

Credit Rating Changes and Institutional Trading

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Abstract

Proactive bond rating changes, especially downgrades, are associated with heightened equity market trading by institutional investors. Institutional sell minus buy imbalance jumps from almost 0 to nearly 13% of the total volume in the five-day period preceding downgrades, controlling for other determinants of volume. Trades consistent with credit rating changes are more profitable than those consistent with equity analysts' recommendations. Rating changes have an incremental explanatory power for overall profitability of institutional trades controlling for past returns, momentum, Fama-French factors, and Regulation Fair Disclosure in periods both before and after the financial crisis.

Credit Rating Changes and Institutional Trading

1. Introduction

Credit ratings are used by investors, issuers, investment banks, broker-dealers, and governments for determining the value of a financial security and its eligibility for inclusion in an investment portfolio. Credit rating agencies (CRAs) typically possess and analyze forward-looking information, such as budgets, forecasts, and advance notification of major corporate events, to formulate their ratings. Therefore, rating changes can significantly affect the valuation of not only fixed income investments but also equity investments. Our paper examines whether institutional equity investors consider a firm's bond rating changes while formulating their trading strategies and whether their trades in the period surrounding rating changes generate excess profits.

The recent subpoenas sent to hedge funds, specialized trading shops, and other institutional trading firms highlight the seriousness with which the regulators may take the implications of our study. According to Eaglesham (2011), Securities and Exchange Commission (SEC) officials demanded more information about specific trades made shortly before the Standard & Poor's downgrade of U.S. sovereign debt in their investigation. SEC officials also asked FINRA's specialized surveillance unit to look hard for bearish trades that seemed unusually large or were made by investment firms that wouldn't normally make such trades. The suspicions point to the potential existence of an information channel from credit rating agencies to institutional traders in equity markets. Notwithstanding the findings of the SEC investigation of this single rating change incident, scientific conclusions about the relation between rating change and institutional trading can be drawn reliably only from a rigorous analysis of a large

sample of rating changes, such as the one we provide in this paper. Fishman and Hagerty (1992) and Ellul and Panayides (2011) posit that firm insiders and equity research analysts compete for the pool of price-sensitive information. Chuang and Lee (2011) find that institutional owners and equity analysts play complementary roles in generating information that helps predict returns. Extending their logic, we analyze credit rating agencies as additional competitors for price-sensitive information.

Jorion, Liu, and Shi (2005) argue that credit rating related information finds its way into stock markets through previously unexplored channels of information flow. Their findings imply bond rating analysts play an important role in equity market's price discovery process. However, their focus is on stock prices and they do not analyze trading activity. We extend the literature by focusing on institutional traders who hold 74% of all outstanding stocks (Bogle 2008, page 35). Berkman and McKenzie (2012) suggest that institutional investors successfully anticipate earnings news. Irvine, Lipson and Puckett (2007) project the possibility of tipping and information leakage from equity analysts to institutional traders in the absence of a direct regulatory ban. Although credit analysts may not have the same incentives as equity analysts to share the information with institutional clients, the institutional investors have the same incentives to receive, extract, and research the types of corporate information produced by either equity analysts or credit analysts. Recent enforcement actions indicate that the U.S. is targeting insider trading and networking culture in the financial markets by casting wider nets than ever before (Rothfeld et al., 2011). By allowing the credit ratings as an additional source of value relevant information, we extend the literature to cross market applications between bond markets and stock markets, which are even more difficult to detect.

We examine this issue for private sector bond issuers by merging credit rating changes data from Mergent Fixed Investment Securities Database (FISD), institutional equity trading data from ANcerno, stock return data from the Center for Research in Security Prices (CRSP), firm specific characteristics from Compustat, and equity analyst recommendations from Institutional Brokers' Estimate System (I/B/E/S). We distinguish between reactive rating changes which are preceded by related public news and proactive rating changes which constitute a surprise. Our research design and sample construction are geared toward extracting the pure effects of bond rating changes on institutional equity trading and profitability by excluding or controlling for confounding events such as earnings surprises, equity rating changes, ratings watch, ratings history, bond features, leverage changes, business cycles and standard asset pricing factors. Since rating agencies can sometimes react slowly, we separate potentially reactive rating changes affected by previously known events from proactive rating changes. For example, we exclude ratings preceded by watches because Chung, Frost, and Kim (2012) find that watch actions are frequently prompted by specific, publicly known events. Proactive rating changes are not affected by prior news but instead they channel new information into the markets. In all we analyze 2,713 proactive credit rating changes for 885 unique firms by three major CRAs - Standard & Poor's (SPR), Moody's (MR), and Fitch (FR) - from January 1998 to June 2009.

Our main contributions relate to institutional trading volume, stock returns, institutional trading profitability in the periods surrounding credit rating changes, and our integrated analysis of bond ratings and equity recommendations. In the premier direct analysis of institutional trading behavior surrounding credit rating changes, we find that institutional equity trading volume is significantly above normal on the days preceding a firm's credit rating downgrade.

Thus, institutional trading in equities is very sensitive to firm's debt rating indicating that institutions could potentially be informed about creditworthiness of a firm through research, monitoring, or networking. The ANcerno data set allows us to observe the trade direction, trading volume, and trade timing of large institutions, none of which was analyzed in the previous literature on credit ratings. Downgrades across investment categories, i.e. from investment grade to speculative grade, result in a particularly large surge in institutional trading volume. The association between institutional trading volume and bond rating downgrades continues to be economically and statistically significant in the regression analysis where we control for accompanying changes in equity analyst recommendations, changes in leverage, past downgrades, past returns, firm size, rating agency identity, recessions, and time trends.

Second, we find that indeed the profit implied by the actual institutional sell orders executed between 5 days before announcement and the date of announcement is 7.31% if liquidated using the benchmark price 5 days after the downgrade announcement. Although institutional buys preceding downgrades lose money, institutions don't buy as aggressively as they sell in this period. As a result, their overall profit from buys and sells is 2.57%, which is statistically significant at the 1% level.

Third, one of our innovations is to study simultaneously the effects of changes in credit ratings and equity analyst recommendations on institutional trading volume and institutional trading profitability. The incremental effect of bond rating changes on institutional trading profitability is comparable to the magnitude of the analogous effect of equity analyst recommendations, in the overall period. Our special emphasis on negative information in bond downgrades fills an important gap in the otherwise positively biased equity research industry.

We obtain a surprising result for a substantial number of firms in our sample, for which equity analysts and rating agencies have conflicting signals. Whether equity analysts have optimistic, pessimistic or no changes in recommendations for a stock, credit rating downgrades drive the stock returns and generate profits for institutions whose decisions are more aligned with changes in credit ratings instead of equity analyst recommendations.

Fourth, we extend the previous findings about asymmetry between downgrades and upgrades, i.e., there are more downgrades than upgrades and the stock price reaction to downgrades is also more severe. The change in institutional trade size and institutional trading volume in response to upgrades and downgrades is also asymmetric and so is the profitability of institutional trades.

Finally, unlike previous research, our paper shows the incremental effect of credit rating changes beyond the mechanical effects that could be predicted easily from publicly observable information such as earnings announcements, changes in a firm's capital structure, or mergers and acquisitions. In our multiple regression analysis, we consider various dynamics of credit rating changes such as ratings watch, competition between rating agencies, the drift or momentum in downgrades, and business cycle recessions including the recent financial crisis. We conjecture that bond-specific features related to callability, seniority, convertibility, and fixed versus floating coupon rates can affect the strength of the relation between ratings change and institutional equity trading. The association between institutional trading volume or profits and future downgrades continues to be significant in all these scenarios and specifications.

We provide a brief discussion of the related literature in the next section where we also state our main testable hypotheses about the effect of credit rating changes on institutional

trading behavior and profitability of institutional trades. Details of sample construction, data sources, dependent and explanatory variables, and descriptive statistics are given in section II. Empirical results are presented in section III. Section IV concludes with interpretations of our findings and potential ideas for further investigation into related topics.

