AN ANALYSIS OF THE INFORMATION CONTENT OF BOND-RATING CHANGES: A CASE OF DIFFERENTIAL INFORMATION

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This dissertation examines the reaction of common stock prices to the announcement of changes in bond ratings by Moody's Bond Service, while having a control for differential information availability. The Institutional Brokers Estimate System (I/B/E/S) number of security analysts and coefficient of variation of earning per share (EPS) estimates are used as a proxy for information availability of the firms. Past studies differs in their conclusions as to whether the market has responded to announcement of bond rating changes. None of past studies have controlled for differential information availability.

This study, using daily stock returns data and the event study methodology with the statistical test, finds that while the sample of rating downgrades exhibit significantly negative abnormal price effect during the announcement period, the magnitude of this effect is significantly higher for firms with low information availability. For the rating upgrades, the sample as a whole has no abnormal announcement period returns, but the

sample of firms with lower information earns significantly positive abnormal returns. This study provides support for the hypothesis that the announcement effect of bond-rating changes is conditional on the information available about the firm.

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CHAPTER I

INTRODUCTION

Bond ratings are designed mainly to measure the long-term default risk of the bonds. There has been a question of how bond rating agencies obtain information to evaluate this default risk. An argument can be made that bond rating agencies have access to only public available information. This position proposes that the rating agencies are usually behind the market in reacting to that information. Supporters of this argument point out that the rating agencies do not closely monitor the firm that they have rated. For example, rating agencies review most of their ratings only when specific events occur that affect these firms. These specific events may consist of the issuance of new debt or equity, retirement of debt or equity, mergers, and firm reorganization. Pinches and Singleton (1978) found that 54 out of 111 of Moody's bond reratings between 1950 and 1972 were associated with those company-specific events. Wansley and Clauretie (1985) found that 51 out of 164 of the companies placed on Standard and Poor's CreditWatch between 1981 and 1983 were associated with company-specific events. Weinstein (1977) found that the majority (over 50%) of rating changes between 1962 and 1974 resulted from new debt issues. Zonana and Hertzberg (1981) found that only about 11% of outstanding ratings are reviewed under the agencies' normal review process. Using a discrimination model based on accounting and other publicly available data, Kaplan and Urwitz's (1979) found support for the argument that rating agencies reacted to information which was already publicly available. Ang and Patel (1975) compared the predictive performance of the bond-rating prediction models of academic researchers (Horrigan, 1966; West, 1970; Pogue and Soldofsky, 1969) and rating agencies (Moody's and Standard and Poor's) and found that statistical models, using only published financial data, do as well as Moody's and Standard and Poor's in predicting financial distress of the company. In addition, in The Wall Street Journal, Peers (1987) cited the failure of rating agencies in catching the company's crisis before the fact as follow:

> Perhaps the best-know incident involved the record $2.25 billion of bonds sold in the late 1970s and early 1980s for two nuclear power plants built by the Washington Public Power Supply System. The ratings firms assigned the debt rating A-plus and single-A1 ratings, indicating a strong capability to pay interest and principal.
>
> In May of 1981, analysts at Merrill Lynch Capital Markets Inc. and Drexel Burnham Lambert Inc. predicted the power plants would never be built. The rating agencies downgraded the debt soon after, but it remained investment-grade. It wasn't until seven months later, when the power plants were canceled, that Moody's and S & P assigned the debt junk status. The bonds went into default in June 1982, the biggest default in the history of the municipal market.(The Wall Street Journal, September 16, 1987, p.31(W) p.37(E))

A second argument can be made that rating agencies are specialists who have access to non-public information. The reason is that some information acquisition is quite costly and rating agencies can obtain this information at a lower cost. Supporters of this argument are the rating agencies themselves who claim that they have access to information which is not readily available to the public. For example, the rating agencies such as Moody's and Standard and Poor's explain that their rating process normally involves a discussion with management, a visit to company premises, and a pro-forma income statement and balance sheet developed using data supplied confidentially by management. The rating agencies comment as follows:

> Many corporations regularly schedule "update" meetings with us (Standard & Poor's) in those years when they are not selling a new issue of registered debt securities.... ....These meetings provide opportunity for management to keep us abreast of current developments, to discuss potential problem areas, and to update us on any change in the company's financing plans. (Standard & Poor's Rating Guide, 1979, pp. 18)

> ...[We] (Standard & Poor's) often meet with company officials on their own premises to attain a greater exposure to management, to go through new or modernized facilities, and generally to obtain a better understanding of the company. (Standard & Poor's Rating Guides, 1979, pp. 18)

> A substantial portion of the information set forth in company presentations is highly sensitive and is used only for the purpose of arriving at ratings. Such information is kept strictly

> confidential by the Corporate and International Finance Department, is not used for any other purpose, and is not used by any third party or other department at S&P. (Standard & Poor's Industrial Credit Overview, November, 1983, pp. 10)

In addition, Standard and Poor's claims that their review process involves a warning to management of potential rating changes. This practice is to give the management a chance to present counter-arguments through the presentation of new or additional data:

> Once the rating has been determined, the issuer will be notified of such rating. This notification will include not only the rating, but also the major considerations behind the rating. It is our policy to allow the issuer to respond to the rating through the presentation of new or additional data prior to publication. (Standard & Poor' Rating Guide, 1987, PP. 18)

Bond ratings have very important implications for many parties: investors, corporations, states, municipalities, and rating agencies. For investors, bond ratings are used as a surrogate measure for the default risk of the bonds. For example, banks are required to invest in bonds of "investment grade," which means bonds in one of the top four rating categories (Baa and above for Moody's, and BBB and above for Standard & Poor's). For corporations, states, and municipalities, bond ratings influence their cost of borrowing. Falsely underrated bonds cause their cost of borrowing to be higher than what it should be. West (1973) found that bond ratings did systematically affect the yields of bonds even after controlling for some of the firm-specific factors which had been found to determine the risk premium on corporate bonds. For rating agencies themselves, the value of bond-rating services depends on not only whether the bond ratings can provide new information but also whether the information is provided in a timely manner.[1]

Because of the importance of rating implications, the question of whether rating agencies have access to nonpublic available information or provide new information to the security markets is an important issue. Studies have been conducted by researchers investigating the impact of bond-rating change announcements on either common stock or bond prices. A statistically significant announcement date effect would indicate that rating changes are unanticipated and that rating agencies provide new information to the security markets. In other words, rating agencies might have access to information which was not readily available publicly assuming capital markets are efficient in the semi-strong form.[2]

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[1]. For a more extensive duscussion of the importance of bond ratings, see Hickman (1958), Pogue and Soldofsky (1969), West (1973), and Ross (1976).

[2]. "By and large, the (empirical) evidence seems to indicate that capital markets are efficient in the weak and semistrong forms, but not in the strong form". (Copeland and Weston, 1983, pp. 307)

So far, research which investigates the impact of bond rating changes on security prices has produced conflicting results. These studies differ in their conclusions as to whether the market has responded to the rating change announcement. For example, Katz (1974) [monthly bond yield], and Ingram, Brooks and Copeland (1983) [monthly bond yield] found evidence that security prices respond to the announcement of bond rating changes. Pinches and Singleton (1978) [monthly stock returns], and Weinstein (1977) [monthly bond returns] found no evidence of security price response to the announcement of bond rating changes. Griffin and Sanvicente (1982) [monthly stock returns], Glascock (1984) [daily stock returns], and Holthausen and LeftWich (1986) [daily stock returns] found significant negative price response to the announcement of a bond downgrading but found no statistically significant price response to the announcement of bond upgradings. Hettenhouse and Sartoris (1976) [monthly bond yields] found evidence of price response to the announcement of bond upgradings but found no evidence of price response to the announcement of bond downgradings.

Past studies: The Weakness

All the past research which investigates the impacts of bond rating changes on security prices shares a common weakness. That is they all implicitly assume that the information structure was monolithic across firms. As a consequence, when testing abnormal security returns associated with bond-rating changes they assume that the magnitude of abnormal security returns related to the rating changes are homogeneous across firms.

The assumption of a monolithic information structure across firms is an invalid assumption. This is because the concentration of professional security analysis is diverse across firms. Some companies may receive intensive and continuous attention by analysts, while other are neglected by analysts and obtain virtually no regular coverage at all.[3] A growing body of research [Arbel and Strebel (1982, 1983), Arbel, Carvell and Strebel (1983), Barry and Brown (1984), Arbel (1985), Barry and Brown (1986), Dowen and Bauman (1986), Edelmann and Baker (1987)] has suggested that the amount of information available is not monolithic across firms.[4]

If information availability is not monolithic across firm, the announcement effect of rating changes can not be

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[3]. Drexel Burnham Lambert, Inc. Research Concentration in the Standard and Poor's 500. New York: 1977.

[4] For examples, Arbel and Strebel (1982) found that differential attention paid to companies by security analysts affected the capital asset pricing process. They found that stock returns of firms with limited information or "neglected firms" performed better compared with firms with more information available or more "popular firms". Using a period of listing as a proxy for quantity of information available for a security in the market, Barry and Brown (1984) found that there was an association between the period of listing (information proxy) and the security returns.

the same for all firms. When the information availability of the firm is limited, the rating agency may be the only low cost provider of information to investors. Consequently, the announcement of rating change by the rating agency may have an impact on the firm's common stock price. On the other hand, when the information availability of the firm is plentiful, the announcement of bond-rating change by the rating agency may provide less or no new information to investors. Consequently, the announcement of rating change by the rating agency may have less or no impact on the firm's common stock price.

Past studies of bond rating changes have not considered the effect of this differential information availability across firms. As a consequence, when testing the significance of abnormal security returns associated with rating change announcements, these studies did not focus on firms where information was limited in availability. In other words, they failed to control for possible differentials in information about the firm. A failure to control for this differential information could contaminate the data and be a prime cause of conflicting results in those past studies.[5]

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[5]. In a recent bond-rating change study, Holthausen and Leftwich (1986) also suggested that some of the rating changes can be anticipated. They suggested that more powerful tests of the effect of rating change announcements could be done by concentrating on those rating changes that are less anticipated.

Statement of Problem

The problem addressed by this study is to examine whether the announcement of a bond-rating change by a major rating agency such as Moody's adds new information to the common stock market. The results of past studies are conflicting. It is possible that these conflicting findings are because these studies did not control for differential information availability. The impact of a bond rating change announcements should be conditional on the information available about the firm.

Purpose of the Study

The purpose of this dissertation is to empirically re-examine the effects of bond-rating change announcements on common stock returns. The proposed study is unique because it investigates the announcement effects while controlling for information availability (as measured by (1) the Institutional Brokers Estimate System (I/B/E/S) coefficient of variation and (2) the I/B/E/S number of analysts following the firm).[6]

This dissertation has been divided into five chapters.

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[6] The Institutional Brokers Estimate System is a service which monitors the earnings estimates on companies of interest to institutional investors. The estimates are produced by analysts from the research departments of leading Wall Street and Regional brokerage firms. The reason these two variables can be used as information proxies is discussed in chapter 2.

This chapter, chapter 1, is the introductory chapter. Chapter 2 reviews some of the relevant literature pertaining to the bond rating process, studies on bond-rating prediction model, studies on bond-rating changes and bond prices, studies on bond-rating changes and stock prices, other studies related to bond rating changes, studies on bond-rating changes: a summary, studies of differential information, studies of differential information a summary, and the measures of differential information. Chapter 3 discusses the methodology. Chapter 4 discusses the results. Chapter 5 ends the paper with conclusions.

CHAPTER II

LITERATURE REVIEW

This chapter is divided into five main sections. Section 1 reviews the history of bond rating. Section 2 discusses the bond-rating process. Section 3 reviews studies on bond rating prediction models. Section 4 reviews studies on bond rating-changes and bond prices. Section 5 reviews studies on bond-rating changes and stock prices. Section 6 reviews other studies related to bond rating changes. Section 7 reviews studies of differential information, and section 8 discusses the measures of differential information.

History of Bond Rating

The history of bond rating dates back to the period before the first World War. At the time, accounting theory and practice, public regulation of many of the financial aspects of enterprises, and the pressures and requirements for published financial information were primitive and minimal. In response to a need for independent and reliable judgement about the quality of corporate bonds, bond ratings were developed. The first bond ratings were published in 1909 by John Moody in his Analyses of Railroad Investment.

Later on, sometimes in the early 1920's, Standard and Poor's and Fitch started their bond rating services (Harold, 1938). Duff and Phelps did not start their service until 1980.

Bond rating agencies active in the United States today are Moody's Investor Services, Standard and Poor's Corporation, Fitch Investors Service, and Duff and Phelps. However, Moody's Investor Services, and Standard and Poor's Corporation are the two major rating agencies. Together, these two agencies have evaluated more than 92% of the $260 billion of corporate and municipal bonds issued in 1987.[7] In response to criticism that rating agencies reacted late to changes in the financial position of corporations, Standard and Poor's instituted a CreditWatch in 1981. This is a weekly listing of firms placed on CreditWatch for either positive, negative, or, sometimes, "developing" reasons, with the expectation that later the firm would be removed from the list with its bond rating altered or affirmed. Moody's and other rating agencies still do not have a service similar to CreditWatch.

Bond ratings are used by investors as a measure of the bond's default risk. Regulatory agencies also use bond ratings to determine the eligibility of bonds for investments by regulated financial institutions. The

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[7] Alexandria Peers. "Value of Bond Ratings Questioned By a Growing Number of Studies", The Wall Street Journal September 16, 1987, p 31(W) p 37(E).

comptroller of the Currency initiated regulations requiring the use of bond ratings in 1931. Some of these regulations are still in effect (Harold, 1938; West, 1973).

Before 1960, rating agencies obtained their revenue from publication subscribers and there was no charge for the issuers. Currently, rating agencies obtain primary revenue from fees charged from issuers (or underwriters). Besides rating corporate bonds, rating agencies also rate other publicly traded securities. These include municipal bonds, commercial paper, and preferred stocks.

Bond ratings are designed essentially to rank issues in order of their probability of default. Moody's uses a nine class rating system with the highest rating of Aaa and the lowest rating of C. Standard and Poor's uses a twelve class rating system with the highest rating of AAA and the lowest rating of D. Both Moody's and Standard and Poor's also assign three gradations within the five classes from AA (Aa) to B. For example, standard and Poor's AA class would consist of AA+, AA, and AA-, and Moody's Aa class would consist of Aa1, Aa2, and Aa3.

For corporate and municipal bonds, investment-grade ratings range from triple-A down to triple-B-minus (at Standard and Poor's) or Baa3 (at Moody's). Junk bonds typically are issued by troubled municipalities or heavily indebted companies to repay bank loans, buy out share holders, or finance takeovers. They are rated double-B-plus

TABLE 2.1

Description of Ratings

Moody's Ratings	Descriptions
Aaa	Best quality-smallest degree of investment risk
Aa	High quality-as judged by all standards.
A	Upper medium grade-possess many favorable investment attributes.
Baa	Medium grade-neither highly protected, nor poorly secured.
Ba	Possess speculative elements-future cannot be considered as well assured.
B	enerally lacking in characteristics of desirable investments.
Caa	Of poor standing-may be in default or in danger of default.
Ca	Obligations speculative in a high degree-often in default.
C	Lowest rated-extremely poor prospects of ever attaining any real investment standing.

Standard & Poor's Ratings	Descriptions
AAA	Highest grade-ultimate protection of principal and interest.
AA	High grade-differ only in a small degree from AAA bonds.
A	Upper medium grade-principal and interest are safe, and they have considerable investment strength.
BBB	Medium grade-borderline between definitely sound obligation and those where the speculative element begins to dominate; lowest qualifying bonds for commercial bank investment.
BB	Lower medium grade-only minor investment characteristics.
B	Speculative-payment of interest not assured under difficult economic conditions.
CCC - CC	Outright speculation-continuation of interest payments is questionable under poor trade conditions.
C	Income bonds on which no interest is being paid.
DDD - DD - D	In default, with rating indicating relative salvage value.

Source: Moody's Bond Record and Standard and Poor's Bond Guide.

or lower (at Standard and Poor's) and Ba1 or lower (at Moody's). Table 2.1 provides a description of Moody's and Standard and Poor's bond ratings.

Bond Rating Process

The process that agencies use in rating corporate bonds can be described in the following manner. The issuer or underwriter contacts the rating agency(s) to rate the newly issued bonds. In many occasions, the issuer finds it desirable to have a meeting with the rating agency prior to registration of a public debt issue with the Securities and Exchange Commision (SEC). The purpose of the meeting is to get an indication of what the rating might be (for the first-time issuer) or to determine the impact on the existing ratings (for the company who is issuing additional long-term debt).

Once an issue has been registered with the SEC, the issuer will submit the rating agency two documents: an offering circular, and a company presentation. The rating agency will arrange a another meeting with the issuer to discuss in detail key operating and financial plans of the issuer. At the meeting, the issuer will give the rating agency a formal presentation which details: (1) the company's 5-year historical and 5-year forecasted income statements, balance sheets, and source and application of funds analysis; (2) comparisons with similar companies; (3)

analysis of capital spending; (4) financing alternatives; and (5) other key factors the issuer may believe will impact on the rating.

To arrive at the rating, the rating agency will aim at determining the capacity of the issuer with regard to the timely payment of principal and interest. The rating agency will evaluate the company on the following aspects: proposed issue and terms of the indenture, capitalization, nature of the company's business and history, management, earnings and cash flow history and forecast, financing plans, ratio analysis (including accounting factors), and rating history (if applicable).[8]

Once the rating has been determined, the rating agency will notify such rating to the issuer. The notification will include not only the rating, but also the major considerations behind the rating. The rating agency will allow the issuer to respond to the rating through the presentation of new or additional data prior to publication. Following this process, the rating agency will reconvene to consider the new information. After that, the rating will be disseminated.

As a part of their normal review process, the bond rating agencies will continuously re-evaluates the firm that

[8] For a more detailed description of process that the agencies use in arriving at a rating, see Standard and Poor's Rating Guide 1987).

they have rated. For Standard and Poor's rating agency, if the agency finds that the financial conditions surrounding the firm have changed and might result in assigning new ratings, the agency will list the firm on CreditWatch. CreditWatch is a weekly listing of firms for either positive, negative, or, sometimes, "developing' reasons, with the expectation that later the firm would be removed for the list with its bond rating changed or affirmed. The period that the firm can be on CreditWatch may range from weeks to months. For Moody's and other rating agencies, these agencies do not have a service similar to CreditWatch. Thus, when they find that the financial conditions surrounding the firm have changed sufficiently to assign the new rating, they would assign the new rating to the firm's bonds. Besides the normal review process, some company-specific events can also cause the rating agencies to review or change the rating of the bonds. These company-specific events include the announcement of new debt or equity financing, retirement of debt or equity, merger, or reorganization of the firm.

Studies on Bond-Rating Prediction Model

The question "What variables either explain and/or predict bond ratings?" has been asked since 1909 when bond ratings were developed by John Moody. After the development of bond ratings, academic research on bond ratings focused on the question of whether readily available statistics on a firm's operations and financial condition could be used to predict bond ratings.

Harold (1938) was the first study on bond ratings. His study has stimulated the production of academic research on bond-rating prediction models, and other bond rating studies. In his study, Harold (1938) compared the performance of the three bond rating agencies (Fitch, Moody's, and Standard and Poor's) and showed that there were differences in ratings assigned to the same bond by different rating agencies.

Motivated by Harold's study, Hickman (1958) studied the performance of corporate bonds rated by Moody's, Fitch, and Standard and Poor's. His study related the rate of default, promised yield, realized yield, and the loss rate to each of the following nine factors: industry; agency rating; legal status in Maine, Massachusetts, and New York; market rating; times-charges-earned ratio; ratio of net income to gross income; lien position; size of issue; and asset size of obligor. He found that the agency ratings as well as market yield were useful factors for the determination of a bond's default risk.

Later on, Fisher (1959) hypothesized that the risk premium (as measured by the difference between yields on corporate bond and U.S. treasury bonds with the same maturity) on corporate bonds is a function of both default and marketability risk. Fisher employed a multiple regression model to test his hypothesis. In his model, four independent variables were used. They are, the coefficient of variation of net income, the number of years since defaults on debts had occurred, the ratio of the market value of equity to the par value of debt, and the market value of publicly traded bonds. Fisher found that each of these variables significantly explained the risk premium of the bonds.

After Fisher's (1959) study, there has been a number of research efforts which have tried to develop models to predict bond ratings. This research may be classified into two groups: groups that employed multiple regression models and groups that employed multiple discrimination analysis. Those that employed multiple regression models were Horrigan (1966), Pogue and Soldofsky (1969), West (1970), and Perry, Henderson and Cronan (1984). Those that employed multiple discriminant analysis were Pinches and Mingo (1973; 1975), and Belkaoui (1980). Ang and Patel (1975) compared the performance of bond-rating prediction models of these researchers and concluded that statistical models could predict the company's financial distress as well as Moody's and Standard and Poor's. Thus, prior studies have found that some financial factors can be used to predict bond ratings. The key financial factors are subordination, size of company, degree of financial leverage, profitability, interest coverage, and stability of dividends and earnings (Hawkin, Brown and Campbell, 1983).

Studies on Bond-Rating Changes and Bond Prices

All the studies done on bond ratings before 1974 were concerned with financial factors that could be used to determine bond ratings. The production of academic research on the efficiency of the capital market before 1974 (for example: Cootner, 1964; Jensen, 1968; Fama, Fisher, Jensen and Roll, 1969; and Fama, 1970) has stimulated another direction for research on bond ratings. The new direction has related bond ratings to the study of capital market efficiency and has been concerned with the question of whether there is any security price reaction to the announcement of bond rating reclassifications.

Katz's, 1974

The first study which investigated the announcement effects of bond-rating changes on security price was Katz's study in 1974, which investigated the announcement effects on the bond market of electric utility companies. Katz (1974) employed an event-oriented procedure for testing the efficiency of bond market. He investigated the abnormal monthly bond yield-to-maturity twelve months prior to and five months after the bond rating change. The period of study was between 1966 and 1972. His sample consisted of 66 utility firms. A regression model was used to estimate and forecast the yield to maturity. The explanatory variables in the model were 1) the term to maturity, 2) the total size of the issue outstanding, and 3) the coupon rate. He found no anticipation of rating change.[9] Moreover, he found that the full adjustment of bond prices was not completed until six to ten weeks after the rating change announcements. His study raised a question regarding the efficiency of the bond market.

