DODD-FRANK WALL STREET REFORM & CONSUMER PROTECTION ACT

The Market Response to Credit Ratings on Corporate Bonds

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Abstract

This paper analyzes the impact of the Dodd-Frank Wall Street Consumer Protection Act (Dodd-Frank) on the informativeness of corporate credit ratings changes as measured by stock returns. I find that the market reaction to credit rating upgrades increased and downgrades decreased significantly after Dodd-Frank. In addition, the association between credit rating changes and leading market returns increased for downgrades. The association did not change for upgrades. Together, these results suggest that the Dodd-Frank Wall Street Reform and Consumer Protection Act did not increase the information content or timeliness of credit ratings downgrades, but did increase the information content of upgrades without changing the timeliness.

Acknowledgements

Introduction

Leading up to the recession of 2008, mortgage-backed securities were compiled of risky securities, yet held the highest-grade rating in the credit industry. Credit Rating Agencies, CRAs, were drawn to the market potential for increased profits and began inflating ratings, even though they were initially established to give investors assurance when buying corporate bonds. Their role was to support a thoughtful, well researched, and responsible buy, but instead inflated ratings lead to large banks holding the title to mortgages with a high probability of default.

Since the CRAs contributed to the worst global recession since the Great Depression, Congress included clauses to regulate the agencies in the passing of the Dodd- Frank Wall Street Reform & Consumer Protection Act in July 2010 (Dodd-Frank). This act was passed with the intention of mitigating the risk of another recession by increasing regulation on CRAs to provide more authentic ratings. Tighter regulation of CRAs offers two potential outcomes. If the legislation is effective than it would result in a more informative rating and the credit rating change would lead the market, causing an abnormal market reaction at time of the change announcement in the after Dodd-Frank period. If the legislation is not effective than it would result in the same or less informative ratings that would lag the market, which would cause less of a reaction at the time of the announcement change. This study explores whether the Dodd-Frank reform that affected CRAs result in more informative credit rating changes in the after Dodd-Frank period.

I find that the credit rating downgrades are less informative and credit rating upgrades are more informative after Dodd-Frank. The credit rating changes are lagging the market significantly more in the after Dodd-Frank period for downgrades and

upgrades continue to lag the market at the same rate before and after Dodd-Frank. Based on these results, Dodd-Frank is only effective for upgrades. Since the data analyses suggest that the law is only partially effective and historically with no regulation corruption prevails, this suggests that the. Dodd-Frank act should be amended.

Background on Dodd-Frank

One of the goals of Dodd-Frank is to impose stricter regulations in the financial industry to help prevent a financial meltdown similar to the one in 2008. On July 22, 2010, the Dodd-Frank Wall Street Reform and Consumer Protection Act was signed into legislation. The act contains over four hundred laws that put regulations on factors that helped to contribute to the financial crisis (Murdock, 2011). The factors to be regulated include CRAs, private funds, and asset backed securities (Dimitrov et al., 2015). President Barack Obama stated the goal of this act is to

> "rein in the abuse and excess that nearly brought down our financial system. It will finally bring transparency to the kinds of complex and risky transactions that helped to trigger the financial crisis" (Murdock, 2011).

The reason that the CRAs were included in the Dodd-Frank act is because of their crucial role in the defaulting of subprime loans. Prior to the recession, high credit ratings given to risky subprime loans lead to false confidence in subprime loan investments. These loans defaulted at rapid rates during the recession, even if they were rated AAA, which is the rating for the highest-grade credit. The CRAs are compensated with fees from corporations that want their debt rated. This introduces a large conflict of interest that often results in inflated credit ratings. This conflict of interest, coupled with the ability of CRAs to defend their ratings by hiding behind the First Amendment, created

incentives for CRAs to offer higher ratings. While a conflict of interest still exists, it is

mitigated by making CRAs liable for their credit rating opinions. CRAs are now held to

the same standards as public accountants, financial gatekeepers or other experts. Under

this new liability, they can be sued for material misstatements, such as manipulating the

information to secure a rating that is different from the rating the debt should have

received. This is because credit ratings are a public concern and for this reason CRAs are

now held accountable for the ratings that are produced (Murdock, 2011).

Dodd-Frank takes a multi-faceted approach in order to regulate CRAs. Table 1A

in the appendix gives an overview and implementation dates of the regulations that are

specific to National Statistical Rating Organizations, NRSROs, registered CRAs. The

final components of Dodd-Frank went into effect in 2015.

Existing Literature & Hypotheses

Existing Literature

While there is existing literature on the effect of credit ratings on the stock market

and an initial look at the impact of Dodd-Frank on the credit rating industry, there has not

been a study that investigates the impact after all sections of Dodd-Frank regarding the

CRAs have been implemented. The first piece of literature to look at the usefulness of

information and the market reaction is Ball and Brown (1968). Ball and Brown (1968)

performed an empirical evaluation in order to look at the market reaction to the reporting

of a company's annual net income. They found that if net income differs from expected

income than the market will have reactions in that direction. They concluded that

accounting reports contain information and that markets impound that information in

prices when it is announced. Subsequent accounting and finance research use this model

to assess the value of information produced by management and analysts and information included in financial reports.

Hand et al., (1992) examine the effect that bond rating agency announcements have on both bond and stock returns. They use daily data on these returns to isolate the effect of the rating announcement by looking at the period before and after the announcement. There were excess positive returns for upgrades, but the excess returns were smaller than the downgrades excess negative returns. There was not a symmetric response for up and down (Hand et al., 1992).

The second question this study addresses is if the expectation of a rating change is included in a stock price prior to the announced credit rating change. If the market already expects a rating change, then the CRAs are not giving investors any new information when they issue a new credit rating. Hite and Warga (1997) look at the effect of bond rating changes on the bond market and find that for downgrades, there is a significant anticipation in both the month of and the month prior to a credit rating change. They find the bond market leading the credit rating is less significant for upgrades.

Norden and Weber (2004) investigate whether or not the market anticipates ratings downgrades and upgrades for credit default swaps from 2000 to 2002. They find that between 90 and 60 days before ratings changes, the market anticipates rating downgrades for credit default swaps (Norden and Weber, 2004). There is no significant evidence with regards to the market anticipating upgrades for credit default swaps. Therefore, Norden and Weber (2004) find evidence of the market leading the rating change, versus the credit rating change leading the market reactions for downgrades only.

