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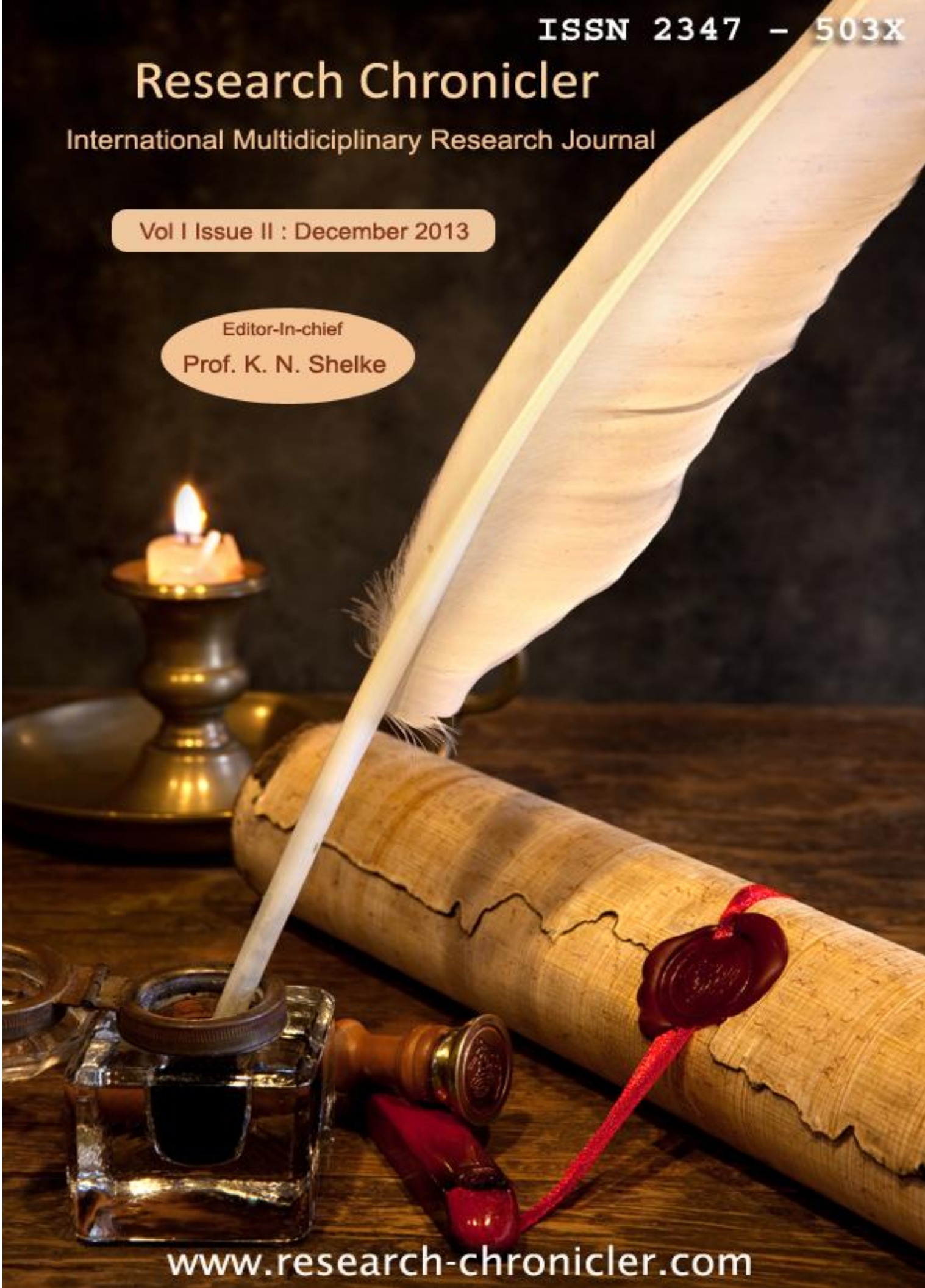

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CONTENTS

Differences in Stock Price Reaction to Bond Rating Changes: With Special Ref from India

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ABSTRACT

There is a paucity of research done in the new issue market in India. What is worse is that much of whatever little work has been done, dates back to the late 1970's and early 1980's prior to the qualitative transformation that took place in the Indian equity markets in the 1980's. Moreover, the advent of free pricing in 1992 has changed the dynamics of the new issue market almost beyond recognition. All this means that the bulk of the work being reviewed here is of doubtful relevance in today's context It was found that firm characteristics do impact the relationship between bond rating changes and stock returns. Small size, low p/b, less liquid, high leverage, more intangible assets and less profitable companies tend to provide positive returns after downgrades implying wealth redistribution effect. They also generally provide positive post – upgrade returns indicating signaling effect. We study the cross variation in stock price reaction to bond rating changes for India. Pre – event returns are significant for downgrades but not for upgrades implying that investors are able to anticipate bad news more than good news. Significant post - event abnormal returns are observed for rating upgrades suggesting the dominance of signaling effect. No post - event abnormal returns are seen in case of downgrades owing to anticipation and early investor reaction in the pre – event period. The research contributes to bond rating and market efficiency literature for emerging markets.

