SEC Working Papers Forum ครั้งที่ 2

บทคัดย่อและบทศึกษา

On The Informativeness of Credit Watch Placements

Chiraphol Chiyachantana
Eakapat Manitkajornkit
Nareerat Taechapiroontong

Securities and *Exchange Commission Thailand*

August 2014

On the Informativeness of Credit Watch Placements

Chiraphol N. Chiyachantana[a], Eakapat Manitkajornkit[b], Nareerat Taechapiroontong[c]

Abstract

This study examines the informational role of credit watch placement in the overall bond rating process. We find that the act of a company's bond being put on a credit watch placement is, in itself, associated with significant abnormal returns in the company's stock. In addition, we show that bond rating revisions that are associated with their initial inclusion on credit watch placement are more informative than rating changes that occur without initial inclusion on a credit watchlist. More importantly, the inclusion of credit watch placement significantly reduces the company's stock price volatility at actual rating revision as well as the subsequent price drift after rating downgrade. Finally, we find that credit watch placement has a greater impact on firms with a high degree of information uncertainty. Overall, our findings underscore the importance of credit watch placements in the overall fabric of credit ratings adjustments.

JEL Classification: G11, G14, G24

---

[a] Thammasat University, Thammasat Business School, 2 Prachan Rd., Pranakorn, Bangkok 10200, Thailand, Tel. : (66-2) 613-2200, (66-2) 623-5742, Fax. : (66-2) 225-2109, Email: chiraphol@tbs.tu.ac.th

[b] Mahidol University, College of Management, Telephone: (66) 2206-2000, Fax: (66) 2206-2090, Email: eakapatm@mahidol.ac.th

[c] Mahidol University, College of Management, Telephone: (66) 2206-2000, Fax: (66) 2206-2090, Email: cmnareerat@mahidol.ac.th

Acknowledgement The authors acknowledge the helpful comments and suggestions of Jeremy Goh, Paul Malatesta, John Griffin, Pankaj Jain, Lakshmanan Shivakumar, Hank Bessembinder, Vidhan Goyal, Sandy Lai, Rina Ray, and seminar participants at the Chulalongkorn Accounting and Finance Symposium, 2011 Financial Management Association European Conference and Singapore Management University. The authors thank Evangeline Chueng at Moody's Investor Service, Inc. for technical assistance. Chiyahantana acknowledges the financial support from Singapore Management University. The authors are responsible for any remaining errors.

Keywords: credit rating agency, credit watch placement, bond rating, abnormal returns, long run abnormal returns

1. Introduction

Beginning in 1992, Moody's initiated an interesting practice as part of a formal bond rating process. Prior to an actual rating revision, it began putting a credit issue on a credit watch (also known as inclusion to a watchlist) in order to provide investors with an indication of the likely direction and timing of anticipated credit rating changes. The underpinnings of a corporation's bond being put on a credit watch is to inform investors of the rating agency's opinion that the credit quality of an obligation, or obligor, may be changing, thus reducing the company's stock price volatility by moving its credit ratings in a gradual, even predictable, fashion in response to changes in the fundamental credit quality of the credit obligation. Over the past two decades, the act of including a particular credit issue on the watchlist has been used extensively as an indicator of a potential directional change in credit rating.

A significant portion of bond rating changes are preceded by credit watch placement. Nonetheless, the existing literature that investigates the impact of bond rating changes generally investigates the bond rating change events as a sole information event in the bond rating process. Yet market participants often view credit watch placement as a more significant credit rating event than the actual bond rating revision. For instance, on August 24, 2005, following two quarters of losses at North American auto operations, Moody's downgraded Ford Motor Company's senior unsecured credit rating from Baa3 (investment grade) to Ba1 (speculative grade). Such a downgrade is widely regarded as a significant credit rating event, and yet Ford's share price experienced no significant identifiable change on that day. However, on June 22, 2005, two months prior to the rating downgrade, Moody's placed Ford on negative watch for possible downgrade. That event sparked a sell-off in Ford's shares that resulted in price plunged of more than 5% on that day. Consequently, with the typical bond rating change, investors following a firm cannot fully understand the overall impact of bond rating revision without considering prior credit watch placement.

In this paper, we extend the existing bond rating literature by explicitly linking the event of a credit watch placement of a publicly traded corporation's bond to the event of an actual rating change, in an effort to improve our understanding of how the overall process of bond rating revisions affect financial markets. Specifically, we examine the little-studied question of how a placement in the watchlist affects the information content of bond rating revisions. To date, our knowledge of the impact of bond rating changes is limited to empirical evidence from actual bond rating changes (see, e.g., Dichev and Piotroski 2001; Ederington and Goh 1998; Grier and Katz 1976; Glascock, Davidson, and Henderson 1987; Goh and Ederington 1993; Griffin and Sanvicente 1982; Hettenhouse and Sartoris 1976; Hite and Warga 1997; Katz 1974; Pinches and Singleton 1978). This limitation leaves many important questions unanswered: What, if any, information does credit watch placement convey about the change in firm's credit quality? What, if any, is the impact of credit watch placement on the information contents of bond rating change? Does credit watch placement reduce investor underreaction following bond rating change? When does credit watch placement have a significant impact on stock price?

We address these and related questions using a comprehensive and unique data set on all credit rating actions provided by Moody's over a 13-year period from October 1992 to December 2005. We focus our analysis on negative credit watch placement, which deemed to be the most important tool to signal investors of the deterioration of a firm's credit worthiness. Our research design takes into account the complete process of bond rating changes, including the event of the inclusion to the watchlist and the event of the actual bond rating change. It is our hope that our analysis leads to a deeper understanding of the importance of credit watch placements on security prices.

The empirical examination of this study is built on three distinct levels. The first level relates to conclusions that emerge directly from the characteristics and market reaction associated with a company's bond being placed on credit watch. Our finding emphasizes the importance of incorporating credit watch placement in the study of bond rating changes. Credit watch is used extensively as a signal of a future rating revision: Approximately 50% of bond downgrades are associated with prior placement on a negative watch. More importantly, in regards to a publicly traded corporation's bond, being placed on a watchlist appears to contain more information than the bond rating change itself. Specifically, we find that the market response to being placed on a negative credit watch is associated with an average cumulative abnormal return (CAR) in the company's stock of –3.34% over a three-day period centered on the watchlist inclusion event, compare with an abnormal equity return of –2.30% associated with the actual bond rating downgrade event.

Having found evidence of a significant market reaction with credit watch placement, we examine how credit watch placement affects the information content of bond rating revision by explicitly linking the event of a credit watch placement to the event of a rating revision. We find that credit watch placement reduces the company's stock price volatility at actual bond rating changes. Specifically, the market response of –3.24% at the rating downgrade event without prior credit watch drops to –1.35% when preceded by credit watch placement.

In the second level of our analysis, we examine how credit watch placement affects investor underreaction following bond downgrades. Our empirical test is motivated by a Dichev and Piotroski's (2001) prominent study on long-run abnormal returns following bond rating change. They report a significant price drift in the first year following a rating downgrade, which they attribute to investors' underreaction to information contained in the announcement of bond rating changes. The act of including a credit issue on the watchlist allows longer time before actual rating change for investors to assimilate better information and should subsequently reduces long-run underreaction. In addition, the announcement of credit watch placement adds information to the market and therefore lower investors' confidence to their private signals. Consequently, we conjecture that investor underreaction should be less (more) severe if the bond downgrade is preceded (not preceded) by inclusion on a credit watch.

We extend Dichev and Piotroski's empirical model by partitioning the sample according to prior credit watch placement. We employ three methods to examine the impact of credit watch placement on investor underreaction following bond rating downgrade. First, we follow Dichev and Piotroski (2001) to calculate CARs and buy and hold returns (BHARs) while controlling for both size and book-to-market ratio. Second, we employ Ibbotson's (1975) returns across time and securities (RATS) method with Carhart's (1997) four factors model. Finally, we calculate underreaction coefficients using the method introduced by Cohen and Frazzini (2008). Our findings from all three approaches provide unambiguous support for the usefulness of credit watch placement in attenuating investor underreaction following bond downgrades. That is, we find that the inclusion of credit watch placement significantly reduces price drift following rating downgrades. In particular, 12-month abnormal returns for bonds downgraded with a negative watch placement are significantly lower than those of bonds downgraded without a negative credit watch by approximately 8%.