Iankova et al., (2006) investigate the impact of CRAs' decisions on equity prices

in France. With a sample of 332 companies from 1990 to 2004, they conclude that downgrades cause stocks to fall in price prior to the decision and then return to be more stable shortly after the rating change. They find that downgrades on the watch list are consistent with downgrades, but it takes longer for the price to return. For upgrades, they conclude that Moody's has a significant rise in returns prior to the rating change, while S&P has negative returns prior to the rating change. Upgrades on the watch list have positive abnormal returns before the rating change. These findings are consistent with Norden and Weber (2004) as the market leads the rating change.

Bolton et al., (2012) investigate inflation of credit ratings by the CRAs'. They find that the CRAs are most likely to inflate their ratings when there are "lower reputation costs." The reputation cost is the cost of losing business. Therefore, giving more precise ratings cost CRAs their reputation (Bolton et al., 2012).

Dimitrov et al., (2015) analyze the initial impact of Dodd-Frank on credit ratings by testing the hypothesis that Dodd-Frank improves credit rating quality. Their paper focuses on the importance of market share on credit ratings after Dodd-Frank. They find support for their hypotheses on lower reliance on credit ratings, but do not find increased information in credit ratings after Dodd-Frank (Dimitrov et al., 2015). These results are preliminary as the data only go through 2012 and Dodd Frank was not fully implemented until 2015. This paper focuses on the market reaction to the ratings changes before and after full implementation of Dodd-Frank and compare the two-time periods.

Hypotheses

In this study, I extend the prior research of Dimitrov et al., (2015) by investigating the information content of credit rating changes after the full implementation of Dodd-

Frank. I expect that the results of this study could differ from Dimitrov et al., (2015) for several reasons. First, the level of oversight and enforcement of the Dodd-Frank regulations by the Office of Credit Ratings may have changed since 2012. Second, the final rules within Dodd-Frank were not completely implemented until 2015. Finally, I include companies in the finance industry in the analyses. The new rules that may impact the outcome of the study are that the SEC can now inspect the CRAs and the disclosing of ratings definitions. Consistent with prior research, I use stock market abnormal returns as the dependent variable to assess the information content of credit rating changes.

Similar to Hand et al., (1992), I investigate the effect that a credit rating change has on the stock market and assess if there is a difference before and after the implementation of Dodd-Frank and if there are differences for upgrades and downgrades. Prior research finds that there is a stronger association between downgrades and market returns than upgrades. If Dodd-Frank achieved its goal of forcing CRAs to issue more timely and informative credit rating changes, then the association of credit rating changes with abnormal returns should be greater in the after Dodd-Frank period than the before Dodd-Frank period for both upgrades and downgrades. However, if Dodd-Frank resulted in CRAs issuing less timely and less informative credit rating changes, then the association between credit rating changes and abnormal returns should decrease in the after Dodd-Frank period for both upgrades and downgrades. Since there are no prior expectations, Hypothesis one is stated in the null as follows:

H_1: *The association of credit rating change upgrades and downgrades with abnormal stock returns will be different in the after Dodd-Frank period from the pre-Dodd-Frank period.*

An alternative way to investigate the timeliness and information content of credit rating changes is to perform a reverse regression. If abnormal stock returns prior to a credit rating change are associated with the credit rating change then it indicates that the market is leading the change and the change has less information. Once again, if Dodd-Frank results in more timely and information relevant credit rating changes, then the association between leading abnormal returns and the credit rating changes should decrease for both upgrades and downgrades. If, however, CRAs are more conservative because of the implementation of increased liability, the CRAs will be slower to implement a credit rating change upgrade. Therefore, the association between upgrades and leading abnormal returns will increase. However, for downgrades, conservatism will result in CRAs issuing downgrades quicker the association between credit rating changes and leading abnormal returns will decrease. This leads to my second hypothesis stated in the null:

H_2: The association between stock market leading abnormal returns and Credit Rating Changes will change from before Dodd-Frank to after Dodd-Frank for both upgrades and downgrades.

Models & Data

<u>Models</u>

In order to replicate and extend the work of Dimitrov et al., (2015) and to test the first hypothesis, I estimate the following model excluding firm and year subscripts:

$$Cummulative\ Abnormal\ Returns\ (3\ day\ window)$$
$$= \beta_1(Credit\ Rating\ Change\ Upgrade\ After\ Dodd-Frank)$$
$$+ \beta_2(Credit\ Rating\ Change\ Downgrade\ After\ Dodd-Frank)$$
$$+ \beta_3(Credit\ Rating\ Change\ Upgrade\ Before\ Dodd-Frank)$$
$$+ \beta_4(Credit\ Rating\ Change\ Downgrade\ Before\ Dodd-Frank)$$
$$+ \beta_5(Short\ Term\ Bonds) + \beta_6(Fitch\ Before\ Dodd-Frank)$$
$$+ \beta_7(Fitch\ After\ Dodd-Frank)$$
$$+ \beta_8(Speculative\ Rating\ Upgrade\ Before\ Dodd-Frank)$$
$$+ \beta_9(Speculative\ Rating\ Downgrade\ Before\ Dodd-Frank)$$
$$+ \beta_{10}(Speculative\ Rating\ Upgrade\ After\ Dodd-Frank)$$
$$+ \beta_{11}(Speculative\ Rating\ Downgrade\ After\ Dodd-Frank)$$
$$+ \beta_{12}(Operating\ Margin) + \beta_{13}(Total\ Debt\ Leverage)$$
$$+ \beta_{14}(Log\ Sales) + \beta_{15}(Treasury\ Bond\ Return) + \beta_{16}(Finance)$$
$$+ \beta_{17}(Utility) + \beta_{18}(Industrial) + e$$

The following are definitions of the variables that are used in this model:

Cumulative Abnormal Returns -The cumulative abnormal returns data is obtained from CRSP using a 3-day window surrounding the announcement date of the rating change. Cumulative abnormal returns are calculated using the value weighted market return model, which is estimated over the 60 trading days prior to the announcement date. Consistent with financial studies that look at decisions based on market prices, an event study is done to assess the impact of the credit rating change on abnormal returns. Cumulative abnormal returns, which are the variation of a specific stock compared to the rest of the stocks in the market, aims to isolate the effect of the rating change on a stock price (Iankova et al., 2006).