Grier and Katz, 1976

The second study which investigated the effects of bond rating change announcements on the bond market appeared in 1976. Being different from Katz's 1974 study, Grier and Katz (1976) investigated the announcement effects of bond-rating changes on monthly bond prices of both industrial and public utility companies. They looked at the abnormal price changes and factored out the effect of a change in credit market condition by having a control group of bonds similar in all respects to the group of bonds whose rating was changed. The only difference was that the control group did not experience a rating change. The period of study was from 1966 to 1972. However, this study examined the announcement

[9]. Katz's sample included downgraded and upgraded bonds. He looked at the absolute value of abnormal monthly bond-yields-to maturity.

effects of bond downgradings only. They found that the industrial bond market anticipated downgradings, but the public utility bond market did not anticipate downgradings. Grier and Katz (1976) suggested that the bond market was segmented.

Hettenhouse and Sartoris, 1976

In the same year, Hettenhouse and Sartoris (1976) also examined the announcement effects on the bond market for public utility companies. Their study examined the effects of both downgraded and upgraded bonds. The sample was split into upgraded and downgraded groups. The study employed a control index to estimate expected monthly bond returns. This index was an average yield on similarly rated utility bonds.

They found that the public utility bond market anticipated bond downgradings. There was no announcement effect of bond downgradings on the announcement date. However, bond upgradings were unanticipated. There was an announcement effect on the announcement date. Bond price adjustments occurred on the event date. However, they noted that a mechanical trading rule could not be used to earn abnormal profits. The bond market tended to either anticipate or react immediately to rating change information.

Weinstein, 1977

Weinstein (1977) examined the behavior of corporate bond prices surrounding the announcement of rating changes. This study differed from all the previous works (Katz's, 1974; Grier and Katz, 1976; and Hettenhouse and Sartoris, 1976) in three aspects. First, Weinstein's sample of rating changes covered both utility and industrial bonds. Second, the sample also covered both rating increases and decreases.[10] Third, instead of using bond yields, he looked at the monthly holding period of bond returns. The data were from July 1962 through July 1974.

As for the results, he found that there was evidence of price changes during the period from 18 to 7 months before the announcement of rating changes. There was no evidence of bond price reaction during the 6 months prior to the rating change announcement. There was a small price reaction during the month of the rating change or for six months after the change. These findings were in contrast with Katz's (1974), and Grier and Katz's (1976).

Ingram, Brooks, and Copeland, 1983

Ingram, Brooks and Copeland (1983) examined the announcement effects of bond rating changes on municipal

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[10]. Weinstein's sample combined upgraded and downgraded bonds. Also, it is a combined sample consisting of both industrial and utility bonds.

bond yields in the secondary market. In their study, the effect of bond rating changes was measured by the difference between the monthly average yield premium for municipalities which experienced a rating change with the monthly average yield premium for equivalently rated municipalities which experienced no rating change. Their sample was split in to bond downgrading and upgrading groups. The period of study was from August 1976 to February 1979. They found that the impact of bond rating changes (on both downgrade and upgrade samples) occurred during the month of the rating change. Before the rating change, the yield premium differential did not appear to anticipate the impending rating change. A differential yield premium was statistically significant in the month of rating change. They concluded that:

> " [R]ating changes may provide information in the municipal market where significant lags separate events and financial information disclosures, where the cost of gathering and analyzing information is substantial, and where rating changes occur contemporaneously with (and reflect) the release of new information to the public" (Ingram, Brook and Copeland, 1983, pp. 10).

Studies on Bond-Rating Changes and Stock Prices

Pinches and Singleton, 1978

Prior to 1978, research which investigated the announcement effects of bond-rating changes only examined the effects on the bond market. In 1978, the study of stock market effects appeared. The first research which investigated the effects of bond-rating changes on stock prices was the study by Pinches and Singleton (1978).

In their study, Pinches and Singleton (1978) investigated the process of stock price adjustment. They tried to answered three questions: 1) Do bond-rating changes possess new information that investors have not already discounted?; 2) What is the average rate changing lag. i.e., the difference between the time investor's actions signify their recognition of significant changes in the prospects of the firms and the time the rating agency changes the firm's bond rating?; and 3) Is there a difference in the rate changing lag when a company-specific event (i.e., new debt or equity financing, retirement of debt, merger, etc.) occurs simultaneously with the rating change?

Their study employed monthly stock returns from the CRSP (Center for Research in Security Prices) tape. The period of study was between January 1950 and September 1972. The market model and event-study methodology as described by Fama, Fisher, Jensen, and Roll (1976) was used to estimate and calculate abnormal stock returns. The estimation period was 18 months before (month -18) and 12 months after (month +12) the event month. The cumulative Abnormal Residual (CAR) was accumulated over the period -30 to +12. Their sample consisted of 207 firms with 111 firms and 96 firms experiencing downgrades and upgrades, respectively.

They found that : 1) the announcement of both downgrades and upgrades were fully anticipated; and 2) the bond rating changes were anticipated by about 15 to 18 months except for downgradings associated with company-specific events. For downgradings associated with company-specific events, the anticipatory period was no more than six months. In addition, they also found that the industrial bond market anticipated the rating changes more than the public utility bond market.

Griffin and Sanvicente, 1982

Griffin and Sanvicente (1982) examined the adjustments in the firm's common stock price during the eleven months before and during the month of announcement of bond rating changes. They looked at upgraded and downgraded bonds separately. The data was monthly stock return data. Being different from the study of Pinches and Singleton (1978), Griffin and Sanvincente employed three approaches for measuring abnormal security returns. The first approach was to derive security residual returns from the one-factor market model. The second approach was to derive residual returns from the two-factor cross-sectional model as described in Black (1972) and Fama and MacBeth (1973). The third approach was to derive residual returns for a given firm in a portfolio as the difference between the actual return and the return on a matched control portfolio. Griffin and Sanvicente employed a statistical t-test of cumulative prediction errors to test over the interval from period -11 to 0, where period 0 represented the month of bond-rating change. The result from the one-factor market model method suggested that rating changes had no statistically detectable impact on common stock prices. However, based on the two-factor model residual and return difference method, the results were consistent with the proposition that bond downgradings convey new information to common stockholders. The null hypothesis was rejected for downgradings focusing on either the residual return in the month of announcement or on the cumulative residual returns in the preceding eleven months. However, for bond upgradings, the residual returns were not statistically significant in the month of announcement, although, in the eleven preceding months, upgraded firms experienced positive abnormal returns. They concluded that their result did not fully support the findings of past research. In addition, they noted that their results raised questions about the adequacy of studies that employ only one method of estimating abnormal security returns.

Glascock, 1984

Glascock (1984) examined the stock price reaction to bond rating change announcements by Moody's Bond Service as reported in the Moody's Bond Survey.[11] He investigated the stock price reaction in terms of a residual from a single index market model around the announcement date. Glascock's (1984) research differed from Pinches and Singleton's (1978) and Griffin and Sanvicente's (1982) studies by employing the daily stock return and performing a statistical testing of the residual. The Cumulative Prediction Error was computed from day -90 to day 0 and for various other intervals. The study used the data from January 1977 to December 1981. Stock return data were obtained from the CRSP (Center for Research in Security Prices) data tape.

Glascock found that bond re-ratings offered new information. However, there was some degree of anticipation of rating changes. He found that the excess stock return for the downgraded sample on the announcement day is .6% which was statistically significant. There was a reversal of residuals after the announcement date; but this reversal was not statistically significant. For the upgrades, there was no significant reaction on the announcement date. There was a statistically significant negative reaction from day +1 to +10. The cumulative residual for days +1 to +10 was -2.8% with a t statistic of -3.85.

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[11]. Glascock looked at bond downgradings and upgradings separately.

Holthausen and Leftwich, 1986

Holthausen and Leftwich (1986) examined the effects of bond rating change announcements on common stock returns during the period between 1977 and 1982.[12] Holthausen and Leftwich criticized past studies which investigated the effects of bond-rating changes on security prices which had tried to draw conclusion regarding whether rating agencies acted too early or too late in announcing the rating changes. They argued that without knowledge of the rating agency's loss function, it was difficult to draw the conclusion that security price performance in the period preceding the rating change was evidence of slow reaction by rating agencies. Instead, Holthausen and Leftwich argued that a price response on the announcement of a rating change on the announcement date was evidence that rating agencies provide some information not already incorporated in the security price. Thus, in their study, Holthausen and Leftwich focused on a two-day window (rating-change announcement date and one day after the announcement date) and aimed at answering the question: Do rating agencies provide information to the capital market?

Their study used daily stock returns and differed from other past studies on four major grounds: 1) The press release date was used as the event date, and the primary

[12]. Holthausen and Leftwitch looked at bond downgradings and upgradings separately.

emphasis was on the two-day announcement period (day 0 and day +1). 2) Observations with contaminating announcements were eliminated. (The observations were considered to be contaminated if the firms' stories about the rating changes appeared in the Wall Street Journal Index during the four trading days, day -1 to day +2, came from a source other than the rating agency(s).) 3) The magnitude of the rating change under different conditions was investigated. These conditions were when the rating change affected a bond's investment grade status, when the rating change closely followed a similar change by the other agency, and when the rating change was a resolution of CreditWatch. 4) The effects on stock prices of Standard and Poor's CreditWatch additions and resolutions were also examined.

Holthausen and Leftwich found that the downgrades (across class) by both Moody's and Standard and Poor's provided information.[13] The downgrades (across class) by both Moody's and Standard and Poor's were associated with negative abnormal stock returns in the two-day window beginning the day of the press release by the rating agency. Significant negative abnormal performance was also found after eliminating observations containing obvious concurrent (potentially contaminating) news releases. However, they found little evidence of abnormal performance on

[13] Holthausen and Leftwich found no evidence of stock price reaction to the upgrades.

announcements of an upgrade. In addition, they also found significant abnormal returns associated with announcements of additions to the Standard and Poor's CreditWatch List, when either a potential downgrade or a potential upgrade was indicated. Furthermore, the evidence suggested that resolutions of CreditWatch provide less information than rating changes not preceded by CreditWatch announcements.

Other Studies Related to Bond Rating Changes

Wansley and Clauretie, 1985

Wansley and Clauretie (1985) examined the announcement effects of both rating-change announcements and CreditWatch placement on both stock and bond prices. The period of study was from November 1981 to December 1983.

For the bond price study, monthly abnormal price changes were calculated for the sample of bonds using a paired comparison technique similar to that employed by Grier and Katz (1976). For the stock price study, the market model was employed to estimate the company's daily stock returns, and the event-study methodology introduced by Fama, Fisher, Jensen, and Roll (1969) was used.

They found that there was no market reaction when firms were listed on CreditWatch with subsequent rating affirmed. However, there was a significance market reaction to those rating changes where the listing was followed by downgradings. They concluded that the bond market did not appear to be as efficient as the stock market, because the relative bond prices continued to decline as long as seven months after the rating change.

Davidson and Glascock, 1985

Davidson and Glascock (1985) examined the common stock return behavior (as measured by residuals of common stock returns) of firms whose preferred stock ratings were changed by Standard and Poor's as reported in Standard and Poor's CreditWeek. The period of study were from 1978 to 1982. The single index market model was used to estimate the common stock returns. Daily common stock return data was taken from the CRSP (Center for Research in Security Prices) tape. The sample in their study consisted of 109 upgrades and 131 downgrades. The upgrade sample contained 83 non-utility and 26 utility firms, while the downgrade sample contained 75 non-utility and 56 utility firms.

They found that: 1) the market anticipated the re-ratings (both downgrades and upgrades) by approximately 40 days for the complete sample (utility and non-utility firms); 2) the downgrades in the utility subsample did not have any negative drift over the event (before or after) period. They concluded that the market's reaction to the downward re-ratings for utilities' and nonutilities' preferred stocks was different.

Zaina and McCarthy, 1988

Zaina and McCarthy (1988) examined the impact of bond rating changes on both bond and common stock prices. Zaina and McCarthy examined both the information content hypothesis and the wealth redistribution hypothesis.[14] Zaina and McCarthy hypothesized that one reason which may have caused past studies to find no significant results for upgrades was because the wealth redistribution effect (resulting in decreasing stock value) dominated the increasing value due to the upgrade information (information content effect).

The bonds of firms without rating changes were paired (in terms of industry, rating, yield to maturity) with bonds of firms with rating changes to form separate experimental and control portfolios. They were able to identify twenty eight matched pairs of rating changes by Standard and Poor's between January 1981 to June 1981. Weekly bond and common stock prices were obtained from The Wall Street Journal. Both excess stock and bond returns were obtained by calculating the difference between securities of firms

[14]. The information content hypothesis predicts that ratings change because the market value of the firm changes. According to this hypothesis, the announcement effect will cause both the market value of debt and equity to change in the same direction as the rating change. The wealth redistribution hypothesis predicts that the rating changes because the variance of the firm's cash flows change. According to this hypothesis, the value of the equity will change in a direction opposite to that of the rating change.

without the rating change and the firms with the rating change.

As a result, they found evidence of the wealth redistribution effect. The information content of bad news dominated firm downgradings, while the wealth redistribution effect dominated firm upgradings. They concluded that the lack of information content for bond upgrades resulted from the offsetting effects of wealth redistribution and information content.

Studies on Bond Rating Changes: A Summary

Studies on the subject of bond rating changes can be classified in to two groups. The first group (see table 2.1) investigated the impact of bond rating changes on the bond market. These studies consist of the study by Katz (1974), Grier and Katz (1976), Hettenhouse and Sartoris (1976), Weinstein (1977), and Ingram, Brooks and Copeland (1983). The second group (see table 2.2) investigated the impact of bond rating changes on the stock market. These studies consist of the work by Pinches and Singleton (1987), Griffin and Sanvincente (1982), Glascock (1984), and Holthausen and Leftwitch (1986).

Besides the bond rating change studies, there are (see table 2.3) Davidson and Glascock's (1985) study which investigated the impact of preferred stock rating changes on stock prices, Wansley and Clauretie's study (1985) which

TABLE 2.2

Summary on Bond-Rating and Bond-Prices Studies

Author's name and Year	Period of Study	Method of Study	Result on: Elec.Util.		Industrial		Munici.	
			Up.g	Dw.g	Up.G	Dw.G	Up.g	Dw.
Kantz (1974)	1966-72	Look at monthly bond yield.		U*	--	--	--	--
Grier & Katz (1976)	1966-72	Look at monthly abnormal price changes.	--	U	--	A	--	--
Hettenhouse & Sartoris (1976)		Use a control index to estimate expected monthly bond yield.	U	A	--	--	--	--
Weinstein (1977)	1962-74	Look at monthly holding period of bond returns.			A**		--	--
Ingram, Brooks & Copeland (1983)	1976-79	Look at difference between the monthly ave. yield premium for bond with rating changes and no rating changes.	--	--	--	--	U	U

Note: A = Anticipated; U = Unanticipated.
* means the sample was not split into downgrading and upgrading.
** means the sample was not split into downgrading and upgrading and also the sample consists of utility and industrial companies.
-- means no test for that industry/type of rating change
Up.g = Upgrades
Dw.G = Downgrade

TABLE 2.3

Summary of Bond-Rating Changes and Stock-Prices Studies

Author's Name and Year	Period of Study	Method	Results on: Upgrade	Downgrade
Pinches & Singleton (1978)	1950-72	Event-Study Monthly stock returns.	A	A
Griffin & Sanvincente (1982)	1960-75	Event-Study Monthly stock returns.	A	U
Glascock (1984)	1977-31	Event-Study Daily stock returns.	A	U
Holthausen & Leftwich (1986)	1977-82	Event-Study Daily stock returns.	A	U

Note: A = Anticipated; U = Unanticipated

TABLE 2.4

Other Studies Related to Rating Changes

Author's Name & Year	Period of Study	Method	Results
Wansley & Clauretie (1985)	1981-83	Look at monthly abnormal price changes.	1) Anticipated when firms are listed on CreditWatch with subsequence ratings affirmed. 2) Unanticipated when firms are listed on CreditWatch with subsequence down ratings
Davidson & Glascock (1985)	1978-82	Event study on Preferred stock rating changes. Impact on common stock prices.	1) Market anticipated the re-ratings by 40 days before the downgradings and upgradings for complete sample (utility and non utility sample). 2) The downgrades in the utility subsample did not have negative drift over the event period.
Zaina & McCarthy	1977-82	Examined effect on both bond and stock markets.	There is evidence of wealth redistribution effect.

investigated the impact of CreditWatch placement on both bond and stock markets, and Zaina and McCarthy's (1988) research which investigated the information content and wealth redistribution hypotheses of bond rating changes.

Katz's (1974) and Weinstein's (1977) were the early studies which investigated the impact of bond rating change on the bond market. Both looked at the impact of bond rating changes without separating the sample into downgraded and upgraded bonds. Katz found that the bond market did not anticipated rating changes, while Weinstein found that the bond market anticipated rating changes. However, the difference between their studies is that while Katz's sample consists of electric utility companies, Weinstein's sample was a combined sample of utility and industrial companies.

Hettenhouse and Sartoris (1976), and Ingram Brooks and Copeland (1983), looked at the impact of bond rating changes by separating the samples into downgraded and upgraded bonds. Hettenhouse and Sartoris looked at public utility companies and found that bond downgradings were anticipated, while bond upgradings were unanticipated. Ingram Brooks and Copeland looked at the rating changes of municipal bonds and found that both downgradings and upgradings were unanticipated.

Grier and Katz's (1976) examined the impact of bond rating changes on bond downgradings of public utility and industrial companies. They found that downgradings of public utility were unanticipated but the downgradings of industrial companies were anticipated.

The first study which investigated the impact of bond-rating changes on the stock market was Pinches and Singleton (1978). Their study used monthly stock return data and employed event-study methodology as introduced by Fama, Fisher, Jensen, and Roll (1976). They found that both bond downgradings and upgradings of both industrial and utility bonds were anticipated.

After Pinches and Singleton's study, there were other studies which investigated the impact of bond rating changes on the stock market. These studies consist of the studies of Griffin and Sanvincente (monthly stock return) (1982), Glascock (daily stock return) (1984), and Holthausen and Leftwich (daily stock return) (1986). The findings of these studies were in conflict with Pinches and Singleton's study. These studies found that bond downgradings were unanticipated but bond upgradings were anticipated.

In addition to the studies of either bond or stock prices discussed above, there are other studies which are related to bond rating changes. Wansley and Clauretie (1985) investigated the announcement effects of both rating-change announcement and CreditWatch placement on both stock and bond prices. They found that CreditWatch placements were anticipated when companies were listed on CreditWatch with subsequent rating affirmations. However, CreditWatch placements were unanticipated when the listing was followed by downgradings. Davidson and Glascock (1985) examined the impact of preferred stock rating changes on common stock prices. They found that both preferred stock downgrading and upgrading were anticipated. Zaina and McCarthy (1988) investigated the impact of bond rating changes on both common stock and bond prices. However, being different from other bond-rating change studies, their study examined both the information content hypothesis and wealth redistribution hypothesis. They found evidence that the wealth redistribution effect dominates the information content effect.

Studies of Differential Information

Arbel and Strebel, 1982

In 1982, Arbel and Strebel addressed the question of whether the differential attention which companies received affected the capital asset pricing process. Arbel and Strebel (1982) selected securities from the Standard and Poor's Index companies. The degree of attention given to companies by security analysts was measured by research concentration rankings (RCR) obtained from two sources: Drexel Burnham Lambert report, and Standard and Poor's

Earnings Forecaster.[15] Research rankings were based on the number of analysts regularly following listed companies. Monthly stock returns were obtained for the S&P 500 stocks from data on the Compustat Tape. The excess stock returns were calculated by using the two moment capital asset pricing model.

As a result, Arbel and Strebel found that there was a relationship between the level of security research and excess returns from stocks. The firms that were relatively neglected by security analysts showed superior market performance compared with those that were intensively researched. From 1972 to 1976, the average annual return, including dividends, for the most neglected group of common stocks on the S&P 500 listing was about 18% compared with 7% for the highly followed group. Arbel and Strebel called this the "neglected firm effect". This neglected firm effect still existed even after market risk as measured by the beta coefficient was factored out. In addition, this neglected firm effect was found to exist beyond that associated with size. Although, it was found to be stronger for small firms. Arbel and Strebel explained that the existence of the neglected firm effect resulted from greater uncertainty concerning ex-ante return distributions.

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[15]. Drexel Burnham Lambert, Inc. Research Concentration in the Standard and Poor's 500 New York: 1977; Standard and Poor's Corporation. Earnings Forecaster (weekly publication).

Investors demanded a positive premium above the return predicted by the two moment capital asset pricing model as a compensation for greater uncertainty associated with lack of information for the security.

Arbel and Strebel, 1983

Arbel and Strebel (1983) extended their 1982 worked by addressing the following questions: 1) Does analyst attention affect the way that the market prices securities? In other words, do neglected securities performed better or worse compared with the more popular firms?; 2) If neglected securities performed better or worse compared with the more popular firms, what is the reason?; 3) What are the practical implications for investors in knowing about neglected securities? This study was different from their 1983 study in the following aspects: 1) The period of study was longer, covering the period from 1970 to 1979; 2) The study assessed the results for portfolios that were less than perfectly diversified; 3) The study explored the practical implications of the neglected firm effect for investors.

Arbel and Strebel measured the degree of analyst's attention by a research concentration ranking based on indicators from two sources: the number of analysts regularly following the firm's security taken from the Drexel Burnham Lambert, Inc., surveys, and the number of analysts reporting earning forecasts as published in the Standard and Poor's Earnings Forecaster. Their study included the firms in the S & P Index. They classified the firms into three portfolios (highly followed by analysts, moderately followed by analysts, and neglected by analysts) based on research concentration. The risk and return performance measures were computed for the three portfolios of securities. The Capital Asset Pricing Model was used to control for possible differences in Beta risk. Beta coefficients and excess returns were calculated for each company and each portfolio. In addition, the returns were also adjusted for differences in unsystematic risk as well as in total risk by using the standard deviation of returns. As a result, they found that analyst attention affected the way securities were priced. The average annual return for the neglected stocks (neglected by analysts) was significantly higher than for the more popular stocks (highly followed by analysts): 16% vs. 9%. Also, even adjusted for both Beta and unsystematic risk (as measured by the standard deviation of returns), the neglected companies still outperformed the more popular companies. In addition, they found after controlling for the firm sizes, neglected firms still significantly outperformed the highly followed firms. Arbel and Strebel concluded that there was an opportunity for investors to benefit from the higher return on neglected companies by trading levels of confidence for higher returns.