In the third level of our analysis, we examine when and why credits watch placements have the most significant impact on stock prices during the bond downgrade and post-event periods. We conjecture that the informativeness of credit watch placement varies across firms depending on the degree of firm's information uncertainty (IU).[1] Specifically, if credit watch placement helps resolve uncertainty about future rating revision, then the effects should be most pronounced in the firms whose information is difficult to acquire by investors. We adopt four widely used IU measures as proxies for information availability: idiosyncratic volatility (IVOL), firm size (SIZE), firm age (AGE), and analyst dispersion (DISP). Our findings indicate that market reactions to rating events and post-downgrade events are consistently higher in high IU than in low IU firms and that credit watch placement plays an important role in diminishing, or attenuating, abnormal returns around bond downgrade and post-downgrade abnormal

[1] A firm's IU is defined as value ambiguity: that is, the degree to which a firm's value can be reasonably estimated by even the most knowledgeable investors at reasonable costs (Jiang, Lee, and Zhang 2005; Zhang 2006). High IU firms are firms whose information is difficult to acquire by investors, and thus estimates of their fundamental value are inherently less reliable and more volatile.

returns in the high IU firms. Finally, our findings from cross-sectional multivariate regressions reinforce the informational effect of credit watch placements. Inclusion on a negative watch list has an economically and statistically significant impact on abnormal returns around bond downgrade and post-downgrade abnormal returns, and the information effects of credit watch are most pronounced in high IU firms.

Our study offers several substantial contributions to the existing literature. First, unlike prior literature, we focus on the entire process of the bond rating revision, including placement on a credit watchlist as well as the subsequent rating change. The existing literature that focuses on market reactions at bond rating change does not make it possible to fully understand whether credit ratings play an important economic role and whether, at its core, ratings changes are informative. Inclusion of the credit watch list event is critical in clearly assessing the role of credit rating agencies in generating fundamental credit quality of the credit obligation. Second, we formulate an event study methodology by utilizing the information inherent in credit watch resolutions to accurately link credit watch placements to subsequent bond rating changes. This complete picture afforded by our data set allows us to investigate the overall impact of bond rating announcements while overcoming the limitations in prior research. Third, we investigate when and why credit watch placements potentially affect stock prices. Our findings highlight the importance of firm's IU in explaining market reactions to rating events and post-downgrade abnormal returns.

We are not the first to realize the importance of credit watch placement in the study of bond rating revision. Holthausen and Leftwich (1986) and Hand, Holthausen, and Leftwich (1992) examine the impact of credit watch placements on security prices and report small but significant market reactions of –0.79% around negative credit watch placement. However, both studies, apart from being over two decades old, are based on a small sample of credit watchlist firms ($N = 127$). Whether their conclusions can be generalized to the current markets, which have undergone a sea change in the intervening 25 years, is unclear. More importantly, the data used by past researchers have no information on credit watch resolutions.[2] The resolution (in terms of ratings changes) following a bond being placed on the credit watchlist is important because it allows the researcher to measure the overall impact of the credit watch as a tool to reduce price impact prior to the rating change. We incorporate this important information in our analysis.

Our study has several academic and practical implications. From the academic perspective, our findings underscore the importance of credit watch placements in the overall fabric of credit ratings adjustments. Failing to incorporate credit watch placement into bond rating analysis could potentially result in the underestimation of the

[2] Holthausen and Leftwich (1986) note: "Reliable inferences about resolutions contrary to the indicated direction are hampered by small sample sizes. Larger sample sizes available with the passage of time will provide more insight into the announcement effect of those resolutions" (P.85).

impact of bond rating revisions. From a practical perspective, investors can use credit watch placement as a credible signal of future rating revision. More important, in light of the recent subprime mortgage crisis and European sovereign debt crisis, the demand for timely credit quality information is increasing, and credit rating agencies can utilize credit watch placement as an early warning mechanism to an impending change in credit quality, thereby reducing the impact of the actual bond rating revisions.

The limitation to this paper is the availability of the information. We only study the bond rating revision up to December 2005 due to the lack of data. However, it is not appropriate to use the rating change data from 2008 onwards. This is because there is the subprime crisis in 2008. The creditability of the rating agency deteriorates tremendously following hamburger crisis which AAA rating had gone default. Moreover, Gartner and Griesbach (2012) discuss the problems of self-fulfilling prophecy on European sovereign debt crisis from 2009-2011. It would be interesting to separate the research to study on investor’s reaction during the financial crisis from 2008-2012.

Potential avenues for future research may include the credit rating revision from S&P. This paper only uses the rating revision from Moody’s. The research on S&P rating revision may or may not yield the same result as Moody’s. Furthermore, there may be concurrent rating revision announcement from both Moody’s and S&P. Sometimes S&P announces first. The other time Moody’s announces first. This situation can potentially affect the market impact and may alter the conclusion. The consolidation of both S&P and Moody’s rating revision can help the credit rating to be even more accurate in the future.

The remainder of the study is organized as follows. Section 2 describes the bond rating and credit watch process. Section 3 presents the data and sample statistics. Section 4 discusses the empirical results. Section 5 provides cross-sectional multivariate regressions controlling for some important variables. Section 6 discusses the robustness for operating performance. Section 7 concludes.

2. Bond Rating Process and Credit Watch Placement

Moody’s assigns credit ratings for issuers of certain types of debt obligations. Ratings are opinions of future relative creditworthiness and the ability to pay back a loan, derived by fundamental credit analysis and expressed through the familiar Aaa to C symbol system. Moody's credit analysis focuses on the fundamental factors and key business drivers relevant to an issuer's risk profile. In the course of the rating process, a Moody's analyst gathers information to evaluate risk to investors who might own or buy a given security, and the appropriate rating is developed in committee. The analyst then monitors the security on an ongoing basis to determine whether the rating remains appropriate. If the analyst sees signs that indicate a rating change, Moody's may alter the rating and inform the marketplace of the change. The rating process involves an active, ongoing dialogue between the issuer and Moody's analysts. Once published, Moody's ratings are continuously monitored and updated through dialogues and regular meetings, during which issuers are encouraged to raise any concern and present all pertinent materials.

In 1992, Moody's began placing certain bonds on a watchlist to indicate the likely direction and timing of future credit rating changes. If changing circumstances cause contradictions in the assumptions or data that support the current rating, Moody's may place the rating under review (i.e. on the watchlist). The watchlist's objective is to reduce volatility and increase the stability of the rating process. The watchlist highlights issuers whose rating is formally on review for possible upgrade, downgrade, or direction uncertain. A formal rating committee is normally required to place an issuer on the watchlist, and a separate rating committee is needed to take the issuer off the watchlist. Typically, rating agencies change or confirm the current rating within 90 days of placing an issuer on the watchlist.

3. Data and Sample Characteristics

We use four databases: Moody's Default Risk Service data, Center for Research in Security Prices (CRSP), CRSP–COMPUSTAT Merged File, and I/B/E/S. Specifically, we have access to a large sample of credit watch placements and bond rating changes from October 1, 1992 to December 31, 2005, provided by the Moody's Default Risk Service database. The objective of a credit watch placement is to provide an indication of the likely direction of a future credit rating change. Accordingly, the database provides information on the beginning date, indications, and the ending date of a credit watch placement, as well as its subsequent rating change. A credit watch is designated either *positive* (possible upgrade), *negative* (possible downgrade), or *developing* (uncertain direction).

To maintain the integrity of the data set and remove potentially contaminating factors, we apply five filters to the data set of credit watch placements and bond rating changes. First, we confine our sample to U.S. domestic taxable corporate bonds and exclude bonds issued via private placement and Yankee bonds. Second, we exclude credit watch placements and bond rating changes associated with other news announcements because our study's objective is to examine the impact of rating actions as a result of change in credit quality.[3] Third, we exclude credit watch announcements associated with an uncertainty implication because it does not provide a clear signal about a credit

[3] To do so, we manually search for news stories in the *Wall Street Journal* for potential contaminated events in the window spanning the three trading days before and after a credit watch placement and a bond rating change announcement. For each news item found, we read the story to determine whether it contains a price-moving news announcement. If a story contains information other than the rating agency announcement, we exclude the credit watch placement from our analysis.

rating's future direction.[4] Fourth, we allow each bond rating change and credit watch announcement to constitute one observation. We refer this method of selection in the subsequent discussion as a linked sample. Fifth, if a rating change and a credit watch relate to multiple bond issues by the same issuer, we consider only that issue with the largest magnitude of the rating change and subsequent rating change for credit watch, respectively, because that particular bond issue is likely to have the greater impact on stock prices.

We collect information on daily and monthly stock returns, value-weighted index returns, delisting returns, volume, and shares outstanding from the CRSP database. Returns are missing in CRSP data for many stocks delisting from the exchange. Each year, many stocks are delisted and ceased to be traded in the exchange. Delisting occur for a number of reasons including merger and acquisition, bankruptcy, liquidation, and migration to another exchange. We follow Shumway (1997) and Shumway and Warther (1999) to resolve missing returns problems and replace missing returns with –30% and –55% for NYSE/AMEX and NASDAQ, respectively.

Table 1 reports the descriptive statistics on the number of credit watch placements and bond rating changes from 1992 to 2005. Our sample includes 729 downgrades with prior credit watch and 731 downgrades without prior credit watch. Downgrades with prior credit watch are 50% of total downgrades. These results indicate that the credit rating agencies frequently use the watchlist as a tool to indicate the direction and timing of an impending ratings change and confirm the importance of this study.

