Research Paper Management

Impact of Bond Rating on Stock Returns

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ABSTRACT

We study the impact of bond rating on the stock returns of the Indian companies. Empirical evidence from prior studies reveals that bond downgrades are associated with significant declines in the stock price of the affected firms while bond upgrades are associated with a small but insignificant positive abnormal return.

Our study finds that there is a statistically insignificant abnormal return associated with the bond down grades. However, our results are consistent with the findings of earlier studies on bond upgrades. This implies that the bond upgrades and downgrades do not convey any important information to the market.

Keywords : Downgrading, Upgrading, Event Study, AARs

1. Introduction

Bond rating is the principal source of investor information about the quality, marketability, and credit worthiness of various bond issuers. Credit rating agencies (CRAs) continuously monitor and review all published ratings during the life time of the securities. These agencies have been publishing information on newly assigned ratings and changes in the earlier rating. CRAs attempt to make sense of the vast amount of information available about an issuer, its market and economic circumstances in order to give investors a better understanding of the risk they face when investing in a particular security. According to the semi-strong form of the efficient market hypothesis (EMH) the current stock prices accurately reflects a vast amount of public information about the firm, including new value relevant information that has just been made public [Ogden, et. al. (2003)]. If this hypothesis holds, as and when new information about a firm's bond rating is published, the market price of the firm's stock should immediately change to reflect this information. If the market takes time to impound the bond rating news, such a market cannot be said to be efficient in the semi-strong form.

Empirical studies reveal that stock market react negatively to the downgrades, indicating that these downgrades have information content with negative implication. In our study we examine the extent to which the stock prices respond to the announcement of changes in bond rating. Contrary to the findings of previous studies conducted in U.S.A and other countries, we find that downgrades and upgrades have no effect on the equity return. The share prices response to the rating changes are insignificant.

Reminder of the paper is organized as follows. Section 2 presents the review of previous studies. Data and sample selection are presented in section 3, methodology is described in the section 4, and empirical results are examined in section 5 and conclusions are presented in section 6.

2. Literature Review

Several studies have been undertaken to examine the effect of credit rating on share prices. In Australia Choy et.al., (2006), examined the effect of credit rating changes on stock returns and found significant market reaction to the downgrade whereas insignificant stock returns for upgrades. They also find that market reaction is much greater if the firm belongs to an industry that is not regulated. Romero and Fernandez (2006) examined the corporate bond rating change on stock prices in Spanish stock market. They find significant negative excess returns for upgrades and no significant excess returns for downgraded firms. They also find strong evidence of negative effect on systematic risk around the announcement of rating changes in both directions. Barron et al., (1997) finds significant excess stock returns associated with bond rating downgrades and positive credit watch announcements. They also find that the assignment of a new long-term rating does not have a statistically significant impact on either unconditional or conditional measures of stock returns volatility or systematic risk. Further, they report that rating change affecting short-term debt has no statistically significant impact as is the case for new long-term debt ratings. Hand, et al., (1992) finds that there are both bond and stock price effects associated with announcements of additions to the credit watch list and with the announcement of actual rating changes. Kim and Nabar (2003) find that rating agencies play an important information provision role and that bond down grades significantly impact firm's future cash flows. They also find that stock returns around the rating change date are significantly negative for firms with institutional ownership. The bond-rating agency is a significant information provider and stock returns are negatively related to firm's debt equity ratios. Goh and Ederington (1993) observe a negative equity market reaction to the downgrades due to deterioration in the firm's prospects but no reaction to the downgrade due to an increase in leverage. They also argue that it is unlikely that all downgrades are a surprise since many follow news of an increase in the firm's riskness and a surprise downgrade is clearly bad news for bondholders. It is not necessarily bad news for shareholders. Dichev and Piotroski (2001) examine the long–run stock returns following bond rating changes and found no reliable abnormal returns following the upgrades, whereas there are substantial negative abnormal returns following downgrades. They also found that underperformance is most pronounced in the first month following downgrades, lasts at least a year, and is on the magnitude of –10 to –14 percent at the one-year horizon. Nayar and Razef (1994) have examined the commercial paper rating and equity returns and found that commercial paper rating downgrades have negative

information content while upgrades have no equity price effects, similar to the effect of rating changes of long–term debt. Rao and Ramachandra (2004) have found that stock price incorporates the factors that lead to rating revisions. They also report that upgrades are received cautiously by the investors with no significant abnormal returns where as downgrades are perceived as bad news by investors with significant negative abnormal returns.