Arbel, Carvel and Strebel, 1983

Arbel, Carvel, and Strebel (1983) investigated the neglected firm effect further. This study differed from their previous study (Arbel and Strebel, 1982; Arbel, and Strebel, 1983) in the way that the degree of neglect was measured in terms of actual investment by institutions, rather than analyst attention. Their study employed a sample of 510 firms randomly drawn from the New York Stock Exchange, the American Stock Exchange, and the over-the-counter markets. The period of study was from 1971 to 1980. The firms were divided into three Institutional Concentration Rankings (ICR) (ICR 1 comprised the securities most intensively held by institutions; ICR 2 comprised the securities moderately held by institutions; and ICR 3 comprised the most institutionally neglected securities) according to institutional holding data published by Standard & Poor's. Portfolio risk adjusted performances in terms of the Sharpe (1966) index (returns per unit of total risk), the Treynor (1965) index (returns per unit of systematic risk), average excess returns and returns per unit of unsystematic risk were calculated.

As a result, they found that the shares of firms neglected by institutions outperformed significantly the shares of firms widely held by institutions. In addition, they found that the superior performance persisted over and above any small firm effect. Both small- and medium-sized neglected firms exhibited superior performance.

Barry and Brown, 1984

Barry and Brown (1984) examined a model of market equilibrium in which there was less information available about some of the securities in the market than others. The quantity of information was measured by the number of observations or length of period of listing of the securities. The data used in their study consisted of all securities traded on the New York Stock Exchange (NYSE) from December 1926 to December 1980. The CRSP value weighted index was used as an index of market returns.

As a result, Barry and Brown found an association between the length of the period of listing (a proxy for quantity of information) and security returns. Stocks with shorter periods of listing offered higher returns and vice versa. Barry and Brown called this the 'period of listing effect'. Moreover, this period of listing effect still existed even after any size effect and January effect had been factored out.[16]

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[16]. To factor out the size effect, Barry and Brown (1984) classified the securities by size (as measured by total market value of equity outstanding). The January effect was factored out by eliminating the January stock return data from the sample.

Arbel, 1985

Arbel (1985) examined the relationship among the four anomalies in stock returns: The Small-firm Effect, The Neglected-firm Effect, The P/E Anomaly, and The January Effect.[17] He tried to show that all of these anomalies resulted from one primary cause: the 'information deficiency'. His data consisted of 1000 companies, and the period of study was from 1978 to 1982. To measure the degree of neglect, Arbel used three types of proxies (as reported by Standard and Poor's): 1) the number of financial institutions holding common stocks of the firm, 2) the percentage of the firm's outstanding shares held by institutions, and 3) a weighted measure of institutional attention calculated as the product of (1) multiplied by (2). The coefficient of variation in analysts' mean earnings forecast as reported by Institutional Brokerage Estimation System (I/B/E/S) was used as a measure of

[17]. Small firm effect is described as the relative higher stock returns of smaller firms compared with larger firms. The Neglected-firm effect is described as the relative higher stock returns of lesser researched firms compared with more highly researched firms. The P/E Anomaly is described as the relative higher stock returns of low P/E stocks compared with high P/E stocks. The January effect is described as a relatively high stock return in January compared with other months.

information deficiency or the proxy for estimation risk.[18]

As a result, Arbel found that the higher returns for small, neglected, low-P/E stocks and for January trades was due to the existence of an information deficiency premium. He concluded that generic stocks, like generic products, sell for less and for precisely the same reasons that relate to availability of information.

Dowen and Bauman, 1986

Dowen and Bauman (1986) investigated the small firm effect, low price-earning (P/E) ratio effect, and the institutional popularity-neglect effect. Being different from Arbel's (1985) study, this study investigated the dominance and consistency of these three effects on a year-by-year basis for a longer period (fourteen years, from April 1, 1969 to March 31, 1983). The sample of common stocks and necessary data were taken from Standard & Poor's (S&P) Compustat Price-Dividend-Earnings and S&P Compustat Primary Industrial file. These common stocks were those that were traded on the New York Stock Exchange or the American Stock Exchange. The P/E ratios were determined by relating the market price on March 31 for the year of the

[18] I/B/E/S, a division of Lynch, Jones and Ryan, monitors and records current earnings estimates of more than 1000 security analysts on a monthly basis. The coefficient of variation was calculated by dividing the standard deviation of different analysts' earnings per share estimates by the mean of the estimates and multiplying by 100.

study to the primary earning reported for the preceding calendar year. The size was determined by multiplying the number of common stocks outstanding by the market price on March 31 of the year studied. The popularity-neglect of a stock was measured by the number of institutional investors holding the stock as reported in the S&P Stock Guide. The data from the Center for Research in Security Prices (CRSP) was used for calculating the annual stock return for each stock. Ordinary Least Square (OLS) regression was run to test the significance of the three special effects (size, P/E, and neglected) for each year.

As a result, they found that, all the effects were significant on the basis of the F test in ten out of fourteen years. During these ten years, the P/E ratio was significant six times but had an inappropriate sign in two cases. Size was significant eight times but with an inappropriate sign twice. Institutional holdings of a firm (neglect) were significant five times but with inappropriate signs on three occasions; in each of those three cases, size was significant with a correct sign.

Dowen and Bauman concluded that none of the effects provided excess returns every year and size tended to dominate both the P/E and neglected firm effects.

Barry and Brown, 1986

Barry and Brown (1986) examined whether the relative lack of information about firms and their securities affected the risk and return of the securities. If so, was this risk diversifiable? Their proxy for availability of information was the period that stocks were listed in the stock exchange (period of listing). The data set they used was the CRSP monthly returns file for all securities that were listed on the New York Stock Exchange (NYSE) during the period December 1925 through December 1980, that were listed on the exchange for at least 61 months, and that had a least 21 months of data on the return file. The period of listing was obtained from the CRSP tape and the archives of the NYSE. They found larger stock returns associated with firms with more limited information. Their result led to the conclusion that limited information was a systematic or nondiversifiable risk.

Edelman and Baker, 1987

Edelman and Baker (1987) expanded the investigation of institutionally neglected firms by determining the rate at which returns respond to changes in institutional ownership. In addition, they also examined the relationship between the neglected firm effect and the P/E ratio effect. The data for their study was from two sources. The number of institutional owners was from the CDA Investment Technologies' Spectrum Universe Report. Data for the stock price, dividends, and earnings were taken from the

COMPUSTAT tape.

Their methodology to determine the relationship between institutional ownership and common stock returns had two steps. The first step was to apply market-adjusted returns and level of institutional ownership to a one-way analysis of variance (ANOVA). This step was to identify the critical event dates by finding the level of ownership at which market-adjusted returns showed a significant decline. Twenty-one quarterly holding period returns were calculated for each of the 107 stocks. The second step was to determine the behavior of portfolio segregating or deficient returns by forming portfolios based solely upon the number of quarters before or after a firm was held by at the least the level of institutional ownership as found in the first step.

As a result, Edelman and Baker found that the t-values in the first step showed a significant reduction in excess returns when the number of institutional owners was greater than eight. In the second step, Edelman and Baker found that the quarterly average excess return declined rapidly after quarter zero. (Quarter zero was the first quarter in which the firm's stock was held by nine or more institutional investors.) Their results indicated that as firms became more widely held, market-adjusted returns declined and a substantial decline occurred when the number of institutional owners was greater than eight. In addition, Edelman and Baker found that there was a relationship between P/E ratio and the level of ownership. Wider ownership increased P/E ratios. This result was in agreement with the finding of Arbel (1985), but was in conflicts with the finding of Dowen and Bauman (1986) who found that the P/E ratio was independent of neglect as measured by the number of institutional owners.

Studies of Differential Information: A Summary

In the past, there have been a number of studies of the subject of differential information. These studies have all been consistent in their findings regarding firms and stocks with limited information. The main findings of these studies was that stock prices of neglected firms or firms with limited information available showed superior performance, after adjusting for either beta or total risk, compared with firms with plentiful information. The only difference among these studies is how information is measured. Arbel and Strebel (1982) and Arbel and Strebel (1983) used the number of analysts following the firms as a proxy for information. Arbel, Carvel, and Strebel (1983), and Edelman and Baker (1987) used the number of institutional owners as a measure for information. Barry and Brown (1984) used a period of listing as a measure of information. Arbel (1985) used (measures of information) firm's size, P/E ratio, number of financial institutional holding common stocks, and the coefficient of variation in analysts' mean earnings forecast. Dowen and Bawen (1986) used firm's size, P/E ratio, and the number of institutional investors holding the firms' stock as the measures of information.

Measures of Differential Information

The relative lack of quantity of information about firms and their securities is referred to as "differential information". In the past, the quantity of information regarding firms and their securities was measured indirectly in many ways. In sum, the literature shows that past studies have used eight measures: 1) period of Listing (the amount of time that the security has been listed on the market stock exchange); 2) firm size (aggregate market values of securities); 3) P/E ratios (Price/Earning ratios); 4) the number of financial institutions holding the stock; 5) the percentage of the firms's outstanding shares held by institutions; 6) a weighted measure of institutional attention calculated as (4) multiplied by (5); 7) the number of security analysts following the firm; 8) the coefficient of variation in analyst's mean earnings forecasts (as reported by Institutional broker Estimation System (I/B/E/S)).

Period of Listing

Period of listing (the amount of time that the security has been listed on the stock exchange) is one of the proxies for the amount of information available about securities to the security analyst. This is because the period of listing reflects the number of observations of historical returns that could be used in analyzing a security. Klein and Bawa (1977) identified a situation where investors were to employ a model to analyze securities based on only historical data. In this situation, they would be using a traditional Markowitz model which would require parameters such as mean returns of all securities, the variances or standard deviations of returns of all securities, and the covariances of returns between all possible pairs of securities. In order to draw reliable inferences about the covariance matrix and vector of means, a large number of observations would be required. A pancity of observations could cause errors in estimation of the mean returns. The errors in the estimation of mean returns would be correlated to the extent that the underlying returns were themselves correlated. In addition, when the number of securities exceeded the number of data points used to calculate the covariance matrix, the estimated covariance matrix was singular. In this case, Klein and Bawa showed that investors would diversify away from low information (fewer observations) securities.

The period of listing as a proxy for information was utilized by Barry and Brown's studies (1984, 1985, 1986). These studies found an association between security returns and their period of listing. In particular, firms with relatively short periods of listing had higher returns. Barry and Brown (1984, 1985, 1986) explained that limited information securities increased portfolio risk. As a consequence, investors required higher returns on these securities.

However, period of listing can not be regarded as a perfect proxy. The reason is that the amount of information about securities may not be the same for all securities that have been listed for the same length of time. In addition, the parameters can change over time. If so, then old data may not be a reliable indicator of a security's current situation (see Barry, 1978).

Firm Size

Firm size (aggregate market value of common stocks) can be used as a proxy for quantity of information. The reason is that analysts for major brokerage houses tend to produce reports on firms for which the brokerage houses could generate a large amount of business. This practice results in greater information production for larger firms. In addition, security analysts normally would prefer to investigate relatively large firms because the size and frequency of transactions could justify the expenditure of search costs. Zeghal (1984) found that earnings announcements and financial statements have larger effects on returns for smaller firms. These findings were consistent with the hypothesis that there was less information available on the smaller firms. In addition, past research (Banz, 1981; Reinganum, 1981; and Roll, 1982) has supported the existence of a small firm effect. They have found that small firms tended to have larger average returns than larger firms even after adjusting for risk. This was because the lack of information about smaller firms and their securities caused the market to require increased returns.

P/E Ratio

The P/E ratio could be one of the possible proxies for information regarding the firms and their securities. An empirical test of the Capital Asset Pricing Model (CAPM) found that the P/E ratio was one of the factors that explained the security returns not captured by beta. For example, Basu (1977) found that low price/earning portfolios had rates of return higher than could be explained by the traditional two moment CAPM. Edelman and Baker (1987) found that neglected firms (firms with a low number of institutional owners) had abnormal returns after adjusting for risk because of information deficiencies. They also found a relationship between the neglected firm effect and the P/E ratio effect, implying that the P/E ratio was also related to informational deficiencies.

Number of Financial Institutional Holding the Stock, Percentage of the Firm's Outstanding Shares Held by Institutions, and A Weighted Measures of Institutional Attention (Calculated as the Product of the Previous Two)

The number of financial institutions holding the stock, percentage of the firm's outstanding share held by institutions, and a weighted measure of institutional attention are some of the proxies that have been used in measuring the quantity of information regarding the firms and their securities. With respect to their preferences, mutual funds, banks, and money managers do not want to take the greater risk perceived to be associated with informationally deficient of the securities. Arbel (1983) investigated the performance of firms' stocks which were neglected by institutions. He measured the degree of neglect by using the number of financial institution holding the stock. He found that shares of firms neglected by institutions outperformed significantly the shares of firms widely held by institution. The conclusion was reached that neglected securities offer a premium as a compensation for associated information deficiencies. In addition, in his study, Arbel (1985) used three different measures of neglect by using (1) the number of financial institutions holding common stocks of the firm, (2) the percentage of the firm's outstanding shares held by institutions, and (3) a weighted measure of institutional attention calculated as the product of (1) and (2). As a result he found an association between the institutional interest and security return: the smaller the institutional interest the higher the return. This relationship existed for all three measures of institutional neglect.

Number of Security Analysts Following the Firm's Securities

The number of security analysts following the firm's securities is one of the proxies that can be used for information regarding the firms and their securities. The concentration of security research performed by security analysts is diverse. Some companies recieve intensive and continous attention by security analysts, while other receive no regular coverage at all. As a consequence, the information production is low when only a small number of analysts are studying a security. Moreover, with respect to their preferences, instutional investors may not want to take the greater risk perceived to be associated with limited information securities. They are expected to follow a prudent investment policy, which frequently means doing what everybody else does. As a result of this instutional investor behavior, the common stock market may be segmented, with certain securities continously receiving little attention by security analysts. Indeed, some studies (Arbel and Strebel, 1982, 1983;) have found a 'neglected firm effect'. Those firms that were relatively neglected by security analysts exhibited market performance superior to that of highly researched firms.

Arbel (1985) also explained that the stock market is like a product market. There are two types of stocks: brand-name stocks and generic stocks. Financial analysts usually closely followed brand-name stocks on a continuous basis because they are of interest to the investment community. As a consequence, every piece of information is not only immediately recorded and assessed but also often predicted and taken into consideration in advance. On the other hand, generic stocks are those that analysts do not follow on a regular basis. As a consequence, there is less information produced for these generic stocks.

Arbel and Strebel (1982, 1983) investigated returns of securities which had a low degree of research concentration. The degree of research concentration was measured by the number of analysts following the firm. The number of security analysts was taken from the Drexel Burnham Lambert, Inc., surveys, and the number of analysts reporting earning forecasts as reported in the Standard and Poor's Earning

Forecaster. They found a 'neglected firm effect' in terms of superior performance for lesser researched companies.

Coefficient of Variation in Analysts' Mean Earning Forecast as reported by Institutional Brokerage Estimation System (I/B/E/S)

The variance in analysts' expectations regarding the company's future earnings (I/B/E/S coefficient of variation) could be used as a measure for the amount and quality of information related to a particular stock. This is because information deficiency tends to be directly related to the degree of disagreement among analysts regarding the company's future. If the professional security analysts are the most accurate estimators of ex ante expectations, then a high level of disagreement represents confusion and information deficiency. On the other hand, a full consensus indicates no information deficiency. The variance in analysts' expectations regarding the company's future earnings as a measure of quantity of information was proposed by Cragg and Malkiel (1982). Strebel (1983) found that excess returns earned by small and neglected firms can be explained by a respecified Capital Asset Pricing Model incorporating the I/B/E/S dispersion of analysts' forecasts of earnings in the risk measure. Arbel (1985) investigated the relationship among the four anomalies: small-firm effect, neglected-firm effect, P/E anomaly, and January effect. He used the coefficient of variation in analysts' mean earnings forecast as reported by Institutional Brokerage Estimation System (I/B/E/S) as a proxy for information deficiency. He found that the four anomalies were related to one common variable: information deficiency.

CHAPTER III

METHODOLOGY

This chapter is divided into 3 sections. The first section describes the steps of the research method, sample selection, and data. The second section defines the hypotheses to be tested. The third section discusses the model and the event study methodology used in the empirical testing.

Steps of Research Method, Sample Selection, and Data

The research methodology, sample selection, and data development were as follows:

1) A sample of all firms, with dates of rating changes between April 1982 and July 1987, that met the following criteria from the Moody's bond Survey were selected:[19]

a) There must be 421 days of stock return data on the Center for Research in Security Prices (CRSP) tapes, specifically 360 days before and 60 days after the rating change announcement.

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[19] Moody's modified its rating system to include detailed gradations in April 1982. Thus, the sample period starts in May 1982 in order to include only bond rating changes under the new system. Also, there was a stock market crash on October 19, 1987. Thus, the period of study ends on July 1987 in order to avoid stock price movement due to this event.

b) There must be no other rating change six months prior or six months after this change. (Firms with multiple rating changes occuring at least one year apart are treated as seperate observations.)

c) The firm must be included in the Institutional Brokers Estimate System (I/B/E/S) during the month of (if the event date falls after the 17 th of the month) or one month before (if the event date falls on or before the 17 th of the month) the month of the event date.[20]

2) (i) The number of analysts providing earning estimates, and (ii) the coefficient of variation in analysts' mean earnings forecast for each firm selected in step (1) was obtained from the Institutional Broker Estimate System (I/B/E/S) data tape;

3) (i) The number of analysts, and (ii) the coefficient of variation in analysts' mean earnings forecast obtained in step (2) were ranked in deciles;

4. The total sample of firms selected in step (1) were classified into 3 subsamples: low analyst's attention

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[20] The firms must be included in the Institutional brokers Estimate System (I/B/E/S) in this manner in order to be able to obtain the number of analysts and coefficient of variation of estimated EPS (earning per share) from the I/B/E/S data tape. Also, the I/B/E/S Monthly Summary Data book mailed to its customer on about the 17 th of each month. (Firms with the number of analyst equal to one will be eliminated because these firms will have a value of coefficient of variation of estimated EPS equal to zero.)

subsamples, medium analyst attention subsamples, and high analyst's attention subsamples; low analyst attention subsample consists of firms with the number of analysts in decile rankings one through three, medium analyst attention subsample consists of firms with the number of analysts in decile rankings four through seven, and high analyst attention subsample consists of firms with the number of analysts in decile rankings eight through ten;

5. The total sample of firms selected in step (1) were classified into 3 subsamples: low analyst disagreement subsample, medium analyst disagreement subsample, and high analyst disagreement subsamples; low analyst disagreement subsample consists of firms with the cofficient of variation in decile rankings one through three, median analyst disagreement subsample consists of firms with the coefficient of variation in decile rankings four through seven, and high analyst disagreement subsample consists of firms with the coefficient of variation in decile rankings eight through ten;

6. The low, medium, and high analyst attention subsamples from step 4 were classified into downgrade across-rating-class subsample, downgrade within-rating-class-subsample, upgrade across-rating-class subsample, and

upgrade within-rating-class subsample;[21]

7. The low, medium, and high analyst disagreement subsamples in step 5 were classified into downgrade across-rating-class subsample, downgrade within-rating-class-subsample, upgrade across-rating-class subsample, and upgrade withing-rating-class subsample;

8. The contaminated observations in each classified subsamples from steps 6 and 7 were eliminated;[22] (Observations are contaminated if the Wall Street Journal story about the rating change contains information from sources other than Moody's, or if any other firm-specific information appears in the Wall Street Journal during the four trading days, day -1 to day +2, around the day 0 announcement date.)

9. An event-study was performed and a Z-statistic test was calculated (as discussed in detail in section four of this chapter) for the low and high analyst attention, and

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[21] A rating change from one class to another class is called "across-class" rating change. A rating change within the same class is called "within-class" rating change. For example, a rating change from Aaa to Aa+ or from B- to Caa is an across-class rating change and a rating change from Aa+ to Aa or Ba- to Ba+ is a within-class rating change.

[22] Generally, large or well known firms have a tendency to have news appear in the Wall Street Journal more often than small or lesser known firms. As a result, large or well known firms have tendency to be eliminated from the sample. To preserve the diversity of the subsamples (low analyst attention subsamples vs high analyst attention subsamples, and low analyst disagreement subsample vs high analyst disagreement subsample), contaminated observation are eliminated at this step rather than at step 1.

low and high analyst disagreement subsamples from step 8;[23]

10. The difference between the (mean of standardized) Z-statistics for the event-date prediction errors of stock returns, PE_0, for the pairs of subsamples was tested: low analyst attention vs high analyst attention subsamples, and low analyst disagreement vs high analyst disagreement subsamples.[24]

11. (i) The I/B/E/S number of analysts, and (ii) the I/B/E/S coefficient of variation were regressed against the event-date (day 0) prediction error, PE_0, for each of the downgrade and upgrade subsamples. (This is to test the statistically significant relationship between the degree of announcement effect and the information proxies.)

Table 3.1, presents the samples of rating changes that meet restrictions 1.a through 1.c for contaminated and non-contaminated samples.[25] For the contaminated sample there are 653 rating changes: 402 (61.6%) downgradings and 251

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[23] The medium analyst attention and analyst disagreement subsamples are ignored because the purpose of the study is to focus on the pairs of two extreme subsamples.

[24] The test of the difference in (mean of standardized) Z-scores is as follows: Ho: $\bar{Z}_1 - \bar{Z}_2 = 0$ (no difference in mean Z); Test: $(\bar{Z}_1 - \bar{Z}_2)/(1/J_i + 1/J_i)^{1/2}$, where Ji, i = 1, 2 = number of firms.

[25] Contaminated sample is the sample before eliminating the observations which have the confounding events in a 4-day interval, day -1 through day +2. Noncontaminated sample is the sample after elimating the observations which have the confounding events in a 4-day interval, day -1 through day +2.