Interaction Change Variables- There are four variables that are three-way interaction variables that are designed to capture the impact of being before or after Dodd-Frank implementation, whether it is an upgrade or downgrade and the amount of change between the current rating and last rating. The amount of change variable is the absolute value of the change in ratings from the last rating number to the current rating number. I

obtained the ratings from Bloomberg and converted them to numbers as indicated in

Table 2A of the Appendix. The numbering is consistent with Dimitrov et al., (2015).

The time period for the before Dodd-Frank is twenty-four months, from September 2006

– August 2008. The time period for After Dodd-Frank is sixteen months from September

2014 to December 2015. The four variables are named, Before Dodd-

Frank*Upgrade*Amount of Change, Before Dodd-Frank*Downgrade*Amount of

Change, After Dodd-Frank*Upgrade*Amount of Change, and After Dodd-

Frank*Downgrade*Amount of Change. I perform tests of differences in coefficient

estimates for upgrades and downgrades before and after Dodd-Frank. If Dodd-Frank

results in more informative credit ratings changes, then I expect the difference in the

coefficients is significant.   If Dodd-Frank had no effect or weakened the information in

credit rating changes then I expect the after coefficient estimates to not be different from

the before or to be significantly smaller than the before coefficient estimates.

Short Term- This variable is a control to account for the difference in the way that short

term and long term bonds are priced and the way in which these pricing differences affect

the stock price. The data for short term bonds is obtained from Bloomberg. If the bond is

short term, which is indicated by a Standard and Poor's or Moody's rating that can be

found in Table 2A, then the variable is given a one. If the debt is long term, then it is

assigned a zero.

Credit Rating Watch Interaction Variables- The credit rating watch variable is an

indicator variable with a one if the last rating was on the watch list. A rating that is on the

watch list is indicated on Bloomberg with a * and then either a + or -, depending if the

rating agency expects to upgrade or downgrade the bond. The indicator variables are

multiplied by the upgrade and downgrade and before and after Dodd-Frank indicator variables to create four new variables called Before Dodd-Frank*Watch List*Upgrade, Before Dodd-Frank*Watch List*Downgrade, After Dodd-Frank*Watch List*Upgrade and After Dodd-Frank*Watch List*Downgrade. These variables are included in the regression to control for different market reactions when the debt is taken from a watch list and given a new rating.

*Fitch Market Share * Before or After Dodd-Frank-* Fitch is the third largest CRA agency after S&P and Moody's. Many studies, including Dimitrov et al., (2015), show that when Fitch has some of the market share, bond and stock prices react differently to credit rating changes. The Fitch Market Share variable is an indicator variable equal to one if Fitch rates the specific debt issued by the company, zero otherwise. This is multiplied by both the before and after Dodd-Frank indicator variables to create a Fitch before Dodd-Frank variable and a Fitch after Dodd-Frank variable. Each of these variables has the value of one if it falls into the criteria and a 0 if it does not. Inserting Fitch into the market share creates more competition, which based on the study by Becker and Milbourn (2011), results in lower credit ratings on average. Based on this finding, I expect that the coefficients on Fitch to be significantly different across periods. Based on the findings of Bolton et al., (2012) there are "lower reputation costs" with less competition before Dodd-Frank. After implementing Dodd-Frank, there is greater liability for upgrading too quickly or not downgrading. Since there is a larger liability after Dodd-Frank, I would expect the impact of Fitch ratings to decrease significantly after Dodd-Frank's implementation. Dimitrov et al., (2015) included the magnitude of rating change for Fitch. I conclude it is sufficient to use an indicator variable since this variable is

controlling for competition in the market place.

Book to Market Value - The book to market value is a ratio of the book value of the company to its market value. This ratio is calculated by using the quarterly market value and common equity from Compustat for the quarter prior to the credit rating change. This variable is included in the regression to control for the under or over valuation of a company by the market.

Total Debt to Total Assets - The total debt leverage ratio is the total debt for a company compared to the total assets. Total debt and total assets are collected from Compustat for the quarter prior to the credit rating change. This variable is included to control for the solvency of a company and how much of a company's assets are financed through debt. The total debt to total assets is an important factor used to determine rating changes and stock prices.

Log Sales- The log sales variable is the log of the total sales from Compustat for the quarter prior to the credit rating change. The total sales was nonlinear and the observations varied greatly prior to the transformation. Taking the logrithmic transformation controlled for the nonliniearity of the data and decreased the range of the variable. This variable is included to control for the size of the company and the current earnings of the corporation, which can cause a stock price to rise or fall.

Treasury Bond Yield - The 30-year treasury daily yield bond rates are taken from https://www.treasury.gov/resource-center/data-chart-center/interest-rates/Pages/TextView.aspx?data=yield. This data is matched with the day of the event date change. This variable is included because this is what a person investing in bonds could be making on government bonds instead of corporate bonds.

Industry - In the regressions, financial, utility and industrial industries are included to account for differences in bond valuations between these industries. These three industries were chosen based on Duffee (1998), who broke the bond data into these three categories. These industries are debt intensive, so the pricing of their debt may vary between each of these three industries and other industries. They were coded based on their two digit SIC code, which is obtained from Compustat. The financial industry variable is an indicator variable that is a one if the two digits SIC code of the company is between sixty and sixty-seven. Although Dimitrov, et al., (2015), do not use data from the financial industry, it is important to keep this data because financial firms represent approximately 29% of the data set. The utility industry variable, which is an indicator variable equal to one if the two digit SIC code of the company is between forty and forty-nine. The industrial industry variable, which is also an indicator variable equal to one if the two digit SIC code of the company is between ten and thirty-nine.

