.13**	1.31	0.83	6.23**
N	1	319	28	115	17
Watch uncertain					
CAR	-3.70%	4.18%	1.94%	-0.46%	-1.12%
t-stat	-1.71	1.58	0.65	-0.42	-0.62
N	10	5	16	23	3

Table 5
Cross sectional analysis for cumulative abnormal returns around watchlist dates

Dependent variable is 3 day cumulative abnormal returns around watchlist announcement dates. Abnormal returns for the stocks are market model residuals using the CRSP equal weighted index and an estimation period of days (-255, -46) relative to the watch start date. For the corporate bond, abnormal returns are obtained by the difference between the bond's
return and the return of the benchmark. Variable definitions are described in section 5.1.3.
* Significant at the 5% level
** Significant at the 1% level

Panel A: Cross sectional analysis of cumulative abnormal returns for the corporate bonds

Watchlist downgrades			Watchlist upgrades		
Independent Variables	Estimate	T-statistic	Independent Variables	Estimate	T-statistic
Intercept	-0.4490	-6.95**	Intercept	-0.3093	-5.13**
Issuer Size	0.0047	3.10**	Issuer Size	-0.0012	-0.81
Level	0.0025	2.91**	Level	-0.0013	-2.00*
Coupon Rate	-0.0027	-1.98*	Coupon Rate	0.0009	2.55**
Face Value	0.0025	1.02	Face Value	0.0017	1.03
Maturity	0.0027	0.81	Maturity	0.0034	1.28
price	0.0740	5.81**	price	0.0624	4.86**
number of trades	-0.0001	-7.65**	number of trades	0.0000	0.49
Watchlength	0.0000	0.79	Watchlength	0.0000	-0.08
Multinotch	-0.0078	-1.82	Multinotch	0.0015	0.33
Fallen Angel	-0.0155	-2.05*	Rising Star	0.0007	0.13
Fvalue		25.19	Fvalue		3.23
Adjusted R2		0.31	Adjusted R2		0.10
No. Obs		558	No. Obs		312

Panel B: Cross sectional analysis of cumulative abnormal returns for the stocks

Watchlist downgrades			Watchlist upgrades		
Independent Variables	Estimate	T-value	Independent Variables	Estimate	T-value
Intercept	-0.4550	-2.72**	Intercept	0.1372	2.08*
Issuer Size	0.0165	0.54	Issuer Size	-0.0066	-0.69
Level	0.0165	2.37**	Level	-0.0080	-3.15**
Market Cap	0.0020	0.06	Market Cap	-0.0080	-0.79
TobinQ	0.0746	1.54	TobinQ	0.0005	0.06
Leverage	-0.1019	-0.75	Leverage	-0.0887	-1.82
price	0.1167	4.45**	price	-0.0241	-2.59**
Watchlength	0.0499	2.72**	Watchlength	0.0036	0.52
Multinotch	-0.0470	-1.20	Multinotch	0.0292	2.09*
Fallen Angel	-0.1235	-1.98*	Rising Star	0.0097	0.44
ROA	0.2286	0.64	ROA	-0.0434	-0.45
Fvalue		6.13	Fvalue		2.73
Adjusted R2		0.09	Adjusted R2		0.08
No. Obs		613	No. Obs		304