TABLE 3.1

Sample of Rating changes of Corporate Debt announced by Moody's Between May 1982 and July 1987[a]
Contaminated vs Non-Contaminated Samples

	Contaminated Sample	Non Contaminated Sample	Loss	% Loss
Downgrades:				
Across-Class[b]	223	133	90	40.4
Within-Class[c]	179	114	65	36.3
Total	402	247	155	38.6
Upgrades:				
Across-Class	113	74	39	34.5
Within-Class	138	110	28	20.3
Total	251	184	67	26.7
Total Rating Changes:	653	431	222	34.0

[a] These rating changes cover only firms with common stock listed on either the New York Stock Exchange (NYSE) or the American Stock Exchange (AMEX).

[b] A rating change from one class to another class is called an "across-class" rating change. The examples are rating changes from Aaa to Aa+ or B- to Caa.

[c] A rating change within the same class is called a "within-class" rating change. The examples are rating changes from Aa+ to Aa or Ba- to Ba+.

TABLE 3.2a

Classified Subamples of Rating Changes of Corporate Debt announced by Moody's Between May 1982 and July 1987 Contaminated vs Non-Contaminated Subsamples

	Contaminated Subsamples	Non-Contaminated Subsamples	Loss	%Loss
		Analyst Attention		
Low	192	139	53	27.6
Medium	274	176	98	35.8
High	187	116	71	38.0
Total	653	431	222	34.0
		Analyst Disagreement		
Low	196	118	78	39.8
Medium	265	178	87	32.8
High	192	135	57	29.7
Total	653	431	222	34.0

TABLE 3.2b

Classified Subamples of Rating Changes of Corporate Announced by Moody's Between May 1982 and July 1987 Contaminated vs Non-Contaminated Subsamples

Contaminated Sample

	Downgrades		Upgrades		Total
	Across	Within	Across	Within	
Analyst Attention					
Low	60	45	37	50	192
Medium	93	78	49	54	274
HIgh	70	56	27	34	187
Total	223	179	113	138	653
Analyst Disagreement					
Low	56	35	48	57	196
Medium	71	75	47	72	265
High	96	69	18	9	192
Total	223	179	113	138	653

Non-Contaminated Sample

	Downgrades		Upgrades		Total
	Across	Within	Across	Within	
Analyst Attention					
Low	37	31	28	43	139
Medium	54	49	31	42	176
HIgh	42	34	15	25	116
Total	133	114	74	110	431
Analyst Disagreement					
Low	27	15	32	44	118
Medium	40	49	30	59	178
High	66	50	12	7	135
Total	133	114	74	110	431

TABLE 3.3

222 Contaminated Observations Classified According to Types of News.

News	Number of Observations	Type of News*
Net income announcement	21	u
Earning loss announcement	17	b
Bankruptcy/ Chapter 11	12	b
Quarterly dividend announcement	12	u
Obtained a contract	11	u
Standard and Poor's rating change announcement	11	u
Issuance of new debt	11	u
Acquisition or takeover related	10	u
Court case related	7	u
Earning decrease announcement	7	u
Named a management	5	u
Omitted dividend	5	b
Sold business	4	u
Stock split	4	u
Opposed tender offer	4	u
Default debt	3	b
Issued preferred stocks	3	u
Droped Nuclear Power Plant	2	b
Dividend decrease	2	b
Cancelled project	2	u
Tender offered	2	u
Earning increase announcement	2	g
Cut dividend	2	b
Other news	63	u
Total	222	

Bad news	(b) =	60
Good news	(g) =	2
Unidentified	(u) =	160

* Most of the time it is ambiguous to classify the news as being good news or bad news, even the news such as bankruptcy news. For example, if bankruptycy news is the news which appears first time through the media and the investors have no knowledge about this before, then it is a bad news. However, if this news is the news which clarifies the previous news, it can be good news. The same situation can also applies to other news. In addition, according to the theory of finance, a particular news can also be either good or bad news. For example, a project being canceled is a good news if the project is a non-profitable project. However, it is a bad news if it is the failure of the project. It is noted that the classification of good or bad news is based on the author's intuition.

(38.4%) upgradings. These rating changes are also categorized according to whether they are within or across rating classes. There are 336 rating changes (51.5%) that are across-class changes and 317 (48.5%) that are within-class changes. Of the 317 across-class rating changes, 223 are downgrades and 113 are upgrades. Of the 317 within-class rating changes, 179 are downgrades and 138 are upgrades.

For the non-contaminated sample, there are 431 rating changes, 247 (57%) downgrades and 184 (43%) upgrades. Similarly, the rating changes are also categorized according to whether they are within- or across- class changes. There are 207 (133 + 74) rating changes (48%) which are across-class rating changes and 224 (114 + 110) rating changes (52%) which are within-class rating changes. Of the 207 across-class rating changes, 133 are downgrades and 74 are upgrades. Of the 224 within-class rating changes, 114 are downgrades and 110 are upgrades.

The 4th and 5th columns of table 3.1 present the numbers and percentage of rating changes lost due to the elimination of contaminated observations, respectively. After the elimination of contaminated observations, the total loss for the sample is 222 which accounted for 34% of the original (contaminated) sample.

Table 3.2a and 3.2b present a detail of rating changes for classified subsamples. A comparison is made between contaminated and noncontaminated observations. In table 3.2a, it is noted that high analyst attention and low analyst disagreement subsamples tend to have a high percentage of contaminated observations. The losses in the high analyst attention subsample and low analyst disageement subsample are 38.0% and 39.8%, respectively. This is because high analyst attention firm and low analyst disagreement firms tend to be large or well-known firms. Consequently, they tend to have news appear in The Wall Street Journal more often.

The 222 contaminated observations are the result of news regarding the companies which appeared in The Wall Street Journal. Table 3.3 presents the type of news that appeared in The Wall Street Journal which contaminated the 222 observations. Please noted that most of the news that can be clearly identified was bad news. Of the 222 news items, 60 are clearly bad news, 2 are clearly good news, and 160 can not be identified as bad or good news.

Hypothesis Testing

Test of the Announcement Effect

Theoretically, the null and alternative hypotheses about the announcement effect of a bond-rating change for firm i during time t involve a comparison of the conditional mean of the stock return's prediction error, $E(PE_{it}|I)$, and the unconditional mean of the stock return's prediction error, $E(PE_{it})$, regard to the information I; where, I = dg denotes downgrading and I = ug denotes upgrading.

$$Ho: \quad E(PE_{it}|I) - E(PE_{it}) = 0 \text{ for } I = ug \text{ or } dg$$

$$Ha: \quad E(PE_{it}|I) - E(PE_{it}) > 0 \text{ for } I = ug \text{ and}$$

$$E(PE_{it}|I) - E(PE_{it}) < 0 \text{ for } I = dg$$

Practically, the below hypotheses will be employed to test the selected subsamples:

$$Ho: \quad Z(PE_0) \geq 0 \text{ for downgrading}$$

$$Ha: \quad Z(PE_0) < 0 \text{ for downgrading}$$ [26]

[26] If a rating change provides information about the probability of default on the firm's bond, it can have an ambiguous effect on the stock price under different circumstances. If the probability of default changes because the firm's value changes, ceteris paribus, the announcement of a bond downgrading (upgrading) will have a negative (positive) impact on the stock price. However, if the probability of default changes because the variance of the firm's cash flows changes, ceteris paribus, option pricing theory suggests that the announcement of a bond downgrading (upgrading) will have a positive (negative) impact on the stock price due to the wealth redistribution effect - a transfer of wealth from bondholder to stockholder in case of downgrading and a transfer of wealth from stockholder to bondholder in case of upgrading. All the past studies which addressed the announcement effect of bond downgrading (upgrading) found a negative (positive) impact on stock prices. This suggested that the effect due to the change of a firm's value dominated the wealth redistribution effect. Thus, this study expects the sign of the

Ho: $Z(PE_0)$ < or = 0 for upgrading

Ha: $Z(PE_0)$ > 0 for upgrading,

where,

$Z(PE_0)$ = the Z-statistic of the prediction error of the stock return on day 0 (event-date).[27]

A failure to reject the null hypothesis would mean that there is no evidence that stock prices react negatively (positively) to a bond downgrading (upgrading) announcement. A rejection of the null hypothesis would mean that stock prices react negatively (positively) to a bond downgrading (upgrading) announcement.

Test of the Relationship Between the Magnitude of the Announcement Effect and the Degree of the Availability of Information

The relationship between the magnitude of the announcement effect of bond-rating changes and the degree of

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announcement of a bond downgrading to be negative and the sign of the announcement of a bond upgrading to be positive.

[27] The event-study methodology and calculation of the Prediction Error (PE), and Cumulative prediction errors (CPE), and their Z-statistics are discussed in section 3 of this chapter.

availability of information (here, measured by (i) the level of I/B/E/S analyst coverage and (ii)) the level of I/B/E/S coefficient of variation) will be examined by testing the difference in the Z-statistics on day 0, $(Z)PE_0$, between each pair of two extreme subsamples.

The relationship between the Z-statistics for the event-date prediction errors, $(Z)PE_0$, for the analyst attention and analyst disagreement subsamples are expected to be as follows:

$\lvert (Z)PE_0 \rvert$	>	$\lvert (Z)PE_0 \rvert$[28]
Low Analyst Attention		High Analyst Attention
High Analyst Disagreement		Low Analyst Disagreement

($\lvert (Z)PE_0 \rvert$ = the absolute value of the event-date prediction error Z-statistic)

In addition, as a supplemental test, the relationship between the magnitude of the announcement effect and the two information proxies -I/B/E/S number of analyst, and I/B/E/S coefficient of variation- will be examined by regressing the I/B/E/S number of analyst and the I/B/E/S/ coefficient of variation against the event-date prediction error, PE_0.

[28] The test of difference in mean of standardized Z-statistics will be done by applying the test to each pair of two extreme subsamples.

Model and Event-Study Methodology

The event-study method employs the following steps:

1) The market model regression parameters of each individual firm are estimated from the pre-event data (day -360 through day -61, while day 0 is the event date).[29]

	Event Window or
Estimation Interval: Day_{-360} - Day_{-61}	Forecast Interval: Day_{-60} - Day_{+60}
Obtain estimates of α and β using ordinary least squares (OLS)	Calculate forecast errors or prediction errors; calculate Z test.

The market model employed to estimate the regression parameters is defined as:

$$R_{jt} = \hat{\alpha}_j + \hat{\beta}_j Rm_t + e_{jt} \qquad (1)$$

$$t = -360, \ldots\ldots\ldots, -61$$

where,

R_{jt} = the continously compounded rate of return for

[29] In their most recent bond-rating change study, Holthausen and Leftwich (1986) (employing daily stock returns) used a 300-day estimation period. This study follows the Holthausen and Leftwich study by using a 300-day estimation period.

the common stock of firm j on day t;

$\hat{\alpha}_j$ = OLS estimate of the intercept;

$\hat{\beta}_j$ = OLS estimate of the slope or measure of systematic risk;

Rm_t = return of the market on day t;[30]

e_{jt} = residual for security j on day t.

2) The prediction errors (PEs) of each firm are calculated for the "event window" (day -60 through day +60) using regression parameters from the pre-event data and market data (market-return data) from the "event window".

The prediction error for firm j on day t, PE_{jt}, in the forecasting interval is defined as:

$$PE_{jt} = R_{jt} - \hat{R}_{jt}, \qquad (2)$$

$$t = -60, \ldots\ldots, +60$$

where,

R_{jt} = actual stock return of firm j on day t;

$\hat{R}_{jt}$ = predicted stock return of firm j on day t.

[30] The CRSP value weighted index is used as a proxy for the market.

3) The prediction errors for each firm, PE_{jt}, are cumulated for the invervals of interest. The cumulative prediction error of firm j from day p to day q, $CPE_{(p,q)j}$, is calculated as follow:

$$CPE_{(p,q)j} = \sum_{t=p}^{q} PE_{jt} \qquad (3)$$

where,

$CPE_{(p,q)j}$ = cumulative prediction error of firm j from day p to day q.

PE_{jt} = prediction error of firm j on day t.

4) Calculate the standard deviation of the prediction errors and cumulative prediction errors for the days and periods corresponding to the prediction errors and cumulative prediction errors calculated in step (2) and (3). The standard deviation of the prediction error for firm j on day p, $S_{(p)j}$, and the cumulative prediction error for firm j from day p to day q, $S_{(p,q)j}$ are calculated as follws:[31]

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[31] The standard deviation for the sum of the individual firm's prediction errors differs from the standard formula for the variance of an individual prediction error. It adjusts for the dependence created by cumulating an individual firm's prediction errors calculated using a single set of estimates of α and β. This calculation of the standard deviation of cumulative prediction errors can be

(4)

$$S_{(p)j} = \{S_j^2 [1 + (1/N) + [(Rm_p - Rm^-)^2 / \sum_{i=1}^{N}(Rm_i - Rm^-)^2]]\}^{1/2}$$

(5)

$$S_{(p,q)j} = \{S_j^2 [T + (T^2/N) + [(\sum_{t=p}^{q} Rm_t - T\, Rm^-)^2 / \sum_{i=1}^{N}(Rm_i - Rm^-)^2]]\}^{1/2}$$

where,

S_j^2	=	the residual variance of firm j's market model regression;
T	=	the number of days in the interval (day p to day q) and equals q - p + 1;
N	=	the number of days in the period used to estimate the market model;
Rm_t	=	the market return on day t (from the forecasting interval);
Rm_p	=	the market return on day p (from the forecasting interval);
Rm_i	=	the market return on day i (from the estimating period);
Rm^-	=	the mean market return in the

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found in Mikkelson and Partch (1988).

estimating period;

5) Calculate the t-statistic for the prediction error and cumulative prediction error for each firm j corresponding to the days and intervals of interest. The t-statistic of the prediction error for firm j on day p, $t(PE_{(p)})_j$, and the cumulative prediction error for firm j from day p through day q, $t(CPE_{(p,q)})_j$, are calculated as follows:

$$t(PE_{(p)})_j = PE_{(p)j} / S_{(p)j} \qquad (6)$$

$$t(CPE_{(p,q)})_j = CPE_{(p,q)j} / S_{(p,q)j} \qquad (7)$$

where,

$PE_{(p)j}$ = the prediction error of firm j on day p (as calculated by equation (2));

$S_{(p)j}$ = the standard deviation of the prediction error for firm j on day p (as calculated from equation (4)).

$CPE_{(p,q)j}$ = the cumulative prediction error for firm j from day p through day q (from equation (3));

$S_{(p,q)j}$ = the standard deviation of the cumulative prediction error for firm j from day p through day q (as calculated from equation (5)).

6) Calculate the Z-statistic of the prediction error (averaged across firms), Z(PE), and cumulative prediction (averaged across firms), Z(CPE), for the days (p) and intervals of interest (p to q) from the equations below:

$$Z(PE_{(p)}) = [(1/J)^{1/2}][\sum_{j=1}^{J} t(PE_{(p)})_j] \quad (8)$$

$$Z(CPE_{(p,q)}) = [(1/J)^{1/2}][\ (\sum_{j=1}^{J} t(CPE_{(p,q)})_j] \quad (9)$$

where,

$t(PE_{(p)}\ _j$ = the t-statistic of the prediction error for firm j on day p as calculated from equation (6)

$t(CPE_{(p,q)})_j$ = the t-statistic of the cumulative prediction error for firm j from day p through day q as calculated from equation (7).

J = the number of firms;

CHAPTER IV

THE RESULTS

This chapter presents the results of the tests. The chapter is divided to two main sections. The first section is the summary of the results. The second section is the discussion of the results.

Summary of Results

Table 4.1 provides the summary of the results by summarizing the Z-statistic of prediction errors and cumulative prediction errors around the event dates, day -1 through day +2, for all the subsamples. Table 4.2 provides a summary of the test of difference in Z-scores of prediction errors and cumulative prediction errors. The results are summarized as follows:

1) Announcements of both downgrades across rating classes and downgrades within rating class of both low analyst attention subsamples and high analyst disagreement subsamples are associated with statistically significant negative abnormal stock returns on day 0, and day 0 to +1. No statistically significant abnormal stock returns are detected for both downgrades across rating classes and downgrades within rating class of both high analyst

TABLE 4.1

Summary of Results
A Comparison of Z-statistics on day -1, 0, 0 to +1, +1, and +2 among subsamples

Downgrades

	Across-Class		Within-Class	
	Analyst Attention		Analyst Attention	
Trading Days	Low	High	Low	High
-1	-1.74	-1.13	1.62	1.57
0	-3.41*	-0.92	-2.37*	-0.73
0 to +1	-2.31*	-1.12	-3.01*	-0.83
+1	0.15	-0.64	-1.88	-0.44
+2	0.36	1.84	-0.11	1.07

	Across-Class		Within-Class	
	Analyst Disagreement		Analyst Disagreement	
Trading Days	Low	High	Low	High
-1	-0.08	-1.29	0.05	1.11
0	-0.01	-3.29*	0.54	-2.52*
0 to +1	0.76	-3.11*	0.48	-2.64*
+1	1.08	-1.09	0.14	-1.21
+2	1.52	-0.36	-0.65	0.99

Upgrades

	Across-Class		Within-Class	
	Analyst Attention		Analyst Attention	
Trading Days	Low	High	Low	High
-1	1.72	-1.35	1.52	-0.83
0	3.43*	0.00	1.09	-0.40
0 to +1	2.05*	-0.47	0.78	-0.38
+1	-0.53	-0.66	0.01	-0.14
+2	1.48	-0.36	-0.61	0.64

	Across-Class		Within-Class	
	Analyst Disagreement		Analyst Disagreement	
Trading Days	Low	High	Low	High
-1	0.37	0.75	0.38	-0.23
0	1.64	0.91	0.59	0.10
0 to +1	0.73	-0.54	0.26	0.28
+1	-0.60	-1.66	-0.24	0.28
+2	1.20	1.48	-0.84	0.44

* Significant at least 5% (two-tailed test)

TABLE 4.2

Test of Difference in Z-scores of Prediction Errors, and Cumulative Prediction Errors Between Pairs of Subamples.

Low Analyst Attention VS High Analyst Attention

Trading Days	Downgrade Across	Downgrade Within	Upgrade Across	Upgrade Within
-60 to -1	-0.54	-0.79	1.49	2.72*
-20 to -1	-0.77	0.36	2.00*	1.18
-10 to -1	-0.86	1.80	2.08*	0.27
-1	-0.50	0.09	2.10*	1.58
0	-1.86	-1.21	2.02*	0.98
0 to +1	-0.92	-1.60	1.59	0.77
+1	0.55	-1.06	0.22	0.11
+2	-1.00	-0.82	1.17	-0.88
+1 to +11	0.08	-0.66	1.22	-0.87
+1 to +21	-0.43	-1.39	-1.15	-0.94
+1 to +60	-0.80	-1.82	-1.22	-0.65

Low Analyst Disagreement VS High Analyst Disagreement

Trading Days	Downgrade Across	Downgrade Within	Upgrade Across	Upgrade Within
-60 to -1	-0.19	1.08	-2.07*	-0.03
-20 to -1	1.36	1.23	-2.29*	-0.53
-10 to -1	1.00	0.22	-1.81	0.68
-1	0.63	-0.49	-0.45	0.36
0	1.76	1.69	0.08	0.12
0 to +1	2.31*	1.69	0.84	-0.16
+1	1.49	0.70	1.10	-0.35
+2	1.47	-1.05	-0.64	-0.72
+1 to +11	-0.31	-0.71	-1.02	-0.95
+1 to +21	-0.88	-0.42	0.53	-0.88
+1 to +60	-2.14*	1.22	-0.37	-0.45

* Significant at least 5% (two-tailed test)

attention subsamples and low analyst disagreement subsamples. (see table 4.1)

2) The announcement of only upgrades across rating classes of the low analyst attention subsample is associated with statistically significant positive abnormal stock returns on day 0, and day 0 to +1. No statistically significant abnormal stock returns are detected for the upgrades within rating classes of the low analyst attention subsample. No statistically significant abnormal stock returns are detected for both upgrades across rating classes and upgrades within rating class for both low and high analyst disagreement subsamples. (see table 4.1)

3) There is a difference in the magnitude of the announcement effect between subsamples of low vs high information firms. The test of differece in the announcement date (day 0, or day 0 to +1) Z-statistics indicates that the statistically significant difference in the announcement date Z-statistics are detected in 2 pairs of subsamples: upgrade across rating classes: low vs high analyst attention subsamples (Z-statistic on day 0 = 2.02), and downgrade across rating classes: low vs high analyst disagreement subsamples (Z-statistic on day 0 to +1 = 2.31)[32] (see table 4.2)

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[32] Using a 5% alpha with two-tailed test, the statistically significant difference in the announcement date (day 0 or day 0 to +1) Z-statistics are detected in these two pairs of subsamples. However, if a 10% alpha with

4) In a cross-sectional analysis of abnormal stock returns (to be discussed later), there is a statistically significant relationship between the I/B/E/S number of security analysts and the magnitude of the announcement effect (as measured by prediction errors of stock returns). The direction of the relationship is as expected: the lower the number of security analysts, the greater the magnitude of the announcement effect. There is no statistically significant relationship between the I/B/E/S coefficient of variation and the magnitude of the announcement effect (as measured by the prediction errors of stock returns). There is no statistically significant relationship between the magnitude of the announcement effect and the number of grades change.

Discussion of Results

A security price response to the announcement of a rating change is generally inconsistent with the findings in Pinches and Singleton (1978) (monthly stock returns), Wakeman (1978) (monthly stock and weekly bond returns), and

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two-tailed test is used, two addition pairs are significant: downgrades across classes: low vs high analyst attention (day 0 Z-statistic = -1.86), downgrades within class: low vs high analyst disagreement (day 0 and day 0 to +1 Z-statistic = 1.69. (see table 4.2) In addition, the test of difference in Z-statistics is actually the test of difference in mean of standardized Z-statistics. (see footnote 24 for the hypothesis and calculation)

Weinstein (1977) (monthly bond returns), who find no evidence of price response to the announcement of rating changes. The results in this study are consistent with Griffin and Sanvincente (1982) (monthly stock return data), Glascock (1984) (daily stock return data) and Holthausen and Lefwich (1986) (daily stock return data), who find a significant negative price response for downgrades but find no significant price response for upgrades given no controlling for differential information. However, in this study after controlling for differential information, a significant price response for upgrade across classes of low analyst attention firms has been detected. In addition, the results of this study are consistent with those results obtained in Kantz (1974) (monthly changes in bond yields), Grier and Kantz (1976) (average monthly bond prices), and Ingram, Brooks and Copeland (1983) (monthly changes in bond yields) who found a security price response to the announcement of a rating change.