Model two is designed to test hypothesis two, whether the credit rating changes lead or lag the market.

$$
\begin{aligned}
\text{Absolute Credit Rating Change} \\
= \ & \beta_1(Cumulative\ Abnormal\ Returns\ Before\ the\ Rating\ Change \\
& * Before\ Dodd - Frank * Upgrade) \\
& + \beta_2(Cumulative\ Abnormal\ Returns\ Before\ the\ Rating\ Change \\
& * Before\ Dodd - Frank * Downgrade) \\
& + \beta_3(Cumulative\ Abnormal\ Returns\ Before\ the\ Rating\ Change \\
& * After\ Dodd - Frank * Upgrade) \\
& + \beta_4(Cumulative\ Abnormal\ Returns\ Before\ the\ Rating\ Change \\
& * After\ Dodd - Frank * Downgrade) + \beta_5(Operating\ Margin\ ) \\
& + \beta_6(Total\ Debt\ Leverage\ ) + \beta_7(Log\ Sales) \\
& + \beta_8(Treasury\ Bond\ Return) + \beta_9(Finance) + \beta_{10}(Utility) \\
& + \beta_{11}(Industrial) + e
\end{aligned}
$$

The following are definitions of the variables that are used in this model:

Absolute Credit Rating Change- This variable is the absolute value of the amount of change between the last rating and the current rating. Each rating is assigned a number value, which can be found in table 2A in the Appendix. This rating change is coded using the current and prior rating data obtained from Bloomberg.

Cumulative Abnormal Returns Before the Rating Change Interaction variables - The cumulative abnormal returns before the rating change are used to determine if the rating changes are leading or lagging the market. This variable is created using a 30-day event window on CRSP, from [-33, -3] trading days prior to the rating change. This relies on an event study to isolate the variation of the stock price before the rating change relative to the market. Based on Hite and Warga (1997), rating changes lead the market during both the month of the rating change and the month before the rating change. This 30-day trading day window I use is approximately 6 weeks, which falls in the period allotted by Hite and Warga (1997). This variable is then broken into two separate variables to capture the abnormal returns if the rating change is before or after Dodd-Frank and for upgrades and downgrades. I test for differences in coefficient estimates for both upgrades and downgrades before and after Dodd-Frank. If the coefficient estimates before and after Dodd-Frank are not significantly different, then there is no evidence to support that the Dodd-Frank either improved or weakened the information content of credit rating changes. If the coefficient estimates on upgrades and downgrades are significantly smaller in the after Dodd-Frank period, then there is evidence the credit rating changes are more timely. If the coefficient estimates on upgrades and downgrades are significantly larger in the after Dodd-Frank period, then there is evidence that that credit rating changes are lagging the markets and less timely.

The definitions for the variables book to market value, total debt to total assets, treasury bond yield and industry are given in Model one.

Data

I draw data from a variety of databases for the time period September 2006-August 2008 (Before Dodd-Frank) and September 2014-December 2015 (After Dodd-Frank). I downloaded credit rating changes from the Bloomberg terminal in my date ranges. I had 93,881 observations from the initial download of data from Bloomberg. The data then had to be cleaned to remove any non-publicly traded companies, which would not have financial data in Compustat. This yielded 53,574 observations. Next, I downloaded the control variables from Compustat, which includes the financial data for publicly traded companies for each quarter. The Compustat and credit rating change data is merged based on ticker and date. I downloaded the daily Treasury Bond return rate from the Federal Reserve's website and matched this to the event date. I then downloaded the cumulative abnormal returns and buy and hold returns from CRSP for 3, 5 and 15-day return windows. CRSP data is only available through December 31, 2015 which reduces my initially desired after Dodd-Frank period from August 2016 to December 2015. This data is then matched using the CUSIP and event date to have a final data set of 9,171 observations, with no missing observations. For the second regression, I used the CRSP data for [-33, -3] trading days before the credit rating change. When this data is merged with the Compustat data, it left 9,089 complete observations for the analyses.

In order to prevent losing any more observations, the variables are Winsorized at the 1% and 99% percentiles. All of the non-indicator variables were Winsorized and then I run the regressions with independent and dependent Winsorized variables. Dimitrov et

al., (2015) address outliers by Winsorizing their variables at the same levels. In unreported sensitivity analyses, results of regressions without Winsorizing the variables are generally consistent with the reported results but weaker.

Results

<u>Univariate Results</u>

The summary statistics for the Winsorized variables described above are in Tables 1 and 2. I performed t-tests of the differences in variables before and after the implementation of Dodd-Frank. There is a significant difference in cumulative abnormal returns before the rating change. This decrease in returns could be caused by the market leading the changes more in the Dodd-Frank period. There is also a significant difference in both the upgrades and downgrades. The reason for this is because before the implementation of Dodd-Frank, a higher percentage of bonds are placed on the watch list. It is interesting that the mean absolute rating change before Dodd-Frank is higher than the mean absolute rating change after the implementation of Dodd-Frank, even though there are more upgrades and downgrades in the after Dodd-Frank period. This may be explained by more risky upgrades and downgrades before the implementation of Dodd-Frank. This is also consistent with more conservatism in ratings after Dodd-Frank. This could also have to do with Fitch rating more companies before Dodd-Frank than after Dodd-Frank.

Many of the control variables, also, differ significantly over the periods. There is a significant difference in log of net sales. The increase in net sales could be attributed to larger companies or higher sales after Dodd-Frank. There is a significant decrease in treasury bond. The 30-year Treasury bond is similar to Dimitrov et al., (2015) before

Dodd-Frank, but significantly lowers after Dodd-Frank. It makes sense that the treasury bond yield after Dodd-Frank was low, since the Federal Reserve kept interest rates low after the financial crisis. There is a significant decrease in book to market value. This decrease could be caused by an increase in market value, decrease in book value or a combination of both. The book to market value is about the same for both periods in each study. There is a significant difference in total debt to total assets. An increase in total debt to total assets can be caused by increased borrowing due to the recession or decrease in total assets due to the recession. Total debt to total assets is also about the same for the two studies, with the total debt to total assets being a little bit higher in this study versus Dimitrov et al., (2015). Both the financial industry and the utility industry have significant differences between periods. The utility industry could have decreased because of more stabilized bonds or less borrowing. The financial industry may have increased because of more borrowing after the recession. For all of the variables described in Dimitrov et al., (2015), there are not any major differences that would not be due to a difference in time periods.

As seen in Table A3, none of the variables are significantly correlated. This is important because it helps to reduce the collinearity between the variables. Based upon the univariate results, this data set has more observations before Dodd-Frank than after Dodd-Frank. This is most likely due to CRSP missing data for 2016 on stock returns.