Table 6
Cross sectional analysis of downgrade anticipation

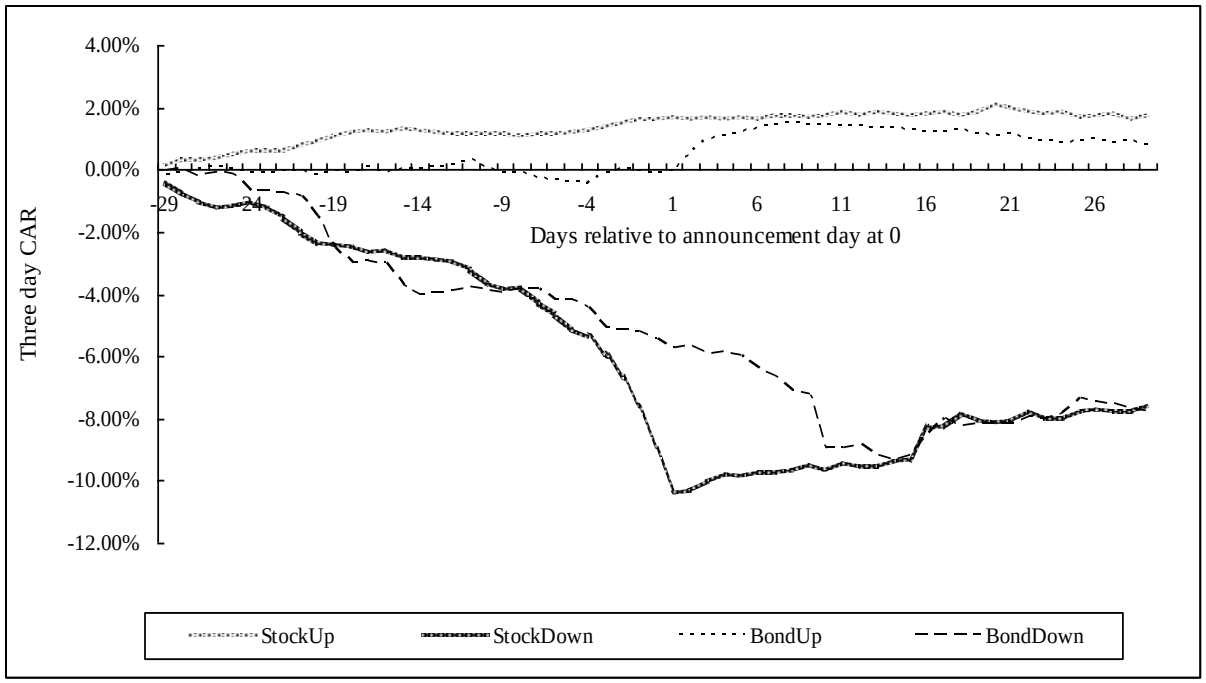
Dependent variable is the anticipation index. We construct it as the ratio of the two weeks' CAR prior to event date over the whole monthly CAR around the watchlists date. We perform the test only for the downgrade ratings announcement. Independent variables are described in the section 5.3.

* Significant at the 5% level
* Significant at the 1% level

Bond market			Stock market		
Independent Variables	Estimate	T-value	Independent Variables	Estimate	T-value
Intercept	-5.3955	-0.37	Intercept	-0.4118	-0.57
Issuer Size	0.0429	0.07	Issuer Size	0.0394	0.28
Level	0.2196	0.87	ROA	-2.0387	-1.16
Coupon Rate	0.2996	0.67	leverage	0.0886	0.13
Face Value	0.0038	0.00	tobinq	0.0036	0.01
Maturity	0.6419	0.26	lmktcap	0.1980	1.31
Fallen Angel	0.7017	0.26	level	-0.0788	-2.3*
			Fallen Angel	0.5525	1.48
Fvalue		4.10	Fvalue		2.15
Adjusted R2		0.024	Adjusted R2		0.009
No. Obs		1,043	No. Obs		1581

Figure 1
The patterns of cumulative abnormal returns around credit rating announcements