Keywords: Bond Ratings, Stock Price Reaction, Wealth Redistribution and Signaling Effect.

1. Introduction

While the investors gain from this assessment, it is claimed that the firms also benefit because ratings and subsequent rating changes are an effective means of conveying confidential inside information to the investors without revealing anything to the competitors (Kliger and Sarig, 2000; Bannier and Hirsch, 2010). However, recently the rating agencies have been severely criticized. The lack of prompt response by the rating agencies during the East Asian Financial Crisis (1997), the failures of Enron (2001), Worldcom (2002) and Subprime Mortgage crisis (2008) have put a question mark on their reliability and credibility.

The issue regarding the informational content of the ratings has been debated. One school of thought believes that ratings only lower the borrowing costs but do not tell anything new (Wakeman, 1990). The agency's rating change action is based on publicly available information and lags the event. Thus,

the announcement of bond rating changes would not affect market prices, assuming the capital markets are efficient in semi-strong form. Many studies support the premise that bond rating changes do not provide new information (Pinches & Singleton, 1978; Creighton, Gower and Richards, 2007; Mohindroo, 2008).

Credit rating agencies play a very vital role in the financial markets by providing an opinion about the 'quality' or 'creditworthiness' of a particular debt instrument to the investors. The ratings define the default risk for the bond issue over its life. On the other hand, the credit rating agencies claim to possess superior information about the company which is used by them for arriving at their ratings (Goh and Ederington, 1993; Ederington and Yawitz, 1987). Therefore, any change in the ratings would affect security prices.

Again, the exact nature of relationship between rating changes and stock returns needs to be understood. There are two main theories which explain the impact of rating change announcements by the credit rating agency on stock prices. These are -**Information Asymmetry and Signaling Hypothesis** and **Wealth Redistribution Hypothesis** (Romero and Fernández, 2007). The signaling hypothesis suggests that a rating change provides additional information to the market about total value of the firm. A rating change may be seen as a signal indicating future earnings and cash flows of the issuer. Hence, a rating downgrade is associated with a decline in stock prices (Hand, Holthausen and Leftwich, 1992; Elayan, Maris and Young, 1996; Hite and Warga, 1997; Barron, Clare and Thomas, 1997; Dichev and Piotrosky, 2001; Choy, Gray and Raghunathan, 2006; Gropp and Richards, 2001; Benjamin, 2008; Avramov et al. 2009; Chakravarty, Chiyachantana and Lee, 2009; Lal and Mitra, 2011) while an upgrade (or placement on a watch with positive indications) is associated with rise in stock prices (Barron, Clare and Thomas, 1997; Gropp and Richards, 2001; Chakravarty, Chiyachantana and Lee, 2009).

Wealth redistribution hypothesis emphasizes that there is usually a conflict between the interest of bondholders and stockholders. The limited liability may prompt the stockholders to invest in riskier options to earn higher return. Such an approach increases the default risk of outstanding bonds forcing the credit rating agencies to downgrade the rating (Romero and Fernández, 2007). This leads to a decline in the value of bond, which is transferred from bondholders to stockholders, leading to a rise in share price. Conversely, a rating upgrade wills add to a decrease in stock prices. Holthausen and Leftwich (1986) and Zaima and McCarthy (1988) also suggest that if equity shareholders are viewed as holding an option on the value of the firm with an exercise price equal to the par value of the firm's debt, then an increase in the variance of the firm's cash flows would redistribute the wealth from bondholders to stockholders. The higher the volatility, the more the risk and thus the option pricing model for valuation becomes more relevant. Results obtained by Goh and Ederington (1993); Bhoot (1995) and Romero and Fernández (2007) support wealth redistribution hypothesis.

