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**The economic function of credit rating agencies -
What does the watchlist tell us?**

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The economic function of credit rating agencies - What does the watchlist tell us?

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Abstract

Credit rating agencies do not only disclose simple ratings but announce watchlists (rating reviews) and outlooks as well. This paper analyzes the economic function underlying the review procedure. Using Moody's rating data between 1982 and 2004, we find that for borrowers of high creditworthiness, rating agencies employ watchlists primarily in order to improve the delivery of information. For low-quality borrowers, in contrast, the review procedure seems to have developed into an implicit contract à la Boot, Milbourn, and Schmeits (2006), inducing the companies "on watch" to abstain from risk-augmenting actions. The agencies' economic role hence appears to have been enhanced from a pure information certification towards an active monitoring function.

Keywords: Credit Rating Agencies; Credit Rating; Watchlist; Rating Review; Market Reaction; Event Study

JEL: G14, G29, G33

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Executive Summary

Kreditratingagenturen wie Standard and Poor's, Moody's Investors Service oder Fitch liefern mittels Ratings qualitative Aussagen über die Kreditwürdigkeit von Unternehmen, Staaten oder einzelnen Finanzprodukten. Die Verwendung von Ratinginformationen hat in den vergangenen Jahren stetig zugenommen, sei es durch die Globalisierung der Finanzmärkte, die wachsende Komplexität von Finanzinstrumenten oder die Nutzung von Kreditratings in regulatorischen und vertraglichen Regelwerken.

Parallel dazu ist auch die Komplexität der Ratinginformationen selbst gestiegen. Ratingagenturen veröffentlichen seit einigen Jahren nicht nur "simple" Kreditratings, sondern geben sogenannte Outlooks und Watchlists bekannt. Mittels dieser Instrumente liefern sie einen Ausblick über die zukünftig erwartete Entwicklung von Ratings. Während sich Rating Outlooks auf einen Zeitraum von etwa einem Jahr erstrecken, stellen Watchlists wesentlich schärfere Aussagen dar, da sie sich auf einen kürzeren Zeitraum konzentrieren - üblicherweise etwa 3 Monate. Watchlist-Einträge werden entweder durch spezielle Unternehmens-Ereignisse, wie beispielsweise die Ankündigung einer Übernahme oder eines Wechsels im Management, ausgelöst oder durch sich abzeichnende Trends im operativen Geschäft oder in der finanziellen Entwicklung des Unternehmens. Das Rating der Firma wird häufig bereits mit dem Zusatz "upgrade" oder "downgrade" auf die Beobachtungsliste gesetzt, in seltenen Fällen mit der Bemerkung "uncertain". Über die Dauer der Watchlist hinweg setzt sich das Team von Ratinganalysten meist intensiv mit dem Firmenmanagement auseinander, so dass am Ende das ursprüngliche Rating entweder bestätigt wird oder eine Ratingänderung vollzogen wird.

Moody's hat das Watchlist-Instrumentarium offiziell seit dem 1. Oktober 1991 in Gebrauch. Interessanterweise sagt Moody's über seine Watchlist: "That rating changes for issuers placed on the watchlist are different from issuers not on the watchlist, implies that the watchlist is an important source of information for market participants interested in measuring credit risk". In der vorliegenden Arbeit gehen wir zwei Fragen nach, die an diesem Statement anknüpfen: Zum einen, besteht tatsächlich ein Unterschied zwischen

direkten Rating-Änderungen und solchen, denen ein Watchlist-Eintrag vorausging? Zum zweiten, falls dies so ist, welche Ursachen hat dieser Unterschied und was können wir daraus in Bezug auf die ökonomische Funktion von Rating-Agenturen schließen?

Unter Nutzung der vollständigen Historie von Moody's Kreditratings sowie der Datenbanken von Compustat und des Center for Research on Securities Prices (CRSP) stellen wir anhand einer Eventstudie fest, dass sich die Marktreaktion auf Ratingänderungen - gemessen anhand der kumulativen abnormalen Rendite - nach der Einführung der Watchlist durch Moody's tatsächlich erhöht hat. Dies stützt die obige Aussage von Moody's. Anschließend testen wir zwischen zwei unterschiedlichen Erklärungsansätzen für die ökonomische Rolle der Beobachtungsliste: zum einen könnte sie ein einfaches Instrument sein, um einer erhöhten Nachfrage nach Kreditrisiko-Informationen zu begegnen, ohne die Langfristigkeit und Stabilität der Agency-Ratings zu kompromittieren. In diesem Sinne dient sie der traditionellen Rolle von Rating-Agenturen als Informationslieferanten und -zertifizierer. Zum anderen könnte die Watchlist als Instrument genutzt werden, um Unternehmen hinsichtlich ihrer Risikoaufnahme zu disziplinieren. Wie in einem Papier von Boot, Milbourn und Schmeits (2006) dargelegt wurde, verhilft die Tatsache, dass viele Investoren sich in ihren Investitionsentscheidungen stark an Ratings ausrichten, den Agenturen zu einer gewissen Machtposition gegenüber den bewerteten Unternehmen. Unter dem Hinweis auf eine drohende Herabstufung im Anschluss an eine Watchlist könnten sie den Unternehmen durchaus Anreize geben, ihre Kreditwürdigkeit zu verbessern bzw. nicht zu stark absinken zu lassen, um das Downgrade ihres Ratings zu vermeiden.

Wir testen zwischen den beiden Erklärungsansätzen, indem wir sowohl die Entscheidung der Agenturen, eine Firma unter Beobachtung zu setzen, anhand einer Probit-Regression, die Länge der Watchlist-Prozedur anhand einer einfachen OLS-Regression sowie die Marktreaktion auf die Rating-Änderung mittels des Heckman-Korrekturverfahrens analysieren. Interessanterweise stellen wir fest, dass die Watchlist unterschiedliche Funktionen ausüben kann, in Abhängigkeit von der Kreditqualität der zu beurteilenden Firma. Für Unternehmen mit hoher Bonität (investment-grade) scheint die traditionelle Informationsverbreitung klar im Vordergrund zu stehen. Für Unternehmen mit schlechter Bonität

(non-investment grade) dagegen scheint die Watchlist in der Tat ein Disziplinierungsinstrument zu sein, um eine weitere Verschlechterung der Kreditwürdigkeit unter Mitwirken der Firma selbst zu vermeiden.

In diesem Sinne hat die Einführung des Watchlist-Instruments tatsächlich die ökonomische Funktion von Rating-Agenturen erweitert: zusätzlich zu ihrer traditionellen Rolle als Informationslieferanten können sie durchaus positiven Druck auf die bewerteten Firmen ausüben und sie zu einer eigenständigen Verbesserung ihrer Bonität veranlassen. Rating-Agenturen sind somit nicht mehr nur passive Beobachter an den Kreditmärkten, sondern durchaus auch aktive Teilnehmer, deren Einfluss nicht unterschätzt werden sollte.

1 Introduction

Credit rating agencies such as Standard and Poor’s (S&P), Moody’s Investors Service (Moody’s), or Fitch, Inc., provide qualitative statements on the creditworthiness of entities and their financial obligations. Use of credit ratings has expanded in recent years, mostly due to the globalization of financial markets, the growing complexity of financial products, and, generally, an increasing usage of ratings in financial regulation and contracting (Frost, 2006).

The widespread use of credit ratings has been accompanied by a rise in the complexity of the rating information. Most credit rating agencies not only offer a rating for a company issuing securities and for the individual financial products issued, but supplement their service by providing additional information via rating outlooks and rating reviews (“watchlists”)¹ that give indications of future credit rating changes. While rating outlooks represent agencies’ opinions on the development of a credit rating over the medium term,² rating watchlists are stronger statements, as they focus on a much shorter time horizon - three months, on average (Keenan, Fons, and Carty, 1998).³

Review listings are usually triggered either by discrete corporate events such as, e.g., the announcement of a merger or a share buy-back, or by trends in a corporation’s operations or financial conditions. A rating may be put on review for possible downgrade or upgrade or with direction uncertain. During the watchlist interval, the rating agency collects additional information on the firms it rates, which typically leads to an interaction between rating analysts and firm management. The watchlist is eventually resolved by the announcement of either a rating change or confirmation of the initial rating. The proportion of ratings “on watch” has sharply risen in recent years: until 1998 about 10 percent

¹Moody’s reports ratings currently as being under review on their “Watchlist”; S&P refers to its “CreditWatch.” In the following, we use the notions of rating watchlists and rating reviews interchangeably.

²Rating outlooks are generally terminated after 12 to 18 months.