Informativeness of Credit Rating Changes before and after Dodd-Frank

A robust estimation of Model one is used to evaluate the change in informativeness of credit rating changes from before to after Dodd-Frank. The results of

estimating Model one are presented in Table 3.

If Dodd-Frank made ratings changes more informative, then I expect the association of rating changes with abnormal returns to be higher after Dodd-Frank than before for both upgrades and downgrades.

On the 95% level, both upgrades and downgrades both before and after Dodd-Frank are all significant. To test the change, an F-test of the differences in coefficients is performed. Both the difference in upgrades and downgrades are significant. The downgrade coefficients before and after Dodd-Frank differ by 0.0046, or a 12.4% decrease, which means the downgrades before the implementation of Dodd-Frank had a larger negative association with abnormal market returns. This is most likely explained by CRAs being more conservative in the after Dodd-Frank era, so the downgrades are less informative. This finding is consistent with Dimitrov et al., (2015). The upgrade coefficients before and after Dodd-Frank have a stronger negative market response after Dodd-Frank, which is significant. This finding is not consistent with Dimitrov et al., (2015), but could be attributed to this study using a regression instead of comparing univariate statistics. The negative coefficient estimates on upgrades differs from Dimitrov et al., (2015). It is important to note that the negative coefficient estimates on downgrades are larger than the negative coefficient estimates on upgrades. One reason for this difference in signs could be that the Dimitrov et al., (2015) studied bond returns instead of stock returns. These negative cumulative abnormal returns are consistent with findings by Iankova et al., (2006), who find that credit rating changes for firms listed on the S&P normally lead to significant negative returns before and after the rating change announcement. It is possible that the reason for the negative abnormal returns could be

related to anticipation for rating changes before the credit rating announcement. As found in Iankova et al., (2006), the cumulative abnormal returns for the period before the rating change are anticipated before the announcement and the negative return is to adjust for over-anticipation by the market. This is also consistent with Norden and Weber's (2004) finding that the cumulative abnormal return performance for upgrades normally does not occur on the day of the rating change. These results indicate that credit rating changes have less information for downgrades, but are more informative for upgrades. This is because the market is over anticipating the impact of the credit rating change, so the actual change does have information.

Some other interesting findings are that the estimated coefficient on watch list rating upgrades is not significant, while the estimated coefficient on watch list rating downgrades is significant before and after Dodd-Frank. The difference of -.006 between coefficients, or 58% increase, in the downgrade coefficient estimates. Both before and after Dodd-Frank the significant positive estimate indicates the market includes the downgrade in the market price because of the watch list. So, when the actual downgrade is announced, the price rises back up knowing the probability of a downgrade was likely. This reversal in price is smaller in the after Dodd-Frank period can be explained by a decrease in market overreaction or less information in the credit rating change. I performed a sensitivity analysis estimating the model without the watch list ratings and find that the coefficient estimate is smaller and less negative for the rating change downgrades before Dodd-Frank and greater and more negative for the rating change downgrades after Dodd- Frank. The watch list downgrades significance after Dodd-Frank could be a result of most of the negative return related to a downgrade being captured in

the prior period when the watch list is published, so the actual downgrade has less information.

The other variables that are significant are the coefficient estimates on Fitch rating before and after Dodd-Frank. Before Dodd-Frank, Fitch ratings had a negative association with cumulative abnormal returns, while after Dodd-Frank Fitch ratings have a positive association with abnormal returns. This occurs because more of the observations were downgrades by Fitch before Dodd-Frank and more observations were upgrades by Fitch after the implementation of Dodd-Frank. Fitch having a market share results in better or more precise credit rating changes by the other CRAs in both the before and after Dodd Frank periods.

The control variables book to market value and total debt to total assets are both significant at the 95% level. This is consistent with firms with more debt financing or less market value premium over book value being more sensitive to credit rating changes. The financial industry variable is significant at the 95% level, while the industrial and utility industry variables are not significant. This could be explained by the fact that the financial industry relies more heavily on debt and a downgrade in their rating may cause investors to worry about the company's solvency.

Leading or Lagging the Market Results

Table 4 presents the results from a robust estimation of Model two and assesses the flow of information from market returns to credit rating changes.

Based upon the results of the regression, it appears the credit ratings agencies are resolving their changes based on information already known to the market. Both before and after Dodd-Frank, the coefficient estimates on cumulative abnormal returns for the [-

33, -3] trading days before the rating change are significant for upgrades and downgrades. To test the change, an F-test of the differences in coefficients is performed. The difference in coefficient estimates on upgrades before and after Dodd-Frank is not significant. The positive coefficient estimate on the upgrades is evidence consistent with the CRAs reacting to information already known to the market before and after Dodd-Frank. I also tested the abnormal market returns from [-60, -31] days before the event since the results of Iankova et al., (2006) found that upgrades are normally associated with abnormal market returns from [-60, -31] days before the event. These results did not significantly differ from the results of [-33, -3] days. Since CRAs may be acting more conservatively in the after Dodd-Frank Era, it is likely that the upgrades are leading the market in an earlier period than before Dodd-Frank. For this reason, the difference between upgrades before and after Dodd-Frank would be seen by comparing two time frames. The difference in coefficient estimates on downgrades between before and after Dodd-Frank is significant. The cumulative abnormal returns coefficient estimates are negative and significant for both periods of downgrades, which is consistent with Iankova et al., (2006). The market appears to always lead the credit rating changes, but more so after Dodd-Frank. This would most likely be explained by CRAs being more careful about ratings changes after Dodd-Frank. Since Dodd-Frank allowed for economic penalties on the CRAs for bad ratings, the Credit rating agencies should be wary to change credit ratings too quickly. This raises the question of the necessity of CRAs, if they are not giving the market new information.

The control variables book to market value, log net sales and total debt to total assets all have significant coefficient estimates at the 95% level. Also, the finance and

utility industry variables coefficient estimates are significant at the 95% level. This is to be expected, since the market for a certain industry can either be positive or negative based on the industries current economic conditions. If a certain industry is struggling in the market, it would be logical that most of the corporate bonds in that industry would be downgraded. The same logic can be applied to upgrades as well.