<<TABLE 1 ABOUT HERE>>

Table 2 presents descriptive statistics for variables of interest. The mean cumulative abnormal return around rating revision is -2.30% while the mean 12-month long-run return following rating revision is -6.85%. The market value ranges from$1,089,000 to $262 billion. Firm age ranges from 6.79 to 957.99 months. Analyst forecast dispersion ranges from 0% to 73%.

<<TABLE 2 ABOUT HERE>>

Panel B shows the correlation matrix. The cumulative abnormal return around rating revision is positively correlated with firm size, age, and analyst dispersion. The cumulative long-run return is positively correlated with firm size and age. For information uncertainty proxy, firm size and firm age are positively correlated with each other and negatively correlated with idiosyncratic volatility and analyst dispersion. None of the proxy is highly correlated with each other so these proxies might capture different aspects of information uncertainty.

[4] Credit watches with uncertainty implications are very rare, and we delete less than 1% of the sample.

4. Empirical Results

We present the empirical findings in three stages. First, we examine the CARs surrounding a credit watch placement event and the subsequent bond rating change. Second, we estimate the long-term abnormal returns and the underreaction coefficients following the bond downgrade to measure investor underreaction. Third, we examine the role that a firm's IU contributes to the underreaction and investigate the cross-sectional variation in the effect of credit watch placements on abnormal returns around bond downgrade and long-term post-downgrade performance.

4.1. Information Content of Credit Watch Placement and Bond Rating Changes

To ascertain whether a credit watch placement is an informative event related to the underlying company, we examine the market response for the event windows of the credit watch placement and the bond rating change using standard event study methodology. We calculate CARs over each three-day event window (–1, +1) centered on day 0 of the credit watch and the bond rating revision. We compute abnormal stock returns as the difference between the daily raw stock return and the concurrent value weighted NYSE/AMEX/NASDAQ index return.

Table 3 reports the CARs for the credit watch placement (–1CW, +1CW), and bond rating changes (–1RC, +1RC). The first row reports the average stock CARs for all rating downgrades. The average CAR around the rating downgrade of –2.30% (*t*-stat = –7.13) is generally consistent with prior research, which reports significant negative price response to ratings downgrade. In the second and third rows, we breakdown the sample into two groups conditional on whether a credit watch placement occurs prior to the credit rating changes. We refer rating changes without (with) prior credit watch placement as surprise (linked) downgrades. The last row shows the CARs difference between linked and surprise ratings changes.

<<TABLE 3 ABOUT HERE>>

To determine whether credit watch provides new information to the financial markets, we analyze the abnormal returns around the event of the credit watch. If the act of being included on a credit watch conveys new information to the market, we should observe a significant reaction on stock prices that corresponds to the placement of the company's bond on the credit watchlist. We find that the market reaction at credit watch placement is striking. The CARs associated with negative credit watch inclusions are economically and statistically significant at –3.34% (*t*-stat - 6.83). Our evidence on abnormal returns strongly supports the importance of credit watch placements in providing essential information to market participants.

To determine whether inclusion on credit watch works to reduce the uncertainty and the informational asymmetry surrounding a material change in a firm's credit quality, we examine the market reaction surrounding the bond rating change, conditional on prior credit watch placement. Recall that the rationale of a credit watch placement is to inform investors of the rating agency's opinion that the credit quality of an obligation, or obligor, may be changing, thereby reducing the company's stock price volatility by moving its credit ratings in a gradual, even predictable, fashion. This volatility may be eminent in the case of a bond downgrade in which investors react strongly to a downward change in credit quality. The credit watch serves to inform market participants of the upcoming significant rating change and reduces the stock market's reaction to the information content underlying the forthcoming rating revision. If so, we should expect to see a smaller market reaction surrounding bond rating changes following inclusion on a credit watch relative to bond rating changes without inclusion on the watchlist.

Consistent with our expectation, the announcement period abnormal returns are larger for bond rating changes with no prior credit watch placements. The abnormal stock returns for bond downgrade are –3.24% for rating changes with no prior credit watch relative to –1.35% for rating changes associated with a prior credit watch. Our findings suggest that placement on a credit watch attenuates the market‘s impact associated with the corresponding stocks in the event of the bond rating change itself.

4.2. Credit Watch Placement and Investor Underreaction

Next, our analysis focuses on the extent to which credit watch placement helps assimilate credit rating information and thus reduces investor underreaction following bond downgrade. To carry out our tests, we partition the sample of downgraded firms into surprise downgrades and linked downgrades and track post-event abnormal returns following rating downgrade. We employ three methods to examine post-event abnormal returns. First, we follow Dichev and Piotroski (2001) to calculate post-event returns using CARs and BHARs. This method allows us to compare our findings directly to their study. Second, we use Carhart's (1997) four-factor model in Ibbotson's (1975) RATS framework. Finally, we calculate underreaction coefficients as proposed by Cohen and Frazzini (2008).

Post-event returns: CARs and BHARs. Following Dichev and Piotroski (2001), we report both CARs and BHARs.[5] To control for size and book-to-market ratio when calculating post-event returns, we form 25 (5 × 5) value-weighted portfolios of all NYSE, AMEX, and NASDAQ stocks based on their size and book-to-market in each calendar month starting in October 1992. We divide the monthly cross sections into size quintiles.[6] Within each size quintile, we form five book-to-market portfolios.[7] Based on the size and the book-to-market quintile cutoff, for each month we assign all firms into one of the 25 (5 × 5) portfolios and calculate value-weighted returns. At the end, for each month of our sample period, we have 25 portfolio returns stratified by size and book-to-market characteristics. We assign firms with bond ratings changes monthly into one cell of the 5 × 5 size and book-to-market matrix of benchmark portfolios. We then calculate both post-event CARs and BHARs.[8]

The first two columns of Table 4 present 12-month post-event CARs and BHARs. First, consistent with Dichev and Piotroski (2001), we observe a strong price drift following rating downgrade. The 12-month post-event CAR following rating downgrades is –6.85% (*t*-stat = –3.96). The mean post-event BHAR of –6.43% is slightly less than the CARs but is still statistically significant. Second, the inclusion of credit watch placement significantly reduces price drift following rating downgrades. The 12-month post-event CAR (BHAR) for the linked downgrades is –2.42% (–2.88%), which is significantly less than that of the surprise downgrades of –11.26% (–9.99%). The difference of –8.84% (–7.11%) is economically and statistically meaningful. Our results are consistent with the notion that credit watch placement helps assimilate credit rating information to the financial market and thus reduces investor underreaction following bond downgrade.

<<TABLE 4 ABOUT HERE>>

Ibbotson's (1975) RATS with Carhart's (1997) four-factor model. We employ the RATS method proposed by Ibbotson, assuming that normal returns are generated using Fama and French's (1993) three-factor model with Carhart's momentum factor. We run the regression for every month *j* relative to the event month 0 (*j* = 1,….., 12):

$$\left(R_{i,t} - R_{f,t}\right) = a_j + b_j\left(R_{m,t} - R_{f,t}\right) + c_j SMB_t + d_j HML_t + e_j MOM_t + \varepsilon_{i,t}, \quad (1)$$

[5] Both CARs and BHARs have their own strengths and can be considered as complementary approaches to computing abnormal returns. Fama (1998) recommends CARs because they have better statistical properties and generally allow for cleaner tests of mispricing. Barber and Lyon (1997) favor BHARs because they reflect the compounding in post-event returns.
[6] Size is measured as closing prices from the previous month times the most recent number of shares outstanding. The size quintile breakpoints are based on NYSE firms only.
[7] Book values equal the last reported book value for a period ending at least six months prior to the ratings change.
[8] Monthly abnormal returns are monthly abnormal return by the firm specific returns minus the corresponding monthly returns for the matching size and book-to-market portfolio. We then add monthly firm-specific abnormal returns to form 12-month firm-specific CARs. BHARs are measured as the BHAR for the appropriate horizon minus the BHAR for a benchmark portfolio matched on size and book-to-market.

where $R_{i,t}$ is the monthly return on security *i* in month *t*. $R_{f,t}$ and $R_{m,t}$ are the risk-free rate and the return on the equally weighted CRSP index, respectively. SMB_t, HML_t, and MOM_t are, respectively, monthly return on the size, book-to-market, and momentum factor in month *t*. The CARs reported are sums of the intercepts of cross-sectional regression over the 12-month periods.

The third column of Table 4 presents 12-month post-event CARs using RATS methodology. The results have similar pattern to post-event CARs and BHARs. The result further confirms our hypothesis that credit watch helps to attenuate investor underreaction. Specifically, the post-event CARs for surprise downgrades using the RATS method are –9.75% relative to a much smaller return of –1.09% for linked rating changes with the difference of –8.66% (*t*-stat = –2.20).