2. Litrature Review

A review of the past research shows that although a lot of studies on the changes in

ratings and their relationship with stock returns have been conducted abroad; there is little research on the subject in India. The limited literature which exists concentrates more on the comparison and analysis of rating methodologies and the performance of various rating agencies (Duggal, 1992; Goswami and Venkatesh, 1999; Raghunathan and Verma, 1992; Bajaj, 1998; Sehgal and Arora, 2004; Kaur and Kaur, 2011). Although some studies do cover the rating changes, but their impact on security prices is not examined (Bajaj, 1998; Sehgal & Arora, 2004). Only a few studies explore this relationship in the Indian context (Mohindroo, 2008; Lal and Mitra, 2011). Moreover, other important areas such as the effect of firm characteristics on the relationship between bond rating changes and stock return behaviour have not been studied. The impact of factors like anticipation, magnitude of rating change, transition to, from or within speculative grade and business cycle on stock returns after rating change in the Indian market is also largely unexamined. Thus, a serious gap exists in the existing literature on credit rating for the Indian environment. The present study attempts to fill this important research gap in bond market literature

Another notable issue is whether all the firms react in a similar manner to the information provided by the rating changes. There may be a differential response to new information in case of companies for which there is little or infrequent information compared to companies which are always in news. The former are much harder to value and arbitrage. For instance, small size, low price to book value (as a measure of relative firm distress as suggested by Chan and Chen (1991)), low liquidity, high asset intangibility, high leverage and low profitability firms are expected to exhibit stronger price reaction to bond rating information, owing to poor disclosures, lower investment analyst and media coverage, higher cost of trading, greater degree of uncertainty in estimating their cash flows and a greater likelihood of earnings management. Dichev and Piotroski (2001) and Creighton, Gower and Richards (2007) reported stronger price reaction for small firms. Avramov et al. (2009) ran cross-sectional regressions of monthly individual stock returns on credit rating and other firm characteristics including book value to market value ratio but did not find it to significantly affect the returns. Cornell, Landsman and Shapiro (1989) found that a firm's stock price response to bond rating variations depends on the net intangible assets of the firm. Kliger and Sarig (2000) show that the bond price reaction to rating change was positively affected by the firm's leverage. In contrast, Goh and Ederington (1993) report that downgrades arising due to a change in the leverage of the firm did not affect the prices of stocks significantly. The actual direction of the impact on returns depends on whether earnings or leverage or both are a surprise.

This paper explores the relationship between bond rating change information and stock return behaviour in India. It examines whether the rating changes have any informational content. It also evaluates the cross-sectional variation in the stock return behaviour to bond rating changes for firms with different characteristics (size, P/B ratio,

liquidity, leverage, intangibles and profitability). The paper inter alia investigates the relationship between pre – event and post – event abnormal returns implying surprise or importance element in case of upgrades and downgrades and firm characteristic based portfolios. It also examines whether factors like magnitude of rating change, transition to, from or within speculative grade and business cycle influence post – event abnormal returns.

The paper is divided into 5 sections including the present one. Section 2 describes data and their sources, section 3 deals with methodological issues. The empirical results are discussed in section 4, while the last section provides summary and conclusions.

3. Data

The data about the bond rating changes was collected from the websites of the two main rating agencies in India namely – CRISIL and ICRA. A list of all the events where a company's bonds had been upgraded or downgraded between November 2003 and February 2011 was made. This consisted of a total of 227 bond rating changes out of which 117 were downgrades and 110 were upgrades. However, these cases were checked for any contamination. The event was considered to be contaminated if any other major announcement like merger or acquisition, divestment, buyback of shares, debenture, GDR or FCCB conversion or exercising of ESOP or ESOS option took place 70 days before or 35 days after the announcement of rating change. Data was also considered contaminated if there was any capital structure change such as declaration of stock dividend, rights issues and stock splits within the event window or if there was an earnings announcement between ±3 days of the date of rating change (Goh and Ederington, 1993). It was also important to identify companies for which regular stock price data was available for the event periods. After data filtering process we finally end up with 70 valid cases of which 31 were upgrades and 39 were downgrades. For all these 70 cases of rating revision, daily closing price data was obtained from BSE Sensex. Daily closing observations for BSE 200 stock index, which was used as market proxy, were also obtained for the corresponding periods. BSE 200 is a broad based value weighted (free float weighted) index which is compiled on the lines of Standard and Poor's Index, USA.

The data for firm characteristics i.e., market capitalization, price to book value ratio, daily trading volume, debt equity ratio, net intangibles to total assets ratio and return to equity ratio was collected from *Thomson Reuter's Datastream* software. The details about measurement of each characteristic as well as the number of cases in each characteristic sorted portfolio are given in Exhibit A. To classify the cases on the basis of firm characteristics, list of BSE 500 companies and the above mentioned attributes was also obtained for each year end from December 2002 to December 2010.