Pinches and Singleton (1978) argue that the informational content of bond rating changes is very small and the stock markets are efficient in processing this type of information for both bond rating increase and decrease. In the context of insurance sector, Singh and Power (1992) observe that rating changes are found to convey no information to the capital market. They also argue that the absence of stock price reactions in response to rating changes are a non-event in terms of new information conveyed to the market.

3. Sample and Data

The share prices and bond ratings change data are collected from the Prowess, the corporate database of Centre for Monitoring Indian Economy (CMIE). In this study we use bond rating changes of listed companies for the period 1998 to 2005. We restrict our sample to the bond rating change of listed companies. Our initial sample consists of 75 bond rating change of 39 firms reported in the CMIE data base. We consider bond rating change announced by the four major credit rating agencies in India i.e., CRISIL, ICRA, CARE and Fitch. The adjusted daily stock prices and Sensex (BSE index) are collected for each of the firms from day – 280 to + 30. If the share price data is not available due to non-trading, such companies are eliminated. The final sample of companies after applying these criteria is 23 events consisting of 17 downgrades and 6 upgrades.

4. Methodology

We follow event study methodology to analyse the impact of bond rating change on stock price. The event period is centered on the announcement date of bond rating change. The announcement date is designated as day "0" in the event period. Prior studies consider different event period to analyse the effect of an event on stock price. Brown and Warner (1985) used eleven day event period (– 5 to + 5) to analyse daily stock returns. Wansley et al., (1987) and Dodd Peter (1980) used – 50 to +50 event period to examine the effect of merger announcement on stock return. To examine the effect of bond rating change, we use 61- day event period, i.e. 30 trading days before the announcement of the bond rating change to 30 trading days after the announcement of the credit rating change, 0 being the day of the announcement of the bond rating change. The market proxy used in the study is Sensex.

The effect of stock prices is measured in an event period using the abnormal return associated with this event. We compute the expected returns (ER), abnormal returns (AR), average abnormal returns (AAR) and cumulative average abnormal returns (CAARs) to examine the stock price reaction. To measure the stock price response to the bond rating change announcement, it is necessary to segregate the returns attributed to the market movement and those that are not attributed to the market movement, but to bond rating change. This adjustment is made using the market adjusted model. The estimation period used was -31 days to -280 days and If there is no trading in the market on the announcement day**,** the immediate next trading day is considered as event-day for those firms.

The methodology of the study involves use of market model-which was developed and suggested by Sharpe (1963). The prior studies use extensively the market model to determine the expected return on specific asset, given the return on market and the two parameters of the market model (alpha and beta of the security). Market model is based on the fact that the most important factor affecting stock returns is market factor and it is captured in the market model in the form of the parameters. It is a model to analyse the riskiness of stocks in terms of systematic risk and unsystematic risk. In market model we regress returns on a security against returns of the market index. The market model is given by the following regression equation:

$$E(R_{jt}) = \alpha_j + \beta_j R_m + e_j$$

Where,

α is intercept. (Mean return over the period not explained by the market).

$E(R_{jt})$ is the expected return on security j,

R_m is the expected market return,

β_j is the slope of the regression and,

e_j is the error term (with a zero mean and constant standard deviation).

The slope, β_j, of the regression measures the variability of the security's returns relative to the market returns and it is the security's beta. Beta is the ratio of the covariance between the security's returns and the market returns to the variance of the market returns. Alpa (α) indicates the return on the security when market return is zero. It could be interpreted as return on the security on account of unsystematic risk. Over a long period of time α should be zero given the randomness of unsystematic risks.

The predicted return represents the return that would be expected if no event took place. The predicted return for a firm for a day in the event period is given by the following market model:

$$E(R_{jt}) = \alpha_j + \beta_j R_{mt}$$

Where R_{mt} is the return on the market index for day 't' in the event period. Since the market model takes explicit account of both the risk associated with the market and mean return, it is used to estimate the expected return (Weston and Kwang, 1996). Abnormal return (AR) is the part of the return on a security on day t that is not predicted, and therefore, is an estimate of the change in firm's share price on that day which is caused by the event The residual is calculated for each day and for each firm. The residual is the actual return for that day for the firm minus the predicted return.

The log returns of the estimation window and also for event window is calculated using the following equation.

$$R_{jt} = \ln (P_{jt/} P_{ij-1})$$

Where

R_{jt} is the daily return on security 'j' on day 't'.