2. Literature Review and Hypotheses Development

Institutional money managers such as mutual funds, investment banks, and hedge funds are frequently viewed as informed traders in the financial markets. Selective disclosure of material corporate information to institutional players was seemingly a common practice toward the end of the twentieth century and eliminating this practice was a primary objective of the Regulation Fair Disclosure (Reg FD) enacted in October 2000. The regulation specifically prohibits U.S. public companies from making selective, nonpublic disclosures to favored investment professionals including equity analysts whose opinions have significant bearing on equity valuations around the world (Jegadeesh and Kim, 2006). But bond rating agencies continue to receive and periodically monitor in-depth information on the rated firms to assess their creditworthiness and business fundamentals (Boot, Milbourn, and Schmeits, 2006; Banner and Hirsch, 2010). Do institutions continue to trade and profit from superior information through these new channels and focal points? This is the main question that we pose in our paper.

Ongoing SEC investigations into institutional equity trades preceding the Standard & Poor's credit rating downgrade of U.S. sovereign debt (Eaglesham, 2011) highlight the practical importance of our multi-market study. Although prior literature has shown abnormally high institutional trading volume (Irvine, Lipson and Puckett, 2007) before equity analyst upgrades

and abnormal levels of short-selling (Christophe, Ferri, and Hsieh, 2010) before the public announcements of equity analyst downgrades, our paper differs significantly from these papers in terms of information origination. Whereas they look at independent research as the source of information, we focus on material private corporate information that can legally be possessed by credit rating agencies ahead of its public disclosure. Our paper also differs in terms of the direction of institutional trading. Whereas Irvine, Lipson and Puckett (2007) focus on institutional buying activity before strong buy recommendations by equity analysts, we focus on institutional selling activity before downgrades by credit rating agencies. Furthermore, institutions in our sample do not engage in short selling, which is the focus of Christophe, Ferri, and Hsieh (2010). Thus, our study fills an important gap in the literature related to selling activity of institutions that already have a long position. We answer the question whether institutions can benefit from trading in periods surrounding downgrades without being able to short sell.

Another major difference between our paper and those cited above is the exploration of cross-market information channels. The linkage between equity values and credit ratings has its roots in the firm's fundamental business prospects (Goh and Ederington, 1993), its capital structure and equity issuance triggers in debt covenants (Bhanot and Mello, 2006; Kisgen, 2006, 2009), wealth redistribution due to EPS dilution and asset substitution (Zaima and McCarthy, 1988; Kisgen and Strahan, 2010), and cross-market hedging (Underwood, 2009). In the context of bond trading and bond returns, De Franco, Vasvari, and Wittenberg-Moerman (2009) integrate bond analyst recommendations, equity analyst recommendations, and lead credit rating agency announcements. They find that the information sources are complementary as bond

analysts issue more negative reports than equity analysts. Odders-White and Ready (2006) provide suggestive evidence about market makers being aware about the predictive relation between credit rating and stock market liquidity based on privately observed shocks by showing their effects on spreads and probability of informed trading (PIN) measures calculated from TAQ. We extend their research design by directly observing institutional investment decisions in ANcerno data set, which contains information about order direction and trader type.

He, Wang and Wei (2011) examine investor perceptions about information asymmetry of stock trading using quarterly institutional holding data. Avramov, Chordia, Jostova, and Philipov (2009) also report that around credit rating downgrades, low-rated firms experience considerable negative returns and attribute their finding to strong institutional selling based on institutional holding data. However, quarterly holdings data do not tell us whether the trades are executed before or after the price decline. We are able to answer this question with institutional trading data. Besides, the focus of these two articles is on the puzzle related to higher returns generated by lower credit risk and on changes in investor perceptions, respectively. We focus on alternative channels through which credit downgrades manifest their effects into stock prices and whether institutional traders are able to profit in the periods surrounding credit rating changes.

Based on the discussions above, we form our testable hypotheses. Against the null hypothesis of no connection between credit rating changes and institutional trading and profits, we test the following nested hypotheses as the alternative:

Alternative Hypotheses: We predict that (i) Bond rating changes have asymmetric impact on equity market valuations, i.e., the negative impact of bond downgrades is more severe than the positive impact of upgrades. (ii) Institutions have some ability to predict the negative returns

surrounding rating downgrades, which is reflected in their increased equity selling activity. (iii) The aggressiveness of institutional trading is expected to be positively correlated with the absolute magnitude of rating change. (iv) Institutions earn above normal profits from their equity trades in periods surrounding bond rating changes.

While testing the strength of the relation between bond ratings and equity trading in our regression analysis, we control for several variables suggested in prior literature. These variables include analysts' behavioral persistence in their rating beliefs (Martinez, 2011), downgrade momentum (Altman and Kao, 1992; Güttler and Raupach, 2010), ratings industry's changing competitive environment (Becker and Milbourn, 2009; Cantor and Packer, 1997; Han, Pagano and Shin, 2012), rating agency identification, time trends, severity of rating change across or within investment grades (Kisgen, 2006), bond-specific features related to callability, seniority (Iskandar-Datta and Emery, 1994), convertibility, and fixed versus floating coupon rates. Other variables that potentially affect institutional trading and profitability around information events suggested by Irvine, Lipson, and Puckett (2007) include volatility, returns, firm size, and leverage. We control for periods identified as recessionary by the NBER as they affect default probabilities (Nickell, Perraudin, and Varotto, 2000) and market price impact (Chiyachantana, Jain, Jiang, and Wood, 2004) although Amato and Furfine (2004) and Avramov, Chordia, Jostova, and Philipov (2009) have challenged these effects of recessions. Industry fixed effects are included to control for industry contagion and competition (Jorion and Zhang, 2010; Schweitzer, Szewczyk, and Varma, 2001). Our work complements this rich literature by integrating bond ratings and equity analyst recommendations in the context of institutional equity trading and profitability.

3. Data sources and descriptive statistics

We gather the dates of credit rating changes during the January 1998 to June 2009 period from the Mergent Fixed Investment Securities Database (FISD) for all U.S. domestic taxable corporate bonds. Each bond rating change record contains the issuer name, ticker symbol, effective date of new rating, and the levels of old and new credit ratings. Admittedly, rating changes can be reactive or proactive. Rating changes following corporate events such as earnings announcements and mergers and acquisitions can potentially be reactive. Following Jorion, Liu and Shi (2005), we impose various filters to eliminate those potentially reactive rating changes from the final sample to understand the pure effects of proactive rating changes. For example, we exclude 339 rating events when merger and acquisitions or market conditions are cited as reasons of credit rating change in FISD because the effects of such news would already be known to the market participants. We also exclude 790 rating changes each of which was preceded by a prior ratings watch.¹ In case of rating changes pertaining to multiple bond issues by the same firm on the same date, we retain the issue with the largest magnitude of rating change because that issue is likely to result in the strongest impact on stock prices of the issuing firm. Furthermore, there is no bond in our sample whose rating is changed by different rating agencies on the same day. We delete 2,118 credit rating changes within 5 trading days of quarterly earnings announcement dates extracted from Compustat, following Irvine, Lipson, and Puckett (2007), because rating changes following negative earnings surprise can simply be a reaction to the bad news which is already known to market participants. Our remaining sample represents proactive rating changes

¹ Of these 790 excluded ratings, 569 had a negative watch and 195 had a positive watch. 26 ratings are preceded by a watch whose direction is not pre-determined. We only keep the rating changes that are not preceded by any watch in our final sample.

that are not preceded by such prior news and are likely to surprise the market participants when they are announced.

To compare the information content of bond rating changes with equity analyst recommendation changes, we obtain the latter from I/B/E/S.

Our institutional equity trading data are from ANcerno, which have been used in several leading academic publications on institutional trading.² Each institutional order record in the ANcerno database has several variables including scrambled institutional client code, order identifier number, stock ticker symbol, order direction (buy or sell), quantity of shares desired, order placement date, transaction execution date, price at the time of order release, number of shares in the released order, transaction execution price, quantity of shares traded, and commissions charged. The richness and depth of ANcerno's order level data let us more accurately assess whether institutions possess and profit from relevant credit rating information even *before* rating changes are announced or related trades are made.³ Puckett and Yan (2011) provide a detailed description of the ANcerno data and the similarity in firm characteristics and return dynamics of stocks contained in the ANcerno database and 13-F quarterly institutional data.