Exhibit A: Measurement of Firm Characteristics

Firm Characteristic	Measurement	Calculation	Number of usable cases	Number of cases in each Portfolio
Size	Natural Log of Market Capitalization	Loge[(Price) X (Number Of shares outstanding)]	51 cases (24 downgrades and 27 upgrades)	Downgrades- 9 large and 15 small size. Upgrades- 19 large and 8 small size.
Price to Book Value Ratio	Market Price to Book Value Ratio	Market Price / Book Value per Share	50 cases (23 downgrades and 27 upgrades)	Downgrades-, 4 high and 19 low P/B. Upgrades- 12 high and 15 low P/B.
Trading volume7	Natural log of Average trading volume to total average trading volume for all companies on BSE 500.	Loge[(Average trading volume for one Year preceding the Date Of rating change) ÷ (total Average trading Volume for all Companies on BSE 500)]	48 cases (23 downgrades and 25 upgrades)	Downgrades-12 high and 11 with low trading volume. Upgrades- 12 high and 13 low trading volume.
Leverage	Debt Equity Ratio	Long-term debt / Shareholders' Equity.	42 cases (18 downgrades and 24 upgrades)	Downgrades- 11 high and 7 low leverage. Upgrades- 11 high and 13 had low leverage.
Intangibles	Net Intangibles to Total Assets Ratio	Net Intangibles / Total assets	44 cases (18 downgrades and 26 upgrades)	Downgrades- 10 high and 8 as low intangibles. Upgrades- 14 high and 12 had low intangibility.
Profitability	Return on Equity	PAT / Average Net Worth	44 cases (18 downgrades and 26 upgrades)	Downgrades- 5 high and 13 with low profitability. Upgrades- 19 high and 7 had low profitability.

4. Methodology

The study has been conducted in two parts. In the first part, the relationship between company characteristics, bond rating changes and stock returns is examined. The impact of bond rating changes is analyzed separately in case of downgrades and upgrades and for each of the company characteristics. We use event study methodology, as developed by Fama, et al. (1969), Brown and Warner (1985) and Campbell, et al. (1997).

The relationship between the bond rating changes and stock returns is also analyzed for portfolios created on basis of different firm characteristics. The characteristics considered include firm size, price to book value ratio, stock liquidity, leverage, nature of assets (intangibles) and profitability. The first step included arranging the BSE 500 companies in the descending order of their respective firm characteristic value (size, P/B ratio, Leverage, proportion of intangibles and profitability) at end of each year (31 December) from 2002 to 2010. The BSE 500 companies were then divided into two equal parts – large and small, each year on the basis of their characteristic value. Company below the median characteristic value was classified as small or low on characteristic otherwise it was classified as large or high on the characteristic[1]. The characteristic category of each case of bond rating change was taken as the category to which the case belonged for the year – end preceding the rating change. Liquidity had to be estimated as average trading volume. The liquidity of stocks was computed for each case of rating change. The companies on BSE 500 were arranged in the descending order of this ratio and divided into two equal parts - high and low based on their liquidity value for each relevant date. Company below the median liquidity value was classified as less liquid otherwise it was classified as highly liquid. The category of each case of rating change was taken as the category to which the case belonged on the relevant date of rating change. Thereafter, upgrade and downgrade portfolios based on each characteristic were analyzed separately using the CAAR analysis.

5. Conclusion

According to Table 1, in case of downgrades, the pre-event CAAR is positive and significant but post – event CAAR is not significant. The results indicate rating changes lag abnormal returns. The existence of lag may imply that the investors pre-empt or anticipate that the rating is about to be downgraded or there are leakages in information and therefore, the reaction exists before the announcement of downgrade. It indicates that the shareholders are able to anticipate the information through other variables related to corporate performance. The positive direction of abnormal returns shows that the wealth redistribution effect dominates and overcomes the negative earnings signal. While the abnormal returns are significantly positive pre-event, they are not significant after the rating downgrades. The investors anticipate in advance that the rating is about to be downgraded and therefore, the wealth redistribution effect is exhausted in the pre-event window leading to insignificant returns in the post – announcement period. Another explanation could be that the downgrade is seen as an indication of deterioration in the financial health of the company which sends a negative signal to the shareholders. Thus, in the post announcement period the positive wealth redistribution effect is cancelled by the negative earnings signal resulting in insignificant returns for the shareholders.