Underreaction coefficients. We follow Cohen and Frazzini (2008) to calculate an underreaction coefficient (URC) as a measure of the initial price response to an event as a fraction of the subsequent abnormal return,

$$\mathrm{URC} = \frac{\mathrm{ER}}{(\mathrm{ER}+\mathrm{SR})}, \qquad (2)$$

where ER is the event period return and SR is the subsequent return.[9] A URC of less than 1 represents underreaction, and other positive number represents overreaction. Among cases of underreaction, lower underreaction coefficients indicate more severe underreaction.

The last column of Table 4 presents URCs. The results are consistent with our expectation that surprise (linked) downgrades are associated with more (less) severe underreaction. The URC of linked downgrades is 66.0% whereas the URC of surprise downgrades is only at 22.3%. The result indicates that 66.0% of one-year returns occur on the credit watch and rating change event period for linked downgrades, compare to 22.3% for surprise downgrades. In sum, all three approaches reach the same general conclusion that supports the benefit of credit watch placement in reducing investor underreaction following the bond downgrades.

4.3. IU and Information Content of Bond Rating Change

We now examine of the extent to which the impact of credit watch placement varies according to information available at the time of announcements. Following Zhang (2006), we use IU to proxy for information availability in the market. By definition, high IU firms are those firms that are more difficult and more costly about which to acquire

[9] ER covers the rating change period [–1RC, +1RC] for surprise downgrades and covers both the credit watch period [–1CW, +1CW] and rating change period [–1RC, +1RC] for linked downgrades. SR covers the subsequent return from *t*+1 to *t*+12, where *t* is the rating downgrade month.

information.We adopt four widely used variables as proxies for information availability: idiosyncratic volatility (IVOL), firm size (SIZE), firm age (AGE), and analyst dispersion (DISP).

We calculate idiosyncratic volatility as the average monthly idiosyncratic risk during the prior quarter before portfolio formation. Following Fu (2009), we define idiosyncratic volatility each month as the product of (a) the standard deviation of the regression residuals of excess daily returns on the daily Fama–French (1993) three factors and (b) the square root of the number of observations in the month.[10] Firm size is another popular proxy to measure IU. Firm size is the market capitalization at the bond rating change date.[11] Firm age is calculated as the number of months since the first return appears in CRSP. Firms with a long history tend to have more information available to the market (Barry and Brown 1985; Jiang, Lee and Zhang 2005; Zhang 2006). Dispersion in analyst earnings forecasts is widely used to proxy for the uncertainty about future earnings or the degree of consensus among analysts or market participants (Diether, Malloy, and Scherbina 2002; Imhoff and Lobo 1992). We calculate forecast dispersion as the standard deviation of analyst forecasts.

IU and market reaction around event periods. We sort sample stocks into three equally weighted portfolios (high, medium, and low) using four IU proxies. Table 5 presents the CARs for credit watch placement (–1CW, +1CW) and bond rating change (–1RC, +1RC) for high and low IU portfolios. Our empirical tests generate several new findings. First, IU is an important determinant of market reaction around credit rating actions. High IU firms consistently have significant larger market impacts than low IU firms. For instance, when using size as the proxy for IU, the event-period CARs of –6.07%, –2.72%, and –6.22% for credit watch placement, rating change of linked downgrades, and rating change of surprise downgrades, respectively, in high IU firms are significantly greater than –1.69%, –0.66%, and –1.09%, respectively, in low IU firms. Second, credit watch placement appears to reduce firm's IU at bond downgrades. For all four IU proxies, the market reaction around bond downgrades in high IU firms largely diminishes for bond downgrades associated with prior credit watch placement. The mean CARs differences between surprise and linked downgrades range from -2.57% (AGE) to -3.93% (IVOL).

<<TABLE 5 ABOUT HERE>>

[10] Jiang, Xu, and Yao (2009) provide evidence that IVOL contains information about the future earnings of the firm. High IVOL firms are those firms with poor prospects of future earnings.
[11] We use firm size as a proxy because small firms are less diversified and have less information available for the market than large firms. Small firms may also have fewer customers, suppliers, and shareholders and may not bear high disclosure preparation costs (Zhang 2006).

IU and investors' underreaction. Panel A of Table 6 presents post-trading downgrade abnormal returns (CARs, BHARs, and RATS with Carhart's (1997) four-factor model) for high and low IU portfolios. As expected, we observe higher post-event returns following both linked and surprise downgrades in the high IU portfolio than in the low IU portfolio for all four IU proxies. This result suggests that investor underreaction is more severe in firms with high IU.

<<TABLE 6 ABOUT HERE>>

We now turn our investigation to the main analysis. That is, if credit watch placement conveys information to the financial markets and thus reduces IU, the price drift following linked downgrades in high IU firms should be lower relative to the price drift of surprise downgrades. Consistent with our expectation, we find that the reduction in post-event CARs and BHARs controlling for size and book-to-market are economically sizable and statistically significant. For example, the difference in 12-month CARs between linked and surprised downgrades ranges from –12.92% (IVOL) to –15.88% (SIZE). Overall, our findings indicate that placement on the credit watchlist helps reduce investor underreaction following the bond downgrade. Panel B of Table 6 presents the underreaction coefficients for high IU firms. This evidence further confirms the benefit of the credit watch in reducing investor underreaction. Specifically, the underreaction coefficients of surprise downgrades (24.4%, 17.7%, 18.6%, and 18.6% for IVOL, SIZE, AGE, and DISP, respectively) are much lower than the coefficients of the linked downgrades (49.5%, 40.4%, 41.0%, and 58.0% for IVOL, SIZE, AGE, and DISP, respectively).

5. Cross-Sectional Multivariate Regressions

5.1. Effect of Credit Watch Placement on Event Returns and Investor Underreaction

To investigate the cross-sectional variation in the effect of credit watch placements on abnormal returns around bond downgrade and post-downgrade performance, we employ multivariate regressions and estimate regressions in the following form:

$$\mathrm{AR_i} = \alpha_0 + \alpha_1 \mathrm{WATCH_i} + \alpha_2 \mathrm{RCHANGE_i} + \alpha_3 \mathrm{REGFD_i} + \alpha_4 \mathrm{CROSS_i} + \varepsilon_\mathrm{i} \qquad (3)$$

The dependent variables are CARs around rating downgrade period (–1RC, +1RC), 12-month post-downgrade CARs, and BHARs. AR is abnormal returns depending on the method used (CARs or BHARs). WATCH is a credit watch dummy variable that equals 1 if the rating change is preceded by credit watch placement, and zero otherwise; RCHANGE is the absolute magnitude of the rating change, where categorical bond ratings are converted into a cardinal variable measured on a 23-point scale (1 = AAA, 23 = D); REGFD is a regulation fair disclosure dummy variable that equals 1 if an observation is from the pre-fair disclosure period, and zero otherwise; CROSS is a dummy variable that equals 1 if a bond is revised from investment grade to speculative grade or vice versa, and zero otherwise.

CARs around rating downgrade period. The variable of interest is the coefficient of WATCH, which gauges the informational impact of credit watch placement on the intercept. If credit watch placement provides information to investors and reduces the impact of the actual rating downgrade, we expect the coefficient of WATCH to be positive. Existing research shows that RCHANGE is a key determinant of the stock price impact around rating changes. Greater RCHANGE should result in more negative informational impact so we expect the coefficient on RCHANGE to be negative. Jorion, Liu and Shi (2005) examine REGFD and find that the rating becomes more informative after the implementation of the Regulation FD. Hence, we expect the coefficients on REGFD to be positive. Finally, the variable CROSS controls for the possibility that across-class rating revisions that shift a bond into or out of investment grade are associated with larger market reactions. We therefore expect a negative sign on CROSS for rating downgrades.

Regression is the Informational effect on the return around the rating change of bond rating revisions. Panel A of Table 7 reports the estimated coefficients of the multivariate regression. VIF value for both upgrade and downgrade regression is not over 1.08 so there is no problem of multi-collinearity. However, for the test of heteroscedasticity, the test rejects the null hypothesis which means that the data is heteroscedastic. Even though the violation of heteroscedasticity assumption will still provide unbiased estimate for the relationship between the predictor variable and the outcome, but the standard errors and inference are suspect. We correct this by adjusting standard error estimates to be robust standard error. The coefficient on WATCH is 2.26 and significant at 1% level, suggesting that credit watch placement reduces the stock price reaction at the rating downgrade. The coefficient on RCHANGE and REGFD implies that the marginal effect of a downgrade in rating of one grade on abnormal stock returns is –1.54 and -1.01 respectively. The sign of the coefficients on CROSS is negative, but not significant.