We merge institutional trading data with CRSP and Compustat to obtain stock returns, index returns, and firm specific characteristics. In Table 1, we present the sample characteristics and summary statistics. The final merged data set has 2,713 rating changes, excluding those with

² ANcerno is a widely recognized consulting firm that works with institutional investors such as CalPERS, Putman Investments, and Lazard Asset Management to monitor their equity trading costs.

³ The data set allows us to identify actual exploitation of this new channel of information for making profitable trades by looking at the imbalance between buy and sell trades. Unlike TAQ which does not contain trade direction, ANcerno has the true trade direction and we do not need to worry about the accuracy of inferences about trade direction. As a result, the actual profits from institutional trading can be estimated with higher precision.

a prior ratings watch, from 885 unique firms. Although we use this proactive rating change sample for majority of our analysis, we also present the statistics for the larger sample of 3,503 rating changes including those that were preceded by prior credit watches as this latter sample represents the traditional approach adopted in prior empirical literature. All of our qualitative conclusions apply regardless of whether we form our sample excluding or including rating changes with prior credit watches. Within a five-day period leading up to the proactive rating changes, institutions execute 1,351,066 trades in stocks of the affected firms, amounting to 504 trades per rating change event.

We define all the variables used in our study in the Appendix. The overall summary statistics from the final data set are presented in Panel B of Table I. The cardinal values of the credit ratings range from 1 for the lowest credit risk (e.g., AAA by SPR) to 23 for the highest credit risk (e.g., a D rating by SPR) for firms in default. Investment grade bonds have a cardinal value of 10 or lower, corresponding to the BBB or better by SPR.⁴ The positive mean of 0.40 for the proactive change in credit risk ratings excluding those preceded by a prior watch implies that there are more downgrades than upgrades in our final sample.

One of the purposes of our paper is to study the incremental effects of credit rating changes over equity analyst recommendation changes in an integrated framework. The cardinal value of 1 stands for a strong buy recommendation by equity analysts, 2 stands for buy, 3 for hold, 4 for underperform, and 5 for sell. Of the 2,713 credit rating changes in our sample, 972 do not have any equity analyst recommendation changes in the 41 day [-20, +20] period enveloping the rating change. The remaining 1,741 credit rating changes are accompanied by a total of 3,944

⁴ See Jorion, Liu, and Shi (2005) p. 314 for further details.

equity analyst recommendation changes in the [-20, +20] period, of which 1,098 are in the [-5, +5] period relative to the credit rating changes. The average equity analyst recommendation change, defined as the cardinal value of the new recommendation minus the cardinal value of the old recommendation, is merely 0.02. If there are multiple equity analyst recommendations for a given credit rating change, we use the mean of those equity recommendation changes. The Spearman correlation between the change in credit rating and the accompanying changes in equity analyst recommendation in our sample is -0.0288 with a p-value of 0.1328, which isn't economically or statistically significant. Thus, the equity analyst recommendation changes in the vicinity of bond rating changes do not capture all of the information content in bond rating changes.

A key variable of interest in our paper is institutional trading volume. The daily sell minus buy imbalance as a proportion of daily total sell plus buy volume is -0.0004 in the benchmark period of [+20,+60] days. Thus, the daily average sell volume of 5.196 million dollars is only slightly less than the daily average buy volume of 5.201 million dollars for the affected stock on the days without a rating change. However, in the 5 days preceding a downgrade, sell volume significantly exceeds the buy volume and the imbalance becomes positive 0.1053. Using an alternative benchmark period of [-60,-100] for computing normal volume, the spike in the institutional equity trading imbalance between sells and buys in the five day [-5,-1] period preceding the firm's credit rating changes is even stronger at 0.1930. Since institutional trading can begin anytime before the rating change, the benchmark before the rating changes are less preferable than the benchmarks after the rating change period, well after the dust

has settled. Nonetheless, we try both benchmarks to ensure robustness but conservatively report the milder findings that we obtain with the more preferred benchmark after the rating change.

The mean leverage or debt to equity ratio for our sample firms is 2.04 at quarter end immediately preceding the rating change, and it represents an increase of 0.29 relative to the previous quarter. We capture firm size with its stock market capitalization, which averages 10.14 billion dollars. There is some variation among the rating agencies with respect to the size of the firms that they rate. Average market capitalization is 15.72 billion for firms rated by FR, 8.16 billion for firms rated by MR, and 9.27 billion for firms rated by SPR.

There is nothing remarkable about the overall stock returns of -0.11% for the sample firms in the pre-event window [-20,-6]. But institutional equity trades in the period surrounding rating change are quite profitable with the average trade yielding 1.66% within a short period ranging from five days before bonds rating change to five days after it. The return that we compute falls within the 0.87% to 2% return performance of round-trip trades by money manager funds with variable holding periods, reported by Puckett and Yan (2011) in their recent article on interim trading skills of institutional investors. A firm is in an excited state if its previous historic rating change is a downgrade, according to Christensen, Hansen, and Lando (2004). Fifty three percent of the rating changes in our sample are from excited firms. Recessionary periods are associated with slightly more than a quarter of our rating changes. Moody's and Standard and Poor's are the dominant players each with a market share of about 40%, and Fitch taking most of the balance.

[Insert Table I about here]

Panel C of Table I provides the distribution of the 1,587 downgrades and 1,126 upgrades by issuing agency and severity of the rating change. A vast majority of rating changes, representing 65% of the downgrades and 78% of the upgrades, are a one-notch change. Consistent with prior research, over 93% of the downgrades and over 98% of the upgrades are within three notches of the original rating, whether we look at the sample excluding prior watches or those including prior watches.

We divide the rating changes into three categories based on their magnitude: “within class”, “across class”, and “across investment grade”. Following Jorion, Liu, and Shi (2005), a rating change is defined as “within class” if the change is from one gradation to another of the same letter class (e.g., AA to AA-). Within rating class downgrades are the mildest form of downgrades. For example, Time Warner bond was downgraded from BBB+ to BBB by Standard and Poor’s on March 27, 2009. Rating revisions are classified as “across class” when they result in a change in rating from one letter class to the other (e.g., A- to BBB). We further identify a subgroup of bond issues whose ratings are changed from investment grade to speculative grade or vice versa. These issues constitute the “across investment grade” category. Thus, across investment grade downgrades are bond rating changes from the investment grade of SPR’s BBB- (Baa3 for MR, BBB- for FR) or better to the speculative grade of SPR’s BB+ (Ba1 for MR, and BB+ for FR) or worse and represent the harshest category of downgrades because many institutional investors are barred by either regulation or their own prospectus from investing in speculative grade securities. As an example, Delphi Automotive Systems Corporation bond was downgraded from BBB to CC by Fitch on October 5, 2005.

Consistent with prior research, downgrades are more likely than upgrades to be across classes whereas majority of upgrades are within classes. Jorion, Liu, and Shi (2005) propose that to the extent that stocks react more strongly to “across class” revisions relative to “within class” revisions, the lower frequency of “across class” revisions for upgrades could contribute to weaker abnormal stock response to upgrade announcements. Extending this logic, we hypothesize and test that institutional trading activity is more pronounced in the period surrounding downgrades than in periods surrounding upgrades.

4. Empirical Analysis

We first establish that institutions sell more aggressively in the periods surrounding downgrades. Then, we show that their positions generate above normal profits. Credit rating downgrades have incremental explanatory power over and above equity analyst recommendations. We also offer several robustness checks.

4.1. Institutional trading in stocks in periods surrounding firm’s bond rating changes

Figure 1 provides initial evidence about the relation between institutional equity trading and credit rating changes. Daily abnormal volume picks up significantly about 3 days before a downgrade is publicly announced, peaks on the announcement day, and remains high for 3 days after the downgrade. Volume is also higher in the weeks preceding an average downgrade compared to the benchmark period. Volume change in response to upgrades is almost 0.