Based on rating change dates



Based on watchlists dates

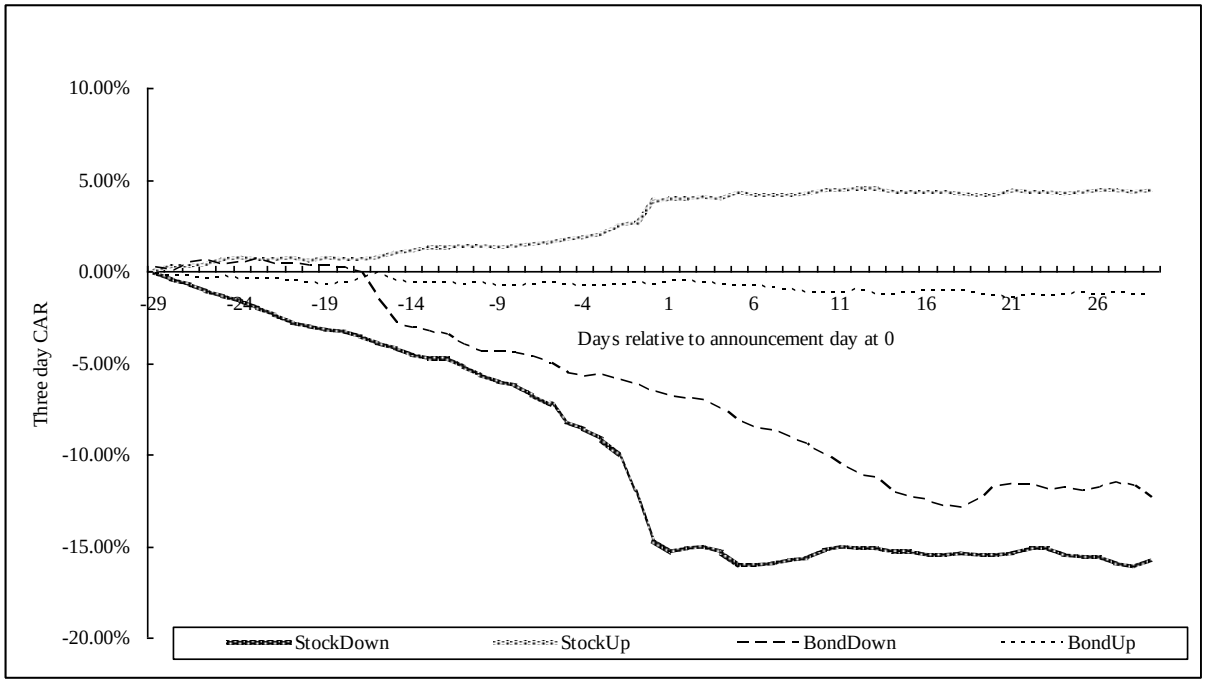
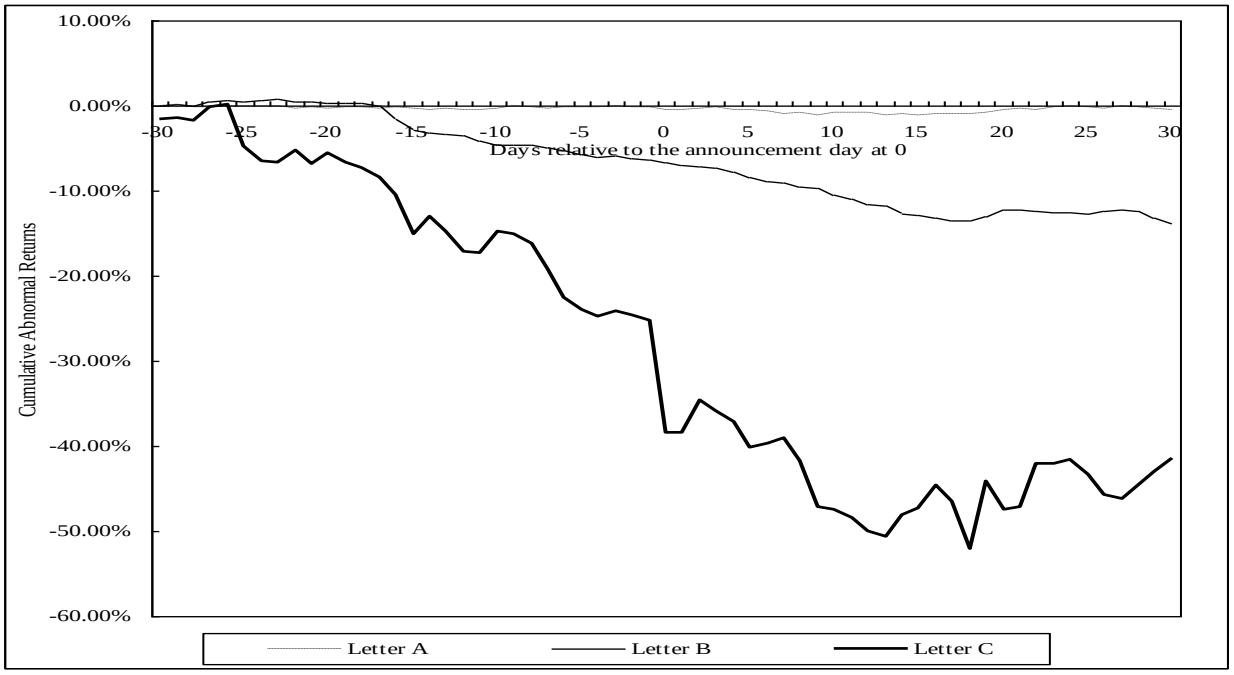