<<TABLE 7 ABOUT HERE>>

CARs and BHARs post-event abnormal returns. We estimate the multivariate regression for 12-month post-event abnormal returns following ratings downgrade. We expect the value of the coefficient of WATCH to be positive if credit watch placement helps reduce IU, which, in turn, reduces post downgrade returns. We expect the coefficients of RCHANGE and CROSS to be negative.[12] Panels B and C of Table 7 present the estimated coefficients from

[12] When the magnitude of rating change is larger or the bonds shift from or into speculative grade, market impacts should be larger and, hence, result in larger price drift. We expect the coefficients of REGFD to be negative because the Regulation FD allows credit

multivariate regressions for CARs and BHARs, respectively. The coefficients of WATCH are positive and statistically significant, suggesting that the average post-event CARs and BHARs are significantly larger for surprise downgrades than linked downgrades. The result suggests that credit watch placement helps reduce investor underreaction to rating downgrades. The coefficient of RCHANGE and CROSS are negative but not statistically significant. However, we observe large and significant coefficient of REGFD. The coefficients for post-event CARs and BHARs are 7.49 and 9.48, respectively, and both are statistically significant. These results are in line with our conjecture that Regulation FD helps mitigate ambiguity and volatility of the firms, which, in turn, reduce investor underreaction in the long run.

5.2. IU, Market Reaction and Investor Underreaction

To investigate the cross-sectional variation in the effect of credit watch placements together with IU on abnormal returns around bond downgrade and post-downgrade performance, we employ multivariate regressions and estimate regressions in the following forms.

$$\mathrm{AR_i} = \alpha_0 + \alpha_1 \mathrm{WATCH_i} * \mathrm{HIGH_i} + \alpha_2 \mathrm{WATCH_i} * \mathrm{LOW_i} + \alpha_3 \mathrm{RCHANGE_i} + \alpha_4 \mathrm{REGFD_i} + \alpha_5 \mathrm{CROSS_i} + \alpha_6 \mathrm{HIGH} + \alpha_7 \mathrm{LOW} + \varepsilon_i \quad (4)$$

The dependent variable is CARs around rating downgrade period (–1RC, +1RC), 12-month post-downgrade CARs, and BHARs. We include the interaction terms of credit watch dummy with other four dummy variables according to IU group. WATCH*HIGH is a dummy variable that equals 1 if negative credit watch placement occurs in the high IU group, and zero otherwise. HIGH is the high IU dummy variable that equals 1 if the firms are in the high IU group, and zero otherwise. We report four models by changing the information proxy for each model. The other control variables are the same as in regression (1).

Table 8 presents the estimated coefficients from the multivariate regressions. The positive coefficients of WATCH*HIGH confirm the importance of credit watch placement in a high IU environment. The coefficients of WATCH*HIGH are statistically significant for the rating change CARs, 12-month CARs, and BHARs (Panels A, B, and C, respectively). For example, in Panel A the coefficient on WATCH*HIGH(IVOL) is 4.20, which is significant at 1% level. The result shows that the act of putting firms on credit watch placement does not have any informational impact on the event period or price drift when IU is low. The results from other variables are similar to those of Table 6. For market reaction around downgrade event, the coefficients of RCHANGE are large and statistically significant

rating agencies access to confidential information that is no longer available to equity analysts, resulting in potentially increases in the information content of the credit rating agency announcements.

across all four proxies whereas the coefficients of REGFD and CROSS are small and insignificant. However, for post-downgrade returns, the coefficients of REGFD are large and significant across all four proxies, and the coefficients of RCHANGE and CROSS are small and insignificant. The results confirm that the magnitude of the rating change is an important determinant for event period returns and that the Regulation FD is important determinant for post-event returns.

<<TABLE 8 ABOUT HERE>>

6. Robustness Checks

6.1. Post-Downgrade Operating Performance

One potential criticism leveled at the results is that the price drift following rating downgrade is caused by deterioration in operating performance rather than investor underreaction. To determine the validity of this concern, we examine the change in post-downgrade operating performance for the whole sample as well as high IU firms. We measure the post-downgrade operating performance as the performance-adjusted return-on-assets (ROA) over four quarters after the rating downgrade quarter. We define ROA as operating income divided by cash-adjusted total assets (total assets minus cash and cash equivalent) at the beginning of the quarter. The performance-adjusted ROA for a given firm is the firm-specific ROA minus the ROA of a matched firm with similar pre-event performance.

For each sample firm, we select all firms in the same two-digit SIC code that have an operating performance for the announcement quarter (quarter 0) within 20% or within 0.01, operating performance for the four quarters ending with quarter 0 within 20% or within 0.01, and pre-announcement market-to-book value of assets within 20% or within 0.1. From all the potential matches, we select the firm that has the lowest sum of absolute performance difference, defined as

$$\left|Perfomance_{quarter\ 0,\ sample\ firm} - Performance_{quarter\ 0, firm\ i}\right| + \left|Performance_{Four\ quarters\ ending\ with\ quarter\ 0,\ sample\ firm} - Performance_{Fourquarters\ ending\ with\ quarter\ 0,\ firm\ i}\right| \quad (5)$$

Following Lie (2005), if the sample firm lacks necessary data to calculate operating performance for any of the four quarters ending with quarter 0, we disregard the second term in the equation. Table 8 reports operating performance improvement following the rating downgrade of the sample firms. The operating performance improvement equals the average performance-adjusted ROA four quarters after rating changes minus the average performance adjusted ROA from quarter –3 to quarter 0. Panel A and Panel B present the operating performance improvement for the whole sample and high IU firms, respectively. Regarding the statistical test, we use a nonparametric test by comparing median operating performance and report the *p*-value of the *z*-statistic. For the whole sample, the results show that the operating performance of the firms slightly improves for both linked and surprise downgrade and upgrade. For the high IU sample, most of the operating performance is very close to zero. More importantly, none of the differences between linked and surprise downgrades show statistically significant value. This result supports our findings of investors' underreaction rather than deterioration of companies' performance.

6.2. Rating Upgrade Events

Prior research documents that credit rating upgrade is not informative and there is no significant identifiable impact around rating upgrades and post-upgrade return up to one year following rating upgrades (Hand et al. 1992; Holthausen and Leftwich 1986; Dichev and Piotroski 2001). Nevertheless, we perform the robustness check on the upgrades to make sure that we do not miss anything important in our analysis. Our findings indicates that while positive credit watch is informative but the actual rating upgrades for both surprise and linked upgrade have insignificantly market impact. Second, the one-year post-upgrade cumulative abnormal return is not statistically significant and is merely 1.84%, consistent with Dichev and Piotroski (2001)'s findings in that there is no significant post-upgrade returns. When we partition our upgrades into linked and surprise upgrades, the linked upgrade has the post-upgrade return of approximately 4%, while the surprise upgrade has the post-upgrade return of less than 1% but their difference is not statistically significant. Lastly, after we partition our sample into high and low IU, none of the post-upgrade return shows significant price drift and there is no difference in returns between high and low IU samples. Overall, we confirm that the credit rating upgrades are not as important as credit rating downgrades, thus, we do not miss out anything important in the rating upgrades that will cause our downgrades analysis to be incomplete.

7. Conclusion

We examine the importance of credit watch placement in the process of bond rating downgrade. We use an extensive database of credit watch placements and the subsequent bond rating changes over a thirteen-year period. Our empirical examination builds on three distinct levels. The first level relates to conclusions emerging directly from the characteristics and market reaction associated with bond's placement on credit watch. We find that the act of placing a publicly traded corporation's bond on a watchlist appears to be the most informative event in bond rating process—even more so than the event of bond rating change itself. Our findings also suggest that credit watch placement provides an essential benefit by reducing the company's stock price volatility at actual bond rating changes. In the second level of our analysis, we examine how credit watch placement affects investor underreaction following bond downgrades. Our findings provide unambiguous support for the usefulness of credit watch placement in attenuating investor underreaction following the bond downgrades. The results show that the inclusion of credit watch placement significantly reduces price drift following rating downgrades. In the third level of our analysis, we examine when and why credit watch placement has the most significant impact on stock prices during bond downgrade and post-event periods. We show that the market reactions to rating events and post-downgrade events are consistently higher in high IU than in low IU firms. We also find that credit watch placement plays an important role in attenuating abnormal returns around actual bond downgrade and post-downgrade abnormal returns in the high IU firms. In sum, we conclude that being included on the credit watchlist is a significant information event and one that should be focused on by researchers, practitioners and policy makers, rather than the event of the actual bond rating change itself.

References

Barber, B. M. and J. D. Lyon. (1997) Detecting Long-Run Abnormal Stock Returns: The Empirical Power and Specification of Test Statistics. J Finan Econ 43: 341–372.

Barry, C. B. and S. J. Brown. (1985) Differential Information and Security Market Equilibrium. J Finan Quan Anal 20: 407–422.

Carhart, M. M. (1997) On persistence on Mutual Fund Performance. J Finance 52: 57–82

Cohen, L. and A. Frazzini. (2008) Economic Links and Predictable Returns. J Finance 63: 1977–2011.

Dichev, I. D. and J. D. Piotroski. (2001)The Long-run Stock Returns Following Bond Ratings Changes. J Finance 56: 173–203.

Diether, K. B., C. J. Malloy and A. Scherbina. (2002) Differences of Opinion and the Cross-Section of Stock Returns. J Finance 57: 2113–2141.