[Insert Figure 1 about here]

In Table II, we formally assess the relation between abnormal institutional trading volume and credit rating changes in a multiple regression model, where we control for other known determinants of trading volume:

$$\begin{aligned}
5\text{-day Abnormal institutional trading} = & \alpha_0 + \alpha_1 \text{Credit Ratings Change} + \alpha_2 \text{Accompanying} \\
& \text{Equity Recommendation Change} + \alpha_3 \text{Callable} + \alpha_4 \text{Senior} + \alpha_5 \text{Convertible} + \alpha_6 \text{Fixed} \\
& + \alpha_7 \text{Leverage} + \alpha_8 \text{Change in Leverage} + \alpha_9 \text{Excited Firms} + \alpha_{10} \text{Past Cumulative Return} + \\
& \alpha_{11} \text{Logged Firm Size} + \alpha_{12} \text{Standard \& Poor's} + \alpha_{13} \text{Moody's} + \alpha_{14} \text{Recession} + \alpha_{15} \text{Time Trend} + \\
& \alpha_{16-62} \text{Industry Fixed Effects} + \varepsilon
\end{aligned} \tag{1}$$

All variables are defined in the Appendix. The coefficient for bond rating change in the institutional equity selling regression has a statistically significant positive sign in all models ranging from 0.13 to 0.15. The result implies that institutions are able to predict the negative returns associated with bond downgrades and make use of their information by selling more and buying less of the downgraded firm's shares. To make economic sense of the magnitude of the coefficient, note that the dependent variable is abnormal trading activity expressed as a ratio of normal trading activity. Thus, selling volume (sell minus buy imbalance) goes up from about 0% to about 13% of the total volume on each of the five days preceding the rating downgrade. The definition of the rating change variable also implies that institutional trading response is stronger for multi-step downgrades.

Credit rating changes have an incremental explanatory power for institutional equity trading over and above the trading driven by equity analyst recommendation changes. The coefficient for equity recommendation change itself is also statistically significant. Comparing the magnitude of the coefficient for bond rating changes and equity recommendation changes, it seems safe to conclude that institutions pay close attention both to the credit worthiness of a firm and its equity analyst recommendations. Control variables aren't significant in the sample excluding the ratings with a prior watch. In a robustness test including rating changes with a

prior watch, credit rating change and equity recommendation change continue to have statistically significant positive coefficient and the negative coefficient on time trend also becomes statistically significant.

[Insert Table II about here]

4.2. Institutional trading profits in periods surrounding credit rating changes

Now that we have shown that credit rating changes, especially downgrades, are associated with abnormal institutional trading, the ultimate question is how profitable the institutional trades are in the periods surrounding credit rating changes. In Table III, we present the average institutional trading profit surrounding credit rating changes. Since we are focusing on institutional selling activity preceding downgrades, the concept of profitability captures the notion of avoiding negative returns by selling the stock before the bond's downgrades.

We compute the loss for each institutional buy trade before a downgrade as the difference between the CRSP closing price on the assumed liquidation date and the actual ANcerno buy execution price, divided by the buy price. Profit for each institutional sell trade is the difference between the actual ANcerno sell execution price and the CRSP closing price on the assumed liquidation date, divided by the CRSP price. We use two alternative portfolio formation dates; [-5,0] days including the announcement date or [-5,-1] days relative to credit rating change excluding the announcement day itself. We show the profitability calculations for three alternative liquidation dates of 0, 5, or 30 days after the rating change announcement.

For each credit rating change, we calculate the mean institutional trade profit including all institutional buy and sell transactions executed in the portfolio formation period. We then report the weighted average profit across rating changes in Table III, where the weights are the

number of trades associated with each rating change event. Equally weighted simple average yields qualitatively similar results but the weighted average represents the magnitude of overall institutional profitability more accurately.

For brevity, we present the results with the sample excluding rating changes with a prior watch although the inferences are same with the sample including those rating changes. Our results indicate that institutions trade profitably in the periods surrounding credit rating changes. Profits for actual institutional sell orders executed in the $[-5,0]$ portfolio formation period average 4.15% on the downgrade announcement date. The implied profit from sells is 7.31% vis-à-vis an alternative closing 5 days after the downgrade, and even higher in the 30 day period following the downgrade. Although institutional buys preceding downgrades would lose money, institutions don't buy as aggressively in this period as they sell. As a result, the overall profit from both buys and sells taken together is 1.35% and 2.57% for alternative closing of 0 and 5 days after downgrades, respectively. Alternative measurement period of 30 days after downgrades gives even stronger indications of institutional profitability at 13.31%. The fact that profits are sustained after a 30 day period imply that they are driven by fundamental changes in the value of the stock instead of short term trading price pressure created by the institutional traders themselves. Profits are also sustained in 10, 20, and 60 day periods after downgrade, as reported in more detail in the robustness section.

Focusing exclusively on the five day portfolio formation period $[-5,-1]$, strictly preceding the downgrade, the profit is still positive. All of these institutional profits in the periods surrounding bond downgrades are also statistically significant at the 1% level for the full sample. For sub-samples based on rating agencies, profits around downgrades are statistically significant

for changes by all three agencies with the 5 day liquidation period. Rating changes by FR and MR are profitable for all liquidation periods. For sub-samples based on severity of rating changes, institutional trading is most profitable when a firm's bond is downgraded from investment grade to speculative grade. Speculative grade to speculative grade downgrades are also profitable for all liquidation periods. Investment grade to investment grade downgrades are profitable only with the longer liquidation periods of 5 and 30 days.

Overall, the results indicate that institutional trades are timely, that they are able to avoid the negative returns associated with downgrades, and as such are able to trade profitably, net of any price impact. Profits from institutional trading surrounding downgrades are much higher than the profits from trades surrounding upgrades. Combined with the fact regarding higher proportion of selling activity relative to buying activity after downgrades, higher institutional profits around downgrades indicate that the institutions are informed players with respect to the potential credit rating changes and its asymmetric effect on valuations.

[Insert Table III about here]

4.3. Credit ratings versus equity analyst recommendations

In this section, we present a horse race between credit rating agencies and equity analysts. For each credit rating change we scan any equity analyst recommendation changes in a 20-day period preceding the rating change as well as in a 20-day period following the rating change. Table IV presents average institutional trading profits for various combinations of credit rating and equity recommendation changes observed in the data set. Combinations not present in the data set are omitted. The first row captures the pure effects of credit rating downgrades when there is no accompanying equity analyst recommendation change. Sells in this period are

associated with a gain of 3.85% whereas buy orders have a loss of -1.06%. Overall, institutional trades executed in the period [-5,0] generate a statistically significant profit of 1.57% based on the CRSP closing price five days after the rating change.

The next row represents the credit rating downgrades which were already preceded by the equity analyst recommendation downgrade for the stock. Furthermore, the equity analyst continued with their pessimistic recommendation after the rating downgrade. Thus, the negative information was probably already known to equity analysts and incorporated in stock prices. Institutional trading profits for such downgrades are statistically significant at the 10% level. By isolating this category, which has potential information overlap, we ensure that all the remaining combinations are free of endogeneity problems. Thus, the pure effects of bond rating changes when equity analysts have no change in opinions or a conflicting opinion can be understood with higher clarity in the following groups.

The third row represents credit downgrades preceded by equity analyst downgrade but the equity analyst improved the outlook after the downgrade. Here, institutional sells generated 2.97% profit. Perhaps the reason for opposite equity analyst recommendations is that after the rating downgrade these stocks became significantly underpriced.

The next two rows are perhaps the most interesting combinations in the table because equity analysts were at odds with rating agencies in these cases. The upgrade-downgrade-downgrade combination includes the cases where equity analysts improved their recommendation to buy the stock just preceding the downgrade. Stocks in this group are worth buying according to equity analysts but the same stocks are worth selling according to the negative signal of credit rating agencies. Thus, these negative credit rating downgrades clearly

brought new and perhaps surprising information to the positively biased stock markets. Equity analysts ultimately fall in line with the rating agencies and lower their recommendations as well, for this group of ratings. Institutions sells are significantly profitable at 4.59% and selling is more profitable than buying. Thus, we can conclude that rating downgrades have greater value relevance than equity recommendation changes for this subset. Overall profit for all trades in this group is 2.03% and statistically significant at the 10% level. The result implies that a greater number of institutions were ignoring the equity analysts' call to buy the stocks and were instead paying more attention to firm's creditworthiness and selling the stock before the downgrades. The next group of upgrade-downgrade-upgrade also represents the situation where equity analysts and rating agencies are giving opposite signals to the market. Institutions aligned with the ratings signal were selling the stock to gain statistically significant return of 6.52% whereas institutions relying on equity analysts were buying the stock to lose -2.39% return. Overall, more institutions appeared to be aligned with rating agencies and gained statistically significant 2.34% return.