P_{it} is the daily adjusted price of the security 'i' at the end of period't'.

P_{it-1} is the daily adjusted price of the security 'i' at the end of period'$_{t-1}$.

$$R_{mt} = \ln(I._t / I_{t-1})$$

Where,

R_{mt} is the daily return on market index on day 't'. $I._t$ and I_{t-1} is the closing index value on day 't' and '$_{t-1}$', respectively.

The abnormal return is the difference between the actual return on day t and the predicted returns by the market model using the parameters from the estimation window. i.e.,

$AR_{jt} = R_{jt} - E(R_{jt})$

The residual AR_{jt} represents the abnormal return, that is, the part of the return that is not predicted and is, therefore, an estimate of the change in firms share price on that day which is caused by the announcement of credit rating change.

Abnormal returns are averaged across firms (j=1 to N) to produce AAR_t for day 't' using the following formula,

$$AAR_{jt} = \sum_{j-1}^{N} \frac{AR_{jt}}{N}$$

N is the number of firms in the sample. Finally we calculate the cumulative average abnormal return (CAAR) for the event period. The cumulative average abnormal return represents the average total effect of the event across all firms for different time periods in the event window. CAAR is given by,

$$CAAR_t = \sum_{t=-30}^{+30} AAR_t$$

To examine the statistical significance of the average abnormal returns (AARs), *t*–statistic is constructed and the hypothesis that the AAR is equal to zero is tested. The test – statistics for significance of AAR is given by,

$t = AAR_t / \sigma AAR_t$

Where,

$$AAR_t = \sum_{i=1}^{N} AR_{it} / N$$

σAAR_t =

$$\left(\sum_{t=1}^{T} (AAR_t - \overline{AAR_t})^2 \right) (T-1)^{1/2}$$ and T is the number of observations (in our case it is 250).

Where $\overline{AAR} = \frac{1}{T} \sum_{t=1}^{T} AAR_t$

In our study T equals to 250 days i.e.-280 to -31 days from the date of announcement of bond rating change. The above model has been employed by Brown and Warner (1985), Kothari and Warner (1997), Georgen and Genneboog (2004), and Greighton, Gower and Richards (2004).

The statistical significance of cumulative average abnormal returns (CAARs) in various event window is assessed by using the following model:

$t = CAAR_t / (\sigma AAR_t . T^{1/2})$

Where $CAAR_t = \sum_{t=1}^{T} AAR_t$

The above model has been used by Kothari and Warner (1997), Georgen and Genneboog (2004), and Greighton, Gower and Richards (2004).

5. Empirical

ResultsTable No. 1AAR, CAAR and Calculated t-Values for Rating Upgrades

-30^{th} day to -1 day				0 day to + 30 day			
Day	AAR	t-value	CAAR	Day	AAR	t-value	CAAR
-30	-0.00659	-0.51855	-0.00659	0	0.01616	1.27048	-0.03447
-29	-0.00461	-0.36228	-0.01120	1	0.00401	0.31516	-0.03046
-28	-0.01028	-0.80822	-0.02148	2	0.00108	0.08493	-0.02938
-27	-0.01943	-1.52801	-0.04091	3	-0.01231	-0.96841	-0.04170
-26	-0.00708	-0.55662	-0.04799	4	-0.00803	-0.63161	-0.04973
-25	0.01735	1.36475	-0.03063	5	-0.01957	-1.53861	-0.06930
-24	0.01536	1.20759	-0.01528	6	-0.01801	-1.41620	-0.08731
-23	-0.00047	-0.03694	-0.01575	7	-0.01452	-1.14171	-0.10182
-22	-0.01880	-1.47830	-0.03455	8	-0.00628	-0.49381	-0.10810
-21	-0.01149	-0.90336	-0.04603	9	0.02545	2.00101	-0.08266
-20	-0.00240	-0.18846	-0.04843	10	-0.01428	-1.12304	-0.09694
-19	-0.00261	-0.20506	-0.05104	11	-0.00074	-0.05842	-0.09768
-18	-0.02234	-1.75705	-0.07338	12	0.00619	0.48645	-0.09150
-17	-0.00984	-0.77346	-0.08322	13	-0.02868	-2.25504	-0.12017
-16	-0.00200	-0.15746	-0.08522	14	0.00849	0.66735	-0.11169
-15	-0.00135	-0.10645	-0.08657	15	0.01056	0.83074	-0.10112
-14	0.01239	0.97400	-0.07419	16	-0.00230	-0.18061	-0.10342
-13	0.03884	3.05464	-0.03534	17	-0.00234	-0.18368	-0.10575
-12	0.00542	0.42596	-0.02993	18	-0.02912	-2.28957	-0.13487
-11	0.00472	0.37140	-0.02520	19	0.01008	0.79237	-0.12479
-10	0.01534	1.20600	-0.00987	20	-0.00036	-0.02848	-0.12516
-9	0.02652	2.08571	0.01666	21	0.02147	1.68871	-0.10368
-8	-0.01485	-1.16755	0.00181	22	-0.01375	-1.08093	-0.11743
-7	-0.03027	-2.38009	-0.02846	23	0.00921	0.72395	-0.10822
-6	-0.00058	-0.04598	-0.02904	24	0.01332	1.04743	-0.09490
-5	0.00126	0.09897	-0.02778	25	-0.00396	-0.31158	-0.09886
-4	-0.01471	-1.15660	-0.04249	26	-0.00391	-0.30713	-0.10277
-3	0.00743	0.58448	-0.03506	27	-0.00210	-0.16500	-0.10487
-2	-0.00806	-0.63382	-0.04312	28	-0.00526	-0.41394	-0.11013
-1	-0.00751	-0.59053	-0.05063	29	-0.01079	-0.84829	-0.12092
				30	-0.00252	-0.19847	-0.12344