Downgrading results

Tables 4.3a, 4.3b, 4.3c, and 4.3d contrast the abnormal stock returns of low information firms vs high information firms of the downgrades under types of rating changes (across or within class) and types of information proxies (analyst attention, or analyst disagreement). Average prediction errors (PE) and cumulative average prediction

TABLE 4.3a

Percentage prediction errors (PE), cumulative prediction errors (CPE), and Z-statistic (Z-stat) for downgrades across class: Low Analyst Attention vs High Analyst Attention.

	Low Analyst Attention (N=37)		High Analyst Attention (N=42)		Difference	
Trading days	PE	CPE	PE	CPE	PE	CPE
-20	0.18	0.18	0.05	0.05	0.13	0.13
-19	0.44	0.62	-0.20	-0.15	0.64	0.77
-18	-0.08	0.53	0.44	0.29	-0.52	0.24
-17	-0.37	0.16	-0.25	0.04	-0.12	0.12
-16	0.53	0.69	0.30	0.34	0.23	0.35
-15	-1.32	-0.63	-0.16	0.18	-1.16	-0.81
-14	-0.10	-0.72	0.00	0.18	-0.10	-0.90
-13	-0.29	-1.01	-0.05	0.12	-0.24	-1.13
-12	-0.46	-1.47	-0.09	0.03	-0.37	-1.50
-11	1.29	-0.18	0.05	0.09	1.24	-0.27
-10	0.04	-0.14	-0.55	-0.46	0.59	0.32
-9	-0.40	-0.54	0.07	-0.38	-0.47	-0.16
-8	-0.62	-1.15	0.16	-0.22	-0.78	-0.93
-7	0.09	-1.06	0.14	-0.08	-0.05	-0.98
-6	-1.46	-2.52	-0.15	-0.23	-1.31	-2.29
-5	-0.78	-3.31	-0.18	-0.41	-0.60	-2.90
-4	0.28	-3.02	0.01	-0.40	0.27	-2.62
-3	0.27	-2.75	0.23	-0.18	0.04	-2.57
-2	0.37	-2.38	-0.18	-0.36	0.55	-2.02
-1	-0.67	-3.06	-0.47	-0.83	-0.20	-2.23
0	-1.31	-4.37	-0.31	-1.14	-1.00	-3.23
+1	0.14	-4.22	-0.13	-1.27	0.27	-2.95
+2	-0.21	-4.44	0.72	-0.55	-0.93	-3.89
+3	-0.04	-4.47	0.31	-0.24	-0.35	-4.23
+4	1.19	-3.28	-0.01	-0.25	1.20	-3.03
+5	-0.17	-3.45	-0.36	-0.61	0.19	-2.84
+6	-0.66	-4.12	-0.14	-0.75	-0.52	-3.37
+7	-0.81	-4.93	0.07	-0.68	-0.88	-4.25
+8	0.34	-4.59	-0.04	-0.71	0.38	-3.88
+9	0.57	-4.02	-0.15	-0.86	0.72	-3.16
+10	0.75	-3.27	0.14	-0.73	0.61	-2.54
+11	-0.34	-3.61	0.10	-0.62	-0.44	-2.99
+12	0.17	-3.44	0.38	-0.24	-0.21	-3.20
+13	0.07	-3.37	-0.22	-0.46	0.29	-2.91
+14	-1.28	-4.65	0.33	-0.14	-1.61	-4.51
+15	0.14	-4.51	-0.12	-0.26	0.26	-4.25
+16	1.31	-3.20	-0.06	-0.32	1.37	-2.88
+17	-0.63	-3.83	-0.47	-0.79	-0.16	-3.04
+18	0.27	-3.56	0.05	-0.73	0.22	-2.83
+19	0.06	-3.50	0.05	-0.69	0.01	-2.81
+20	-2.00	-5.49	0.27	-0.41	-2.27	-5.08
Trading days	CPE	Z-stat	CPE	Z-stat	CPE	Z-stat
-60 to -1	-3.52	-0.58	0.61	0.17	-4.13	-0.54
-20 to -1	-3.06	-1.58	-0.83	-0.56	-2.23	-0.77
-10 to -1	-2.88	-2.14*	-0.92	-1.02	-1.96	-0.86
-1	-0.67	-1.74	-0.47	-1.13	-0.20	-0.50
0	-1.31	-3.41*	-0.31	-0.92	-1.00	-1.86
0 to +1	-1.17	-2.31*	-0.44	-1.12	-0.73	-0.92
+1	0.14	0.15	-0.13	-0.64	0.27	0.55
+2	-0.21	0.36	0.72	1.84	-0.93	-1.00
+1 to +11	0.75	0.42	0.52	0.33	0.23	0.08
+1 to +21	0.55	0.14	0.71	0.77	-0.16	-0.43
+1 to +60	1.13	0.20	3.96	1.38	-2.83	-0.80

* = Significant at 5% (two-tailed test)

TABLE 4.3b

Percentage prediction errors (PE), cumulative prediction errors (CPE), and Z-statistic (Z-stat) for downgrades within class: Low Analyst Attention vs High Analyst Attention.

	Low Analyst Attention (N=31)		High Analyst Attention (N=34)		Difference	
Trading days	PE	CPE	PE	CPE	PE	CPE
-20	0.74	0.74	0.15	0.15	0.59	0.59
-19	-0.13	0.61	-0.42	-0.27	0.29	0.88
-18	-0.21	0.40	-0.12	-0.39	-0.09	0.79
-17	-0.60	-0.20	-0.24	-0.63	-0.36	0.43
-16	0.61	0.41	0.06	-0.57	0.55	0.98
-15	-0.28	0.13	-0.03	-0.61	-0.25	0.74
-14	0.18	0.31	0.53	-0.07	-0.35	0.38
-13	0.26	0.57	0.57	0.50	-0.31	0.07
-12	-0.81	-0.23	0.21	0.71	-1.02	-0.94
-11	-0.43	-0.67	-0.07	0.64	-0.36	-1.31
-10	0.30	-0.37	-0.25	0.39	0.55	-0.76
-9	-0.06	-0.42	-0.41	-0.01	0.35	-0.41
-8	0.85	0.43	-0.76	-0.77	1.61	1.20
-7	-0.36	0.06	-0.28	-1.05	-0.08	1.11
-6	-0.80	-0.74	-0.83	-1.88	0.03	1.14
-5	0.15	-0.59	0.23	-1.65	-0.08	1.06
-4	0.19	-0.40	-0.03	-1.68	0.22	1.28
-3	-0.13	-0.53	-0.20	-1.88	0.07	1.35
-2	-0.38	-0.91	0.22	-1.66	-0.60	0.75
-1	0.65	-0.26	0.46	-1.20	0.19	0.94
0	-1.01	-1.28	-0.34	-1.54	-0.67	0.26
+1	-0.56	-1.83	-0.12	-1.66	-0.44	-0.17
+2	-0.08	-1.91	0.37	-1.28	-0.45	-0.63
+3	0.91	-1.00	0.47	-0.81	0.44	-0.19
+4	-1.15	-2.15	-0.04	-0.85	-1.11	-1.30
+5	-0.08	-2.23	0.04	-0.82	-0.12	-1.41
+6	-0.29	-2.52	-0.18	-0.99	-0.11	-1.53
+7	0.05	-2.47	-0.28	-1.27	0.33	-1.20
+8	0.03	-2.44	-0.50	-1.78	0.53	-0.66
+9	0.86	-1.58	-0.10	-1.88	0.96	0.30
+10	-0.18	-1.76	0.49	-1.39	-0.67	-0.37
+11	-0.43	-2.18	0.13	-1.26	-0.56	-0.92
+12	-0.07	-2.25	-0.64	-1.90	0.57	-0.35
+13	-0.04	-2.29	-0.53	-2.43	0.49	0.14
+14	0.64	-1.65	0.64	-1.79	0.00	0.14
+15	-0.06	-1.71	0.04	-1.75	-0.10	0.04
+16	0.22	-1.49	0.09	-1.66	0.13	0.17
+17	-0.33	-1.82	-0.01	-1.67	-0.32	-0.15
+18	-0.27	-2.10	0.94	-0.73	-1.21	-1.37
+19	-1.83	-3.93	-0.33	-1.06	-1.50	-2.87
+20	-0.27	-4.20	-0.08	-1.14	-0.19	-3.06
Trading days	CPE	Z-stat	CPE	Z-stat	CPE	Z-stat
-60 to -1	-3.43	-0.91	0.68	0.19	-4.11	-0.79
-20 to -1	-0.26	-0.33	-1.20	-0.87	0.94	0.36
-10 to -1	0.40	0.45	-1.84	-2.14*	2.24	1.80
-1	0.65	1.62	0.46	1.57	0.19	0.09
0	-1.01	-2.37*	-0.34	-0.73	-0.67	-1.21
0 to +1	-1.57	-3.01*	-0.46	-0.83	-1.11	-1.60
+1	-0.56	-1.88	-0.12	-0.44	-0.44	-1.06
+2	-0.08	-0.11	0.37	1.07	-0.45	-0.82
+1 to +11	-0.91	-0.92	0.28	0.00	-1.19	-0.66
+1 to +21	-3.63	-1.60	0.95	0.34	-4.58	-1.39
+1 to +60	-7.86	-1.71	2.33	0.85	-10.19	-1.82

* = Significant at 5% (two-tailed test)

TABLE 4.3c

Percentage prediction errors (PE), cumulative prediction errors (CPE), and Z-statistic (Z-stat) for downgrades across class: Low Analyst disagreement vs High Analyst Disagreement

	Low Analyst Disagreement (N=27)		High Analyst Disagreement (N=66)		Difference	
Trading days	PE	CPE	PE	CPE	PE	CPE
-20	0.20	0.20	-0.29	-0.29	0.49	0.49
-19	0.13	0.33	0.08	-0.21	0.05	0.54
-18	-0.02	0.31	0.13	-0.08	-0.15	0.39
-17	-0.10	0.21	-0.30	-0.38	0.20	0.59
-16	-0.51	-0.30	0.40	0.02	-0.91	-0.32
-15	0.10	-0.20	-0.68	-0.66	0.78	0.46
-14	0.51	0.31	-0.14	-0.80	0.65	1.11
-13	0.10	0.40	-0.21	-1.01	0.31	1.41
-12	0.12	0.53	-0.68	-1.69	0.80	2.22
-11	0.09	0.62	0.80	-0.89	-0.71	1.51
-10	0.67	1.29	-0.18	-1.07	0.85	2.36
-9	-0.24	1.05	-0.03	-1.10	-0.21	2.15
-8	-0.31	0.74	-0.48	-1.58	0.17	2.32
-7	0.22	0.96	-0.36	-1.94	0.58	2.90
-6	0.24	1.20	-0.99	-2.93	1.23	4.13
-5	0.01	1.21	-0.90	-3.83	0.91	5.04
-4	-0.14	1.07	0.45	-3.38	-0.59	4.45
-3	-0.38	0.69	-0.24	-3.62	-0.14	4.31
-2	-0.12	0.57	0.61	-3.01	-0.73	3.58
-1	-0.05	0.51	-0.25	-3.25	0.20	3.76
0	0.01	0.53	-1.01	-4.26	1.02	4.79
+1	0.33	0.86	-0.14	-4.40	0.47	5.26
+2	0.39	1.24	-0.22	-4.62	0.61	5.86
+3	-0.37	0.87	0.14	-4.47	-0.51	5.34
+4	0.04	0.91	0.12	-4.35	-0.08	5.26
+5	-0.22	0.69	0.59	-3.76	-0.81	4.45
+6	-0.28	0.41	-0.10	-3.86	-0.18	4.27
+7	-0.10	0.30	-0.28	-4.14	0.18	4.44
+8	-0.15	0.15	-0.22	-4.36	0.07	4.51
+9	0.04	0.19	0.34	-4.02	-0.30	4.21
+10	-0.04	0.15	0.19	-3.83	-0.23	3.98
+11	0.15	0.30	-0.27	-4.10	0.42	4.40
+12	0.23	0.53	0.48	-3.62	-0.25	4.15
+13	-0.11	0.42	-0.18	-3.80	0.07	4.22
+14	0.04	0.46	-0.73	-4.54	0.77	5.00
+15	-0.42	0.04	0.34	-4.19	-0.76	4.23
+16	-0.49	-0.45	0.04	-4.16	-0.53	3.71
+17	0.23	-0.22	-0.16	-4.32	0.39	4.10
+18	0.01	-0.21	-0.17	-4.49	0.18	4.28
+19	-0.30	-0.52	0.33	-4.15	-0.63	3.63
+20	-0.26	-0.78	-1.16	-5.31	0.90	4.53
Trading days	CPE	Z-stat	CPE	Z-stat	CPE	Z-stat
-60 to -1	-0.29	-0.12	-2.00	0.16	1.71	-0.19
-20 to -1	0.51	0.46	-3.25	-1.81	3.76	1.36
-10 to -1	-0.11	-0.15	-2.36	-2.09*	2.25	1.00
-1	-0.05	-0.08	-0.25	-1.29	0.20	0.63
0	0.01	-0.01	-1.01	-3.29*	1.02	1.76
0 to +1	0.34	0.76	-1.15	-3.11*	1.49	2.31*
+1	0.33	1.08	-0.14	-1.09	0.47	1.49
+2	0.39	1.52	-0.22	-0.36	0.61	1.47
+1 to +11	-0.23	-0.18	0.16	0.29	-0.39	-0.31
+1 to +21	-0.96	-0.78	0.27	0.42	-1.23	-0.88
+1 to +60	-2.99	-1.38	4.69	1.81	-7.68	-2.14*

* = Significant at 5% (two-tailed test)

TABLE 4.3d

Percentage prediction errors (PE), cumulative prediction errors (CPE), and Z-statistic (Z-stat) for downgrades within class: Low Analyst Disagreement vs High Analyst disagreement

	Low Analyst Disagreement (N=15)		High Analyst Disagreement (N=50)		Difference	
Trading days	PE	CPE	PE	CPE	PE	CPE
-20	0.52	0.52	0.58	0.58	-0.06	-0.06
-19	-1.14	-0.62	0.07	0.65	-1.21	-1.27
-18	0.17	-0.45	-0.02	0.63	0.19	-1.08
-17	0.51	0.06	-0.11	0.52	0.62	-0.46
-16	-0.16	-0.10	0.13	0.65	-0.29	-0.75
-15	0.61	0.51	-0.32	0.33	0.93	0.18
-14	0.48	0.98	-0.38	-0.05	0.86	1.03
-13	1.23	2.21	0.48	0.42	0.75	1.79
-12	0.50	2.71	-0.16	0.27	0.66	2.44
-11	-0.17	2.54	-0.10	0.17	-0.07	2.37
-10	0.60	3.15	-0.24	-0.07	0.84	3.22
-9	-0.61	2.54	-0.28	-0.35	-0.33	2.89
-8	0.51	3.05	0.04	-0.31	0.47	3.36
-7	-0.24	2.81	0.21	-0.10	-0.45	2.91
-6	-0.46	2.36	-0.49	-0.59	0.03	2.95
-5	0.30	2.65	0.01	-0.59	0.29	3.24
-4	0.26	2.91	-0.33	-0.92	0.59	3.83
-3	-0.34	2.57	0.08	-0.84	-0.42	3.41
-2	-0.27	2.30	0.22	-0.62	-0.49	2.92
-1	-0.17	2.14	0.43	-0.19	-0.60	2.33
0	0.14	2.27	-0.86	-1.05	1.00	3.32
+1	0.18	2.45	-0.27	-1.32	0.45	3.77
+2	-0.33	2.12	0.26	-1.06	-0.59	3.18
+3	-0.55	1.57	1.12	0.06	-1.67	1.51
+4	0.47	2.04	-0.27	-0.21	0.74	2.25
+5	-0.03	2.01	0.19	-0.02	-0.22	2.03
+6	-0.48	1.53	-0.02	-0.04	-0.46	1.57
+7	0.58	2.10	-0.53	-0.58	1.11	2.68
+8	-0.35	1.75	0.04	-0.53	-0.39	2.28
+9	0.01	1.76	0.53	0.00	-0.52	1.76
+10	0.18	1.94	0.16	0.16	0.02	1.78
+11	0.27	2.21	0.30	0.46	-0.03	1.75
+12	0.46	2.67	-0.39	0.07	0.85	2.60
+13	-0.54	2.14	-0.32	-0.25	-0.22	2.39
+14	0.51	2.64	0.36	0.10	0.15	2.54
+15	0.23	2.87	-0.67	-0.57	0.90	3.44
+16	-0.30	2.57	0.07	-0.50	-0.37	3.07
+17	-0.63	1.95	-0.16	-0.66	-0.47	2.61
+18	0.12	2.07	0.28	-0.37	-0.16	2.44
+19	-0.81	1.26	-0.93	-1.30	0.12	2.56
+20	0.35	1.61	-0.18	-1.48	0.53	3.09
Trading days	CPE	Z-stat	CPE	Z-stat	CPE	Z-stat
-60 to -1	3.84	0.92	-0.93	-0.57	4.77	1.08
-20 to -1	2.14	1.33	-0.19	-0.13	2.33	1.23
-10 to -1	-0.41	-0.13	-0.36	-0.69	-0.05	0.22
-1	-0.17	0.05	0.43	1.11	-0.60	-0.49
0	0.14	0.54	-0.86	-2.52*	1.00	1.69
0 to +1	0.31	0.48	-1.13	-2.64*	1.44	1.69
+1	0.18	0.14	-0.27	-1.21	0.45	0.70
+2	-0.33	-0.65	0.26	0.99	-0.59	-1.05
+1 to +11	-0.06	-0.07	1.51	1.33	-1.57	-0.71
+1 to +21	-0.84	-0.49	-0.15	-0.02	-0.69	-0.42
+1 to +60	2.65	0.66	-4.06	-1.34	6.71	1.22

* = Significant at 5% (two-tailed test)

errors (CPE) are presented for each subsample, as well as for the difference between the two groups. The lower portion of the tables present the cumulative average prediction errors (CPE) and associated Z-statistics for 11 intervals, day -60 to day -1, day -20 to day -1, day -10 to day -1, day -1, day 0, day 0 to +1, day +1, day +2, day +1 to day +11, day +1 to day +21, and day +1 to day +60. Fromtables 4.3a, 4.3b, 4.3c, and 4.3d, three outcomes are important:

First, the Z-statistics of the announcement dates (day 0, and day 0 to day +1) of all low information firm subsamples -low analyst attention (table 4.3a, and table 4.3b), and high analyst disagreement (table 4.3c, and table 4.3d) -are statistically significant at 5%, in a two-tailed test. For low analyst attention firms, the downgrade across class subsample [table 4.3a] and downgrade within class subsample [table 4.3b] have the announcement date abnormal stock return on day 0 (day 0 to day +1) of -1.31% (-1.17%) and -1.01% (-1.57%) respectively. Their associated Z-statistics are -3.41% (-2.31) and -2.37 (-3.01), respectively. These Z-statistic are all statistically significant at 5%, in a two-tailed test. For high analyst disagreement firms, the downgrade across class subsample [table 4.3c] and down grade within class subsample [table 4.3d] have the announcement date abnormal stock return on day 0 (day 0 to day +1) of -1.01% (-1.15%) and -0.86% (-

1.13%), respectively. Their associated Z-statistic are -3.29 (-3.11) and -2.52 (-2.64), respectively. Again, these Z-statistic are statistically significant at 5%, in a two-tailed test.

Second, the Z-statistics of the announcement dates (day 0, and day 0 to day +1) of <u>all high information firm subsamples</u> -high analyst attention subsamples (table 4.3a, and table 4.3b), and low analyst disagreement subsamples (table 4.3c, and table 4.3d) -are not statistically significant (at 5%, in a two-tailed test). For high analyst attention firms, the downgrade across classes subsample [table 4.3a] and downgrade within class subsample [table 4.3b] have the announcement date abnormal stock returns on day 0 (day 0 to day +1) of -0.31% (-0.44%) and -0.34% (-0.46%), respectively. Their associated Z-statistics are -0.92 (-1.12) and -0.73 (-0.83), respectively. These Z-statistics are not statisticlly significant at 5%, in a two-tailed test. For low analyst disagreement firms, the downgrade across class subsample [table 4.3c] and downgrade within class subsample [table 4.3d] have the announcement date abnormal stock returns on day 0 (day 0 to day +1) of 0.01 (0.34) and 0.14 (0.31) respectively. Their associated Z-statistics are -0.01 (0.76) and 0.54 (0.48), respectively. Again, these Z-statistics are not statistically significant at 5%, in a two-tailed test.

Third, the test of differences in the announcement date effect between low vs high information firms indicated that there is a statistically significant difference in the announcement date effect (day 0 or day 0 to +1) for downgrades across-class subsamples in table 4.3c [5%, two-tailed test]. In table 4.3c, the test of difference in the announcement date effect (day 0 to day +1) of downgrade across classes between low vs high analyst disagreement firms indicates a Z-statistic of 2.31. This Z-statistic is statistically significant at 5%, in a two-tailed test.

In past studies which employed daily stock returns without controlling for differential information, Glascock (1984) and Holthausen and Leftwich (1986) found that the announcement of bond downgradings was associated with statistically significant event date abnormal stock returns. Glascock's downgraded sample was not split into across class and within class subsamples. Holthausen and Leftwich (1986) examined downgrades across classes and downgrades within class, seperately. They found statistically significant event date (day 0 to day +1) abnormal stock returns on bond downgrades across classes, but found no statistically significant event date abnormal stock returns on the downgrades within classes. The results obtained from this study indicated that both downgrades across classes and downgrades within classes of low information firm subsamples are associated with statistically significant event date abnormal stock returns. This study did not find statistically significant event date abnormal stock returns for either downgrades across classes or downgrades within class of <u>high</u> information firm subsamples. Thus, a question remains: is it possible that the announcement of bond downgrades within classes may have very small announcement effect; a focus on low information firms may help to increase the signal to noise ratio? Consequently, this study can detect a statistically significant announcement date effect of bond downgrade within classes for low information firm subsamples. To further investigate this question, a test was performed by taking the total downgrade sample and splitting it into across classes and within class subsamples. Table 4.3e presents the result of the test.