³In the study by Keenan, Fons, and Carty (1998), the 10 (90) percent quantile is 22 (95) days for firms that are placed on watchlist with designation downgrade. For firms entering the watchlist with designation upgrade, the mean is 115 days with 21 (218) as the 10 (90) percent quantile.

of bond issuers, on average, were under review at Moody's; between 2000 and 2004, this percentage increased to about 40 percent (Hamilton and Cantor, 2004; Chung, Frost and Kim, 2008). Obviously, rating watchlists have grown into heavily used instruments to transmit information to financial markets.

Moody's, as one of the oldest rating agencies, has been publishing a list of ratings on review since 1985.⁴ However, it only started to consider watchlist assignments as formal rating action on October 1, 1991. Since that time, Moody's has employed a full rating committee to decide whether to place a borrower under review and how to resolve the watchlist. Interestingly, Moody's states: "That rating changes for issuers placed on the watchlist are different from issuers not on the watchlist, implies that the watchlist is an important source of information for market participants interested in measuring credit risk." (Keenan, Fons and Carty, 1998). In this paper we use Moody's rating data to try to answer two questions with respect to this statement. First, is it true that there is a difference between watch-preceded rating action and direct, i.e., not-review preceded, rating action? Second, if so, how can we explain this difference? Based on our results, we then argue whether the review process has enhanced the rating agencies' traditional role as information providers.

Our paper contributes to the growing literature on information provision by credit rating agencies. With seminal studies in the late 1980s and early 1990s (Holthausen and Leftwich, 1986; Hand, Holthausen and Leftwich, 1992), there is now an established set of empirical results with respect to the informational content of rating changes. Most of the studies find that the rated firms' equity reacts negatively to downgrades, but rarely observe a significant reaction to positive rating changes (Cantor, 2004; Vassalou and Xing, 2005).⁵ While bond prices tend to react asymmetrically as well, the effect is not quite as

⁴Standard and Poor's instituted a watchlist in November 1981.

⁵There are exceptions to this generally accepted asymmetry in market reaction: Jorion, Liu, and Shi (2005) find a significant positive abnormal return following upgrades after the introduction of the Regulation Fair Disclosure on October 23, 2000, by the SEC. Second, Goh and Ederington (1993) find a significant negative abnormal return only for downgrades associated with a deterioration of the firm's expected financial performance but not for those attributed to a reorganization or an increase in financial

strong (Wansley and Clauretje, 1985).

Few studies have yet examined the informational content of the watchlist instrument. Holthausen and Leftwich (1986) use S&P's Credit Watch data in the period 1981 to 1983 and find tentative evidence that watch-preceded rating downgrades provide less information than rating changes not preceded by a formal review process. However, their small sample size hampers reliable inferences. Hill and Faff (2007), in contrast, conclude from sovereign ratings that the market does not react any differently to the two types of rating changes. They observe that prior to a watch-preceded downgrade, the market seems to anticipate the event by displaying negative returns but has a significantly positive reaction after the downgrade.⁶ Norden and Weber (2004) report similar anticipation effects of corporate rating reviews both on stock and credit default swap (CDS) markets. Purda (2007) distinguishes between expected and unexpected rating changes, where rating reviews are one among several ingredients affecting rating change expectations. She concludes that there are no differences in market reaction to anticipated versus surprise rating changes. Chung, Frost, and Kim (2008) are the first to give an extensive overview on the characteristics and information value of credit watches. They observe that watch-preceded rating changes are more often triggered by corporate events than are direct rating actions and that the watchlist instrument helps rating agencies to supply information to financial markets. Our paper enhances these earlier studies in at least two ways: first, we investigate in more detail the economic function underlying the review procedure. Essentially, we test between two different explanations for this particular rating instrument. Second, and in contrast to earlier work, we draw inferences not only from market-reaction studies but use several approaches to discriminate between the two lines of argument. This allows us to take a more robust view on the role of credit rating agencies in financial markets.

As a first pre-study, we employ Moody's estimated senior unsecured ratings between leverage. Regarding cross-sectional aspects, stronger market effects are generally found for downgrades to and within the sub-investment-grade rating category (Goh and Ederington, 1999).

⁶This result is supported by Hull, Predescu, and White (2004), who focus on ratings' effects on credit default swaps and find that while additions to the watchlist (with designation downgrade) are informative, the eventual rating downgrades are not.

1982 and 2004 to test for a time-series break in the market reaction to rating changes due to the institutional implementation of the watchlist on October 1, 1991. The market reaction is measured by the rated companies' cumulative abnormal stock returns. In line with earlier work, we find a significant reaction following negative rating changes only, but not following upgrades. Comparing the pre-watchlist period (April 26, 1982 - September 1991) with the post-watchlist period (October 1991 - December 2004), we see that the informational content of downgrades significantly increased after the watchlist introduction. This result is robust to business-cycle effects, regulatory changes and sample-composition effects and, consequently, underlines the conjecture implicit in the initial Moody's statement that the watchlist instrument has in some sense influenced rating agencies' traditional role as information providers.

In our main analysis, we test between two different explanatory lines for the review procedure: first, the creation of an additional rating process via the watchlist may be a simple means to comply with investors' demand for accurate and timely, but also stable rating information (Cantor and Mann, 2006). According to this argument, a watchlist may be invoked whenever investors' needs for information are particularly strong (Chung, Frost and Kim, 2008), so that the watchlist helps to improve the information-certification role of credit ratings. As an alternative, however, it has recently been argued that credit ratings may also be used as an instrument to coordinate investors' anticipation of credit risk (Carlson and Hale, 2006). As a consequence, an intensive monitoring process via the watchlist should allow rating agencies to influence firms' risk choices by threatening them with imminent rating downgrades and subsequent investor reactions. In a theoretical model, Boot, Milbourn, and Schmeits (2006) have shown that this "implicit contract" feature enables watch-preceded credit ratings to convey information of a different quality: Whereas a direct downgrade signals a firm's lack of capability to uphold a specific credit quality, a watch-preceded downgrade signals a failure in the attempt. According to this argument, the watchlist gives rise to an active monitoring role of rating agencies.

Since both explanatory approaches are particularly convincing for the case of negative

developments in credit quality, our further analyses focus on imminent rating downgrades.⁷ The two arguments (“delivering information” versus “implicit contracting”) allow the derivation of distinct predictions both with respect to the watchlist-placement of firms, the length of the review procedure and the market reaction to direct vs. watch-preceded rating changes. Interestingly, our empirical analyses indicate that we have to differentiate between high-quality borrowers and low-quality borrowers. For the former, we find that the watchlist procedure is mainly used to deliver precise and stable information in order to feed investors’ demand. Particularly the decision to list a firm on review depends strongly on investors’ quest for information. The market reaction to a subsequent downgrade is moreover similar to the reaction to a direct downgrade. For low-quality borrowers, in contrast, we find strong evidence that the review instrument is used as an implicit contract in order to induce the rated companies to abstain from further risk-enhancing actions. In accordance with this line of argument, we observe that the market reacts much less strong to a watch-preceded downgrade than to a direct rating change. The introduction of the review procedure hence seems to have indeed enhanced the agencies’ traditional role as information providers. At least vis-à-vis issuers of weak credit quality, the agencies appear to take on a beneficial monitoring function, inducing the rated firms to reduce their credit risk.

The rest of the paper proceeds as follows. Section 2 describes our data set and lays out its main characteristics. Section 3 examines the information content of rating changes before and after the introduction of the watchlist instrument. Section 4 contains the main analyses and tests between the two potential explanatory lines underlying the review procedure. Section 5 concludes.

⁷I.e. we employ data from watchlist placements with designation downgrade (leading to either an actual downgrade or a confirmation of the initial rating) and from direct downgrades.

2 Data Selection and Descriptive Statistics

Our data comprise the complete history of Moody's estimated senior unsecured ratings of U.S. issuers.⁸ Since Moody's started to add numerical modifiers to its letter ratings on April 26, 1982, we choose to exclude all rating information prior to this date. Consistent with the existing literature, we convert Moody's letter ratings into a numerical scale, where 1 is equivalent to Aaa, 2 is equivalent to Aa1,..., and 21 is equivalent to C.

We make several further refinements to our raw data. First, as we match rating information with firm-specific data later on (taken from Compustat and from the Center for Research on Securities Prices, CRSP), we restrict the reported database to include only those firms' ratings for which firm-specific information is available. Second, we delete all watchlist entries that lead to rating reversals (e.g., additions to the watchlist with direction upgrade that were downgraded subsequently). This deletion of data is uncritical, as we lose only six observations altogether. Third, we control for contaminated rating changes (Jorion, Liu, and Shi, 2005). An observation is considered to be contaminated if any firm-specific, price-relevant information appears in the Wall Street Journal Abstracts within a three-day window surrounding the event day of the rating change. Our final sample consists of 2,531 (direct and watch-preceded) downgrades and 1,512 (direct and watch-preceded) upgrades.