The next five rows pertain to credit rating upgrades. Institutional trades in this group are not consistently profitable or significant. Nonetheless, the downgrade-upgrade-downgrade group indicates that when equity analysts are in conflict with rating agencies in their recommendations, the institutions gain by following the rating agencies signal. In this group equity analysts are recommending to sell the equity whereas the credit rating agency is sending a positive signal. Institutions that take the cue from the credit rating agencies and buy the stock, gain more than those that sell based on equity analyst recommendation changes. In this group, the overall profit of 2.90% is statistically significant.

We repeat the analysis for trades in the five day [-5,-1] portfolio formation period strictly preceding the credit rating downgrade or upgrade, i.e., excluding the rating announcement day. In that analysis we continue to find that credit rating downgrades are a strong determinant of institutional trading profits and they dominate the equity analyst recommendation changes. These differences complement the findings of Busse, Green, and Jegadeesh (2011) who conclude that institutional investors do not exhibit special skills in discerning the quality of equity analyst recommendations. We find that institutional trades consistent with all combinations of CRA downgrades have statistically significantly positive returns. Thus, institutions are able to trade profitably in the periods preceding credit rating downgrades. Rating changes, therefore, represent stronger information channels than equity analyst recommendations.

[Insert Table IV about here]

4.4. Multiple regressions including asset pricing factors

In Table V, we investigate the relation between institutional trading profits and bond rating changes more formally in a multiple regression model. Bond rating change and equity analyst's recommendation change are the key explanatory variables. Control variables include past returns, Fama-French (1993) three asset pricing factors of SMB, HML, and market return in excess of T-bill rate, and Jegadeesh and Titman (1993) momentum factor. Gutierrez and Kelley (2008) highlight the reversal in 1-week returns followed by subsequent momentum profits. Thus, the direction of the momentum factor is an empirical question that depends on the length of the portfolio formation and holding period. Finally, we include an indicator variable in the overall period and the period before crisis for Regulation Fair-Disclosure (Reg-FD) that is assigned the value of 1 after the passage of the act.

[Insert Table V about here]

Institutional trading profit is an extra 0.67%, 1.52%, and 0.75% higher in the pre-crisis, post-crisis, and overall period for every additional notch in the magnitude of bond rating downgrade. Coefficients on Fama-French factors of $Mkt-r_f$, HML, and SMB are also statistically significant in the expected direction for the overall sample period. Coefficients for the momentum factor are insignificant in the overall period but negative for the pre-crisis period. The negative sign can indicate that ratings changes are surprising trend-breaking events. These results also control for the effects of equity analyst recommendation taking place in the vicinity of bond rating changes. Equity recommendations themselves have a profit enhancing effect of 0.76% in the overall period. Thus, the incremental effect of bond rating changes on institutional trading profitability is approximately the same in magnitude as the effect of equity analyst recommendations. Similar inferences about institutional trading profitability around rating changes can be drawn from the sample including watches in the last column.

4.5. Robustness of Results

To begin with, we have constructed the final sample and our research design to explicitly remove the effects of any confounding events such as earnings announcements, changes in a firm's capital structure, mergers or acquisitions, ratings watches, or equity analysts' recommendations. Nonetheless, we carry out additional checks in this section to verify our findings about institutional trading aggressiveness and profitability of institutional trades for various sub-samples based on firm leverage, business cycles, and alternative portfolio formation and evaluation dates.

A firm can get downgraded due to either an increase in its leverage or deterioration in its earnings potential. Since the former is not as damaging to equity values as the latter, we separate our sample into two groups. The first group includes firms experiencing an increase in leverage in the quarter preceding a rating downgrade. The second group includes firms for which leverage did not change or decreased in the quarter preceding a rating downgrade. Stock returns in the period surrounding rating downgrades are negative in both sub-samples. Thus, institutional traders can potentially benefit from the effects of bond downgrades irrespective of the leverage dynamics.

We conservatively report institutional profitability in Tables IV and V by using the alternative liquidation price from CRSP five days after the rating downgrade. We also repeat the analysis with other benchmark prices from CRSP on day 0 and day 10, respectively, after the rating change. Profits are even higher using those alternative liquidation dates. For example, the overall profit of 2.57% reported in Table III for liquidation on day 5 becomes 1.35%, 4.25%, 5.11%, or 5.23% if we change the position liquidation date to 0, 10, 20, or 60 days, respectively, after the downgrade announcement.

The focus of our paper is on proactive downgrades which are not preceded by other confounding negative events such negative earnings surprise, leverage shocks, equity rating changes, mergers and acquisitions etc. To control for any negative confounding events that might be missing from this list, we calculate abnormal return around each individual rating change and retain only those rating changes with positive abnormal stock returns greater than 6% during [-20, -1] window. Abnormal institutional trading and profits in the periods preceding these rating changes continue to be economically and statistically significant.

In our next robustness test, we split the sample into booming or recessionary business cycle periods. We split the sample into two parts based on NBER's starting and ending recession dates. Since the direction and statistical significance of our key variables are unchanged, we do not tabulate the results for all these sub-samples for brevity. When we replicate profitability regression in the last column of Table V separately for growth and recessionary period, the coefficient for credit rating change is 0.52 during growth and 1.23 during recessions. In essence our main findings about the stock market's negative response to downgrades, increased institutional aggressiveness in periods preceding downgrades, and profitability of institutional trades are robust to firm characteristics and market conditions.

5. Conclusions

We study the relation between changes in credit rating of a firm's bond, the associated changes in institutional trading in a firm's stock, and the profitability of those trades. We analyze 2,713 proactive credit rating changes by the major rating agencies from 1998 to 2009, a period encompassing various business cycles and historic events for the rating industry. There are more downgrades than upgrades and stock price reaction to downgrades is also more severe than to upgrades. We find that institutions trade more aggressively in the periods surrounding rating changes especially downgrades. Both volume and trades size increase. Downgrades from investment grade to speculative grade result in a particularly huge spike in institutional trading volume.

Although previous research shows that stock prices decline in the periods surrounding downgrades, it does not tell us whether any market participants have the ability to predict this

information or trade profitably from it before the downgrade becomes public knowledge. We use the ANcerno institutional trading database to investigate whether institutional investors trade profitably in the periods surrounding credit rating changes. We find that institutions sell more aggressively than they buy in the periods preceding rating downgrade announcements. The overall institutional profit from both sells and buys executed in the five days leading up to the downgrades is 2.57% on average based on a liquidation price five days after the rating change. Alternative portfolio formation and liquidation periods suggest even higher profits.

In our regression analysis we control for several variables such as bond-specific features, changes in leverage, downgrade momentum history, firm size, rating agency identity, business cycle recession, time trends, Fama-French asset pricing factors, momentum, and equity analyst recommendations. Institutions pay attention to leverage and equity analyst recommendations, and there is a trend of increasing institutional trading volume. More importantly, the association between bond rating downgrades with both institutional trade aggressiveness and profitability survives with statistically and economically significant coefficient. We present the first integrated analysis of a firm's credit rating changes and accompanying changes in equity analyst recommendations. The incremental effect of bond rating changes on institutional trading profitability is approximately the same in magnitude as the effect of equity analyst recommendation changes. Furthermore, when changes in equity analyst recommendations and in credit ratings are in opposite directions, credit rating changes dominate. Institutions better aligned with credit rating downgrades sell the stock and gain whereas those relying on positive equity analyst recommendation changes would buy the stock and lose money.

We interpret the results as evidence of either superior institutional research about firm's credit rating or the potential emergence of new channels of corporate information flows to institutions, particularly in an environment where selective disclosure of information directly from corporations to selective analysts is prohibited but bond rating agencies continue to receive such information separately. The existence of these indirect channels of information points to the limitations of regulatory reach. The results also highlight the benefits of directly analyzing institutional trading data. Doing so can potentially unravel how direct and indirect channels of corporate information affect the trading behavior of various participants in the securities markets. Of course, a key issue here is to separate institutional research from insider information. Direct regulatory intervention and investigation such as the one initiated recently by the SEC for institutional trading surrounding U.S. credit rating downgrade (see Eaglesham, 2011) can provide field evidence on the topic. Future academic research can then supplement that case study with rigorous empirical analysis like the one we provide, but with additional variables motivated by the outcome of the SEC investigation. Irrespective of the information source, our overall results support the hypothesis that institutional traders are informed and they exploit exit opportunities provided by bond downgrade announcements to avoid the potential losses from holding the firm's closely related equity securities.