Ederington, L. H. and J. C. Goh. (1998) Bond Rating Agencies and Stock Analysts: Who Knows What When? J Finan Quant Anal 33: 569–585.

Fama, E. F. (1998) Market Efficiency, Long-Term Returns, and Behavioral Finance. J Finan Econ 49: 283–306.

Fama, E. F. and K. R. French. (1993) Common Risk Factors in the Returns of Stocks and Bonds. J Finan Econ 33: 3–56.

Fu, F. (2009) Idiosyncratic Risk and Cross-Section of Expected Stock Returns. J Finan Econ 91: 24–37.

Gartner, M. and Griesbach, B. (2012) Rating agencies, self-fulfilling prophecy and multiple equilibria? An empirical model of the European sovereign debt crisis 2009-2011. Working Paper.

Glascock, J. L., W. N. Davidson and G. V. Henderson. (1987) Announcement Effects of Moody's Bond Ratings Changes on Equity Returns. Quart J Bus Econ 26: 67–78.

Goh, J. C. and L. H. Ederington. (1993) Is a Bond Rating Downgrade Bad News, Good News, or No News for Stockholders? J Finance 48: 2001–2008.

Grier, P. and S. Katz. (1976) The Differential Effects of Bond Rating Changes Among Industrial and Public Utility Bonds by Maturity. J Bus 49: 226–239.

Griffin, P. A. and A. Z. Sanvicente. (1982) Common Stock Returns and Rating Changes: A Methodological Comparison. J Finance 37: 103–119.

Hand, J., R. Holthausen and R. W. Leftwich. (1992) The Effect of Bond Rating Agency Announcements on Bond and Stock Prices. J Finance 47: 733–752.

Hettenhouse, G. and W. Sartoris. (1976) An Analysis of the Informational Value of Bond Rating Changes. Quart Rev Econ Bus 16: 65–78.

Hite, G. and A. Warga. (1997) The Effect of Bond-Rating Changes on Bond Price Performance. Finan Anal J 53: 35–51.

Holthausen, R. and R. W. Leftwich. (1986) The Effect of Bond Rating Changes on Common Stock Prices. J Finan Econ 17: 57–89.

Ibbotson, R. G. (1975) Price Performance of Common Stock New Issues. J Finan Econ 3: 235–272.

Imhoff, E. A., Jr. and G. J. Lobo. (1992) The Effect of Ex Ante Earnings Uncertainty on Earnings Response Coefficients. Acc Rev 67: 427–439.

Jiang, G. J., D. Xu and T. Yao. (2009) The Information Content of Idiosyncratic Volatility. J Finan Quant Anal 44: 1–28.

Jiang, G., G. Lee and G. Zhang. (2005) Information Uncertainty and Expected Return. Rev Acc Stud 10: 185–221.

Jorion, P., Z. Liu and C. Shi. (2005) Informational Effects of Regulation FD: Evidence from Rating Agencies. J Finan Econ 76: 309–330.

Katz, S. (1974) The Price and Adjustment Process of Bonds to Rating Reclassifications: A Test of Bond Market Efficiency. J Finance 29: 551–559.

Lie, E. (2005) Operating Performance Following Open Market Share Repurchase Announcements. J Acc Econ 39: 411–436.

Pinches, G. E. and J. C. Singleton. (1978) The Adjustment of Stock Prices to Bond Ratings Changes. J Finance 33: 29–44.

Shumway, T. (1997) The Delisting Bias in CRSP Data. J Finance 52: 327–340.

Shumway, T. and V. A. Warther. (1999) The Delisting Bias in CRSP's Nasdaq Data and its Implications for the Size Effect. J Finance 54: 2361–2379.

White, H. (1980) A Heteroskedasticity-Consistent Covariance Matrix Estimator and a Direct Test for Heteroskedasticity. Econometrica 48 (4): 817-838.

Zhang, X. F. (2006) Information Uncertainty and Stock Returns. J Finance 61: 105–137.

Table 1: Descriptive Statistics

This table presents the number of linked and surprise credit rating changes by calendar year. Linked credit rating change is credit rating change with prior credit watch placement. Surprise credit rating change is credit rating change without prior credit watch placement. Data on Moody's credit rating are obtained from Moody's Corporate Default Risk Service database. The analysis covers time period from October 1992 to December 2005.

Year	Number of Linked Downgrade	Number of Surprise Downgrade	Total Downgrade	% Linked Downgrade
1992	10	13	23	43
1993	35	28	63	56
1994	33	33	66	50
1995	33	47	80	41
1996	43	43	86	50
1997	34	55	89	38
1998	40	71	111	36
1999	54	64	118	46
2000	67	72	139	48
2001	88	110	198	44
2002	121	66	187	65
2003	85	46	131	65
2004	44	41	85	52
2005	42	46	88	48
Total	729	735	1464	50

Table 2: Descriptive Statistics

Idiosyncratic volatility (IVOL) is calculated as the average monthly idiosyncratic risk during the prior quarter before portfolio formation. Firm size (SIZE) is the market capitalization at the bond rating change date. Firm age (AGE) is the number of months since the firm was first covered by CRSP. Analyst dispersion (DISP) is the standard deviation of analyst forecasts in month of bond rating change. WATCH is credit watch dummy variable that equals 1 if rating change is preceded by credit watch placement and zero otherwise. Rate Change is the cumulative abnormal return around the rating revision. CAR is 12-month long-run abnormal return following rating revision.

Panel A: Descriptive Statistics

Variable	N	Mean	Std	Min	Max
Rate Change	1460	-2.30%	12.30%	-122.53%	127.00%
CAR	1460	-6.85%	66.14%	-337.58%	369.78%
IVOL	1418	15.89	15.23	1.05	107.02
SIZE	1460	6016126	20871364	1089	262509809
AGE	1445	300.28	253.89	6.79	957.99
DISP	1220	0.39%	2.51%	0	73%
WATCH	1460	0.5	0.5	0	1

Panel B: Correlation Matrix (Pearson Correlations Are Shown above the Diagonal with Spearman Below)

Variable	Rate Change	CAR	IVOL	SIZE	AGE	DISP	WATCH
Rate Change	1	-0.03074	-.28171	0.03438	0.08441	0.00858	0.07714
CAR	0.02527	1	-0.07704	0.04709	0.12348	-0.03305	0.06688
IVOL	-0.19552	-0.13436	1	-0.17430	-0.27043	0.02045	-0.14955
SIZE	0.16357	0.20653	-0.64156	1	0.07368	-0.04064	-0.09288
AGE	0.11526	0.16162	-0.38529	0.44243	1	0.00124	0.21664
DISP	-0.08247	-0.07757	0.33990	-0.49888	-0.16867	1	-0.04695
WATCH	0.07735	0.07061	-0.15317	0.21706	0.20757	-0.00038	1

Table 3: Moody's Cumulative Abnormal Returns around Event Period

This table reports cumulative abnormal returns (CARs) for linked sample of credit watch placements and bondrating changes for event window of credit watch placement (–1 to 1, where day 0 denotes the day of the credit watch placements), and event window of bond rating changes (–1 to 1, where day 0 denotes the day of the bond rating changes). CAR is defined as stock return minus the contemporaneous return on the value-weighted market portfolio. The last row shows the difference and test statistics of CARs between linked and surprise event. The sample period is from October 1992 to December 2005. Linked rating change is rating change that is preceded by credit watch placement. Surprise rating change is the rating change without prior credit watch placement. *** indicates significance at the 1% level. t-statistics are reported in the parentheses.

	Negative Watch and Bond Downgrade		
	Obs. (*n*)	Credit Watch CAR (%)	Rating Change CAR (%)
All Downgrade	1,460		–2.30%***
			(–7.13)
Linked Downgrade	729	–3.34%***	–1.35%***
		(–6.83)	(–2.98)
Surprise Downgrade	731		–3.24%***
			(–7.11)
Difference:			–1.89%***
Surprise – Linked			(–2.95)

Table 4: Post-Event Cumulative Abnormal Return and Underreaction Coefficients

Table 4 reports cumulative abnormal returns (CARs), buy-and-hold abnormal return (BHAR), Ibbotson's (1975) returns across time and securities (RATS) CARs, and underreaction coefficients following bond rating change. Linked rating change is rating change that is preceded by credit watch placement. Surprise rating change is the rating change without prior credit watch placement. CAR is defined as monthly stock return minus the corresponding monthly return for the matching size and book-to-market portfolio. BHAR is defined as the buy-and-hold raw return for the appropriate horizon minus the buy-and hold return for a benchmark portfolio matched on size and book-to-market. RATs CARs are the abnormal performance using Ibbotson's RATS methodology and applying the Fama and French's (1993) three-factor model plus Carhart's (1997) momentum factor. Underreaction coefficient (URC) is event date reaction divided by the total reaction (event date reaction plus post-event return).The sample period is from October 1992 to December 2005. ** and *** indicate significance at the 5% and 1% levels, respectively. *t*-statistics are reported in the parentheses.