With respect to the time series dimension, we dispose of considerably more data points in the post-watchlist era as compared to the pre-watchlist era (1,810 downgrades altogether versus 721, and 1,112 upgrades versus 400). Overall, the number of rated issuers per year increased almost fivefold from 1982 to 2004. The proportion of direct to watchlist-driven downgrades in the post-watchlist period is roughly 60:40, for upgrades it is 70:30.

⁸Estimated senior unsecured ratings are usually calculated as issuer ratings, rarely as issue ratings. By using this type of rating, we avoid the problem of multiple ratings for one issuer, which facilitates comparability across firms and also over time. In the case of multiple ratings, the watchlist decision cannot be attributed to a particular issue rating. Therefore, we assume that it affects all outstanding ratings of this firm. For a detailed description of the respective algorithm employed by Moody's to calculate the issuer rating, see Hamilton (2005).

This again confirms the perception that the watchlist has become an important tool for rating agencies.

Table 1 (2) provides the distribution of the number and the average size of direct and watchlist-preceded downgrades (upgrades) per year. The number of rating changes per year clearly varies along with the business cycle, both with respect to downgrades and upgrades.⁹ Comparing the average size of rating changes, we see that watchlist-preceded changes tend to be larger than direct rating changes, with the effect being more pronounced for upgrades than for downgrades. Over time, however, the average size of the rating change for both downgrades and upgrades seems to have decreased. Similar observations have also been made by Chung, Frost, and Kim (2008).

A summary of the size distribution of downgrades (upgrades) is provided in Table 3 (4). During the pre-watchlist era, we find a higher proportion of more-than-one-notch rating downgrades as compared to both the post-watchlist period, in general, and watchlist-downgrades, in particular. In contrast, whereas 49 percent of all downgrades in the pre-watchlist period are a change by one notch, this proportion rises to 57 percent in the post-watchlist era. This may at least partly be a consequence of the favorable economic conditions prevailing during most of the 1990s, given that the number of downgrades is positively correlated with recessions. In the post-watchlist period, however, watch-preceded downgrades seem to be slightly larger than direct downgrades (the proportion of rating changes larger than three notches is a bit higher). Very similar results are obtained with respect to upgrades.

Watchlist assignments may be triggered either by discrete corporate events or by trends in a company's operations or financial data. In our analyses, we frequently differentiate between these two types of review placements. In our sample, roughly 30 percent of all watch listings are event-driven. Most of them are related to mergers or acquisitions. Even though we may expect to observe unique effects related to event-driven watch listings - given the specific corporate circumstances surrounding the review procedure - we

⁹According to the NBER classification, there were three recessions in our sample period: April 1982 to November 1982, July 1990 to March 1991, and March 2001 to November 2001.

do not find any striking differences from an ex-ante perspective. In particular, the mean duration of the review procedure is 101 days on average; it is 105 days for event-driven watches and 99 days for non-event driven watches - an insignificant difference.

3 Does the Watchlist Instrument Change the Informational Content of Credit Ratings?

In order to find out whether or not the introduction of the watchlist instrument has generally influenced the information content of ratings, we use a standard event study methodology à la MacKinlay (1997). Effectively, we test for a time-break in the impact of rating changes on the value of firm equity, i.e., on the cumulative abnormal stock return, at the time of the formal introduction of the watchlist on October 1, 1991. The cumulative abnormal return (CAR) is computed as the cumulative stock return over the event window minus the return of the market portfolio. The event window spans three days, beginning at -1 and ending at +1, with the event being the direct rating change or review-preceded rating change. Our estimation window spans the time period -120 to -20. We take stock price information from CRSP daily tapes and calculate the market model using the value-weighted index in CRSP.

Based on the Moody's quotation, we expect to observe a larger market reaction to rating changes (disregarding any differences between direct rating changes and watch-preceded changes) in the post-watchlist period:

Hypothesis 1 *The effect of rating changes on the market value of firm equity is stronger in the post-watchlist era, as compared to the era before the introduction of the watchlist procedure.*

Table 5 presents the results of a univariate test, where we analyze the effects of rating changes on cumulative abnormal stock returns, differentiating between market reactions before and after the introduction of the watchlist procedure. In line with earlier studies,

we find statistically significant (negative) CARs only following downgrades. Furthermore, the general market reaction to downgrades is stronger in the post-watchlist era (with a CAR of -3.1 percent) than in the pre-watchlist period (with only -1.89 percent). The difference is both statistically and economically significant. This result lends support to Hypothesis 1, as it indicates that ratings have, indeed, become more informative since the introduction of the watchlist, thereby increasing the negative stock price reaction to a rating downgrade. For upgrades, in contrast, we find no significant market reaction.¹⁰

We now proceed to a test in a multivariate framework. As the univariate analysis indicated insignificant CAR effects from upgrades, we focus solely on downgrades in the following,¹¹ using model 1,

$$\begin{aligned}
CAR_j = & \beta_0 + \beta_1 RCHANGE_j + \beta_2 IGRADE_j + \beta_3 DAYS_j \\
& + \beta_4 POSTWL * RCHANGE_j + \beta_5 POSTWL * IGRADE_j \\
& + \beta_6 POSTWL * DAYS_j + \epsilon_j.
\end{aligned} \tag{1}$$

In line with Holthausen and Leftwich (1986) and Jorion, Liu, and Shi (2005), we test the influence of the size of the rating change (in number of notches, RCHANGE), the crossing of the investment grade boundary (a dummy variable, IGRADE), and, finally, the number of days since the previous rating action (DAYS) on the cumulative abnormal return of firm j . In order to test Hypothesis 1, we create a dummy variable (POSTWL) equal to one if the rating change falls into the post-watchlist era, and zero otherwise. This dummy variable enters our model as an interaction term with the other control variables.

We expect to find a negative coefficient for RCHANGE. To the extent that a rating change conveys new information to the market, a downgrade should raise the firm's future debt refinancing costs and, hence, lower the firm's market value. This negative effect should increase in the size of the rating change. Note that the probability of default rises exponentially with decreasing rating notches, so that a downgrade by two notches has an effect on the firm's net worth more than twice as large as a one-notch rating change.

¹⁰Note that our results do not change if we use different methods of calculating CARs. As an alternative, e.g., we used the method by Boehmer, Masumeci, and Poulsen (1991).

¹¹The results from rating upgrades are available from the authors upon request.

The variable IGRADE is expected to display a negative coefficient as well. Large investors, pension funds in particular, are usually not allowed to hold non-investment grade rated products.¹² When bonds pass the boundary to junk status, portfolio managers are often forced to sell. Thus, the market for investment-grade bonds may differ substantially in terms of participants, volume, and risk preferences from the market for junk bonds, leading to a downward jump in CAR due to a crossing of the investment-grade boundary. However, as we use issuer ratings (senior unsecured ratings), this effect may be weaker than for issue ratings.

With respect to regressor DAYS, both a positive and a negative coefficient may be conceivable. On the one hand, the longer the time period between two sequential ratings, the stronger may be the informational novelty of a downgrade, leading to a strongly negative effect on CAR. On the other hand, the more time passes, the more likely it becomes that the market has already updated its belief with respect to the creditworthiness of the borrower based on other pieces of private and public information. In this case, a rating change no longer conveys new information to the market (Jorion, Liu, and Shi, 2005). A downgrade may even lead to a positive market reaction if it is less pronounced than the unconfirmed market pessimism.

Our key variable in model 1 is the interaction of RCHANGE with the POSTWL-dummy. If this variable turns out to be significantly negative, this should confirm Hypothesis 1 that the introduction of the watchlist has increased the informational content of rating events. We also include interaction terms with the IGRADE and DAYS variables.

The results of model 1 are presented in Table 6, column 2. While the coefficient of the variable RCHANGE shows the expected negative sign, a significant reaction is only observed after the introduction of the watchlist, i.e. in the interaction term. Furthermore, the economic significance of the interaction variable is four times as strong as that of the simple RCHANGE regressor (-0.016 vs. -0.004). The crossing of the investment grade boundary, in contrast, turns out not to be significant. However, the market reacts significantly positive to the DAYS variable before the introduction of the review procedure.

¹²For an overview of rating-based regulation of investment decisions, see Partnoy (2002).

While the effect remains positive in the post-watchlist era, it is much weaker both in statistical and economic significance. Our results hence indicate that the informational content of rating downgrades has strongly risen after the introduction of the watchlist. This is consistent with Hypothesis 1.

In order to render our results more robust, we consider additional factors that may have influenced our observations. Chief among them are time trends and sample composition effects. With regard to time trends, we use two alternative specifications. First, we include a set of $(n-1)$ year dummies into the regression equation of model 1 in order to capture a linear time trend. This constitutes model 2. We present the results in Table 6, column 3. Note that the year dummies' coefficients are not displayed. Our former results stay almost unchanged. Only the DAYS variable loses slightly in statistical significance and takes on a negative sign in the interacted form (without statistical significance, though).