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Appendix. Definitions of Variables

| Variable | Definition |
|---|--|
| <u>Credit rating variables</u> | |
| Change in credit rating | Difference in the cardinal values of new and old ratings |
| Magnitude of rating change | Absolute value of change in credit rating |
| Within class | New credit rating is within the same letter class of the old rating |
| Across class | New credit rating is outside the same letter class of the old rating |
| Across invest. grade | Changes from investment to speculative grade or vice versa |
| <u>Institutional trading variables</u> | |
| Daily abnormal volume | Volume on the given day / Mean volume _[+20, +60] -1 in Figure 1 |
| 5-day abnormal sell minus buy volume | Mean sell minus buy _[-5, -1] / Mean sell plus buy volume _[+20, +60] |
| Trading profit (%) for buys | (CRSP Price _[+5] - ANcerno Buy Price) / ANcerno Buy Price |
| Trading profit (%) for sells | (ANcerno Sell Price - CRSP Price _[+5]) / CRSP Price _[+5] |
| <u>Indicator variables</u> | |
| Callable | Set to 1 if the following condition is met and 0 otherwise: If bond issue is callable |
| Senior | For senior, senior subordinate, or senior secured issues |
| Convertible | If bond issue can be converted to the common stock |
| Fixed Rate | If the bond issue has fixed interest rate |
| Excited | If a previous downgrade is the last rating transition |
| Recession | For the calendar dates identified as recessions by the NBER |
| SPR, MR, and FR | If rating is issued by Standard and Poor's, Moody's, and Fitch, respectively (3 variables) |
| Negative watch | If a negative watch is issued prior to rating change |
| Positive watch | If a positive watch is issued prior to rating change |
| Industry fixed effects | Fama and French's (1997) 48 industry indicator variables |
| <u>Other control variables</u> | |
| Change in equity recomm. | Average change in the cardinal value of stock recommendations over the period [-5, +5] days relative to credit rating change |
| Leverage | Debt Equity Ratio: Firm's book value of debt to market value of equity at the end of the quarter preceding the rating change |
| Change in leverage | The quarter to quarter change in leverage at the end of the quarter just preceding the rating change |
| Firm size | Market capitalization in millions of dollars |
| Past return (%) | Past cumulative return in pre-event window [-20, -6] |
| Time trend | 1 for year 1998, 2 for year 1999, ..., and 12 for year 2009 |
| Mkt-r _f factor | Market return in excess of the return on the U.S. Treasury bond |
| HML factor | Spread in returns between portfolios of value and growth stocks |
| SMB factor | Spread in returns between portfolios of small and large stocks |
| UMD factor | Spread between portfolios of previous winner and loser stocks |

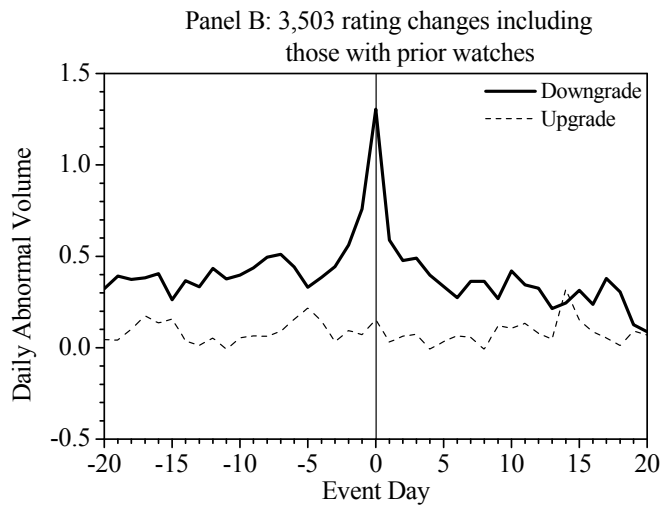
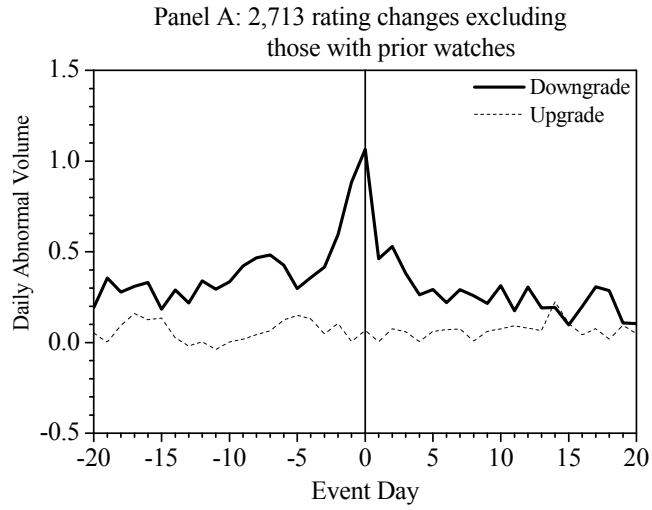


Figure 1. Institutional daily abnormal volume surrounding credit rating changes. Panel A uses rating change sample excluding those with watches. Panel B uses rating change sample including those with watches. Daily abnormal volume is the institutional trading volume on the given day divided by the mean volume in the benchmark period [+20, +60], minus 1. Day 0 is the rating change event day.

Table I. Summary statistics

This table reports summary statistics. The rating changes of U.S. taxable corporate bonds are from January 1998 to June 2009. See Appendix for variable definitions.

| Panel A: Sample characteristics | | | | | | | | | | | |
|--|-------------------|-----------|-----------|-----------|-------------------|-------------------|------|-----------|-----|-------------------|--|
| | Excluding watches | | | | Including watches | | | | | | |
| Number of firms | 885 | | | | 934 | | | | | | |
| Number of downgrades | 1,587 | | | | 2,139 | | | | | | |
| Number of upgrades | 1,126 | | | | 1,364 | | | | | | |
| Total number of rating changes | 2,713 | | | | 3,503 | | | | | | |
| Number of trades | 1,351,066 | | | | 1,368,889 | | | | | | |
| Panel B: Summary statistics | | | | | | | | | | | |
| Variable | Excluding watches | | | | Including watches | | | | | | |
| | Mean | Std. Dev. | Mean | Std. Dev. | Mean | Std. Dev. | Mean | Std. Dev. | | | |
| Change in credit rating | 0.40 | 1.83 | 0.48 | 1.83 | | | | | | | |
| Accompanying change in equity analyst recommendation | 0.02 | 0.72 | 0.03 | 0.74 | | | | | | | |
| Daily sell – buy imbalance in benchmark period [+20,+60] | -0.0004 | 0.39 | -0.0003 | 0.39 | | | | | | | |
| 5-day abnormal sell – buy imbalance before downgrades | 0.1053 | 3.03 | 0.1063 | 2.89 | | | | | | | |
| 5-day abnormal sell – buy volume imbalance before downgrades with alternative benchmark [-60,-100] | 0.1930 | 10.32 | 0.1365 | 9.10 | | | | | | | |
| Leverage | 2.04 | 21.63 | 2.20 | 19.39 | | | | | | | |
| Change in leverage | 0.29 | 2.43 | 0.41 | 3.04 | | | | | | | |
| Firm size (in millions) | 10,140.37 | 22,808.48 | 10,360.09 | 23,116.48 | | | | | | | |
| Firm size rated by FR | 15,727.35 | 29,871.76 | 15,054.85 | 28,573.11 | | | | | | | |
| Firm size rated by MR | 8,164.11 | 18,970.35 | 8,844.18 | 19,487.46 | | | | | | | |
| Firm size rated by SPR | 9,275.51 | 21,698.45 | 9,750.53 | 23,414.55 | | | | | | | |
| Past return (%) | -0.11 | 6.26 | -0.12 | 6.30 | | | | | | | |
| Trading profit (%) around credit rating changes | 1.66 | 17.52 | 1.69 | 16.89 | | | | | | | |
| Excited | 0.53 | 0.50 | 0.55 | 0.50 | | | | | | | |
| Recession | 0.28 | 0.45 | 0.26 | 0.44 | | | | | | | |
| SPR | 0.42 | 0.49 | 0.41 | 0.49 | | | | | | | |
| MR | 0.38 | 0.49 | 0.40 | 0.49 | | | | | | | |
| FR | 0.20 | 0.40 | 0.18 | 0.39 | | | | | | | |
| Panel C: Distribution of credit rating changes | | | | | | | | | | | |
| | Downgrades | | | | | Upgrades | | | | | |
| | Excluding watches | | | | Including watches | Excluding watches | | | | Including watches | |
| | All | SPR | MR | FR | All | All | SPR | MR | FR | All | |
| Absolute magnitude of rating changes | | | | | | | | | | | |
| 1 | 1,036 | 431 | 393 | 212 | 1,385 | 873 | 403 | 318 | 152 | 1,054 | |
| 2 | 339 | 107 | 160 | 72 | 462 | 180 | 83 | 59 | 38 | 221 | |
| 3 | 111 | 42 | 45 | 24 | 157 | 52 | 16 | 19 | 17 | 62 | |
| 4 | 101 | 41 | 37 | 23 | 135 | 21 | 6 | 10 | 5 | 27 | |
| Within class | 804 | 329 | 308 | 167 | 1,081 | 687 | 323 | 254 | 110 | 820 | |
| Across class | 783 | 292 | 327 | 164 | 1,058 | 439 | 185 | 152 | 102 | 544 | |
| Across invest. Grade | 195 | 66 | 82 | 47 | 282 | 96 | 37 | 27 | 32 | 138 | |