Sensitivity Analysis

I performed sensitivity analyses to ensure that there are no significant differences in results based on design choices. The first set of sensitivity analyses is for buy and hold returns versus cumulative abnormal returns and for different return event windows of 7 and 15 days. For the 3, 7, and 15 day event windows, there is no significant difference between the buy and hold return and cumulative abnormal returns. The 7 and 15-day window returns result in adjusted r-squares that are too low to interpret. Therefore, I use the cumulative abnormal market adjusted returns for a 3-day event window.

I also completed a sensitivity analysis by performing the regressions without Fitch and the finance industry. For both Fitch and the finance industry, there is no significant difference in the regression results, especially with the variables of interest. I also completed a sensitivity analysis by running the regression without the bonds that are on the watch list. While this regression only has 3,586 observations, the only variables whose significance changed from significant to non-significant are the before and after Dodd-Frank upgrades. The t-test for the difference before and after Dodd-Frank was also not significant. These results are consistent with Dimitrov et al., (2015). This change in significance can be explained by the bonds that are upgraded from the watch list cause a greater market reaction than the bonds that are not on the watch list.

Conclusion and Policy Implications

Policy Implications and Further Research

The results of the 2016 presidential election leaves America open to the possibility of repealing Dodd-Frank. In regards to CRAs, repealing Dodd-Frank may not influence stock market reaction to credit rating changes because there is potential that investors lack trust in CRAs after the recession or the CRAs may fear large fines if they were to assert themselves as a key player in another financial meltdown. It is also possible that CRAs may revert to old habits and participate in risky credit ratings changes. Inflated credit ratings would lead to less informative credit ratings upgrades and slow credit rating downgrades.

If CRAs are not held to high ethical standards or held liable for their actions, similarly to accountants, material mistakes can cause large personal losses. This liability model has increased the financial statement validity after the implementation of Sarbanes Oxley in 2001 and the creation of the Public Company Accounting Oversight Board. Leading from past example and the similar conflicts of interests between accountants and CRAs, the Office of Credit Ratings, should make credit ratings and their changes more reliable. Model one resolves that upgrades are more informative and downgrades are less informative after Dodd-Frank. Model two resolves that only downgrades are significantly less informative after Dodd-Frank. Based upon intuition and the regression results, the best policy recommendation would be to not repeal Dodd-Frank, but instead amend some of the regulation. It would be imperative to do a study on the effects of each section of Dodd-Frank's implementation and try to isolate its effect on the credit ratings.

In the future, it would be interesting to explore the possibility of using bond

returns in replace of stock returns. I could then do a sensitivity analysis to see if the informativeness of the credit rating change is different for stock and bond returns before and after Dodd-Frank, since Dimitrov et al., (2015) included the bond market in their model. I would also like to rerun this study with more current data. It would be interesting to see if the results stay the same with a larger data set for the after Dodd-Frank period. Also, if there is more data for the After-Dodd Frank period, it would be interesting to see if the CRAs are still conservative with upgrades and more quickly to downgrade the more time passes since the implementation of Dodd-Frank. It would be interesting to redo the model to see if there is a significant difference between this study and a study with a longer After-Dodd Frank period. If there is a significant difference, it could imply that there has been stricter or more relaxed enforcement of Dodd-Frank on CRAs.   I could use a regression to see if there has been a trend in upgrades or downgrades on a year to year basis.

Conclusion

The implementation of Dodd-Frank after the financial crisis was an important piece of legislation intended to tighten regulations in the financial industry. It looked to increase regulation of the CRAs because of their contribution to poorly rated housing bonds. Based on the data, it appears that only credit rating upgrades are more informative to consumers after Dodd-Frank. Specifically, the market reaction to credit rating change announcements has declined for credit rating downgrades and the association of credit rating downgrades with leading returns has increased. While there is still information in credit ratings changes, the new regulation has not improved the information content or timeliness of downgrades. This poses the question of whether or not new legislation

should be imposed to make CRA's information more informative or if repealing Dodd-

Frank will have a positive effect on credit rating change information.

Tables: Table 1 – Univariate Statistics

Variable	Observations	Mean	Std. Deviation	Min	Max
Cumulative Abnormal Returns Event Data	9,171	0.0019	0.0830	-0.3839	0.33560
Dodd-Frank*Upgrade*Amount of Change	9,171	0.1616	0.4088	0	2
Dodd-Frank*Downgrade*Amount of Change	9,171	0.1467	0.4290	0	2
Before Dodd-Frank*Upgrade*Amount of Change	9,171	0.1927	0.4579	0	2
Before Dodd-Frank*Downgrade*Amount of Change	9,171	0.1954	0.5225	0	3
Fitch Rating Before Dodd-Frank	9,171	0.3293	0.4700	0	1
Fitch Rating After Dodd-Frank	9,171	0.2076	0.4056	0	1
Watch List * Before Dodd-Frank*Upgrade	9,171	0.0475	0.2128	0	1
Watch List * Before Dodd-Frank*Downgrade	9,171	0.0804	0.2719	0	1
Watch List * After Dodd-Frank* Upgrade	9,171	0.0367	0.1881	0	1
Watch List * After Dodd-Frank * Downgrade	9,171	0.0358	0.18857	0	1
Short term	9,171	0.1016	0.3022	0	1
Absolute Rating Change	9,089	0.7117	0.7288	0	3
Cumulative Abnormal Returns leading the Rating Change Before Dodd-Frank Upgrades	9,089	0.0018	0.0403	-0.5214	0.2417
Cumulative Abnormal Returns leading the Rating Change Before Dodd-Frank Downgrades	9,089	-0.0068	0.0634	-0.5214	.2417
Cumulative Abnormal Returns leading the Rating Change After Dodd-Frank Upgrades	9,089	0.0011	0.0305	-0.4450	.2184
Cumulative Abnormal Returns leading the Rating Change After Dodd-Frank Downgrades	9,089	-0.0112	0.0689	-0.4450	0.2184
Book to Market Value	9,171	0.6299	0.87567	-2.7079	6.4905
Total Debt to Total Assets	9,171	0.3544	0.2394	0	1.2839
Log Net Sales	9,171	6.5852	1.7098	2.0952	10.5088
Treasury Bond Yield	9,171	0.0401	0.0092	0.0239	0.0526
Financial Industry	9,171	0.2496	0.4328	0	1
Utility Industry	9,171	0.1559	0.3628	0	1
Industrial Industry	9,171	0.3892	0.4876	0	1