In order to allow for the time series of coefficients to follow a macroeconomic cycle, we include a business cycle dummy, labeled BCYCLE, to constitute model 3. It equals one if the observation is from an NBER recession period, and zero otherwise. Results are given in Table 6, column 4. We find the business cycle dummy to have a negative, but statistically insignificant effect. Compared to model 1, the remaining results are unchanged. Although we find evidence of a time dependence in our data, this cannot fully explain the different abnormal returns in the two subperiods.

As the SEC's introduction of the Regulation Fair Disclosure on October 23, 2000 falls into our observation period, we also control for this event by including a dummy variable REGFD in model 4. Regulation Fair Disclosure prohibits U.S. public companies from making selective, non-public disclosures to favored investment professionals. Rating agencies, however, are exempted from this rule, which seems to improve the ratings' informational content: Jorion, Liu, and Shi (2005) even find significant positive abnormal returns following upgrades in the aftermath of this regulatory change. As can be seen from Table 6, column 5, however, this dummy has no explanatory power in our regression

and leaves the earlier results unchanged.¹³

One further robustness check concerns the development of corporate financial risk over our sample period and the exponential relation between rating notches and probability of default. By using RCHANGE as an explanatory variable in the basic model, we have implicitly assumed that the distribution of firms across rating notches is stationary over the entire period. If, however, the composition of our sample shifts over time to lower rating categories, and in these lower rating categories a one-notch rating change implies a larger increase in default probability, then a sheer sample composition effect may just as well yield the results that we have found.¹⁴ To capture these effects, we include the initial rating level into model 5.

As can be seen from Table 6, column 6, the rating level has a highly significant negative coefficient. Its inclusion strongly increases the regression's R^2 , but it does not change the overall results obtained in model 1 with respect to the POSTWL*RCHANGE variable. We interpret this as evidence that there is, indeed, a sample composition effect, which partly explains the increased strength of the announcement effect in the post-watchlist era. However, we are left with an unexplained part that we attribute to the enhanced informational value of the observed rating action. In sum, we find evidence consistent with Hypothesis 1.

¹³Note that we use issuer ratings in our empirical analysis, while Jorion, Liu, and Shi (2005) use issue ratings. This may, at least partly, explain the insignificant coefficient.

¹⁴From earlier studies, we know that a rating improvement by one notch, say from Baa3 to Ba1, raises the probability of default from 0.52 percent to 0.81 percent. However, a rating change from Ba3 to B1, which is also one notch, raises the default probability from 2.69 percent to 4.04 percent, i.e., four times more than in the first case (Keenan, Hamilton, and Berthault, 2000). The exponential rise in default probability is particularly pronounced in the non-investment grade sector of the rating scale (Jorion and Zhang, 2007).

4 What is The Economic Function of the Review Procedure?

4.1 Derivation of hypotheses

With respect to the economic rationale behind the introduction of an institutionalized rating review process, two lines of arguments may be distinguished. First, the introduction of a formal review process may have been the agencies' reaction to a heightened demand for accurate and timely credit risk information from financial markets. Agency ratings typically adjust more slowly to new information than market-based measures of corporate default risk such as, e.g., KMV's distance-to-default measure (Löffler, 2004a; Vassalou and Xing, 2005; Robbe and Mahieu, 2005).¹⁵ However, while market prices respond prior to rating events, they tend to react more aggressively than is warranted ex-post. Agency ratings, in contrast, are supposed to reflect changes in credit quality only when they are "unlikely to be reversed within a relatively short period of time" (Cantor, 2001).¹⁶

According to this argument, watchlists may help to alleviate the traditional conflict between rating stability and accuracy in that they allow agencies to "buy time" for an eventual rating decision while signalling immediate rating activity. Consequently, the decision to list a firm on credit watch should be determined by investors' demand for information on the company's creditworthiness. Demand should be higher, the larger the number of investors interested in the firm, the higher the overall uncertainty about the firm's credit quality and the more severe the effects of a rating change are on the firm's credit costs (Chung, Frost and Kim, 2008). The length of the watchlist, i.e. the time it takes the rating committee to resolve the review procedure, in turn, should depend on the complexity of the company's operations and its financial data. The higher the firm's

¹⁵Interestingly, the KMV measure of credit risk was introduced in 1989, i.e., only shortly before Moody's released its institutionalized watchlist.

¹⁶Löffler (2005) provides empirical proof of agency-ratings' stability and analyzes why rating reversals may be harmful. Löffler (2004b) examines the tradeoff between rating timeliness and accuracy against the background of portfolio governance rules.

complexity, the longer it should take the agency to reach a sufficient degree of certainty about the permanence of the change in the company's creditworthiness. Finally, since watch-preceded rating changes and direct rating changes do not differ in informational content but only in investors' demand for rating information, there is no reason why the market should react any differently to the eventual rating change.

While this "delivery of information" argument should hold both for watchlists with direction downgrade and upgrade, it is reasonable to believe that for realistic degrees of risk-aversion among investors, the demand for information is particularly strong in case of imminent deteriorations of creditworthiness. As such, our predictions should be most notable for negative watchlist placements and rating downgrades.

Second, following the argument in Boot, Milbourn, and Schmeits (2006), the watchlist may be interpreted as an agency's means of engaging in an implicit contract with the borrowing firm. This explanatory line holds only for negative changes in credit quality. In a theoretical model, the authors show that credit ratings can serve as mechanisms coordinating investors' beliefs. Provided that enough financiers condition their investment decisions on the rating level - for instance due to regulatory reasons¹⁷ -, this coordination function brings rating agencies in a position to put quasi-contractual pressure on the firms they rate. According to Boot, Milbourn, and Schmeits (2006), the watchlist procedure is the institutionalized form of this "active" monitoring process. By threatening the listed companies with imminent rating deteriorations, the agencies may induce the firms to abstain from further risk-enhancing actions in order to uphold the initial rating level. Of course, this procedure will only be enacted, if the implicit contract of the watchlist is incentive compatible, i.e. if the firm is deemed capable of undertaking the necessary means to reduce the credit risk. As such, the decision to place a borrower under review is triggered by the fundamental quality of the company. The duration of the watchlist procedure, in turn, depends on the firm's incentives to comply with the conditions set

¹⁷Many institutional investors are often obliged by specific investment guidelines to engage only in highly-rated (non-speculative grade) investments. See also Hill (2004) for an overview of ratings-based U.S. regulations.

forth by the agency. These incentives should be the higher, the larger is the anticipated effect of a rating downgrade on the company's credit costs. Also the firm's management quality may be expected to influence the length of the watchlist procedure. Finally, a watch-preceded downgrade signals that the firm has tried to exert the necessary effort but has failed in the attempt to comply with all the conditions raised by the agency to uphold the initial rating level. The market should hence be expected to react much less strong than to a direct downgrade, which - according to this "implicit contracting" argument - mirrors the deemed incapability of the firm to exert any recovery effort at all.¹⁸

The two lines of argument, delivering-information vs. implicit-contracting, hence lead to different projections both with respect to the decision to place a borrower under review, the length of the watchlist and the market reaction to direct vs. watch-preceded rating changes. Hypothesis 2 sums up the conjectures:

Hypothesis 2 *If the watchlist is used as an instrument to deliver information, i) the decision to place a borrower under review will be triggered by investors' demand for information about this borrower; ii) the length of the review procedure will depend on the firm's complexity; iii) the effect of a watchlist-preceded downgrade on the value of firm equity will be of similar magnitude as the effect of a direct downgrade.*

If, in contrast, the review procedure forms an implicit contract between rating agency and rated firm, i) the decision to list a borrower on watch will depend on the fundamental credit quality of the firm; ii) the duration of the watchlist will be determined by the firm's incentives to comply with the criteria set forth by the agency; iii) the market reaction should be less strong to a watch-preceded downgrade than to a direct downgrade.

¹⁸Note that in the original model by Boot, Milbourn, and Schmeits (2006), the authors assume that investors have perfect knowledge about the rated firms' credit quality, but cannot observe the realization of recovery effort. They hence conjecture that new information can enter the market only via watch-preceded downgrades. Softening this extreme assumption about investors' knowledge, also direct downgrades will deliver informational content as they inform on a company's incapability to exert effort. This may reasonably be expected to trigger a stronger market reaction than watch-preceded downgrades, that show that effort has been exerted but was not completely successful.