In table 4.3e, the result indicates that both downgrades across classes and downgrades within classes have day 0 (day 0 to day +1) Z-statistics of -3.51 (-2.77) and -2.59 (-2.77), respectively. These Z-statistics are all statistically significant at 5%, in a two-tailed test. Therefore, this result suggests that, in general the announcement of bond downgrades within class has the announcement effect. The test of difference in degree of the announcement effect between acrosses classes vs within classes indicates that there is no statistically significant difference in the announcement effect between the two groups on day 0 and day 0 to day +1. However, there is a statistically significant difference in the announcement

TABLE 4.3e

Percentage prediction errors (PE), cumulative prediction errors (CPE), and Z-statistic (Z-stat) <u>downgrade across classes</u> vs <u>downgrade within class</u>.

	Downgrade Across Class (N=133)		Downgrade Within Class (N=114)		Difference	
Trading days	PE	CPE	PE	CPE	PE	CPE
-20	-0.04	-0.04	0.45	0.45	-0.49	-0.49
-19	-0.01	-0.05	-0.11	0.33	0.10	-0.38
-18	0.02	-0.02	-0.01	0.32	0.04	-0.34
-17	-0.24	-0.26	-0.30	0.01	0.06	-0.27
-16	0.08	-0.19	0.26	0.28	-0.19	-0.47
-15	-0.42	-0.61	-0.08	0.20	-0.34	-0.81
-14	-0.06	-0.68	-0.04	0.15	-0.02	-0.83
-13	-0.28	-0.96	0.24	0.39	-0.52	-1.35
-12	-0.45	-1.41	-0.12	0.27	-0.33	-1.68
-11	0.42	-0.99	-0.15	0.13	0.57	-1.12
-10	-0.12	-1.11	0.01	0.14	-0.14	-1.25
-9	-0.01	-1.12	-0.14	0.00	0.13	-1.12
-8	-0.25	-1.37	-0.10	-0.10	-0.15	-1.27
-7	-0.02	-1.39	0.00	-0.10	-0.02	-1.29
-6	-0.61	-2.00	-0.32	-0.43	-0.28	-1.57
-5	-0.45	-2.45	0.11	-0.32	-0.55	-2.13
-4	0.33	-2.12	0.03	-0.29	0.29	-1.83
-3	-0.07	-2.19	-0.06	-0.35	0.00	-1.84
-2	0.02	-2.17	0.01	-0.34	0.00	-1.83
-1	-0.21	-2.38	0.32	-0.02	-0.52	-2.36
0	-0.71	-3.09	-0.55	-0.57	-0.16	-2.52
+1	-0.03	-3.12	-0.23	-0.80	0.20	-2.32
+2	0.06	-3.05	0.28	-0.51	-0.22	-2.54
+3	0.04	-3.01	0.39	-0.13	-0.35	-2.88
+4	0.01	-3.00	-0.20	-0.33	0.22	-2.67
+5	0.01	-2.99	-0.02	-0.35	0.03	-2.64
+6	-0.13	-3.12	-0.12	-0.46	-0.01	-2.66
+7	-0.21	-3.33	-0.27	-0.74	0.06	-2.59
+8	0.01	-3.32	-0.25	-0.99	0.26	-2.33
+9	0.34	-2.98	0.14	-0.85	0.20	-2.13
+10	0.27	-2.71	0.03	-0.81	0.24	-1.90
+11	-0.16	-2.87	0.14	-0.67	-0.31	-2.20
+12	0.21	-2.67	-0.07	-0.74	0.28	-1.93
+13	-0.05	-2.72	-0.24	-0.98	0.19	-1.74
+14	-0.21	-2.93	0.31	-0.67	-0.52	-2.26
+15	0.00	-2.93	0.00	-0.67	0.01	-2.26
+16	-0.02	-2.95	0.04	-0.63	-0.06	-2.32
+17	-0.17	-3.11	-0.26	-0.89	0.09	-2.22
+18	-0.06	-3.17	0.18	-0.72	-0.23	-2.45
+19	0.20	-2.97	-0.57	-1.29	0.77	-1.68
+20	-0.50	-3.47	0.04	-1.24	-0.55	-2.23
Trading days	CPE	Z-stat	CPE	Z-stat	CPE	Z-stat
-60 to -1	-2.00	-0.62	-1.50	-0.81	-0.50	0.17
-20 to -1	-2.38	-2.27*	-0.02	0.03	-2.36	-1.56
-10 to -1	-1.39	-1.85	-0.15	-0.38	-1.25	-0.98
-1	-0.21	-1.29	0.32	1.59	-0.52	-2.04*
0	-0.71	-3.51*	-0.55	-2.59*	-0.16	-0.49
0 to +1	-0.74	-2.77*	-0.77	-2.77*	0.04	0.15
+1	-0.03	-0.40	-0.23	-1.32	0.20	0.70
+2	0.06	0.80	0.28	1.80	-0.22	-0.78
+1 to +11	0.22	0.31	-0.10	-0.39	0.32	0.49
+1 to +21	0.37	0.43	-0.54	-0.49	0.91	0.65
+1 to +60	2.72	1.39	-1.18	-0.16	3.89	1.06

* = Significant at 5% (two-tailed test

effect on day -1. The Z-statistic on this day is -2.04, which is statistically significant at 5%, in a two tailed-test.

One factor could explain the difference between this study's result and Holthausen and Lefwich's (1986) result regarding the significant announcement effect of downgrades within class. The periods of interest between the two studies are different. While Holthausen and Leftwich's study addressed the rating changes between 1977 and 1982, this study looks at the rating changes between 1982 and 1987. It is hypothesized that an increase in competion among rating agencies may have caused more intense monitoring of companies during a more recent time period. Consequently, the signal to noise ratio which used to be small for downgrades within classes has increased and the announcement effect is detectable. In their studies, Holthausen and Leftwich (1986) also found a statistically significant relationship between the announcement effect and a dummy variable which measured pre- and post-1980 periods. This supports an increase in monitoring efficiency by rating agencies.

Upgrade results

Table 4.4a, 4.4b, 4.4c, and 4.4d contrast the abnormal stock returns of low information firms vs high information firms of the upgrades under types of rating changes (across or within class) and types of information proxy (analyst attention, or analyst disagreement). The presentation is provided in the same format as table 4.3a, 4.3b, 4.3c, and 4.3d. From table 4.4a, 4.4b, 4.4d, and 4.4e, three outcomes are important:

First, the announcement dates (day 0, and day 0 to day +1)' Z-Ststistics of upgrade across class of low analyst attention (low information) firms (table 4.4a) are statistically significant (5%, two-tailed test). In table 4.4a, the upgrades across classes of low analyst attention firms has the announcement date abnormal stock returns on day 0 (day 0 to day +1) of 1.50% (1.07%), with the associated Z-statistic of 3.43 (2.05). These Z-statistics are statistically significant (5%, two tailed).

Second, the Z-statistics of announcement dates (day 0, and day 0 to day +1) of all high information firm subsamples -high analyst attention subsamples (table 4.4a, and table 4.4b), and low analyst disagreement subsamples (table 4.4c, and table 4.4d) -are all not statistically significant (at 5%, in a two-tailed test). For high analyst attention firms, the upgrades across classes subsample [table 4.4a] and the upgrades within classes subsample [table 4.4b] have announcement date abnormal stock returns on day 0 (day 0 to day +1) of 0.00% (-0.21%) and -0.20% (-0.25%), respectively. Their associated Z-statistics are 0.00 (-0.47) and -0.40 (-0.38), respectively. These Z-statistics are all not

TABLE 4.4a

Percentage prediction errors (PE), cumulative prediction errors (CPE), and Z-statistic (Z-stat) upgrades across class: Low Analyst Attention vs High Analyst Attention.

	Low Analyst Attention (N=28)		High Analyst Attention (N=15)		Difference	
Trading days	PE	CPE	PE	CPE	PE	CPE
-20	-0.20	-0.20	0.00	0.00	-0.20	-0.20
-19	0.81	0.62	-0.10	-0.11	0.91	0.73
-18	0.10	0.71	0.01	-0.10	0.09	0.81
-17	0.10	0.81	-0.21	-0.31	0.31	1.12
-16	-0.50	0.31	0.07	-0.24	-0.57	0.55
-15	-0.06	0.25	-0.48	-0.72	0.42	0.97
-14	0.80	1.04	0.08	-0.64	0.72	1.68
-13	0.38	1.42	-0.14	-0.78	0.52	2.20
-12	0.09	1.51	-0.03	-0.81	0.12	2.32
-11	-0.17	1.34	0.07	-0.74	-0.24	2.08
-10	-0.45	0.89	-0.09	-0.83	-0.36	1.72
-9	1.11	2.00	0.04	-0.79	1.07	2.79
-8	0.29	2.29	0.27	-0.52	0.02	2.81
-7	0.61	2.90	-0.23	-0.75	0.84	3.65
-6	0.90	3.80	-0.03	-0.78	0.93	4.58
-5	-0.63	3.17	0.04	-0.74	-0.67	3.91
-4	0.09	3.26	0.04	-0.70	0.05	3.96
-3	0.33	3.59	-0.35	-1.06	0.68	4.65
-2	-0.17	3.41	-0.13	-1.18	-0.04	4.59
-1	0.72	4.14	-0.51	-1.69	1.23	5.83
0	1.50	5.63	0.00	-1.69	1.50	7.32
+1	-0.42	5.21	-0.21	-1.90	-0.21	7.11
+2	0.58	5.78	-0.06	-1.97	0.64	7.75
+3	-0.20	5.58	-0.78	-2.75	0.58	8.33
+4	0.05	5.63	-0.25	-3.00	0.30	8.63
+5	-0.87	4.76	-0.48	-3.47	-0.39	8.23
+6	-0.55	4.20	0.20	-3.27	-0.75	7.47
+7	-0.03	4.17	-0.43	-3.71	0.40	7.88
+8	-0.68	3.49	-0.25	-3.95	-0.43	7.44
+9	-0.29	3.20	-0.27	-4.23	-0.02	7.43
+10	0.30	3.50	0.22	-4.01	0.08	7.51
+11	0.46	3.97	0.11	-3.90	0.35	7.87
+12	-0.26	3.71	0.51	-3.39	-0.77	7.10
+13	0.13	3.84	0.27	-3.12	-0.14	6.96
+14	0.16	4.00	0.23	-2.88	-0.07	6.88
+15	-0.23	3.77	-0.47	-3.35	0.24	7.12
+16	-0.75	3.02	-0.02	-3.37	-0.73	6.39
+17	-1.12	1.90	0.84	-2.53	-1.96	4.43
+18	0.40	2.30	0.69	-1.84	-0.29	4.14
+19	0.00	2.30	0.51	-1.32	-0.51	3.62
+20	-0.44	1.86	0.32	-1.00	-0.76	2.86
Trading days	CPE	Z-stat	CPE	Z-stat	CPE	Z-stat
-60 to -1	6.08	1.10	-3.18	-1.04	9.26	1.49
-20 to -1	4.14	1.65	-1.69	-1.27	5.83	2.00*
-10 to -1	2.79	2.37*	-0.95	-0.85	3.74	2.08*
-1	0.72	1.72	-0.51	-1.35	1.23	2.10*
0	1.50	3.43*	0.00	0.00	1.50	2.02*
0 to +1	1.07	2.05*	-0.21	-0.47	1.28	1.59
+1	-0.42	-0.53	-0.21	-0.66	-0.21	0.22
+2	0.58	1.48	-0.06	-0.38	0.64	1.17
+1 to +11	-1.66	-0.59	-2.21	-1.94	0.55	1.22
+1 to +21	-3.53	-1.13	0.93	0.60	-4.46	-1.15
+1 to +60	-8.00	-2.01*	0.26	0.04	-8.26	-1.22

* = Significant at 5% (two-tailed test)

TABLE 4.4b

Percentage prediction errors (PE), cumulative prediction errors (CPE), and Z-statistic (Z-stat) for <u>upgrades within class</u>: <u>Low Analyst Attention vs High Analyst Attention</u>.

	Low Analyst Attention (N=43)		High Analyst Attention (N=25)		Difference	
Trading days	PE	CPE	PE	CPE	PE	CPE
-20	-0.02	-0.02	-0.05	-0.05	0.03	0.03
-19	-0.05	-0.07	0.85	0.80	-0.90	-0.87
-18	0.13	0.07	-0.39	0.41	0.52	-0.34
-17	-0.54	-0.47	-0.12	0.29	-0.42	-0.76
-16	-0.07	-0.54	0.05	0.35	-0.12	-0.89
-15	0.42	-0.11	-0.09	0.25	0.51	-0.36
-14	0.56	0.45	-0.24	0.01	0.80	0.44
-13	-0.08	0.37	-0.23	-0.23	0.15	0.60
-12	0.42	0.79	-0.24	-0.47	0.66	1.26
-11	0.18	0.97	-0.43	-0.89	0.61	1.86
-10	0.08	1.05	0.36	-0.53	-0.28	1.58
-9	-0.39	0.66	-0.17	-0.70	-0.22	1.36
-8	0.25	0.91	-0.36	-1.06	0.61	1.97
-7	-0.12	0.79	0.09	-0.97	-0.21	1.76
-6	-0.30	0.49	0.01	-0.96	-0.31	1.45
-5	-0.11	0.37	0.44	-0.52	-0.55	0.89
-4	0.08	0.45	-0.21	-0.73	0.29	1.18
-3	0.29	0.74	0.03	-0.70	0.26	1.44
-2	-0.05	0.69	0.33	-0.37	-0.38	1.06
-1	0.13	0.82	-0.14	-0.51	0.27	1.33
0	0.39	1.22	-0.20	-0.71	0.59	1.93
+1	0.01	1.23	-0.05	-0.76	0.06	1.99
+2	-0.14	1.09	0.27	-0.49	-0.41	1.58
+3	0.16	1.25	0.26	-0.23	-0.10	1.48
+4	-0.20	1.05	-0.28	-0.51	0.08	1.56
+5	0.18	1.23	-0.21	-0.72	0.39	1.95
+6	-0.61	0.63	-0.61	-1.33	0.00	1.96
+7	-0.28	0.35	0.22	-1.12	-0.50	1.47
+8	-0.50	-0.15	0.40	-0.72	-0.90	0.57
+9	-0.21	-0.36	0.49	-0.23	-0.70	-0.13
+10	0.17	-0.19	-0.17	-0.41	0.34	0.22
+11	0.11	-0.08	-0.50	-0.90	0.61	0.82
+12	-0.10	-0.18	0.25	-0.65	-0.35	0.47
+13	-0.33	-0.51	0.13	-0.53	-0.46	0.02
+14	-0.01	-0.52	0.27	-0.25	-0.28	-0.27
+15	-0.34	-0.86	-0.91	-1.16	0.57	0.30
+16	-0.38	-1.24	0.49	-0.67	-0.87	-0.57
+17	-0.24	-1.48	-0.17	-0.84	-0.07	-0.64
+18	-0.20	-1.69	-0.09	-0.93	-0.11	-0.76
+19	-0.22	-1.91	-0.19	-1.11	-0.03	-0.80
+20	-0.24	-2.15	0.02	-1.09	-0.26	-1.06
<u>Trading days</u>	<u>CPE</u>	<u>Z-stat</u>	<u>CPE</u>	<u>Z-stat</u>	<u>CPE</u>	<u>Z-stat</u>
-60 to -1	3.44	2.17*	-4.86	-1.76	8.30	2.72*
-20 to -1	0.82	0.98	-0.51	-0.73	1.33	1.18
-10 to -1	-0.15	0.30	0.38	-0.10	-0.53	0.27
-1	0.13	1.52	-0.14	-0.83	0.27	1.58
0	0.39	1.09	-0.20	-0.40	0.59	0.98
0 to +1	0.40	0.78	-0.25	-0.38	0.65	0.77
+1	0.01	0.01	-0.05	-0.14	0.08	0.11
+2	-0.14	-0.61	0.27	0.64	-0.41	-0.88
+1 to +11	-1.30	-1.38	-0.19	0.04	-1.11	-0.87
+1 to +21	-2.91	-1.99*	-0.63	-0.33	-2.28	-0.94
+1 to +60	-4.10	-0.82	-1.21	-0.20	-2.89	-0.65

* = Significant at 5% (two-tailed test)

TABLE 4.4c

Percentage prediction errors (PE), cumulative prediction errors (CPE), and Z-statistic (Z-stat) for <u>upgrades across class</u>: <u>Low Analyst Disagreement vs High Analyst Disagreement</u>

	Low Analyst Disagreement (N=32)		High Analyst Disagreement (N=12)		Difference	
Trading days	PE	CPE	PE	CPE	PE	CPE
-20	-0.22	-0.22	-0.29	-0.29	0.07	0.07
-19	-0.25	-0.47	2.42	2.13	-2.67	-2.60
-18	0.04	-0.43	0.99	3.12	-0.95	-3.55
-17	0.08	-0.35	0.01	3.13	0.07	-3.48
-16	-0.25	-0.61	-0.94	2.19	0.69	-2.80
-15	0.12	-0.49	-0.67	1.52	0.79	-2.01
-14	0.15	-0.34	1.48	2.99	-1.33	-3.33
-13	-0.03	-0.37	1.63	4.62	-1.66	-4.99
-12	0.10	-0.27	0.46	5.08	-0.36	-5.35
-11	0.25	-0.02	0.54	5.63	-0.29	-5.65
-10	-0.24	-0.26	-0.59	5.04	0.35	-5.30
-9	-0.10	-0.36	1.27	6.30	-1.37	-6.66
-8	0.19	-0.17	0.68	6.98	-0.49	-7.15
-7	0.20	0.03	2.61	9.59	-2.41	-9.56
-6	-0.09	-0.06	1.51	11.10	-1.60	-11.16
-5	-0.34	-0.41	-0.27	10.83	-0.07	-11.24
-4	-0.01	-0.41	-0.34	10.49	0.33	-10.90
-3	0.39	-0.02	-0.22	10.27	0.61	-10.29
-2	-0.14	-0.16	0.01	10.28	-0.15	-10.44
-1	0.17	0.01	0.85	11.13	-0.68	-11.12
0	0.33	0.34	1.57	12.70	-1.24	-12.36
+1	-0.24	0.10	-1.26	11.44	1.02	-11.34
+2	0.26	0.37	1.27	12.71	-1.01	-12.34
+3	-0.16	0.21	-0.77	11.95	0.61	-11.74
+4	0.32	0.52	-0.50	11.45	0.82	-10.93
+5	-0.50	0.02	-1.67	9.79	1.17	-9.77
+6	-0.21	-0.19	-0.54	9.25	0.33	-9.44
+7	-0.27	-0.46	0.66	9.91	-0.93	-10.37
+8	-0.21	-0.67	0.59	10.50	-0.80	-11.17
+9	-0.21	-0.88	-0.36	10.14	0.15	-11.02
+10	-0.12	-1.00	1.00	11.14	-1.12	-12.14
+11	-0.29	-1.29	1.10	12.24	-1.39	-13.53
+12	0.16	-1.13	-1.22	11.02	1.38	-12.15
+13	0.31	-0.82	0.22	11.25	0.09	-12.07
+14	0.10	-0.72	0.02	11.27	0.08	-11.99
+15	-0.01	-0.73	-0.54	10.73	0.53	-11.46
+16	-0.19	-0.91	-1.30	9.43	1.11	-10.34
+17	-0.36	-1.27	-0.50	8.93	0.14	-10.20
+18	0.34	-0.94	1.19	10.12	-0.85	-11.06
+19	0.39	-0.55	-0.18	9.94	0.57	-10.49
+20	0.15	-0.39	-1.76	8.18	1.91	-8.57

Trading days	CPE	Z-stat	CPE	Z-stat	CPE	Z-stat
-60 to -1	-0.82	-0.48	17.95	2.13*	-18.77	-2.07*
-20 to -1	0.01	-0.01	11.13	2.67*	-11.12	-2.29*
-10 to -1	0.03	0.11	5.51	2.20*	-5.48	-1.81
-1	0.17	0.37	0.85	0.75	-0.88	-0.45
0	0.33	1.64	1.57	0.91	-1.24	0.08
0 to +1	0.09	0.73	0.31	-0.54	-0.22	0.84
+1	-0.24	-0.60	-1.26	-1.66	1.02	1.10
+2	0.26	1.20	1.27	1.48	-1.01	-1.64
+1 to +11	-1.63	-1.63	-0.46	0.20	-1.17	-1.02
+1 to +21	-0.77	-0.12	-4.11	-0.70	3.34	0.53
+1 to +60	-2.33	-0.68	-3.72	0.02	1.39	-0.37

* = Significant at 5% (two-tailed test)

TABLE 4.4d

Percentage prediction errors (PE), cumulative prediction errors (CPE), and Z-statistic (Z-stat) for upgrades within class: Low Analyst Disagreement vs High Analyst Disagreement

	Low Analyst Disagreement (N=44)		High Analyst Disagreement (N=7)		Difference	
Trading days	PE	CPE	PE	CPE	PE	CPE
-20	-0.20	-0.20	0.58	0.58	-0.78	-0.78
-19	0.28	0.08	1.17	1.75	-0.89	-1.67
-18	-0.35	-0.27	2.22	3.97	-2.57	-4.24
-17	-0.21	-0.48	-0.23	3.74	0.02	-4.22
-16	-0.05	-0.53	-1.01	2.73	0.96	-3.26
-15	-0.09	-0.62	-0.12	2.62	0.03	-3.24
-14	-0.22	-0.84	0.69	3.31	-0.91	-4.15
-13	0.01	-0.84	0.70	4.01	-0.69	-4.85
-12	0.00	-0.84	-0.32	3.68	0.32	-4.52
-11	0.16	-0.67	-0.47	3.22	0.63	-3.89
-10	0.06	-0.62	1.10	4.32	-1.04	-4.94
-9	-0.17	-0.79	-0.75	3.57	0.58	-4.36
-8	0.23	-0.56	-1.57	2.00	1.80	-2.56
-7	-0.10	-0.66	0.71	2.71	-0.81	-3.37
-6	0.00	-0.66	-0.13	2.58	0.13	-3.24
-5	0.25	-0.41	-0.90	1.68	1.15	-2.09
-4	0.34	-0.07	-0.54	1.14	0.88	-1.21
-3	0.13	0.06	-0.37	0.77	0.50	-0.71
-2	-0.33	-0.27	0.62	1.39	-0.95	-1.66
-1	0.04	-0.24	-0.29	1.10	0.33	-1.34
0	0.17	-0.07	0.24	1.34	-0.07	-1.41
+1	-0.15	-0.22	0.81	2.15	-0.96	-2.37
+2	-0.27	-0.50	0.54	2.69	-0.81	-3.19
+3	-0.32	-0.81	0.83	3.51	-1.15	-4.32
+4	-0.30	-1.12	-1.43	2.08	1.13	-3.20
+5	-0.55	-1.67	1.10	3.19	-1.65	-4.86
+6	-0.31	-1.98	-1.35	1.84	1.04	-3.82
+7	0.11	-1.87	0.35	2.19	-0.24	-4.06
+8	0.02	-1.85	-1.24	0.95	1.26	-2.80
+9	-0.31	-2.16	0.01	0.96	-0.32	-3.12
+10	-0.19	-2.35	-1.18	-0.22	0.99	-2.13
+11	-0.23	-2.58	1.89	1.67	-2.12	-4.25
+12	0.04	-2.54	0.59	2.26	-0.55	-4.80
+13	-0.19	-2.73	-0.89	1.37	0.70	-4.10
+14	-0.18	-2.91	-0.06	1.31	-0.12	-4.22
+15	-0.07	-2.98	-0.50	0.81	0.43	-3.79
+16	-0.32	-3.29	-0.05	0.76	-0.27	-4.05
+17	0.02	-3.27	0.12	0.88	-0.10	-4.15
+18	-0.23	-3.50	-0.14	0.74	-0.09	-4.24
+19	-0.08	-3.58	-0.56	0.19	0.48	-3.77
+20	0.09	-3.48	-0.30	-0.11	0.39	-3.37
Trading days	CPE	Z-stat	CPE	Z-stat	CPE	Z-stat
-60 to -1	-0.67	-0.58	3.35	-0.20	-4.02	0.03
-20 to -1	-0.24	-0.70	1.10	0.29	-1.34	-0.53
-10 to -1	0.44	-0.07	-2.12	-0.76	2.56	0.68
-1	0.04	0.38	-0.29	-0.23	0.33	0.36
0	0.17	0.59	0.24	0.10	-0.07	0.12
0 to +1	0.02	0.26	1.05	0.28	-1.03	-0.16
+1	-0.15	-0.24	0.81	0.28	-0.96	-0.35
+2	-0.27	-0.84	0.54	0.44	-0.81	-0.72
+1 to +11	-2.51	-3.05*	0.33	-0.19	-2.84	-0.95
+1 to +21	-3.42	-3.41*	-1.20	-0.41	-2.22	-0.88
+1 to +60	-5.61	-2.63*	-2.90	-0.57	-2.71	-0.45

* = Significant at 5% (two-tailed test)

statistically significant (5%, two-tailed test). For low analyst disagreement firms, the upgrades across classes subsample [table 4.4c] and the upgrades within classes subsample [table 4.4d] have announcement date abnormal stock returns on day 0 (day 0 to day +1) of 0.33% (0.09%) and 0.07 (0.02%), respectively. Their associated Z-statistics are 1.64 (0.73) and 0.59 (0.26), respectively. Again, these Z-statistics are all not statistically significant at 5%, in a two-tailed test.