Table 1. Aggregate Analysis: Pre-Event and Post-Event CAAR

	Downgrades		Upgrades	
	Pre - event	Post – event	Pre - event	Post - event
CAAR	0.024*	0.009	-0.002	0.016*
SCAAR	3.358	1.393	-0.516	2.882

* Value significant at 5% level of significance

In case of upgrades, (Table 1), pre-event CAAR is not significant but post upgrade CAAR is found to be positive and significant. The statistical insignificance of pre – event results indicates the lack of anticipation by the shareholders in case of upgrades. It emphasizes that shareholders do not monitor good news or positive developments as closely as bad news or potentially negative developments. This confirms asymmetric investor reaction to different types of information.

In case of upgrades, significantly positive abnormal returns are observed after the rating change and there is no lag or anticipation of the rating change. The positive sign in case of upgrades indicates the dominance of signaling effect i.e. the rating change is seen as an indication of future trend of company's performance.

4.1.2 Analysis on the Basis of Firm Characteristics

Size Based Portfolios - The results on the basis of company size are listed in Panel A of Table 2. It can be seen that the size based portfolios exhibit different return behavior in case of upgrades. While signaling effect dominates in large size portfolio, small sized portfolio does not depict a significant impact after upgrades. However, in case of downgrades, both the large and small size portfolios show dominance of wealth redistribution effect. Thus, they show similar post – downgrade reaction.

Moreover, though theory suggests that small sized firms should respond more strongly to bond rating changes than large firms but the results obtained do not support this conjecture. This is due to the observation of strong post – event abnormal returns in case of large firms both after downgrades as well as upgrades. In case of downgrades, the large size firms demonstrate stronger response (CAAR = 0.064) than small size portfolio (CAAR = 0.039). In case of upgrades, CAAR is significant only in case of large sized firms.

It is also observed that large size firms show anticipation both in case of upgrades and downgrades as evident from the presence of significant pre – event abnormal returns. This anticipation may be because institutional investors have exposure in large companies and these companies are continuously monitored for any developments which may have a bearing on the future cash flows. Moreover, the impact of the news leading to a rating revision is not fully absorbed in the pre – event period and the effect continues after the rating change.

Price to Book Value (P/B) Based Portfolios - Panel B of Table 2 shows results of Price to Book Value based portfolios. The firms classified on the basis of P/B ratio differ in their response to bond rating changes after downgrades. While no significant reaction is seen for high P/B firms after downgrades, for low P/B firms a strong wealth redistribution effect is observed. This may be because in high

P/B firms, both the signaling and wealth redistribution effect cancel each other. Alternatively, it can be said that the entire impact of the information leading to downgrades may have been absorbed in the pre – event period and, therefore, no significant CAAR is observed after the downgrade.

On the other hand, the fundamentally weak[6], low P/B companies demonstrate abnormal returns after announcement. They show significantly positive abnormal returns after downgrade. The positive impact may come from possible increase in leverage of the firms which changes the risk profile of the firm. These companies initially under react to the information leading to rating downgrade during the pre – event period and the effect continues in the post - event period as well, bringing positive abnormal returns later.

In case of upgrades, however, both high as well as low P/B portfolios exhibit signaling effect after announcement.

Moreover, the relationship between bond rating changes and stock returns is more pronounced for low P/B firms compared to high P/B firms. This is indicated by the presence of strong abnormal returns for low P/B firms both after downgrades as well as upgrades. This is particularly evident in case of downgrades where no significant reaction is observed for high P/B firms after downgrades but for low P/B firms a strong wealth redistribution effect is seen after the announcement of rating downgrade. The value of CAAR in their case increases from 0.040 before to 0.070 after the announcement of downgrade.

The results of profitability based portfolios. Price response is more pronounced for small profitability firms compared to large profitability firms. The results for high profitability portfolio are insignificant. For low profitability firms, a response is seen both after upgrades and downgrades. Signaling effect is dominant after upgrades in low profitability firms. This may be because the investors normally do not expect firms with low profitability to be upgraded. The announcement of upgrade is seen as an improvement in the future earnings prospects of the firm. This leads to positive sentiment in the shareholders and generates significant returns. In case of downgrades, wealth redistribution effect dominates and overcomes the signal. Also firms with low profitability are likely to be downgraded, thus, anticipation is seen in form of significant pre – event returns. There is no pre - emption in case of upgrades. This may be because investors monitor negative market developments (leading to downgrades) more closely than good ones (which result in upgrades).