Table II. Determinants of abnormal institutional trading volume imbalance surrounding changes in ratings excluding those with prior watches

Each bond rating change represents one observation in this regression. The dependent variable is the stock's 5-day Abnormal Sell minus Buy Volume preceding the firms rating change standardized by the benchmark volume. See Appendix for variable definitions. Sample period covers January 1998 to June 2009. Coefficient on Leverage is multiplied by 100. Coefficients on the industry fixed effects are not reported to save space. Corresponding Newey-West standard errors are in parentheses. ***, **, and * denote significantly different from zero at the 1%, 5%, and 10% levels, respectively.

| Independent variable | Dependent variable | | |
|---------------------------------|--|------------------|------------------|
| | 5-day Abnormal Sell minus Buy Volume Imbalance | | |
| Intercept | 0.04 (0.04) | -0.40 (0.75) | -0.78 (0.79) |
| Change in Credit Rating | 0.15** (0.06) | 0.13** (0.06) | 0.13** (0.06) |
| Accomp. Change in Equity Rating | 0.20** (0.09) | 0.19** (0.09) | 0.18* (0.10) |
| Callable | | -0.26 (0.18) | -0.37 (0.22) |
| Senior | | 0.04 (0.16) | -0.06 (0.12) |
| Convertible | | 0.29 (0.19) | 0.27 (0.18) |
| Fixed Rate | | 0.32 (0.67) | 0.31 (0.65) |
| Leverage | | -0.48 (0.00) | -0.41 (0.00) |
| Change in Leverage | | 0.10 (0.08) | 0.11 (0.08) |
| Excited | | -0.01 (0.10) | -0.01 (0.10) |
| Past Return | | -0.88 (1.36) | -0.95 (1.34) |
| Ln(Firm Size) | | 0.05 (0.06) | 0.11* (0.06) |
| SPR | | -0.03 (0.10) | -0.04 (0.10) |
| MR | | 0.03 (0.15) | 0.03 (0.15) |
| Recession | | 0.04 (0.18) | 0.08 (0.18) |
| Time Trend | | -0.03 (0.02) | -0.02 (0.02) |
| Industry fixed effects | No | No | Yes |
| No. of Obs | 2,713 | 2,713 | 2,713 |
| Adj. R2(%) | 0.93 | 1.45 | 1.08 |

Table III

Institutional trading profits surrounding credit rating changes excluding those with prior watches

Trading profits, as defined in the Appendix for trade, are averaged for all positions initiated in the trading period shown below in the first column relative to rating change date. We use two alternative definitions of trade initiation periods, [-5, 0] and [-5, -1]. Position liquidation date (0, 5, or 30 days) after the bond rating announcement is shown in top header row below. See Appendix for variable definitions and position opening and closing prices. In Panel A, the sample is based on 1,561 downgrades and in Panel B it is based on 1,124 upgrades of U.S. taxable corporate bonds excluding those with watches from January 1998 to June 2009. Average trading profit is reported in percentage. ***, **, and * denote significantly different from zero at the 1%, 5%, and 10% levels, respectively.

| Trading Period | Rating Type | Liquidating on Day 0 | | | Liquidating on Day 5 | | | Liquidating on Day 30 | | |
|----------------------------|--------------------|----------------------|----------|----------|----------------------|----------|----------|-----------------------|----------|----------|
| | | All | Sell | Buy | All | Sell | Buy | All | Sell | Buy |
| Panel A: Downgrades | | | | | | | | | | |
| [-5, 0] | All | 1.35*** | 4.15*** | -1.76*** | 2.57*** | 7.31*** | -2.69*** | 13.31*** | 25.31*** | 0.02 |
| | FR | 1.55** | 5.84*** | -2.24*** | 2.30*** | 6.90*** | -1.77*** | 10.91* | 27.26** | -3.53*** |
| | MR | 2.12*** | 4.52*** | -0.67** | 2.83*** | 6.89*** | -1.92*** | 19.74*** | 33.29*** | 3.97*** |
| | SPR | 0.61 | 2.80** | -2.18*** | 2.58*** | 7.86*** | -4.15*** | 10.34*** | 18.30*** | 0.20 |
| | Invest. to Specl. | 6.27*** | 13.41*** | -3.30*** | 7.21** | 15.35** | -3.71*** | 23.67* | 30.53 | 14.45*** |
| | Invest. To Invest. | 0.36 | 2.31*** | -1.81*** | 1.56*** | 5.57*** | -2.90*** | 14.11*** | 28.86*** | -2.26** |
| | Specl. to Specl. | 1.88*** | 4.60*** | -0.83*** | 3.33*** | 8.20*** | -1.51*** | 4.32*** | 8.43*** | 0.27 |
| [-5, -1] | All | 1.56*** | 5.05*** | -2.23*** | 2.94*** | 8.51*** | -3.12*** | 13.67*** | 27.04*** | -0.84 |
| | FR | 1.93** | 7.71*** | -2.70*** | 2.44*** | 8.78*** | -2.65*** | 11.76* | 31.69*** | -4.25*** |
| | MR | 2.43*** | 5.19*** | -1.04*** | 3.46*** | 7.89*** | -2.10*** | 21.28*** | 35.90*** | 2.95** |
| | SPR | 0.58 | 3.28* | -2.72*** | 2.89*** | 8.85*** | -4.38*** | 9.09*** | 17.00*** | -0.56 |
| | Invest. to Specl. | 7.51*** | 15.61*** | -3.71*** | 8.67*** | 17.53*** | -3.62*** | 24.62* | 33.55 | 12.23*** |
| | Invest. To Invest. | 0.31 | 2.81*** | -2.34*** | 1.64*** | 6.29*** | -3.31*** | 14.38*** | 30.57*** | -2.85*** |
| | Specl. to Specl. | 2.39*** | 5.84*** | -1.10*** | 4.08*** | 10.28*** | -2.21*** | 4.36*** | 9.21*** | -0.51 |