Third, the test of difference in the announcement date effect between low vs high information firms indicates that there is a statistically significant difference in the announcement effect for upgrades across classes in the analyst-attention subsample (table 4.4a). In table 4.4a, the test of differences in the announcement date (day 0) effect of upgrades across classes between low vs high analyst attention firms has a Z-statistic of 2.02. This Z-statistic is statistically significant at 5%, in a two tailed test.

In past studies which employed daily stock return without controlling for differential information, Glascock (1984) and Holthausen and Lefwich (1986) found no statistically significant announcement effect of bond upgradings. Glascock's upgraded sample was not split into across classes and within classes subsamples. Holthausen and Lefwich (1986) examined upgrades across classes and upgrades within classes sepeartely. They found no statistically significant event date (day 0 to day +1) abnormal stock returns on both bond upgrades across classes and upgrades within classes. The results obtained in this study indicated that upgrade across class of low analyst attention firms are associated with a statistically significant event date abnormal stock returns. The statistically significant event date abnormal stock returns which are detected in upgrades across classes of low analyst attention firms are due to an increase in the signal to noise ratio when the differential information has been controlled for. Without controlling for differential information, the results obtained from this study are consistent with the results obtained in Holthausen and Lefwich's study. Table 4.4e presents the result of the upgrades across classes vs upgrades within classes without controlling for differential information. In table 4.4e, the result indicates that both upgrades across classes and upgrades within classes have day 0 (day 0 to day +1) Z-statistics of 1.43 (0.71) and 0.62 (0.61), respectively. These statistics are all not statistically significant at 5%, in a two-tailed test.

The hypothesis that price effect of rating change announcement is conditional on the information available about the firms is supported by the findings of an announcement date effect in some of the low information

TABLE 4.4e

Percentage prediction errors (PE), cumulative prediction errors (CPE), and Z-statistic (Z-stat) for upgrade across classes vs upgrade within class.

	Upgrade Across Class (N=74)		Upgrade Within Class (N=110)		Difference	
Trading days	PE	CPE	PE	CPE	PE	CPE
-20	-0.20	-0.20	-0.06	-0.06	-0.14	-0.14
-19	0.36	0.16	0.20	0.14	0.16	0.02
-18	0.38	0.54	-0.07	0.07	0.45	0.47
-17	0.15	0.69	-0.11	-0.04	0.26	0.73
-16	-0.15	0.55	-0.06	-0.10	-0.09	0.65
-15	-0.17	0.38	0.04	-0.05	-0.21	0.43
-14	0.51	0.89	0.18	0.12	0.34	0.77
-13	0.08	0.97	0.00	0.13	0.08	0.84
-12	-0.03	0.95	0.13	0.26	-0.16	0.69
-11	0.04	0.99	-0.11	0.16	0.15	0.83
-10	-0.10	0.89	0.06	0.22	-0.16	0.67
-9	0.19	1.07	-0.31	-0.10	0.50	1.17
-8	-0.05	1.02	-0.13	-0.23	0.08	1.25
-7	0.49	1.52	0.02	-0.21	0.47	1.73
-6	0.41	1.93	-0.17	-0.37	0.58	2.30
-5	-0.13	1.80	0.03	-0.34	-0.16	2.14
-4	0.34	2.14	-0.05	-0.39	0.38	2.53
-3	-0.11	2.03	0.00	-0.39	-0.11	2.42
-2	0.08	2.11	-0.06	-0.46	0.15	2.57
-1	0.13	2.24	0.08	-0.37	0.04	2.61
0	0.41	2.65	0.10	-0.27	0.30	2.92
+1	-0.27	2.38	0.04	-0.23	-0.30	2.61
+2	0.40	2.78	-0.10	-0.33	0.50	3.11
+3	-0.28	2.50	0.17	-0.16	-0.45	2.66
+4	0.04	2.54	-0.35	-0.51	0.39	3.05
+5	-0.25	2.29	-0.21	-0.72	-0.04	3.01
+6	-0.20	2.09	-0.51	-1.23	0.31	3.32
+7	0.01	2.11	0.03	-1.20	-0.01	3.31
+8	-0.22	1.89	-0.17	-1.37	-0.05	3.26
+9	-0.15	1.74	-0.18	-1.55	0.03	3.29
+10	0.17	1.91	-0.10	-1.65	0.27	3.56
+11	0.11	2.02	0.10	-1.55	0.01	3.57
+12	0.04	2.07	-0.04	-1.58	0.08	3.65
+13	-0.01	2.06	-0.27	-1.85	0.26	3.91
+14	0.10	2.15	-0.04	-1.89	0.13	4.04
+15	-0.21	1.94	-0.39	-2.28	0.18	4.22
+16	-0.34	1.60	-0.03	-2.31	-0.31	3.91
+17	-0.33	1.27	-0.07	-2.39	-0.26	3.66
+18	0.31	1.59	-0.16	-2.54	0.47	4.13
+19	0.22	1.81	-0.19	-2.74	0.41	4.55
+20	-0.28	1.53	0.06	-2.68	-0.34	4.21
Trading days	CPE	Z-stat	CPE	Z-stat	CPE	Z-stat
-60 to -1	4.49	1.55	-0.40	-0.12	4.89	1.27
-20 to -1	2.24	1.29	-0.37	-0.63	2.61	1.39
-10 to -1	1.25	1.24	-0.53	-1.10	1.78	1.66
-1	0.13	0.28	0.08	1.10	0.04	-0.48
0	0.41	1.43	0.10	0.62	0.30	0.71
0 to +1	0.14	0.71	0.14	0.61	0.00	0.16
+1	-0.27	-0.42	0.04	0.24	-0.30	-0.48
+2	0.40	1.80	-0.10	-0.60	0.50	1.77
+1 to +11	-0.62	-0.35	-1.28	-2.46*	0.65	1.29
+1 to +21	-1.17	-0.16	-2.25	-2.93*	1.08	1.74
+1 to +60	-1.67	-0.30	-4.07	-2.46*	2.40	1.33

* = Significant at 5% (two-tailed test)

firm subsamples and no announcement date effect in all high information firm subsamples. The announcement date effects are found in low information firm subsamples, especially in upgrades across classes (of low-analyst -attention firm subsample), because the firms in these subsamples are small and lesser known firms. There is limited information available to the investors regarding these firms. When the information availability of the firms is limited, the rating agencies are the only low cost providers of information to the investors. Consequently, the announcement of rating changes by rating agencies has an impact on the firm's common stock price. The announcement date effect is not found in high information firm subsamples because the firms in these subsamples are large and well known firms. The information regarding these firms is publicly available and plentiful. As a consequence, the announcement of bond re-ratings by the rating agency does not provide any new information to the investors.

Why can the degree of analyst attention and analyst disagreement relate to the degree of information availability for the firms? As it applies to analyst attention, Arbel (1985) explained that the stock market is like a product market. There are two types of stocks: brand-name stocks and generic stocks. Financial analysts usually closely followed brand-name stocks on a continuous basis because they are of interest to the investment community. As a consequence, every piece of information is not only immediately recorded and assessed but also often predicted and taken into consideration in advance. On the other hand, generic stocks are those that analysts do not follow on a regular basis. As a consequence, there is less information produced for these generic stocks. As it applies to the degree of analyst disagreement, Arbel (1985) explained that if professional security analysts are the most accurate estimators of ex ante expectations, then a high level of disagreement represents confusion and information deficiency. On the other hand, a full consensus indicates no information deficiency.

Cumulative Prediction Errors

Figure 4.1a, 4.1b, 4.1c, 4.1d, and 4.1e present the plot of average cumulative prediction error (CPE) patterns of the downgraded subsamples. Figure 4.2a, 4.2b, 4.2c, 4.2d, and 4.2e present the plot of average cumulative prediction error (CPE) patterns of the upgraded subsamples. Each figure, except figure 4.1e and 4.2e, contrasts the CPEs of high information firms vs low information firms under different information proxies (analyst attention or analyst disagreement) and types of rating changes (across or within classes). Figure 4.1e and 4.2e contrasts the CPE patterns of across class subsamples vs within class subsamples for the downgrades and the upgrades, respectively.

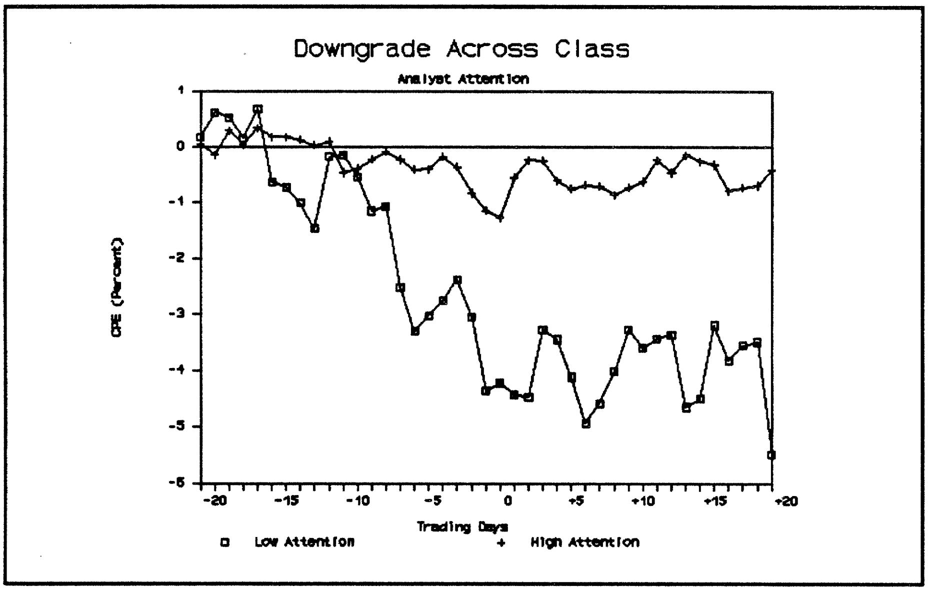

Figure 4.1a

A Plot of Cumulative Prediction Errors for Across-Class Rating Downgrades: Low and High Analyst Attention Samples.

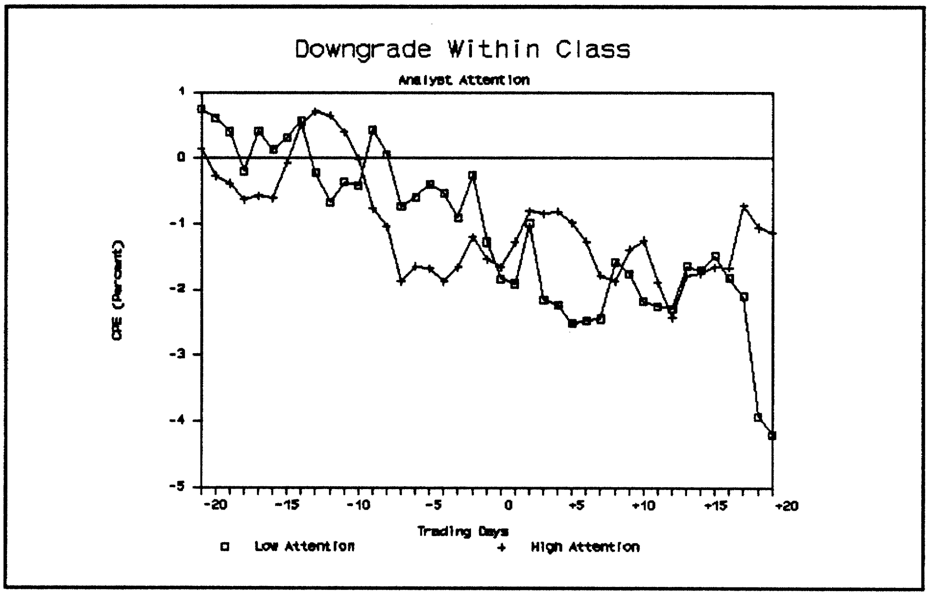

Figure 4.1b

A Plot of Cumulative Prediction Errors for Within-Class Rating Downgrades: Low and High Analyst Attention Samples.

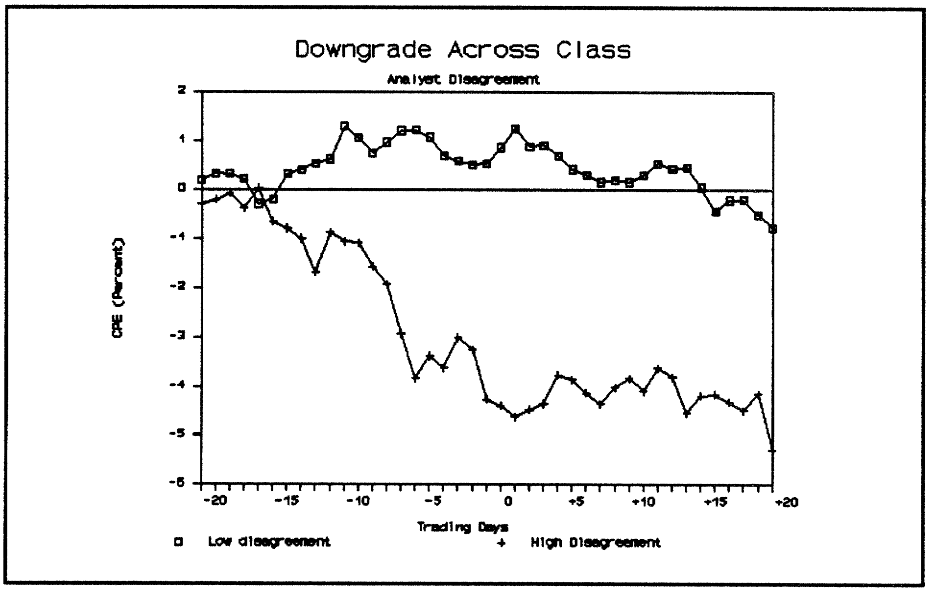

Figure 4.1c

A Plot of Cumulative Prediction Errors for Across-Class Rating Downgrades: Low and High Analyst Disagreement.

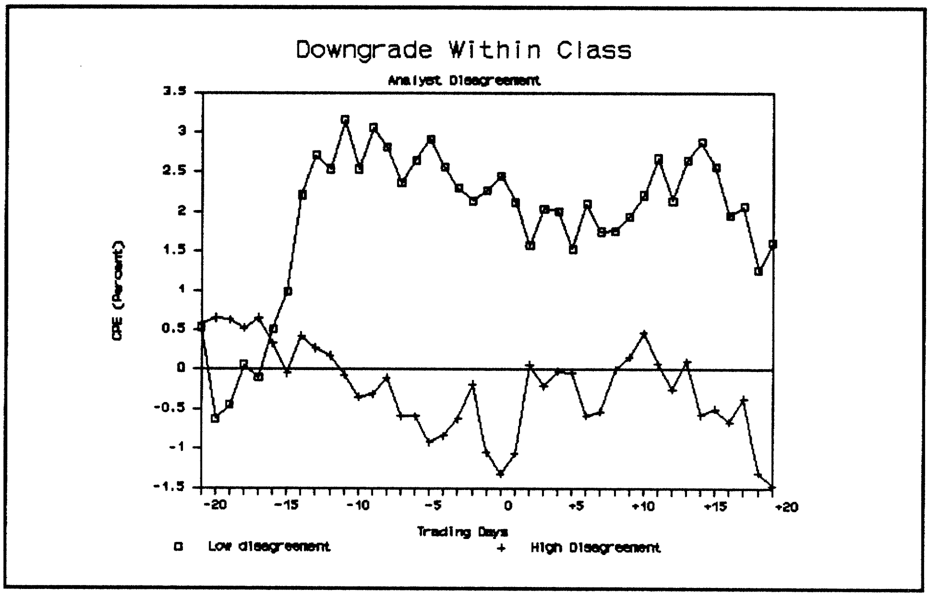

Figure 4.1d

A Plot of Cumulative Prediction Errors for Within-Class Rating Downgrades: Low and High Analyst Disagreement.

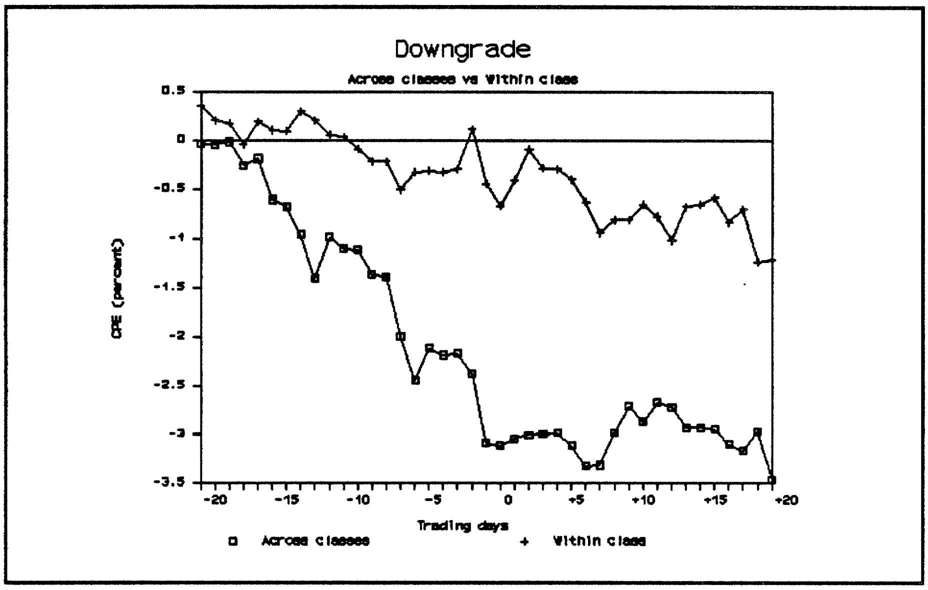

Figure 4.1e

A Plot of Cumulative Prediction Errors for Across-class Rating Downgrades and Within-class Rating Downgrades.

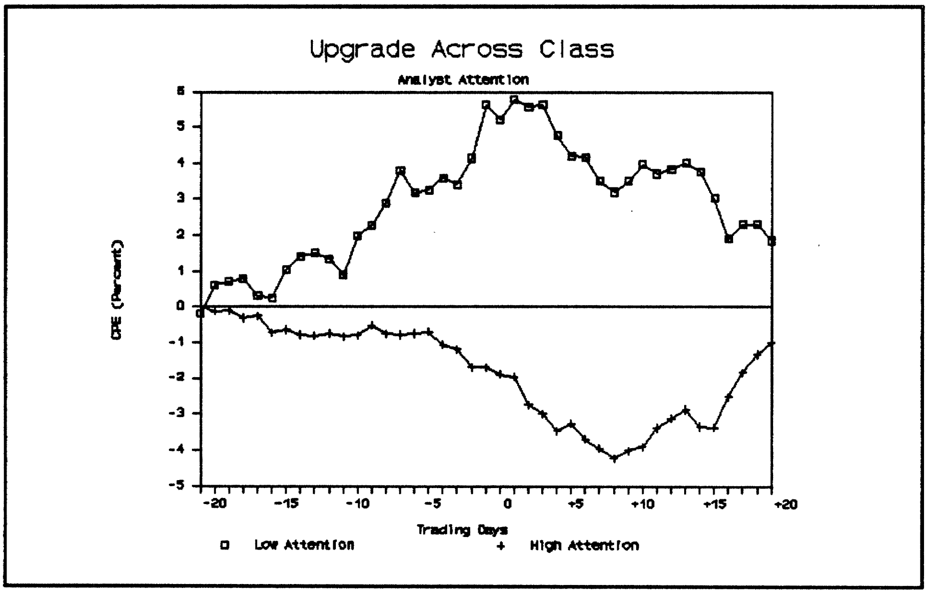

Figure 4.2a

A Plot of Cumulative Prediction Errors for Across-Class Rating Upgrades: Low and High Analyst Attention Samples.