Table 2 - *Before & After Dodd-Frank Univariate Results*

Variable	**Before Dodd-Frank**			**After Dodd-Frank**		
	Obs.	Mean	Std. Deviation	Obs.	Mean	Std. Deviation
Cumulative Abnormal Returns	5,194	0.0002	0.0792	3,977	0.0022	0.0876
Cumulative Abnormal Returns Before Rating Change	5,147	-0.0197*	0.1393	3,942	-0.0270*	0.1473
Absolute Rating Change	5,147	0.6953*	0.7444	3,942	0.7331*	0.7047
Upgrade	5,194	0.2925*	0.4549	3,977	0.3361*	0.4725
Downgrade	5,194	0.2636	0.4406	3,977	0.2703	0.4442
Fitch	5,194	0.5814*	0.4934	3,977	0.4788*	0.4996
Watch List	5,194	0.6650*	0.4720	3,977	0.5351*	0.4998
Book to Market Value	5,194	0.6606*	0.4720	3,977	0.5899*	0.8989
Total Debt to Total Assets	5,194	0.3408*	0.2349	3,977	0.3722*	0.2441
Log Net Sales	5,194	6.5540*	1.7590	3,977	6.6260*	1.6426
Treasury Bond	5,194	0.0478*	0.0024	3,977	0.0300*	0.0027
Industrial Industry	5,194	0.3787	04851	3,977	0.4028	0.4905
Utility Industry	5,194	0.1632*	0.3696	3,977	0.1463*	0.3535
Financial Industry	5,194	0.2391*	0.4266	3,977	0.2633*	0.4405
* Difference in means across time periods is significant with a p-value <0.05						

Table 3 – Market Response to Credit Rating Changes
Number of Observations = 9,171
$F(19, 9152) = 17.13$
R-Squared = 0.0560

Cumulative Abnormal Returns – 3 day window	Coefficient	Robust Standard Error	t-score	P>|t|	95% Confidence Interval
Dodd-Frank*Upgrade*Amount of Change	-0.0106	0.0022	-4.79	<0.0001	(-0.0150, -0.0063)
Dodd-Frank*Downgrade*Amount of Change	-0.0261	0.0036	-7.35	<0.0001	(-0.0331, -0.0191)
Before Dodd-Frank*Upgrade*Amount of Change	-0.0097	0.0015	-6.36	<0.0001	(-0.0127, -0.0067)
Before Dodd-Frank*Downgrade*Amount of Change	-0.0298	0.0032	-9.29	<0.0001	(-0.0356, -0.0231)
Fitch Rating Before Dodd-Frank	-0.0085	0.0023	-3.75	<0.0001	(-0.0130, -0.0041)
Fitch Rating After Dodd-Frank	0.0058	0.0026	2.23	0.0260	(0.0007, 0.0110)
Watch List * Before Dodd-Frank*Upgrade	-0.0017	0.0035	-0.82	0.4140	(-0.0059, 0.0026)
Watch List * Before Dodd-Frank*Downgrade	0.0119	0.0047	2.52	0.0012	(0.0026, 0.0211)
Watch List * After Dodd-Frank* Upgrade	-0.0007	0.0025	-.27	0.7870	(-0.0055, 0.0042)
Watch List * After Dodd-Frank * Downgrade	0.0188	0.0054	3.51	<0.0001	(0.0083, 0.0293)
Short term	-0.0021	0.0024	-0.87	0.3860	(-0.0069, 0.0027)
Book to Market Value	-0.0076	0.0016	-4.80	<0.0001	(- 0.0102, -0.0045)
Total Debt to Total Assets	-0.0002	0.0001	-3.91	<0.0001	(-0.0003, -0.0001)
Log Net Sales	0.0006	0.0005	1.38	0.1670	(-0.0003, 0.0016)
Treasury Bond Yield	0.6446	0.0905	7.12	<0.0001	(0.4676, 0.8221)
Financial Industry	-0.0122	0.0026	-4.71	<0.0001	(-0.0173, -0.0071)
Utility Industry	0.0016	0.0029	0.17	0.582	(-0.0041, 0.0073)
Industrial Industry	-0.0040	0.0023	-1.73	0.083	(-0.0086, 0.0005)

Table 4 – Credit Rating Changes and Leading Market Returns

Number of Observations = 9,089

$F(12, 9077) = 830.48$

R-Squared = 0.51122

Rating Change	Coefficient Estimate	Robust Standard Error	t-score	P>|t|	95% Confidence Interval
Cumulative Abnormal Returns before the Rating Change Before Dodd-Frank Upgrades	1.0817	0.2078	5.21	<0.0001	(0.6743, 1.4890)
Cumulative Abnormal Returns before the Rating Change Before Dodd-Frank Downgrades	-1.3255	0.1646	-8.06	<0.0001	(-1.6480, -1.0029)
Cumulative Abnormal Returns before the Rating Change After Dodd-Frank Upgrades	1.0271	0.3000	3.42	0.0010	(0.4392, 1.6150)
Cumulative Abnormal Returns before the Rating Change After Dodd-Frank Downgrades	-2.3407	0.1265	-18.50	<0.0001	(-2.5888, -2.0926)
Book to Market Value	0.0600	0.0120	5.01	<0.0001	(0.0365, 0.0834)
Total Debt to Total Assets	0.0029	0.0004	7.64	<0.0001	(0.0021, 00036)
Log Net Sales	0.0133	0.0036	3.68	<0.0001	(0.0062, 0.0204)
Treasury Bond Yield	8.9629	0.6331	14.37	<0.0001	(7.7218, 10.2040)
Financial Industry	0.1319	0.0223	5.90	<0.0001	(0.1068, 0.1962)
Utility Industry	0.0051	0.0257	0.20	0.842	(-0.0453, 0.0555)
Industrial Industry	0.0922	0.0199	4.64	<0.0001	(0.0881, 0.1757)

Appendix:

Table A1: Overview of Dodd-Frank

Section	Description**	Effective ***
931- Findings	(1) CRA are important to "capital formation investor confidence and efficient performance of the United States' economy" (2) CRAs are similar to auditors and securities analysts and therefore should be held to the same accountability (3) CRAs are commercial because of their public evaluation for clients and therefore should be liable for their opinions (4) CRAs conflict of interest must be stated, so that the SEC can regulate this (5) The inaccurate credit ratings contributed to the global recession and therefore require increased liability for the CRAs	July 22, 2010
932- Enhanced Regulation, Accountability and Transparency of NRSROs	(1) Section 15E of the Securities and Exchange Act of 1933 will be amended (2) NRSROs will implement internal controls over the process of credit ratings (3) SEC can suspend or revoke NRSROs for inaccurate ratings for asset backed securities (4) SEC will perform annual reviews of each NRSROs (5) NRSROs are required to have more than half of the board of directors as independent reviewers and other requirements for the board of directors	Passing of Dodd Frank on July 22, 2010
932- Enhanced Regulation, Accountability and Transparency of NRSROs	(1) The Office of Credit Ratings was created under the SEC	Created on June 15, 2012
932- Enhanced Regulation, Accountability and Transparency of NRSROs	(1) The SEC can give requirements for internal controls (2) Separation of sales and marketing ratings (3) Look-back reviews (4) Additional disclosure of the method of ratings (5) SEC can regulate the rating agencies	Passed on August 14, 2014
933- State of Mind in	(1) The CRAs must assume the same liability as	July 10, 2010

Private Actions	public accounting firms (2) Must prove that the CRAs "knowingly or recklessly failed to conduct a reasonable investigation… or reasonable verification of such factual elements"	
934- Referring Tips to Law Enforcement or Regulatory Authorities	(1) NRSROs must report any violations of the law that they find	July 10, 2010
935- Consideration of Information from Sources Other than the Issuer in Rating Decisions	(1) NRSROs must consider third party information about the debt issuer	July 10, 2010
936- Qualification Standards for CRAs	(1) The SEC must issue rules about the employees of CRAs	Rules Proposed in May 2011 and Passed as part of Section 932 in August 2014
937- Timing of Regulations	(1) Final regulations of the laws should be issued within one year, unless otherwise stated	Passed on July 20, 2010
938- Universal Rating Symbols	(1) Each NRSRO must write, maintain and enforce written policies and procedures. (2) They also must define and disclose the definitions of their ratings and symbols used	Passed on August 14, 2014
939- Removal of Statutory References to Credit Ratings	(1) Removes the references of credit ratings from the following acts: a. Federal Deposit Insurance Act b. The Federal Housing Enterprises Financial and Safety and Soundness Act of 1992 c. Investment Company Act of 1940 d. Revised Statutes of the United States Securities and Exchange Act of 1934 e. World Bank Discussion	Enacted in Part by May 10, 2016
939A- Review of Reliance on Ratings	(1) There will be a removal of any references to and or requirement on the reliance of credit ratings	SEC effective as of September 2, 2011, Office of the Controller of the Currency effective on January 1, 2013
939B- Elimination of Exemption from Fair Disclosure Rule	(1) The regulation of the Fair Disclosure Rule will remove the exemption of CRAs	Effective October 4, 2010

939C- SEC Study on Strengthening Credit Rating Independence	(1) SEC will complete a study on how independence of NRSROs affects ratings	SEC completed in November 2013 and GAO completed its studies in January 2012 and December 2015
939D- Government Account Office (GAO) study on alternative business models	(1) The GAO will complete a study on the alternative models for compensating CRAs	Completed in January 2012
939E- GAO study on the creation of independent professional analyst organizations	(1) The GAO will complete a study on the possibility and rewards of creating an independent organization for rating agencies	Completed in December 2015
939F- Study and Rulemaking on Assigned Credit Ratings	(1) The practicability of creating an organization that assigns NRSROs to rate structured finance products	Completed in December 2012
939G- Effect of Rule 436(G)	(1) The Securities and Exchange Act, which exempts CRAs from being a certified opinion, is no longer in effect. This increases the liability for the CRAs.	July 20, 2010
939H- Sense of Congress	(1) Congress believes that the SEC should provide rules and regulation for the NRSROs	July 20, 2010

Note the numbers in the table above are not the section numbers for the laws; they are only summaries of each section broken down by dates
** Information gathered from Dodd-Frank Wall Street Reform and Consumer Protection Act
***Information gathered from the Dimitrov et al., (2015)

Table A2- Numerical Value for Each Rating

Credit Rating	Moody's Rating	S&P Rating	Number Assigned
Highest Grade	Aaa	AAA	1
High Grade	Aa1	AA+	2
	Aa2	AA	3
	Aa3	AA-	4
Upper Medium Grade	A1	A+	5
	A2	A	6
	A3	A-	7
Lower Medium Grade	Baa1	BBB+	8
	Baa2	BBB	9
	Baa3	BBB-	10
Non-investment grade	Ba1	BB+	11
	Ba2	BB	12
	Ba3	BB-	13
Highly Speculative	B1	B+	14
	B2	B	15
	B3	B-	16
Substantial Risks	Caa1	CCC+	17
Extremely Speculative	Caa2	CCC	18
In default with little prospect of recovery	Caa3	CCC-	19
	Ca	CC	20
	C	C	21
Default	N/A	D	22
Short term High Grade	N/A	A-1+	23
Short term High/upper medium grade	P-1	A-1	24
Short term upper Medium Grade/lower medium grade	P-2	A-2	25
Short Term Lower Medium Grade	P-3	A-3	26

Table A3- Correlation Matrix

Correlation Matrix	Rating Change	Cumulative Abnormal Returns	Book to Market Value	Total Debt to Total Assets	Log Net Sales	Treasury Bond
Rating Change	1					
Cumulative Abnormal Returns	0.124	1				
Book to Market Value	-0.177	-0.114	1			
Total Debt to Total Assets	-0.188	-0.051	-0.243	1		
Log Net Sales	0.109	0.019	-0.042	-0.206	1	
Treasury Bond	0.004	0.009	0.003	-0.100	0.070	1

*None of the variables are correlated significantly at the 95% level

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