4.2 Review placement

In order to test between the two explanatory lines, we first of all run a probit regression on the agency's decision which borrowers to place under review. Regressors are chosen in order to reflect investors' demand for information about a company's creditworthiness (delivering-information) and the fundamental quality of the rated company (implicit-contracting). The demand for information should be high if a large number of investors are interested in this company, i.e. if the company is large and has many outstanding ratings. We measure firm size by its total assets (SIZE) and calculate the number of outstanding (issuer and issue) ratings of the company (INTENSITY). Demand should also be high if the uncertainty surrounding the company is large. We measure uncertainty by the stock-price volatility in the 100 days before the watchlist placement (VOLATILITY). Also, fixed assets could be an inverse proxy for uncertainty about the company (FIXED ASSETS). Furthermore, investors should be particularly keen on precise information if the firm is close to the investment-grade boundary. We therefore include a dummy variable that takes on the value one if the firm's initial rating is Baa and zero otherwise (Baa-Dummy). As measures of fundamental quality we employ the company's leverage (LEVERAGE), interest payments (INTEREST), market-to-book value (MTB) and its cash holdings (CASH).

The results are presented in Table 7. Splitting the sample in a first step into low-quality borrowers with a non-investment grade (NIG) rating and high-quality borrowers with an investment-grade (IG) rating, we observe that both sets of regressors seem to make a contribution. Yet, examining the results more carefully shows that only the size variable and the stock-price volatility have an equally significant, positive effect on the watchlist placement decision in both subsets. Otherwise, fundamental quality variables seem to be more relevant for NIG borrowers, while demand-related factors appear more significant for IG issuers. This first indication is confirmed if we further differentiate between event-driven review placements and those not triggered by a corporate event. As event-driven watch listings will obviously depend strongly on the triggering corporate event, our discrimination between delivering-information and implicit-contracting should

be clearest for the non-event driven watchlist placements. Indeed, concluding from column 5, for this subgroup of watch listings we observe that a non-investment graded firm is the more likely to be placed under review the lower its interest payments, the higher its leverage, its market-to-book value and its stock-price volatility. Thus, three out of four significant regressors refer to the implicit-contracting argument. An investment-grade rated company, in contrast, is the more likely to be dealt a watch listing (column 6), the larger the company, the higher its leverage, the higher its stock volatility and if it is not too close to the investment-grade boundary - here factors referring to investors' demand for information preponderate.

For event-driven watchlist placements, the results are not quite as clear. We find that for both low- and high-quality borrowers a review listing becomes more likely, the higher the market-to-book value, the larger the company and the higher the stock-price volatility. Still, for NIG issuers we find that the leverage has a negative influence (while being significant only at the 10-% level), while for IG issuers both the level of fixed assets and the Baa-dummy show a significantly negative coefficient.¹⁹ These are hints - though slightly weaker ones than for non-event driven watch listings - that rating agencies use the review procedure as an instrument to deliver precise and accurate information particularly for borrowers of high creditworthiness and employ it as an implicit contract for low-quality issuers.

Over and above this general result, it is interesting to note that the leverage variable has a positive influence on the decision to place a borrower under a non-event driven review. This result is counterintuitive at first sight: a higher leverage - taken as a sign of weaker credit quality - should make a direct downgrade more likely. However, a higher leverage may also increase the firm's incentives to comply with the criteria set forth via the review placement. Anticipating this effect, the agency may be induced to place issuers with high leverage on review more easily. Given the particularly high significance of this regressor for NIG borrowers, this supports our interpretation that implicit contracting

¹⁹It should also be mentioned that event-driven watch listings appear to be more homogeneous than non-event driven placements. This leads to a higher R^2 in the respective regressions.

seems to play an important role for low quality issuers.

A second counterintuitive result is obtained with respect to the Baa-dummy. According to our analysis, being extremely close to the non-investment grade boundary reduces the probability of being placed under review. This may have to do with the fact that watch-preceded downgrades are often larger than one rating notch. As such, the crossing of the investment-grade boundary would be almost inevitable for these borrowers should the downgrade occur, which reasonably reduces the willingness of rating agencies to place these issuers on watch in the first place.

4.3 Watchlist duration

Using the same partition of non-event and event-driven watchlist placements on the one hand and of NIG and IG borrowers on the other, we run an OLS regression on the length of the review procedure in days. According to the delivering-information explanation, factors relating to the complexity of the firm's operations and data should determine the watchlist duration. We include the firm's stock-price volatility as our main measure of complexity and expect to find a positive effect should the delivering-information function prevail. Additionally, we use the firm's size, its fixed assets and cash holdings as further controlling factors. Given that the average firm in our dataset is already relatively large, we assume that firm complexity may even increase in firm size. Higher fixed assets and higher cash holdings, in contrast, should make it easier to evaluate the company's creditworthiness.

With respect to the implicit-contracting argument, the review duration should depend on the firm's incentives to comply with the criteria set forth by the agency. We conjecture that the firm should be more willing to exert recovery effort - so that the watchlist length will be reduced - the larger the number of outstanding ratings and the closer the company is to the investment grade boundary. Also, the current level of interest payments and leverage should have a decreasing effect on the review duration. Finally, a management of higher quality may be able to comply with the agency's requests more quickly. As a consequence, the firm's size and its market-to-book value - as typical measures for

management quality (Boot, Milbourn, and Schmeits, 2006) - should exert a negative impact as well.

Table 8 displays the results. We observe that the size variable has significant (negative) explanatory power for non-event driven watch listings. Thus, the larger the company, the less time is needed to resolve the watchlist procedure. This corresponds with the implicit-contracting argument, according to which a management of higher quality - measured by the firm's size - can lead to a quicker resolution of the watchlist. The economic significance of this explanatory variable is strongest for low-quality borrowers. This finding underlines our earlier conclusion that the implicit-contracting feature of the watchlist seems to be most relevant for low-quality borrowers. The market-to-book value as an alternative proxy for management quality displays a negative coefficient, too, but turns out not to be significant.

Further significant effects are obtained for event-driven watchlist placements. Here, we observe that cash holdings reduce the duration of the review procedure, but this variable loses its significance when differentiating between NIG and IG borrowers. The level of fixed assets exerts a strongly positive effect on the duration of the watchlist, while the Baa-dummy reduces it, but only for IG borrowers.

In sum we have to conclude that analyzing the watchlist duration delivers less discriminatory results as compared to the decision on which firms to place under review. Still, we obtain weak evidence that implicit contracting seems to play a more important role for borrowers of lower quality.

4.4 Market reaction

The test of the market reaction to direct vs. watch-preceded rating changes starts again with a univariate approach. Table 9 displays the CARs following from direct and watch-preceded rating changes in the post-watchlist period. We find that direct rating downgrades trigger a much stronger market reaction (-3.65 percent) than watch-preceded downgrades (-2.19 percent). The difference is also highly significant (at the 1 percent-level).

If we differentiate between event-driven and non-event driven watch listings, the general result remains the same. Yet, for non-event driven watchlist placements, the difference turns out not to be significant.

It should be kept in mind, however, that the results so far considered only the “off-watch” effects. This procedure tends to underestimate the true stock market reaction to rating changes, because the anticipatory effect implicit in the price reaction to the announcement of a rating’s addition to the watchlist has been neglected. Yet, as there is a strong dependence between the initial watchlist designation and the final resolution,²⁰ we believe that a simple summing up of on-watch and off-watch CARs is not a sensible approach. Additionally, if issuers are, indeed, affected by the watchlist procedure, their quality will change over the course of the review procedure, so that on- and off-watch effects do not relate to the same corporate entity and, therefore, should not be aggregated (Hirsch and Krahn, 2007). In order to take the market reaction to the watchlist addition into account while not simply summing up non-comparable CAR-values, we conduct an additional univariate robustness test, where CARs have been measured using a longer event window, starting one day before the watchlist announcement and ending one day after the watchlist resolution.²¹ To facilitate comparability, we use the mean length of the watchlist period in our sample as the length of the event window for direct rating changes as well. Results are displayed in Table 10. As can be seen, our former result is confirmed: The market reacts much more strongly to direct rating downgrades than to watch-preceded downgrades, with a strongly significant difference.

When analyzing the market reaction in a multivariate approach, we face a clear selection problem: according to our earlier analyses, rating agencies preselect firms for addition to the watchlist, so that the difference in effects from direct rating action versus watch-preceded rating action becomes endogenous. In order to account for this preselection, we split our empirical model into two separate regressions, following the Heckman correction

²⁰In our sample, for instance, the probability of a downgrade, given the firm is placed on watchlist with designation downgrade, is 0.64.

²¹In our sample, the watchlist spans a time period between 13 and 271 days. The mean length is 101 days.

approach (Heckman, 1979). The first regression contains the agency’s decision to put a firm on the watchlist, as studied in section 4.2. The second captures the relation of interest between the rating change and the market’s reaction to it.