	12-Month Abnormal Returns						URC
	CAR		BHAR		RATS		(%)
Total Downgrade	-6.85%	***	-6.43%	***	–5.95	***	45.4
	(-3.96)		(-3.95)		(–3.03)		
Linked Downgrade	-2.42%		-2.88%		–1.09		66
	(-1.17)		(-1.39)		(–0.45)		
Surprise Downgrade	-11.26%	***	-9.99%	***	–9.75	***	22.2
	(-4.08)		(-3.98)		(–3.13)		
Difference:	-8.84%	***	-7.11%	**	–8.66	**	
Surprise – Linked	(-2.56)		(-2.19)		(–2.20)		

Table 5: Cumulative Abnormal Returns by Information Uncertainty Proxies

This table reports cumulative abnormal returns (CARs) sorted into three equally weighted portfolios (High, Medium, and Low) by four information uncertainty (IU) proxies for linked sample of credit watch placements and bond rating changes for event window of credit watch placement (–1 to 1, where day 0 denotes the day of the credit watch placements), and event window of bond rating changes (–1 to 1, where day 0 denotes the day of the bond rating changes). CAR is defined as stock return minus the contemporaneous return on the value-weighted market portfolio. Idiosyncratic volatility (IVOL) is calculated as the average monthly idiosyncratic risk during the prior quarter before portfolio formation. Firm size (SIZE) is the market capitalization at the bond rating change date. Firm age (AGE) is the number of years since the firm was first covered by CRSP. Analyst dispersion (DISP) is the standard deviation of analyst forecasts in month of bond rating change. CW is credit watch placement. RC is bond rating change. The sample period is from October 1992 to December 2005. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. *t*-statistics are reported in the parentheses.

Cumulative Abnormal Return by Information Uncertainty proxies

		Linked Downgrade				Surprise Downgrade		Difference	
		CW		RC				RC	
IVOL	H	-6.16%	***	-3.40%	***	-7.33%	***	-3.93%	**
		(-6.27)		(-3.06)		(-6.01)		(-2.39)	
	L	-0.19%		-0.13%		-0.29%		-0.16%	
		(-0.39)		(-0.89)		(-1.58)		(-0.71)	
	H-L	-5.97%	***	-3.27%	***	-7.04%	***		
		(-5.44)		(-2.92)		(-5.70)			
SIZE	H	-6.07%	***	-2.72%	**	-6.22%	***	-3.50%	**
		(-5.38)		(-2.29)		(-5.80)		(-2.19)	
	L	-1.69%	***	-0.66%	*	-1.09%	***	-0.43%	
		(-3.29)		(-1.67)		(-3.06)		(-0.82)	
	H-L	-4.38%	***	-2.06%	*	-5.13%	***		
		(-3.53)		(-1.65)		(-4.54)			
AGE	H	-4.19%	***	-2.86%	***	-5.43%	***	-2.57%	**
		(-3.91)		(-3.12)		(-5.91)		(-1.97)	
	L	-2.68%	***	-0.93%		-0.87%		0.06%	
		(-3.66)		(-1.08)		(-1.50)		(-0.05)	
	H-L	-1.51%		-1.93%		-4.56%	***		
		(-1.17)		(-1.54)		(-4.19)			
DISP	H	-5.74%	***	-0.73%		-4.49%	***	-3.76%	***
		(-5.21)		(-0.77)		(-4.20)		(-2.62)	
	L	-1.65%	**	-0.76%		-1.04%	**	-0.28%	
		(-2.39)		(-1.41)		(-2.40)		(-0.40)	
	H-L	-4.09%	***	0.03%		-3.45%	***		
		(-3.13)		(0.02)		(-2.99)			

Table 6: Post-Event Abnormal Returns by Information Uncertainty Proxy

Panel A reports one-year cumulative abnormal returns (CARs), buy-and-hold abnormal returns (BHARs), and Ibbotson's (1975) returns across time and securities (RATS) using Fama and French (1993) three-factor plus Carhart's (1997) momentum factor following bond rating changes by each information uncertainty proxy (IU). CAR is defined as monthly stock return minus the corresponding monthly return for the matching size and book-to-market portfolio. BHAR is defined as the buy-and-hold raw return for the appropriate horizon minus the buy-and hold return for a benchmark portfolio matched on size and book-to-market. Panel B reports underreaction coefficients (URC) for high IU firms. URC is event date reaction divided by the total reaction (event date reaction plus post-event return). Stocks are sorted by four different IU proxies to form three equal portfolios. Idiosyncratic volatility (IVOL) is calculated as the average monthly idiosyncratic risk during the prior quarter before portfolio formation. Firm size (SIZE) is the market capitalization at the bond rating change date. Firm age (AGE) is the number of years since the firm was first covered by CRSP. Analyst dispersion (DISP) is the standard deviation of analyst forecasts in month of bond rating change. AR is abnormal returns depending on which method used: CAR, BHAR or RATS. The sample period is from October 1992 to December 2005. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Post-Downgrade 12 Month Cumulative Abnormal Returns Sorted by Information Uncertainty

			IVOL			SIZE			AGE			DISP		
			AR	t		AR	t		AR	t		AR	t	
Linked Downgrade	CAR	High	-9.77%	(-1.78)	*	-12.97%	(-2.59)	***	-10.16%	(-2.29)	**	-4.69%	(-1.18)	
		Low	1.24%	(0.74)		3.49%	(1.48)		4.68%	(1.59)		1.16%	(0.38)	
		H-L	-11.01%	(-1.92)	*	-16.46%	(-2.97)	***	-14.84%	(-2.79)	***	-5.85%	(-1.17)	
	BHAR	High	-8.33%	(-1.58)		-12.35%	(-2.57)	***	-11.91%	(-2.78)	***	-7.56%	(-2.04)	**
		Low	0.37%	(0.19)		2.56%	(1.04)		4.51%	(1.46)		0.64%	(0.20)	
		H-L	-8.70%	(-1.55)		-14.91%	(-2.76)	***	-16.42%	(-3.11)	***	-8.20%	(-1.68)	*
Surprise Downgrade	CAR	High	-22.69%	(-3.48)	***	-28.85%	(-5.01)	***	-23.79%	(-4.16)	***	-19.68%	(-3.23)	***
		Low	1.45%	(0.72)		0.74%	(0.33)		0.30%	(0.08)		-2.06%	(-0.67)	
		H-L	-24.14%	(-3.53)	***	-29.59%	(-4.80)	***	-24.09%	(-3.52)	***	-17.62%	(-2.58)	***
	BHAR	High	-23.13%	(-4.03)	***	-31.37%	(-6.34)	***	-21.83%	(-4.62)	***	-19.34%	(-3.77)	***
		Low	0.09%	(0.04)		0.56%	(0.29)		-1.42%	(-0.39)		-2.65%	(-0.83)	
		H-L	-23.22%	(-3.80)	***	-31.93%	(-6.04)	***	-20.41%	(-3.41)	***	-16.69%	(-2.76)	***

Post-Downgrade 12 Month Cumulative Abnormal Returns Sorted by Information Uncertainty (Continued)

Difference Surprise - Linked	CAR	High	-12.92%	(-1.52)		-15.88%	(-2.08)	**	-13.63%	(-1.88)	*	-14.99%	(-2.13)	**
		Low	0.21%	(0.08)		-2.75%	(-0.85)		-4.38%	(-0.91)		-3.22%	(-0.74)	
	BHAR	High	-14.80%	(-1.90)	*	-19.02%	(-2.76)	***	-9.92%	(-1.56)		-11.78%	(-1.91)	**
		Low	-0.28%	(-0.10)		-2.00%	(-0.63)		-5.93%	(-1.23)		-3.29%	(-0.72)	

Panel B: Underreaction Coefficients for High IU

	IVOL (%)	SIZE (%)	AGE (%)	DISP (%)
Linked Downgrade	49.5	40.4	41.0	58.0
Surprise Downgrade	24.4	17.7	18.6	18.6

Table 7: Regression of Credit Watch Placement with Robust Standard Errors

This tables report the regression analysis for the effects of credit watch placement on stock price reaction. Panel A reports cumulative abnormal returns (CARs) for the rating change event period. Panel B reports one-year CARs. Panel C reports one-year BHARs.

$$AR_i = \alpha_0 + \alpha_1 \text{ WATCH}_i + \alpha_2 \text{ RCHANGE}_i + \alpha_3 \text{ REGFD}_i + \alpha_4 \text{ CROSS}_i + \varepsilon_i$$

AR is abnormal return depending on method used: CAR or BHAR. WATCH is credit watch dummy variable that equals 1 if rating change is preceded by credit watch placement and zero otherwise; RCHANGE is the absolute magnitude of the rating change, where categorical bond ratings are converted into a cardinal variable measured on a 23-point scale (1 = AAA, 23 = D); REGFD is the fair disclosure regulation dummy variable equal to one if an observation is from the post-fair disclosure period and zero otherwise; CROSS is a dummy variable set that equals 1 if a bond is revised from investment grade to speculative grade or vice versa, and zero otherwise. The sample period is from October 1992 to December 2005.