Results of this study reveal that under the market model with log returns, AARs are negative for 20 days and positive for 10 days before the announcement of bond rating upgrade, where as they are negative for 19 days and positive for 12 days after the announcement of the bond rating upgrade. During the whole event period, AARs are negative for 39 days and positive for 22 days. The movement of AARs after the announcement reveals that the share price movements persist after the bond rating upgrade. AARs are statistically insignificant for all the days and negative for majority of the days in window period.

Table No. 2
AAR, CAAR and Calculated t-Values for Downgrades

-30th day to -1 day				0 day to + 30 day			
Day	AAR	t-value	CAAR	Day	AAR	t-value	CAAR
-30	-0.01182	-1.04904	-0.0118151	0	0.004198	0.372705	0.0437585
-29	-0.00128	-0.11328	-0.0130909	1	0.012312	1.093163	0.0560706
-28	0.003941	0.349937	-0.0091497	2	-0.02509	-2.22748*	0.0309829
-27	0.005922	0.525815	-0.0032275	3	0.022821	2.026241	0.0538041
-26	0.001131	0.100401	-0.0020967	4	0.006371	0.565679	0.0601752
-25	0.006368	0.56542	0.0042715	5	0.005746	0.510143	0.0659209
-24	0.018758	1.665503	0.0230298	6	-0.01195	-1.06068	0.0539746
-23	-0.0205	-1.8202	0.0025292	7	0.009245	0.820882	0.0632201
-22	-0.00963	-0.8553	-0.0071039	8	0.001996	0.177249	0.0652164
-21	0.00856	0.760007	0.0014559	9	-0.00823	-0.73035	0.0569906
-20	0.006806	0.604281	0.0082618	10	-0.00299	-0.26581	0.0539969
-19	-0.00436	-0.38667	0.0039068	11	-0.00152	-0.13526	0.0524734
-18	-0.01175	-1.04326	-0.0078433	12	-0.00642	-0.56968	0.0460573
-17	0.004682	0.415664	-0.0031617	13	0.011134	0.98858	0.0571915
-16	-0.00229	-0.2036	-0.0054549	14	-0.00794	-0.70515	0.0492495
-15	0.020956	1.86065	0.0155013	15	0.011234	0.997408	0.0604831
-14	0.00764	0.678358	0.0231415	16	0.013358	1.186021	0.073841
-13	-0.02105	-1.86865	0.0020953	17	-0.02795	-2.48133*	0.0458943
-12	0.012337	1.095394	0.0144325	18	0.010184	0.904189	0.056078
-11	-0.00863	-0.76633	0.0058014	19	0.006771	0.601151	0.0628486
-10	0.002407	0.213702	0.0082083	20	0.010353	0.919246	0.0732019
-9	-0.01633	-1.45034	-0.0081266	21	0.013992	1.242322	0.087194
-8	0.011542	1.024794	0.0034155	22	-0.00417	-0.37029	0.0830234
-7	-0.00459	-0.40753	-0.0011745	23	0.014215	1.262152	0.0972388
-6	0.026984	2.395841*	0.0258095	24	-0.00469	-0.41648	0.0925481
-5	0.013642	1.211202	0.039451	25	0.009054	0.803915	0.1016025
-4	0.006076	0.539463	0.0455269	26	-0.01288	-1.1435	0.0887234
-3	-0.00722	-0.64093	0.0383082	27	0.000713	0.06334	0.0894368
-2	0.003625	0.321894	0.0419336	28	-0.00999	-0.88671	0.0794499
-1	-0.00237	-0.21068	0.0395608	29	-0.00083	-0.07382	0.0786185
				30	0.013747	1.220605	0.092366