Our final test of Hypothesis 2 hence uses the following model:

$$CAR_j = \beta_0 + \beta_1 RCHANGE_j + \beta_2 IGRADE_j + \beta_3 DAYS_j + \beta_4 WATCHLIST * RCHANGE_j + \epsilon_j .$$

Here, the dependent variable is the cumulative abnormal return for firm j ; *RCHANGE*, *IGRADE*, and *DAYS* are the same as in model 1. Our key variable is the interaction between *WATCHLIST* and *RCHANGE*, where the *WATCHLIST* variable is estimated via the probit regression in section 4.2 using the Heckman approach (Santos and Winton, 2008). Accordingly, we have to differentiate between NIG and IG rated borrowers on the one hand and rating downgrades following event-driven and non-event driven watchlist placements on the other hand. While the delivering-information argument would conjecture a similar effect related to *RCHANGE* and to the interaction of *WATCHLIST* and *RCHANGE*, the implicit-contracting argument prescribes a smaller effect of the interaction term.

Results are displayed in Table 11. For NIG borrowers the predictions of the implicit-contracting argument are clearly confirmed: we observe a significantly negative effect of *RCHANGE* and a significantly positive effect of the interaction variable *WATCHLIST*RCHANGE*, both for event-driven watch listings and non-event driven placements. For IG issuers, in contrast, we do not find any significant coefficients related to the rating change variables. Only the *DAYS* variable displays a significant (positive) coefficient. Qualitatively similar results are also obtained from a simple OLS-regression on the market reaction, where we interact a watchlist-dummy with *RCHANGE*.²² Overall, this leads us to conclude that the introduction of the watchlist has changed the traditional role of credit rating agencies, indeed. At least for borrowers of lower creditworthiness it seems that it has allowed the agencies to take on an active monitoring role vis-à-vis the firms

²²Results are available upon request.

they rate, so that watch-preceded rating changes contain information of a different quality than direct rating changes.

5 Conclusion

Our study examined whether Moody's formal introduction of the watchlist procedure in 1991 influenced the informational content of credit ratings and possibly extended the economic role that rating agencies play in financial markets. We find that after the introduction of the review instrument, rating downgrades lead to stronger market reactions than in the pre-watchlist period. Furthermore, our empirical study lends support to the hypothesis that the watchlist procedure allows rating agencies to enter into an implicit contract with the rated firms, as has been suggested by Boot, Milbourn, and Schmeits (2006), at least for borrowers of low credit quality. Consequently, rating reviews add a finer level of detail to information in financial markets: whereas direct rating downgrades make a statement on issuers' lack of *capability* to sustain their credit quality, watchlist downgrades inform market participants of borrowers' lack of *success* in the attempt to do so.

In this respect, our study confirms the initial statement by Moody's that rating changes for issuers placed on the watchlist are different from those not preceded by a review procedure. The watchlist instrument seems to have partly developed into an active monitoring device that allows the rating agencies to exert real pressure on the reviewed companies. An interesting question arises from this observation: Was the review procedure introduced with this objective or did it unintentionally develop into such a specific instrument? While our study did not focus on this particular question and, hence, cannot provide an answer, we would like to point out that watchlists seem to have a different impact with respect to sovereign ratings (Hill and Faff, 2007). It is possible that the implicit-contracting feature does not operate in an environment where the counterparty consists of a relatively undefined group of politicians and statesmen instead of the much smaller management circle, as in the case of corporate ratings. Although outside the scope

of this paper, interesting general conclusions might be drawn from this comparison with respect to the objective function of credit rating agencies.

References

- Boehmer, Ekkehart, Jim Masumeci, and Anette B. Poulsen, 1991, Event-study methodology under conditions of event-induced variance, *Journal of Financial Economics* 30, 253–272.
- Boot, Arnoud W. A., Todd T. Milbourn, and Anjolein Schmeits, 2006, Credit ratings as coordination mechanism, *Review of Financial Studies* 19, 81–118.
- Cantor, Richard, 2004, An introduction to recent research on credit ratings, *Journal of Banking and Finance* 28, 2565–2573.
- Chung, Kee H., Carol Ann Frost, and Myungsun Kim, 2008, Characteristics and Information Value of Credit Watches, *mimeo*.
- Frost, Carol Ann, 2007, Credit Rating Agencies in Capital Markets: A Review of Research Evidence on Selected Criticisms of the Agencies, *Journal of Accounting, Auditing, and Finance* 22, 469–492.
- Goh, J., and H. Ederington, 1999, Cross-Sectional Variation in the Stock Market Reaction to Bond Rating Changes, *Quarterly Review of Economics and Finance* 39, 101–112.
- Goh, Jeremy, and Louis Ederington, 1993, Is a bond rating downgrade bad news, good news, or no news for stockholders?, *Journal of Finance* 48, 2001–2008.
- Hamilton, David T., 2005, Moody’s senior rating algorithm and estimated senior ratings, *Moody’s Investors Service*.
- Hamilton, David T., and Richard Cantor, 2004, Rating Transitions and Defaults Conditional on Watchlist, Outlook and Rating History, *Moody’s Investors Service, Special Comment*.
- Hand, John R. M., Robert W. Holthausen, and Richard W. Leftwich, 1992, The Effect of Bond Rating Agency Announcements on Bond and Stock Prices, *Journal of Finance* 47, 733–752.

- Heckman, James, 1979, Sample selection bias as a specification error, *Econometrica* 47, 153–161.
- Hill, C., 2004, Regulating the Rating Agencies, *Washington University Law Quarterly* 82, 42–95.
- Hill, Paula, and Robert Faff, 2007, Do Credit Watch Procedures Affect the Information Content of Sovereign Credit Rating Changes?, Mimeo.
- Hirsch, Christian, and Jan Pieter Krahnert, 2007, A primer on rating agencies as monitors: an analysis of the watchlist period, Working Paper.
- Holthausen, Robert W., and Richard W. Leftwich, 1986, The effect of bond rating changes on common stock prices, *Journal of Financial Economics* 17, 57–89.
- Hull, John, Mirela Predescu, and Alan White, 2004, The Relationship Between Credit Default Swap Spreads, Bond Yields, and Credit Rating Announcements, *Journal of Banking and Finance* 28, 2789–2811.
- Jorion, Philippe, Zhu Liu, and Charles Shi, 2005, Informational effects of regulation FD: evidence from rating changes, *Journal of Financial Economics* 76, 309–330.
- Jorion, Phillippe, and Gaiyan Zhang, 2007, Information Effects of Bond Rating Changes: The Role of the Rating Prior to the Announcement, *Journal of Fixed Income* 16, 45–59.
- Keenan, Sean C., Jerome S. Fons, and Lea V. Carty, 1998, An historical analysis of Moody's watchlist, *Moody's Investors Service*.
- Keenan, Sean C., David T. Hamilton, and Alexandra Berthault, 2000, Historical default rates of corporate bond issuers, 1920-1999, *Moody's Investors Service*.
- Löffler, Gunter, 2004a, An anatomy of rating through the cycle, *Journal of Banking and Finance* 28, 695–720.
- Löffler, Gunter, 2004b, Ratings versus market-based measures of default risk in portfolio governance, *Journal of Banking and Finance* 28, 2715–2746.

- Löffler, Gunter, 2005, Avoiding the rating bounce: Why rating agencies are slow to react to new information, *Journal of Economic Behavior and Organization* 56, 365–381.
- MacKinlay, A.Craig, 1997, Event studies in Economics and Finance, *Journal of Economic Literature* 35, 13–39.
- Norden, Lars, and Martin Weber, 2004, Informational efficiency of credit default swap and stock markets: The impact of credit rating announcements, *Journal of Banking and Finance* 28, 2813–2843.
- Partnoy, Frank, 2002, The Paradox of Credit Ratings, in Richard M. Levich, Giovanni Majnoni, and Carmen M. Reinhart, eds.: *Ratings, Rating Agencies, and the Global Financial System* (Kluwer Academic Publishers, Norwell, Mass.).
- Purda, Lynnette D., 2007, Stock Market Reaction to Anticipated Versus Surprise Rating Changes, *Journal of Financial Research* 30, 301–320.
- Robbe, Paul, and Roland Mahieu, 2005, Are the standards too poor? An empirical analysis of the timeliness and predictability of credit rating changes, Working Paper.
- Santos, Joao, and Andrew Winton, 2008, Bank Loans, Bonds, and Information Monopolies across the Business Cycle, *Journal of Finance* 63, 1315–1359.
- Vassalou, Maria, and Yuhang Xing, 2005, Abnormal equity returns following downgrades, Working Paper.
- Wansley, James W., and Terrence M. Clauretje, 1985, The impact of creditwatch placement on equity returns and bond prices, *Journal of Financial Research* 8, 31–42.