Thus, firm characteristics do impact the relationship between rating changes and stock returns. In case of less informationally efficient firms, wealth redistribution effect dominates in downgrades while signaling effect generally dominates in upgrades. For more informationally efficient firms, the results are not so clear. Further, stock price reaction is stronger for low P/B and low profitability firms (which are expected to be informationally less efficient) viz a viz their counterparts for both rating upgrades as well as downgrades. Similar conclusions however, cannot be drawn while classifying firms on other characteristics.

- *4.2 Factors Affecting Cross –Sectional Post Rating Change Performance*

- 4.2.1 Aggregate Analysis

Table 3 shows the results of regression between the post - event CAR and the independent variables both in case of downgrades and upgrades.

For companies which are expected to

have transparency and better disclosures, the post rating change results are not as strong as their counterparts. There is mixed response to downgrade announcements. In case of downgrades, the wealth redistribution effect dominates in case of only large size, highly liquid and low intangibles companies. Again in case of such firms, the results after upgrade announcement support the signaling effect in only three cases (large size, high P/B, and low leverage).

Analyzing the factors that influence post –rating performance, it is observed that pre – event CAR negatively affects the post - event CAR. The negative sign implies that where the downgrade is anticipated by the investors, the post – event abnormal returns are low, whereas, the post – event abnormal returns are larger in cases where the downgrade is a surprise. The results also confirm that there is a significantly negative relationship between post – event abnormal returns and magnitude of rating change in case of downgrades which is contrary to prior research.

Firm characteristics based portfolios were found to differ cross – sectionally in respect to their response in only two cases. The relationship between pre – event and post – event returns was found to be significantly positive in case of upgrades for portfolios with large trading volume indicating importance of the information being conveyed.

Again in case of portfolio with small proportion of intangibles a significantly positive relationship was observed between business cycle and post – event returns for upgrades. This indicates that in companies with low intangibility the value does not get eroded to a large extent in the downturn of business cycle.

The study shall be useful for regulators, rating agencies, investors, analysts, bankers and academicians.

The research has implications for the regulators like SEBI because the pre – emption of rating change may imply leakages of information and insider trading in case of companies undergoing rating change. The same can be examined by the regulators.

The study is useful for credit rating agencies. The role of credit rating agencies as information providers seems to be over-stated in the system. This is evident from the presence of pre – announcement stock price reaction in a number of cases indicating that the investors are able to gauge the financial position of the firm from indicators other than the rating change announcements. There seems to be a need for closer monitoring of assigned ratings.

The investors and traders can apply the results of the research to form profitable trading strategies.

The banks and other creditors may also find the study helpful in ascertaining how their returns and risk of default varies around rating change. The study is helpful particularly where, a bond rating downgrade is leading to positive returns. Assuming that the overall value of the firm remains constant it implies that the shareholders are gaining at the cost of bondholders owing to redistribution of wealth.

Notes

1. In case of intangibles, all companies which had no intangible assets were put in the low intangibles

category irrespective of where they fell in equal division of companies during classification.

2. This study differs from the work by Goh and Ederington, 1999 in respect of post – event window. While the above mentioned researchers used a 2 day post - event window, this study uses a longer window consisting of 21 days. This has been done due to the reason that impact of rating change is usually lagged and is spread over a longer period of time. Thus, a longer window is used to understand how the impact of bond rating change continues over time.

3. The pre – event window used by Goh and Ederington (1999) consisted of 45 days. However, in this study the window used consists of 20 days which is consistent with the analysis done in the previous sections. For calculating NUMGRADE, ICRA as well as CRISIL's rating scale is converted into numerical form with the highest rating (CRISIL AAA of CRISIL and [ICRA]AAA of ICRA) being given a score of 20, and lowest rating (CRISIL D of CRISIL and [ICRA]D of ICRA)being given a score of 1. The approach of converting the scale of rating change has been followed by a number of researchers like Barron, Clare and Thomas (1997); Goh and Ederington (1999) and Avramov et al. (2009).

4. In September 2008 Lehmann Brothers Holdings Inc. filed for bankruptcy. This was followed by the fall of several other financial corporations. Thus, after this period the global financial crisis became explicit. Hence the period after September, 2008 has been considered as the period of downturn in the business cycle.

5. Fama and French (1995) show that low P/B firms exhibit weaker sales and earnings growth rate historically viz a viz high P/B firms and hence can be classified as fundamentally distressed.

6. The measurement of trading volume is in line with Lee and Swaminathan (2000).

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