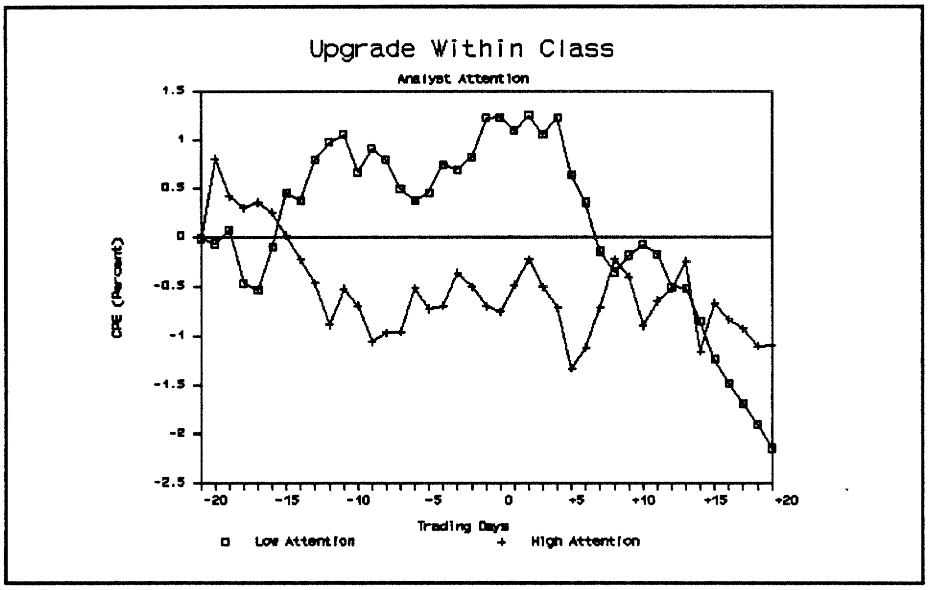

Figure 4.2b

A Plot of Cumulative Prediction Errors for Within-Class Rating Upgrades: Low and High Analyst Disagreement.

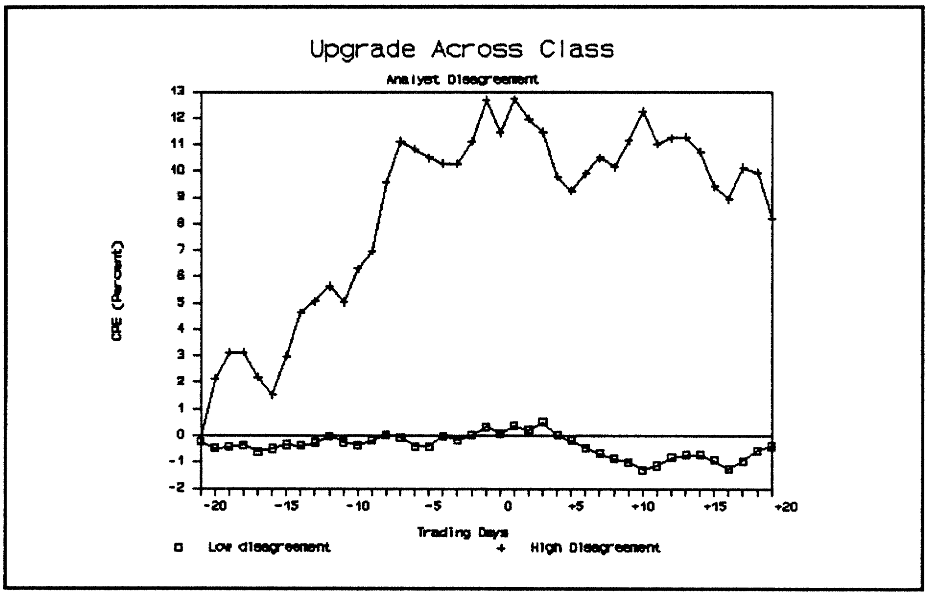

Figure 4.2c

A Plot of Cumulative Prediction Errors for Across-Class Rating Upgrades: Low and High Analyst Disagreement.

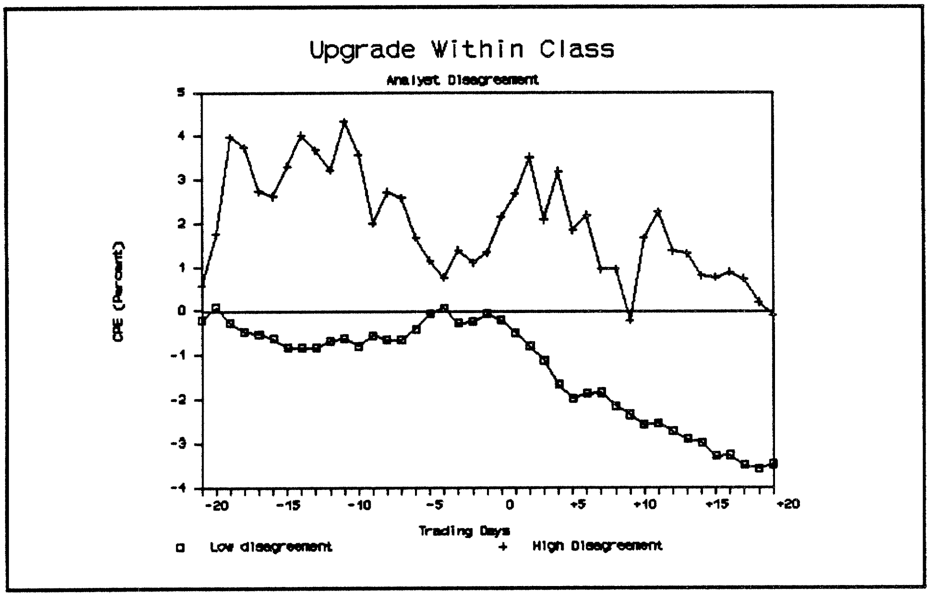

Figure 4.2d

A Plot of Cumulative Prediction Errors For Within-Class Rating Upgrades: Low and High Analyst Disagreement.

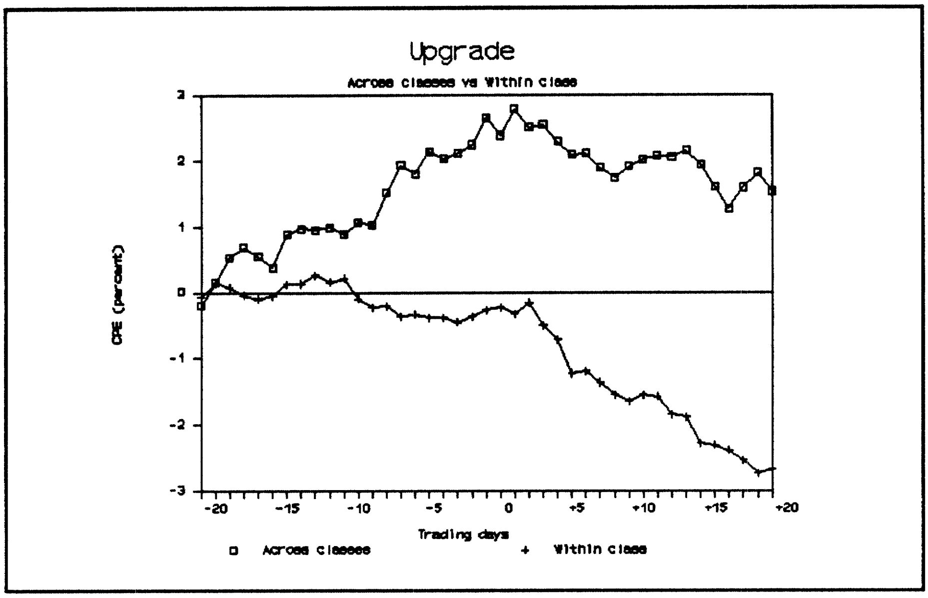

Figure 4.2e

A Plot of Cumulative Prediction Errors for Across-class Rating Upgrades and Within-class Rating Downgrades.

Figure 4.1a, 4.1c, 4.1d, 4.2a, 4.2b, 4.2c, 4.2d appear to exhibit a clear contrast of CPEs' patterns between high and low information firms. There seems to be a stronger downward (upward) stock price adjustment before the announcement of down rating (up rating) in low information firms than in high information firms. However, as warned by Brown and Warner (1980), it can be misleading to base decisions on visual display alone. The lower portion of table 4.3a, 4.3b, 4.3c, 4.3d, 4.4a, 4.4b, 4.4c, and 4.4d which are corresponding to figure 4.1a, 4.1b, 4.1c, 4.1d, 4.2a, 4.2b, 4.2c, and 4.2d, respectively, provide the cumulative average prediction errors (CPE)s for each group, as well as the difference between the two groups, and their associated Z-statistic for different intervals. The figures seem to exhibit a clear contrast of CPE's patterns between high and low information firms for both upgrade and downgrade subsamples. However, the test of statistical difference in CPEs shows that for the intervals before day 0, only upgrade subsamples (table 4.4a, 4.4b, and 4.4c) have Z-statistic which are statistically significant. In table 4.4a, the test of difference in mean of Z-statistics between low vs high analyst attention firms indicate that intervals -20 to -1, and -10 to -1 have the Z-statistic of 2.00 and 2.08 respectively. In table 4.4b, the test of difference in mean of Z-statistics between low vs high analyst attention firms indicate that interval -60 to -1 has a Z-statistic of

2.72. In table 4.4c, the test of difference in mean of Z-statistics between low and high analyst disagreement firms indicates that interval -60 to -1 and -20 to -1 have Z-statistics of -2.07 and -2.29 respectively. All of these Z-statistics are statistically significant at 5% in a two-tailed test. For the interval after day 0, there is only one case that a statistically significant difference in mean of Z-statistics between the two groups are detected. That is the downgrades across classes in table 4.3c. In table 4.3c, the test of differnce in mean of Z-statistics between low and high analyst disagreement firms show that interval +1 to +60 has a Z-statistic of -2.14 which are statistically significant at 5% in at two-tailed test.

Cross-Sectional Analysis of Abnormal Stock Returns

In the results that follow, weighted least square are estimated to explain cross-sectional variation in abnormal stock returns (or prediction errors) on the announcement date, day 0.[33] The regressions are estimated separately for the downgrades and upgrades in the following form:

$$PE_{0j} = \beta_0 + \beta_1 \log(\#ANALYSTS_j) + \beta_2 \log(COEFF_j) + \beta_3 (\#GRADES_j),$$

[33] The reciprocal of variances of prediction errors are used as weight in the weighted least squares. The purpose is to correct for heteroscedasticity.

where,

PE_{0j} = abnormal stock returns for observation j on day 0;

#ANALYSTS = the I/B/E/S number of security analysts following the firm j's common stock;

COEFF = the I/B/E/S coefficient of variation of earning per share estimates for observation j.

$\#GRADES_j$ = the number of grades changed (old rating less new rating) for observation j -a cardinal variable measured on the scale of 28 (for rating AAA) to 1 (for rating D);[34]

The variable #ANALYSTS provides a test for whether there is a relationship between the number of security analysts and the magnitude of the announcement effect. For downgrades, (upgrades), the coefficient on #ANALYSTS should be positive (negative). Similarly, the variable COEFF provides a test for whether there is a relationship between the I/B/E/S coefficient of variation and the magnitude of

[34] There are ten major rating classes from D to AAA. Since some classes have three gradations, every class was assigned three numbers. Classes without gradations (D, C, CC, CCC, and AAA) are assigned the midpoint of the three numbers. The midpoint is 28 for AAA and 1 for D. As a result, of the 114 downgrades within class, 22 observations have the #GRADES variables which have the value of 2, and of the 1102 upgrades within class, 15 observations have the #GRADES variable which have the value of 2.

TABLE 4.5

Regression tests of announcement effects: downgrades and upgrades (dependent variable is abnormal stock return for each observation measured on day 0).

	Independent variables				Adj R^2	F-stat.
	INTERCEPT	#ANALYSTS	COEFF	#GRADES		
	Panel A: Downgrades (247 observations)					
Predicted sign		(+)	(-)	(-)		
Estimated coefficient	-0.0128	0.0043	-0.0006	-0.0007	0.33	3.75
t-stat.	-2.45	2.61**	-1.49	-0.62		
	Panel B: Upgrades (184 observations)					
Predicted sign		(-)	(+)	(+)		
Estimated coefficient	0.0098	-0.0027	-0.0013	-0.0000	0.01	1.86
t-stat.	2.29	-1.95*	-1.45	0.02		

** significant at 5% (two-tailed test)
* significant at 10% (two-tailed test)

the announcement effect. For downgrades (upgrades), the coefficient on COEFF should be negative (positive)

The variable #GRADES is positive (negative) for downgrades (upgrades) because it is calculated as old rating less the new rating. Thus, if downgrades (upgrades) are associated with negative (positive) abnormal stock returns, then the coefficient on #GRADES should be negative (positive).

The results of two seperate regressions are reported in table 4.5. Panel A contains results for the downgrades. The explanatory power of the regression for the downgrades is low (adjusted R^2 = 0.33). The variable #ANALYSTS is positive (0.0043), as predicted, and is statistically significant at less than 5%, in a two-tailed test. The variables #GRADE (-0.0007) and COEFF (-0.0006) are not statistically significant. The F-statistic (3.75) implies that the regression as a whole has explanatory power.

Panel B contains results for upgrades. Similar to the downgrades, the explanatory power of the regression for theupgrades is low (adjusted R^2 = 0.01). The variable #ANALYSTS is negative (-0.0027), as predicted, and significant at least 10% level, in a two-tailed test. Similar to the downgrade, the variable COEFF (-0.0013) and #GRADES (0.0000) are not statistically significant. The F-statistic (1.86) implies that the regression as a whole does not have high explanatory power.

The statistically significant relationship between the number of analysts and the event date (day 0) prediction errors is consistent with the results obtained in the earlier section. In the earlier section, the following results are obtained: 1) The statistically significant annnouncement effect is found in 3 out of 4 low analyst attention subsamples. These 3 subsamples are downgrade across classes, downgrades within classes, and upgrades across classes; 2) No statistically significant announcement effect is found in any of the 4 high analyst attention subsamples -downgrades across classes, downgrades within class, upgrades across classes, and upgrades within clases; 3) The statistically significant differences in the (mean of) event date's Z-statistics between low and high analyst attention subsamples are found in 1 out of 4 pairs of subsamples. This pair of subsample is upgrades across classes (Z-statistic on day 0 = 2.02, significant at 5%, two-tailed test).[35]

The I/B/E/S coefficient of variation may not be a good proxy for information. In a regression test, no statistical significant relationship between the I/B/E/S coefficient of

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[35] Using a 5% alpha with two-tailed test, the statistically significant differences in announcement date (day 0 or day 0 to +1) Z-statistic is detected in this pair of subsamples. However, if 10% alpha with two-tailed test is used, one addition pair is significant: downgrades across classes: low vs high analyst attention (day 0 Z-statistics = -1.86, significant at 10%, two-tailed test).

variation and the event date (day 0) prediction is detected. In the earlier section, no statistically significant announcement effect are detected in any of the upgraded high-analyst-disagreement subsamples. For the downgraded high-analyst-disagreement subsamples, statistically significant announcement effects are detected for both downgrades across classes and within classes. The I/B/E/S coefficient of variation may contain another proxy - uncertainty of the firm regarding its future earnings. This is because the I/B/E/S coefficient of variation is coefficient of variation the earning per shares (EPSs) forecasted by the security analysts. The higher the I/B/E/S coefficient of variation, the greater the uncertainty regarding the firm's future earnings. In a situation of uncertainty regarding the firm's future earnings, investors may respond to favorable, as well as, unfavorable surprise events by setting stock prices, on average, below their expected values. The positive unanticipated information, such as the announcement of a bond upgrading, affects investors who hold the firm's common stocks with highly uncertain future earnings in the following manner. First, as the good news is received, projections of the fortunes of the firm are revised upward. Second, because of the existing uncertainty regarding the company's earning, the investors tend to set the firm's stock price below its expected value. As a consequence, no statistically significant announcement effect is detected in any upgraded high-analyst-disagreement subsamples. The negative unanticipated information, such as the announcement of bond downgrading, affects investors who hold the firm's common stocks with highly uncertain future earnings in the following manner. First, as the bad news is received, projections of the fortunes of the firm are revised downward. Second, because of the existing uncertainty regarding the company's earning, the investors further set the firm's stock price below its expected value. As a consequence, the statistically significant announcement effect are detected in all the downgraded high-analyst-disagreement subsamples. Simply stated, it is the quality of information from the rating agencies that investors count on. Investors tend to discount the creditability of the the good news and over react to the bad news from rating agencies when the future earnings of the firms are uncertain. This situation is also consistent with the Uncertainty Information Hypotheis (UIH) asserted by Brown, Harlow, and Tinic (1989).

Holthausen and Lefwich (1986) found a statistically significant relationship between the number of grades changed and the degree of the announcement effect (event date prediction error). This study found no statistically significant relationship between the number of grades changed and the degree of the announcement effect. The difference between this study's result and Holthausen and Lefwich's result is related to the difference in statistical methods. While this study employed the weighted least square (WLS) method, Holthausen and Lefwich employed the ordinary least squares (OLS) method. In case of heteroscedasiticity problems, the ordinary least squares tends to overstate the value of t-statistic of the beta coefficients, resulting in a statistically significant.[36]

[36] The test was also done by using the ordinary leas square (OLS) method. The diagnostic tests suggested by White (1980) indicates a severe heteroskedasticity problem in the OLS estimate. Using the Weighted Least Square (WLS) method results in an inprovement in variance stationarity.

CHAPTER V

CONCLUSION

The results of this study suggest that rating agencies provide information to the capital market. Previous studies had produced conflicting results because they failed to control for differential information. This study has used (1) the I/B/E/S number of security analysts following the firm's common stocks, and (2) the I/B/E/S coefficient of variation of estimated earning per share (EPS) as a proxy for information availability of the firms. This study finds that the announcements of downgrade across rating classes, downgrade within rating class, and upgrade across rating class, of low information firms are associated with statistically significant event date abnormal stock return when the proxy for information is the I/B/E/S number of analysts. When the information proxy is the I/B/E/S coefficient of variation, only downgrades across and within rating class are associated with significant event date abnormal stock returns. This study concludes that the I/B/E/S coefficient of variations contain another proxy - uncertainty of the firms regarding their future earning. In the regression test, no statistically significant relationship between the I/B/E/S coefficient of variation and the event date (day 0) prediction errors is detected in both the downgrades and upgrades. In addition, while statistically significant announcement effects are detected in both downgraded high-analyst-disagreement subsamples (across classes and within classes) no statistically significant announcement effect is detected in any type of upgraded high-analyst-disagreement subsamples (across classes and within classes). In a situation of uncertatinty regarding the firms' future earning, investors tend to discount the creditability of rating agencies when the good news is announced. On the other hand, when the bad news is announced, investors tend to over react to the bad news. This type of investor behavior explains why no announcement effect is detected in any of the upgraded high-analyst-disagreement subsamples, while a statistically significant announcement effect is detected in all of the downgraded high-analyst-disagreement subsamples.

There is evidence of a differential effect for bond rating change announcements, depending on the degree of information availability for the firms. This study found a statistically significant difference between the announcement date (day 0, or day 0 to +1) Z-statistics in a pair of subsample -low information firms vs high information firms- when the proxy for information is the I/B/E/S number of analysts. The statistically significant difference between the announcement date (day 0 or day 0 to +1) mean of

Z-statistics are detected in the pair of subsample: upgrades across rating class -low vs high analyst attention firms.[37] The differential effect is also confirmed by the statistically significant relationship between the I/B/E/S number of analysts and the day 0 prediction errors in both upgrades and downgrades subsamples.

The magnitude of the impact of bond rating-change announcement does not depend on the number of grades changed. In the regresstion test, no statistically significant relationship between the number of grades changed and the event date (day 0) prediction errors is detected in both the downgrades and upgrades.

Limitations

This study is subjected to some limitations. First, due to the inherent nature of social science research, it is

[37] Using 5% alpha with two-tailed test, the statistically significant difference in the announcement date (day 0 or day 0 to +1) Z-statistics is detected in this pair of subsample. However, if 10% alpha with two-tailed test is used, one addition pair is significant: downgrades across classes: low vs high analyst attention (day 0 Z-statistic = -1.86, significant at 10%, two-tailed test). The significant statistical differnce between the announcement date (day 0 or day 0 to +1) Z-statistics are also detected in the pairs of subsamples: downgrades across rating class -low vs high analyst disagreement firms (day 0 to +1 Z-statistic = 2.31, significant at 5%, two-tailed test), and downgrades within rating class -low vs high analyst disagreement firms (day 0 and day 0 to day +1 Z-statistics = 1.69, significant at 10% two-tailed test). However, because the I/B/E/S coefficient of variation is ruled out as a valid proxy for information as mention earlier, the conclusion of differential effects is not drawn from analyst disagreement subsamples.

not possible to perform a study in which all variables, except bond rating changes, are constant. Second, the data used in this study is Moody's bond ratings. Care should be taken when generalizing these findings to other rating agencies. Third, although an effort has been made to eliminate the confounding events in the 4-day window (day -1 through day +2) by checking for the news from The Wall Street Journal Index, it is recognized that The Wall Street Journal may not routinely follow many of the firms in the samples. The sample could also contain observations for firms which may be monitored by other news media. Finally, the results may be time period specific. However, the study does provide major evidence that is consistent with past studies which used daily stock return data. The announcement effect of bond downgradings across rating classes is consistent with Holthausen and Leftwich's (1986) findings when using daily stock return data.

Suggestion for Future Research

The results of this study suggests that Moody's rating agency provides information to the capital markets. However, there is a difference in degree of the announcement effects depending on the degree of availability of the information that the firms have. Given these results, numbers of questions remain unanswered. First, will the results be the same with the rating change announcement by other agencies such as the Standard and Poor's ? Second, is Moody's or Standard and Poor's more efficient in bond re-rating? Third, are other variables such as period of listing, firm size, P/E ratio, and the number of financial institutions holding the stock good proxies for information availability for the firms? Finally, can a model for predicting bond re-ratings be developed?

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