Tables

Table 1: Distribution and Size of Rating Changes by Year - Downgrades

The table contains number and mean size of rating downgrades for each year of the sample. The sample period after October 1, 1991, includes direct changes as well as watchlist-preceded rating changes. Size reports the mean of all rating changes (in notches) in a given year.

Year	All downgrades		Direct downgrades		Watchlist-preceded downgrades	
	#	Size	#	Size	#	Size
1982	64	1.68	64	1.68	-	-
1983	61	1.44	61	1.44	-	-
1984	56	1.75	56	1.75	-	-
1985	70	1.78	70	1.78	-	-
1986	89	2.14	89	2.14	-	-
1987	63	2.12	63	2.12	-	-
1988	64	2.35	64	2.35	-	-
1989	86	1.93	86	1.93	-	-
1990	110	1.74	110	1.74	-	-
1991	58	1.6	58	1.6	-	-
1992	50	1.38	46	1.39	4	1.25
1993	66	1.51	50	1.54	16	1.43
1994	60	1.51	43	1.3	17	1.58
1995	81	1.53	60	1.55	21	1.47
1996	79	1.54	49	1.48	30	1.63
1997	67	1.4	42	1.4	25	1.4
1998	136	1.57	99	1.5	37	1.75
1999	173	1.68	122	1.73	51	1.54
2000	182	1.68	120	1.66	62	1.72
2001	318	1.75	209	1.75	109	1.77
2002	298	1.65	162	1.59	136	1.72
2003	192	1.69	83	1.6	109	1.59
2004	108	1.38	45	1.44	63	1.34
PREWL	721	1.86	721	1.86	-	-
POSTWL	1810	1.6	1130	1.59	680	1.62
Total	2531	1.68	1851	1.7	680	1.62

Table 2: Distribution and Size of Rating Changes by Year - Upgrades

The table contains number and mean size of rating upgrades for each year of the sample. The sample period after October 1, 1991, includes direct changes as well as watchlist-preceded rating changes. Size reports the mean of all rating changes (in notches) in a given year.

Year	All upgrades		Direct upgrades		Watchlist-preceded upgrades	
	#	Size	#	Size	#	Size
1982	13	1.3	64	1.3	-	-
1983	45	1.69	61	1.69	-	-
1984	41	1.46	56	1.46	-	-
1985	54	1.54	70	1.54	-	-
1986	46	1.5	46	1.5	-	-
1987	44	1.86	44	1.86	-	-
1988	54	1.83	54	1.83	-	-
1989	45	1.4	45	1.4	-	-
1990	33	1.48	33	1.48	-	-
1991	25	1.56	25	1.56	-	-
1992	47	1.36	41	1.31	6	1.67
1993	75	1.44	52	1.44	23	1.43
1994	89	1.33	65	1.24	24	1.58
1995	73	1.19	55	1.14	18	1.33
1996	114	1.24	88	1.26	26	1.19
1997	94	1.18	76	1.14	18	1.33
1998	101	1.36	74	1.28	27	1.55
1999	85	1.23	62	1.17	23	1.39
2000	75	1.52	50	1.16	25	2.03
2001	80	1.26	55	1.12	25	1.56
2002	56	1.25	38	1.23	18	1.28
2003	86	1.17	46	1.17	40	1.17
2004	127	1.27	73	1.19	54	1.38
PREWL	400	1.59	400	1.59	-	-
POSTWL	1112	1.29	775	1.22	337	1.45
Total	1512	1.37	1175	1.34	337	1.45

Table 3: Summary of Rating Downgrades by Absolute Magnitude

The table presents the number and proportion (in %) of all 2531 rating downgrades in our sample by absolute magnitude of the rating change (in notches). The sample is split into two periods: The pre-watchlist period from April 26, 1982, to September 30, 1991 (PREWL), and the post-watchlist period from October 1, 1991, to December 31, 2004 (POSTWL).

Rating change	PREWL		POSTWL			
	#	%	All		From watchlist	
			#	%	#	%
1	354	49.15	1042	57.57	389	57.2
2	226	31.35	532	29.39	198	29.12
3	90	12.48	166	9.17	61	8.97
4	24	3.33	49	2.71	22	3.24
5	10	1.39	15	0.83	8	1.18
6	6	0.83	4	0.22	2	0.29
7	7	0.97	2	0.11	-	-
> 8	4	0.5	-	-	-	-
Total	721	100	1810	100	680	100

Table 4: Summary of Rating Upgrades by Absolute Magnitude

The table presents the number and the proportion (in %) of all 1512 rating upgrades in our sample by absolute magnitude of the rating change (in notches). The sample is split into two periods: The pre-watchlist period from April 26, 1982 to September 30, 1991 (PREWL), and the post-watchlist period from October 1, 1991, to December 31, 2004 (POSTWL).

Rating change	PREWL		POSTWL			
	#	%	All		From watchlist	
			#	%	#	%
1	246	61.5	898	80.75	247	73.29
2	111	27.75	164	14.75	60	17.8
3	24	6	23	2.07	15	4.45
4	10	2.5	12	1.08	8	2.37
5	4	1	8	0.72	4	1.19
6	2	0.5	3	0.27	1	0.3
7	2	0.5	1	0.09	-	-
> 8	1	0.25	3	0.27	2	0.6
Total	400	100	1112	100	337	100

Table 5: Stock Market Response to Rating Changes: PREWL/POSTWL

The table provides the cumulative abnormal returns for both direct and watch-preceded downgrades and upgrades. The sample consists of 4043 uncontaminated rating events in the period between April 26, 1982, and December 31, 2004. PREWL is used with reference to the pre-watchlist period from April 26, 1982, to September 30, 1991, while POSTWL denotes the post-watchlist era from October 1, 1991 to December 31, 2004. Panel A refers to downgrades, Panel B to upgrades. The cumulative abnormal return (CAR) is calculated over a three-day event window (-1,+1) around the date the rating change becomes effective. The CAR is the cumulative abnormal stock return minus the return of the market portfolio, where the market portfolio is given by the value-weighted portfolio from CRSP. Wilcoxon T values are given below the median and t-values below the mean. ***, **, and * indicate significance at the 1%, 5%, and 10% level. Mean and median values are tested using one-sided t-test and Wilcoxon T test, respectively.

Panel A: Downgrades			
	Mean	Median	CAR < 0 (%)
PREWL	-1.89 (-4.71)***	-0.69 (-5.07)***	59
POSTWL	-3.1 (-9.69)***	-0.91 (-9.13)***	59
Difference (POSTWL-PREWL)	-1.21 (-2.37)***	-0.22 (-1.59)	0
Panel B: Upgrades			
	Mean	Median	CAR > 0 (%)
PREWL	0.05 (0.78)	-0.08 (-0.22)	49
POSTWL	0.018 (0.13)	-0.04 (-0.46)	499
Difference (POSTWL-PREWL)	-0.03 (0.13)	0.04 (0.10)	0

Table 6: Effect of the Watchlist Introduction on the Stock Market Reaction to Rating Downgrades

The sample consists of 2531 downgrades in the period between April 26, 1982 and December 31, 2004. Ratings are issuer ratings provided by Moody's. The sample period after 1991 includes direct downgrades as well as downgrades following watchlist placements. The dependent variable is the cumulative abnormal return (CAR). It is calculated over a three-day event window (-1,+1) around the date the rating change becomes effective. The CAR is the cumulative abnormal stock return minus the return of the market portfolio, where the market portfolio is given by the value-weighted portfolio from CRSP. RCHANGE is the absolute value of rating change in notches; IGRADE is a dummy variable equal to 1 if the rating downgrade crosses the investment grade boundary, and 0 otherwise; DAYS is the log of the number of days since the last rating change (downgrades as well as upgrades); POSTWL is a dummy variable equal to 1 if the observation is from the watchlist period (October 1, 1991 to December 31, 2004), and 0 otherwise; BCYCLE is a dummy variable equal to 1 if the rating change is from a time period defined as recession by NBER, and 0 otherwise; REGFD is a dummy variable equal to 1 if the rating change is from the time period after the introduction of regulation FD, and 0 otherwise. RATINGLEVEL refers to the initial rating level before the rating change. ***, **, and * indicate significance at the 1%, 5%, and 10% level. t-values are given in parenthesis. Robust standard errors are used.