Figure 2
The corporate bond CAR patterns to watch announcements

Down watch case



Up watch case

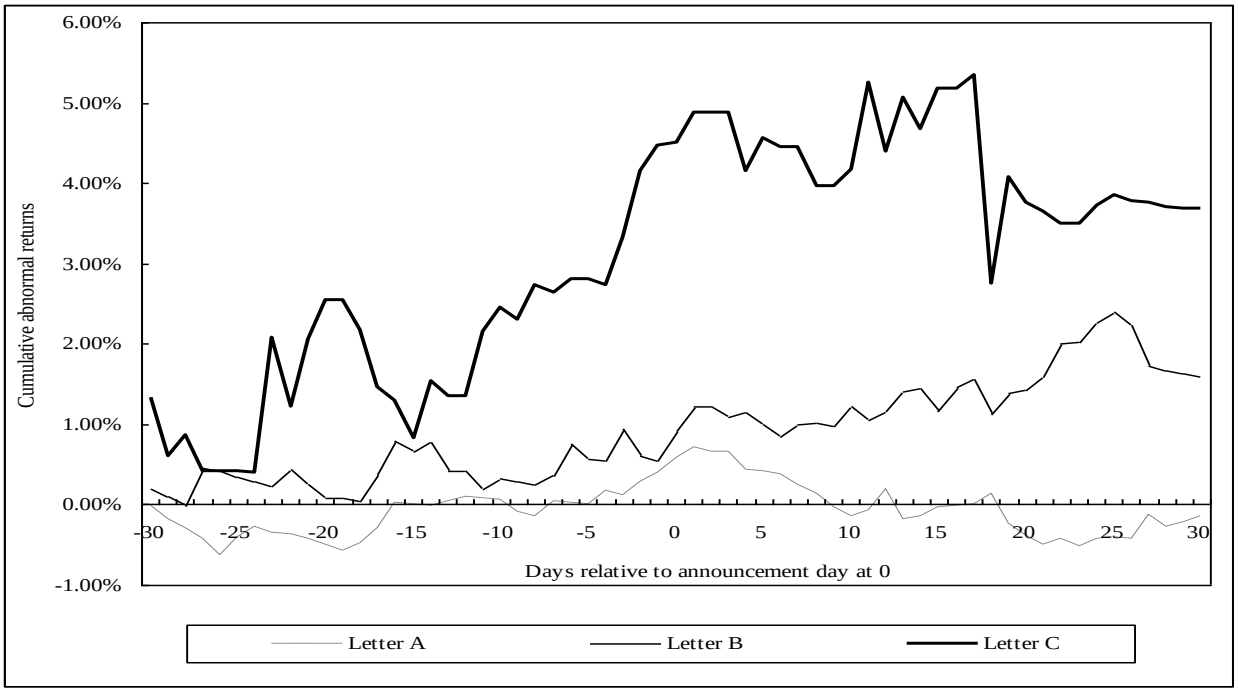
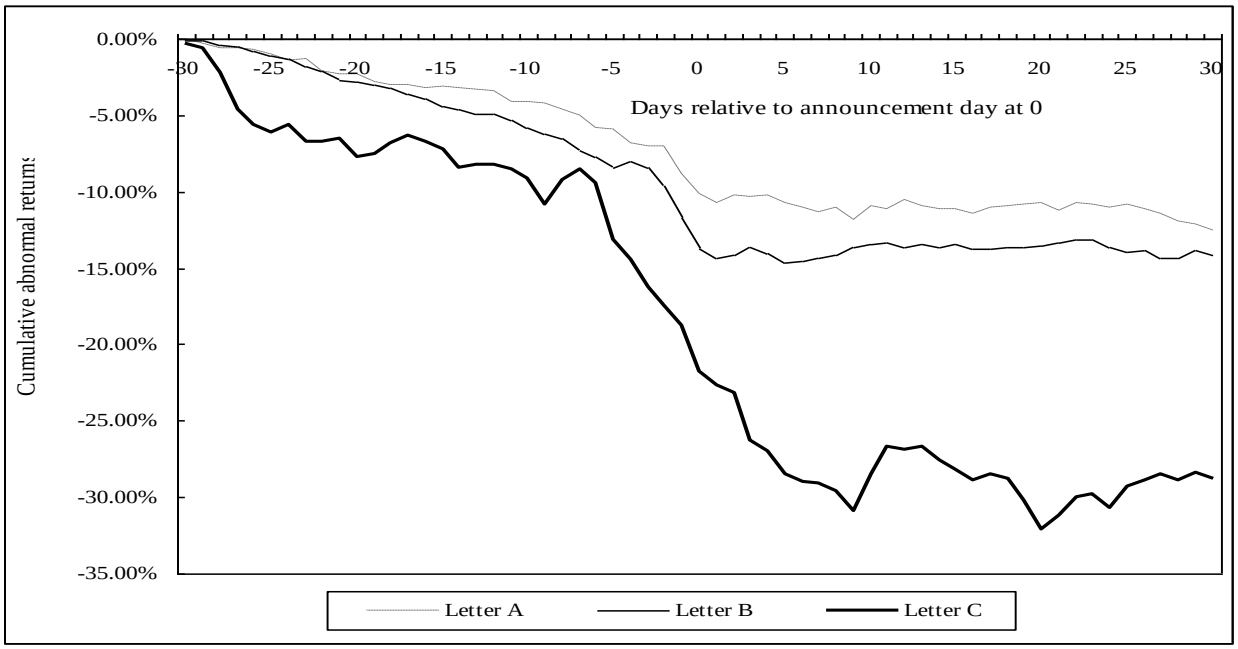


Figure 3
The stock CAR patterns to watch announcements

Down watch case



Up watch case