Panel A: Market Reaction around Rating Revision

	Downgrade				
	Expect Sign	Coefficients	*t*-stat		VIF
Intercept		-0.63	-0.54		
WATCH	+	2.26	3.6	***	1.05
REGFD	-	-1.01	-1.65	*	1.02
RCHANGE	-	-1.54	-1.98	**	1.02
CROSS	-	-0.17	-0.17		1.05
Adjusted R^2 (%)		1.76			
F-stat		7.53***			
Heteroscedasticity		37.26***			
No. of obs.		1460			

Panel B: Post-Event CAR

	Downgrade				
	Expect Sign	Coefficients	*t*-stat		VIF
Intercept		-9.94	-2.42	**	
WATCH	+	8.98	2.55	***	1.05
REGFD	+	7.49	2.14	**	1.02
RCHANGE	-	-3.24	-1.32		1.02
CROSS	-	-2.24	-0.49		1.05
Adjusted R^2 (%)		0.65			
F-stat		3.37***			
Heteroscedasticity		80.61***			
No. of obs.		1460			

Panel C: Post-Event BHAR

	Downgrade				
	Expect Sign	Coefficients	*t*-stat		VIF
Intercept		-12.3	-3.27	***	
WATCH	+	7.18	2.15	**	1.05
REGFD	+	9.48	2.87	***	1.02
RCHANGE	-	-1.17	-0.53		1.02
CROSS	-	-6.4	-1.45		1.05
Adjusted R^2 (%)		0.71			
F-stat		3.61***			
Heteroscedasticity		61.99***			
No. of obs.		1457			

Table 8: Regression for the Effects of Credit Watch Placements with Information Uncertainty for Downgrade using Robust Standard Errors

This tables report the regression analysis for the effects of credit watch placement and information uncertainty (IU) on stock price reaction. Panel A reports cumulative abnormal returns (CARs) on the rating change event period. Panel B reports one-year CARs. Panel C reports one-year buy-and-hold returns (BHARs).

$$AR_i = \alpha_0 + \alpha_1 \text{ WATCH}_i * \text{HIGH}_i + + \alpha_3 \text{ RCHANGE}_i + \alpha_4 \text{ REGFD}_i + \alpha_5 \text{ CROSS}_i + \alpha_6 \text{ HIGH} + \varepsilon_i$$

AR is abnormal return depending on method used: CAR or BHAR.WATCH is credit watch dummy variable that equals 1 if a rating change is preceded by credit watch placement, and zero otherwise; RCHANGE is the absolute magnitude of the rating change, where categorical bond ratings are converted into a cardinal variable measured on a 23-point scale (1 = AAA, 23 = D); REGFD is a fair disclosure regulation dummy variable that equals 1 if an observation is from the post-fair disclosure period, and zero otherwise; CROSS is a dummy variable that equals 1 if a bond is revised from investment grade to speculative grade or vice versa, and zero otherwise. HIGH is an IU proxy dummy variable that equals to 1 if an observation is from the high IU grouping, and zero otherwise. Four IU proxies are used; IVOL, SIZE, AGE, and DISP. Idiosyncratic volatility (IVOL) is calculated as the average monthly idiosyncratic risk during the prior quarter before portfolio formation. Firm size (SIZE) is the market capitalization at the bond rating change date. Firm age (AGE) is the number of years since the firm was first covered by CRSP. Analyst dispersion (DISP) is the standard deviation of analyst forecasts in month of bond rating change. The sample period is from October 1992 to December 2005.

Panel A: Market Reaction at Event Period

	Coefficients	t-stat		Coefficients	t-stat		Coefficients	t-stat		Coefficients	t-stat	
Intercept	0.83	(0.82)		0.69	(0.67)		0.96	(0.95)		0.42	(0.39)	
WATCH * HIGH	4.2	(2.59)	***	3.73	(2.33)	**	2.82	(2.19)	**	4.27	(3.04)	***
RCHANGE	-0.88	(-1.45)		-1.11	(-1.84)	*	-0.85	(-1.37)		-0.9	(-1.46)	
REGFD	-0.92	(-1.14)		-1.01	(-1.30)		-1.36	(-1.71)	*	-1.56	(-2.02)	**
CROSS	-0.21	(-0.22)		-0.26	(-0.26)		0.02	(0.02)		0.29	(0.30)	
IVOLHIGH	-6.14	(-4.67)	***									
SIZEHIGH				-4.63	(-4.01)	***						
AGEHIGH							-3.92	(-3.91)	***			
DISPHIGH										-2.29	(-2.07)	**
Adj. R^2 (%)	4.05			2.66			2.23			1.71		
F-stat	13.32***			8.97***			7.65***			6.08***		
Heteroscedasticity	91.67***			70.59***			49.29***			45.76***		
No. of obs.	1460			1460			1460			1460		

Panel B: Post-Downgrade CAR

	Coefficients	t-stat		Coefficients	t-stat		Coefficients	t-stat		Coefficients	t-stat	
Intercept	-4.55	(-1.26)		-3.38	(-0.93)		-2.29	(-0.60)		-4.51	(-1.18)	
WATCH * HIGH	12.58	(1.48)		15.85	(2.06)	**	13.66	(1.88)	*	15.47	(2.34)	**
RCHANGE	8.07	(2.33)	**	6.47	(1.87)	*	8.21	(2.38)	**	7.91	(2.28)	**
REGFD	-1.08	(-0.44)		0.53	(0.22)		-2.29	(-0.94)		-3.06	(-1.53)	
CROSS	-1.81	(-0.41)		-3.91	(-0.86)		-2.23	(-0.49)		0.23	(0.04)	
IVOLHIGH	-20.01	(-2.95)	***									
SIZEHIGH				-29.09	(-4.71)	***						
AGEHIGH							-21.85	(-3.63)	***			
DISPHIGH										-14.41	(-2.73)	***
Adj. R^2 (%)	1.31			2.67			1.61			0.68		
F-stat	4.88***			9.00***			5.78***			2.99**		
Heteroscedasticity	118.11***			87.29***			87.92***			80.99***		
No. of obs.	1460			1460			1460			1460		

Panel: C Post-Downgrade BHAR

	Coefficients	t-stat		Coefficients	t-stat		Coefficients	t-stat		Coefficients	t-stat	
Intercept	-7.45	(-2.14)	**	-5.89	(-1.71)	*	-5.22	(-1.46)		-7.13	(-2.00)	**
WATCH * HIGH	14.32	(2.52)	***	19.31	(3.46)	***	9.95	(1.76)		11.82	(1.91)	*
RCHANGE	9.92	(3.06)	***	7.96	(2.48)	**	10.11	(3.12)	*	9.81	(3.01)	***
REGFD	1.1	(0.57)		3.08	(1.59)		-0.21	(-0.11)	***	-0.85	(-0.45)	
CROSS	-6.85	(-1.19)		-9.46	(-1.66)	*	-6.61	(-1.15)		-4.06	(-0.70)	
IVOLHIGH	-22.03	(-4.83)	***									
SIZEHIGH				-34.22	(-7.54)	***						
AGEHIGH							-20.91	(-4.67)	***			
DISPHIGH										-15.16	(-3.06)	***
Adj. R^2 (%)	1.93			4.24			1.97			0.97		
F-stat	6.72***			13.90***			6.84***			3.85***		
Heteroscedasticity	77.39***			59.16***			58.02***			63.02***		
No. of obs.	1457			1457			1457			1457		

Table 9: Post-Rating Downgrade Performance

This table reports post-rating downgrade operating performance. Panel A (Panel B) reports improvement in operating performance for the whole sample (high IU firms). Improvement in operating performance is measured as performance-matched quarterly return on assets averaged over one year minus performance matched return on assets for quarter 0 where quarter 0 is the rating downgrade announcement quarter. *p*-values are reported in parentheses.

Panel A: Improvement in Operating Performance for Whole Sample

	Improvement
Surprise Rating Downgrade	0.00015
	0.578
Linked Rating Downgrade	0.00033
	0.274
Difference	-0.00018
	0.436

Panel B: Improvement in Operating Performance for High IU

	Improvement
IVOL	
Surprise Rating Downgrade	0.001
	0.5825
Linked Rating Downgrade	0.0014
	0.4017
Difference	-0.0004
	0.6482
SIZE	
Surprise Rating Downgrade	0.0003
	0.2904
Linked Rating Downgrade	0.0002
	1
Difference	0.0001
	0.6618
AGE	
Surprise Rating Downgrade	0.0004
	0.2384
Linked Rating Downgrade	0.0012
	0.076*
Difference	-0.0008
	0.2201
DISP	
Surprise Rating Downgrade	0.0009
	0.4913
Linked Rating Downgrade	-0.001
	0.3777
Difference	0.0019
	0.2341