Table III - Continued

| Trading Period | Rating Type | Liquidating on Day 0 | | | Liquidating on Day 5 | | | Liquidating on Day 30 | | |
|--------------------------|--------------------|----------------------|---------|---------|----------------------|----------|----------|-----------------------|----------|----------|
| | | All | Sell | Buy | All | Sell | Buy | All | Sell | Buy |
| Panel B: Upgrades | | | | | | | | | | |
| [-5, 0] | All | 0.37*** | 0.53** | 0.18 | 0.07 | 0.16 | -0.04 | 0.67* | 2.15*** | -1.17*** |
| | FR | -0.33*** | -0.28** | -0.44** | 0.92*** | 1.99*** | -1.28*** | 5.43*** | 8.62*** | -1.12* |
| | MR | 1.34*** | 2.67*** | 0.16 | -0.91*** | -1.14*** | -0.71* | -0.63 | 0.90 | -1.98*** |
| | SPR | 0.19** | -0.20 | 0.60*** | 0.13 | -1.06*** | 1.40*** | -2.72*** | -4.88*** | -0.42 |
| | Spec. to Invest. | -0.11 | -0.31** | 0.86** | 0.69** | 0.55 | 1.38*** | -2.40*** | -3.45*** | 2.67** |
| | Invest. To Invest. | 0.44 | 0.72 | 0.08 | 0.21 | -0.14 | 0.67*** | 1.98*** | 3.87*** | -0.45 |
| | Spec. to Spec. | 0.43*** | 0.67*** | 0.26 | -0.53** | 0.76** | -1.45*** | -1.00** | 1.66** | -2.90*** |
| [-5, -1] | All | 0.47*** | 0.67** | 0.21 | 0.24* | 0.46** | -0.03 | 1.47*** | 3.57*** | -1.24*** |
| | FR | -0.35*** | -0.27* | -0.52** | 1.21*** | 2.28*** | -1.32*** | 6.36*** | 9.57*** | -1.27* |
| | MR | 1.56*** | 3.03*** | 0.18 | -1.03*** | -1.17*** | -0.90** | -0.43 | 1.39 | -2.14*** |
| | SPR | 0.30*** | -0.10 | 0.70*** | 0.41*** | -0.78*** | 1.56*** | -1.88*** | -3.45*** | -0.38 |
| | Spec. to Invest. | -0.10 | -0.30* | 1.00** | 0.90*** | 0.82** | 1.36*** | -2.53*** | -3.43*** | 2.43** |
| | Invest. To Invest. | 0.60* | 0.95 | 0.12 | 0.44** | 0.22 | 0.72*** | 3.31*** | 6.23*** | -0.58 |
| | Spec. to Spec. | 0.45*** | 0.71*** | 0.27 | -0.51** | 0.85** | -1.46*** | -0.81* | 2.00** | -2.80*** |

Table IV

Institutional trading profits around changes in credit ratings and accompanying changes in stock recommendations excluding those with prior watches

Prior (post) average change in stock recommendation is the average of all equity analyst recommendation changes, if any, within the [-20, 0] ([1, 20]) window relative to the bond rating change announcement day. All combinations of equity and bond rating changes observable in the dataset are reported. Combinations not present in the dataset are omitted. Sample information and the method of computing institutional profits are described in Table III header. Average trading profit is reported in percentage. The sample is based on 1,561 downgrades and 1,124 upgrades of U.S. taxable corporate bonds excluding those with watches from January 1998 to June 2009. ***, **, and * denote significantly different from zero at the 1%, 5%, and 10% levels, respectively.

| Trading Period | Prior Average Change in Stock Recommendation | Change in Credit Rating | Post Average Change in Stock Recommendation | N | Liquidating on Day +5 | | |
|----------------|--|-------------------------|---|-----|-----------------------|----------|----------|
| | | | | | All | Sell | Buy |
| [-5, 0] | None | <i>Downgrade</i> | None | 563 | 1.57*** | 3.85*** | -1.06** |
| | Downgrade | <i>Downgrade</i> | Downgrade | 36 | 1.48* | 4.42** | -3.29* |
| | Downgrade | <i>Downgrade</i> | Upgrade | 290 | 2.97*** | 8.48*** | -4.23*** |
| | Upgrade | <i>Downgrade</i> | Downgrade | 119 | 2.03* | 4.59* | -0.95 |
| | Upgrade | <i>Downgrade</i> | Upgrade | 289 | 2.34* | 6.52** | -2.39*** |
| | None | <i>Upgrade</i> | None | 409 | 0.16 | 0.48* | -0.29 |
| | Downgrade | <i>Upgrade</i> | Downgrade | 20 | 2.90*** | 2.48*** | 5.43*** |
| | Downgrade | <i>Upgrade</i> | Upgrade | 175 | -0.62*** | -1.36*** | 0.48 |
| | Upgrade | <i>Upgrade</i> | Downgrade | 350 | -0.39 | 3.11*** | -2.53*** |
| | Upgrade | <i>Upgrade</i> | Upgrade | 461 | 1.96** | 4.80** | -0.34 |
| [-5, -1] | None | <i>Downgrade</i> | None | 563 | 1.40*** | 3.67*** | -1.24*** |
| | Downgrade | <i>Downgrade</i> | Downgrade | 36 | 2.71** | 8.74*** | -3.11 |
| | Downgrade | <i>Downgrade</i> | Upgrade | 289 | 3.37*** | 9.72*** | -5.37*** |
| | Upgrade | <i>Downgrade</i> | Downgrade | 119 | 3.12** | 6.05* | -0.35 |
| | Upgrade | <i>Downgrade</i> | Upgrade | 289 | 2.57* | 8.03** | -3.15*** |
| | None | <i>Upgrade</i> | None | 409 | 0.32 | 0.61** | -0.20 |
| | Downgrade | <i>Upgrade</i> | Downgrade | 20 | 2.76*** | 2.51*** | 4.80*** |
| | Downgrade | <i>Upgrade</i> | Upgrade | 175 | -0.24 | -0.93** | 0.56 |
| | Upgrade | <i>Upgrade</i> | Downgrade | 350 | -0.25 | 3.37*** | -2.42*** |
| | Upgrade | <i>Upgrade</i> | Upgrade | 461 | 2.17** | 5.42*** | -0.50 |

Table V
Determinants of institutional trading profits surrounding changes in ratings excluding those with prior watches

Each rating change represents one observation in the regression. The sample period is from January 1998 to June 2009. See Appendix for variable definitions. The dependent variable is the mean institutional trading profit, as defined in the appendix for each trade, average across all positions initiated during the pre-event window [-5, -1] relative to the rating change. Results are based on CRSP closing price on the liquidation date 5 days after the rating change. Results using other trading period and liquidating dates are qualitatively similar. Before crisis means before June 30, 2008. After crisis means after June 30, 2008. Corresponding Newey-West standard errors are in parentheses. ***, **, and * denote significantly different from zero at the 1%, 5%, and 10% levels, respectively.

| Independent variable | Before crisis | | After crisis | | Entire Period | |
|------------------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| Intercept | 0.25 (0.45) | 0.25 (0.45) | 1.01 (0.62) | 0.91 (0.60) | 0.23 (0.44) | 0.23 (0.44) |
| Change in Credit Rating | 0.67*** (0.23) | 0.67*** (0.23) | 1.58*** (0.59) | 1.52*** (0.57) | 0.75*** (0.21) | 0.75*** (0.21) |
| Accomp. Equity Rating Change | | 0.42 (0.42) | | 3.21*** (1.16) | | 0.76* (0.41) |
| Mkt-rf (%) | 1.27* (0.69) | 1.28* (0.70) | -0.46 (1.21) | -0.56 (1.18) | 0.88* (0.51) | 0.91* (0.52) |
| HML (%) | 1.82** (0.89) | 1.84** (0.90) | 0.64 (0.87) | 0.81 (0.81) | 1.26** (0.52) | 1.29** (0.52) |
| SMB (%) | 1.49*** (0.35) | 1.48*** (0.35) | 1.52** (0.67) | 1.63** (0.66) | 1.28*** (0.22) | 1.28*** (0.22) |
| UMD (%) | -0.39** (0.19) | -0.39** (0.18) | -0.09 (0.57) | -0.06 (0.53) | -0.24 (0.16) | -0.23 (0.16) |
| Past Return (%) | 0.02 (0.07) | 0.02 (0.07) | -0.09 (0.06) | -0.10 (0.06) | -0.03 (0.05) | -0.03 (0.05) |
| Reg FD | 0.66 (0.52) | 0.65 (0.52) | 0.00 (0.00) | 0.00 (0.00) | 0.72 (0.50) | 0.70 (0.50) |
| No. of Obs | 2,383 | 2,383 | 296 | 296 | 2,679 | 2,679 |
| Adj. R ² (%) | 5.39 | 5.44 | 20.54 | 24.01 | 7.54 | 7.78 |