The above table and chart reveals that AARs are negative for 13 days and positive for 17 days before the announcement of downgrading. AARs are negative for 13 days and positive for 18 days after the announcement of the downgrading. During the whole event period, AARs are negative for 26 days and positive for 35 days. AARs are positive on majority of the days in the event window. The movement of AARs after the announcement downgrade indicates that the share price movements persist. Interestingly, we find AARs are statistically insignificant on 58 of the 61 days. Our results are consistent with the findings of Pinches and Singleton (1978), Singh and Power (1992). Our results are inconsistent with the findings of Hand, et al., (1992), Kim and Nabar (2003), Goh and Ederington (1993), and Dichev and Piotroski (2001) with regard to the share price responses to the rating changes.

Table No. 3
CAAR for Various Window Periods and t-Values

Window Period	Upgrades		Downgrades	
	CAAR	t-vales	CAAR	t-vales
-30 to +30	-0.12344	-1.24288	0.092366	1.050026
-25 to +25	-0.05088	-0.56022	0.103699	1.289268
-20 to +20	-0.07912	-0.97172	0.071746	0.994853
-15 to +15	-0.0159	-0.22461	0.065938	1.051496
-10 to +10	-0.07174	-1.23101	0.048195	0.93379
-5 to +5	-0.04025	-0.95445	0.040111	1.073803
-2 to +2	0.005674	0.199556	-0.00733	-0.29087
-1 to +1	0.012654	0.574527	0.014137	0.724684
0th day	0.016156	1.27048	0.004198	0.372705
0 to 5	-0.01867	-0.59934	0.02636	0.955485
0 to 10	-0.04631	-1.09805	0.014436	0.386461

0 to 15	-0.05049	-0.99269	0.020922	0.46441
0 to 20	-0.07453	-1.27892	0.033641	0.651799
0 to 25	-0.04824	-0.7439	0.062042	1.080313
0 to 30	-0.07281	-1.02841	0.052805	0.842071

CAARs are negative for larger windows and positive for shorter window (-2 to +2 and -1 to +1) for upgrades. However, CAARs are insignificant for both larger and shorter windows for upgrades. CAARs are positive and insignificant for various event windows except for -2 to +2 period which is negative and insignificant for downgrades. We find persistence of positive trend in CAARs for downgrades and persistence of negative trend in CAARs for upgrades. AARs are positive and insignificant for the announcement day for both downgrades and upgrades. We usually expect the AARs to be positive for the upgrades and negative for the downgrade for the announcement day. However, our results show that it is not the case for the downgrade for this day.

6. Conclusion

Our study examines the stock price responses to the rating changes for the period 1998 to 2005. Examination of 23 events consisting of 17 downgrades and 6 upgrades, reveal that AARs are negative for majority of the days and statistically insignificant for upgrades, and positive for majority of the days and statistically insignificant for downgrades. Our results are inconsistent with the findings of Hand, et al., (1992), Kim and Nabar (2003), Goh and Ederington (1993), and Dichev and Piotroski (2001) who report that bond downgradings are associated with significant negative returns and whereas for upgrades are associated with the small insignificant positive returns. CAARs are also insignificant and negative for different window periods for upgrades. We also find that AARs and CAARs are statistically insignificant and positive for majority of the window period for downgraded firms. The above results reveal that upgrading and downgrading have not provided any additional news to the market. Market has not found any surprises in the announcements as revealed by the continuing trend that started before the event. The absence of any change in the direction of stock price reactions to bond ratings reveals that market anticipates the information provided by credit rating agencies and incorporates this before the event and therefore, event itself does not seem to have any significant impact on the stock prices. However, it is not possible to generalise our results for upgrades and downgrades as our results are based on a small sample.

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