Explanatory variables	Model 1	Model 2	Model 3	Model 4	Model 5
INTERCEPT	-0.085*** (-3.59)	-0.186*** (-2.87)	-0.092*** (-3.61)	-0.093*** (-3.50)	-0.011 (-1.63)
RCHANGE	-0.004 (-1.38)	-0.003 (-1.37)	-0.003 (-1.24)	-0.003 (-1.21)	-0.003 (-1.30)
IGRADE	0.013 (1.24)	0.013 (1.31)	0.012 (1.11)	0.013 (1.24)	0.010 (0.91)
DAYS	0.011*** (3.18)	0.015** (2.00)	0.010*** (2.92)	0.010*** (2.69)	0.011 (1.46)
POSTWL*RCHANGE	-0.016** (-2.37)	-0.016** (-2.29)	-0.016** (-2.41)	-0.017** (-2.44)	-0.014** (-2.02)
POSTWL*IGRADE	0.001 (0.10)	0.001 (0.03)	-0.018 (0.13)	-0.001 (0.07)	-0.005 (-0.33)
POSTWL*DAYS	0.002 (1.50)	-0.005 (-0.58)	0.002 (1.62)	0.003* (1.70)	-0.004 (-0.47)
BCYCLE			-0.013 (-1.36)		
REGFD				-0.001 (-0.22)	
RATINGLEVEL					-0.004*** (-5.59)
Year fixed effects	no	yes	no	no	yes
Industry fixed effects	no	yes	yes	yes	yes
Adj. R^2 (%)	3.4	4.93	3.99	3.88	6.17
F	6.84***	2.30***	4.34***	4.33***	3.14***
Observations	2531	2531	2531	2531	2531

Table 7: Which Firms are Placed on the Watchlist? - Probit Regression

The sample consists of 1,810 direct downgrades and watchlist placements with direction downgrade in the watchlist period between October 1, 1991 and December 31 2004, respectively. Ratings are issuer ratings provided by Moody's. The dependent variable is a dummy variable equal to 1 if the observation is placed on watchlist with designation downgrade, and 0 otherwise. INTEREST is the periodic expense to the company of securing short-term and long-term debt divided by total assets; LEVERAGE is measured as total debt divided by total assets; CASH is cash and all securities readily transferable to cash divided by total assets; SIZE is calculated as log of book value of total assets; FIXED ASSETS is equal to the cost of tangible fixed property used in the production of revenue divided by total assets; INTENSITY is calculated as the number of outstanding Moody's ratings (both issue and issuer ratings); VOLATILITY is the standard deviation of stock market returns in the 100 days before the event; the Baa-Dummy takes on the value of one if the initial rating of the company falls in the Baa-range (Baa3-Baa1) and zero otherwise. ***, **, and * indicate significance at the 1%, 5%, and 10% level. z-values are given in parenthesis.

Explanatory variables	NIG	IG	non-event	non-event + NIG	non-event + IG	event	event + NIG	event + IG
INTERCEPT	-3.0808*** (-6.07)	-2.8992*** (-4.86)	-3.1171*** (-8.67)	-2.6560*** (-5.02)	-3.1519*** (-4.67)	-4.7832*** (-8.78)	-10.6751	-3.9192*** (-4.88)
INTEREST	-9.2710*** (-2.75)	-12.4655 (-1.55)	-13.1823*** (-4.15)	-13.2701*** (-3.56)	-11.4222 (-1.33)	-2.7323 (-0.57)	5.4126 (0.92)	-13.7573 (-1.09)
LEVERAGE	0.5676 (1.57)	0.8227 (1.27)	0.9070*** (2.77)	1.0664*** (2.70)	1.3028* (1.84)	-0.9855** (-2.04)	-1.2330* (-1.82)	-0.5054 (-0.55)
MTB	0.4761*** (3.40)	0.2270** (2.46)	0.2963*** (3.74)	0.3817** (2.51)	0.1637 (1.48)	0.4881*** (5.61)	0.6906*** (3.02)	0.3057*** (2.73)
CASH	0.4900 (1.07)	0.0308 (0.03)	0.2670 (0.65)	0.3736 (0.74)	0.5221 (0.54)	0.2929 (0.50)	0.9960 (1.37)	-1.4738 (-1.15)
SIZE	0.1257*** (2.92)	0.1265*** (2.70)	0.1326*** (4.34)	0.0762 (1.59)	0.0926* (1.78)	0.3120*** (7.56)	0.3148*** (3.74)	0.2333*** (3.61)
FIXED ASSETS	-0.0401 (-0.19)	-0.6236** (-2.05)	-0.1381 (-0.79)	-0.0858 (-0.40)	-0.3682 (-1.09)	-0.2929 (-1.12)	0.0389 (0.10)	-0.9636** (-2.27)
INTENSITY	0.0067 (0.80)	-0.0062 (-1.18)	-0.0081 (-1.49)	-0.0078 (-0.49)	-0.0061 (-1.06)	0.0003 (0.09)	0.0183 (0.87)	-0.0029 (-0.44)
VOLATILITY	19.7672*** (4.69)	37.8823*** (7.61)	25.4130*** (7.75)	18.5624*** (4.24)	36.0049*** (6.69)	29.1812*** (6.13)	20.6281*** (2.76)	40.8548*** (5.73)
Baa-DUMMY		-0.4070*** (-3.45)	-0.1564* (-1.71)		-0.4048*** (-3.05)	-0.1423 (-1.18)		-0.3945** (-2.41)
Year fixed effects	yes	yes	yes	yes	yes	yes	yes	yes
Industry fixed effects	yes	yes	yes	yes	yes	yes	yes	yes
Pseudo R^2 (%)	14.7	22.46	15.27	13.45	22.39	26.26	25.95	27.33
LR χ^2	191.83***	225.10***	302.16***	153.05***	178.65***	288.67***	116.00***	154.29***
Observations	1087	723	1617	1024	593	1323	837	486

Table 8: What Determines the Length of the Watchlist?

The sample consists of 680 watchlist placements with direction downgrade between October 1, 1991 and December 31 2004. Ratings are issuer ratings provided by Moody's. The dependent variable is the length of the watchlist measured in days. INTEREST is the periodic expense to the company of securing short-term and long-term debt divided by total assets; LEVERAGE is measured as total debt divided by total assets; CASH is cash and all securities readily transferable to cash divided by total assets; SIZE is calculated as log of book value of total assets; FIXED ASSETS is equal to the cost of tangible fixed property used in the production of revenue divided by total assets; INTENSITY is calculated as the number of outstanding Moody's ratings (both issue and issuer ratings); VOLATILITY is the standard deviation of stock market returns in the 100 days before the event; the Baa-Dummy takes on the value of one if the initial rating of the company falls in the Baa-range (Baa3-Baa1) and zero otherwise. ***, **, and * indicate significance at the 1%, 5%, and 10% level. t-values are given in parenthesis. Robust standard errors are used.

Explanatory variables	NIG	IG	non-event	non-event + NIG	non-event + IG	event	event + NIG	event + IG
INTERCEPT	176.811** (2.45)	183.8792*** (3.32)	203.6277*** (4.24)	180.8976** (2.25)	277.768*** (3.92)	136.4222 (1.51)	90.7939 (0.69)	328.2965*** (3.78)
INTEREST	199.174 (0.25)	-353.7396 (-0.42)	-35.2599 (-0.05)	188.9072 (0.17)	-697.5471 (-0.70)	-464.888 (-0.47)	757.5198 (0.70)	588.4585 (0.35)
LEVERAGE	-2.7481 (-0.04)	3.4797 (0.08)	-13.4811 (-0.22)	-11.2585 (-0.11)	-0.9494 (-0.02)	76.9276 (1.12)	25.0324 (0.22)	26.7675 (0.29)
MTB	-2.1301 (-0.12)	-4.2817 (-0.92)	-6.6141 (-0.78)	-4.4670 (-0.20)	-10.8628 (-1.21)	-0.9865 (-0.15)	19.6861 (0.44)	-6.6009 (-0.76)
CASH	-19.0927 (-0.46)	7.6282 (0.15)	-23.3243 (-0.60)	-12.4104 (-0.23)	15.3450 (0.25)	-125.079** (-2.13)	-113.3279 (-1.17)	40.4502 (0.33)
SIZE	-15.7854** (-2.48)	-8.0314* (-1.92)	-9.5009** (-2.43)	-14.5553* (-1.78)	-10.8841** (-2.06)	-7.6273 (-1.32)	-16.2182 (-1.13)	-9.6598 (-1.24)
FIXED ASSETS	15.1191 (0.54)	47.8784 (1.35)	8.9878 (0.36)	10.6634 (0.36)	8.2363 (0.18)	136.7104*** (2.64)	105.9235 (0.92)	144.2011** (2.29)
INTENSITY	-0.1293 (-0.74)	-0.4054 (-1.09)	-0.6070* (-1.67)	-0.5320 (-0.44)	-0.3855 (-1.09)	-0.4937 (-2.04)	-0.2776 (-0.74)	-0.1478 (-0.12)
VOLATILITY	-301.7136 (-0.71)	-455.899 (-0.63)	-78.6468 (-0.20)	-101.9791 (-0.22)	-281.4137 (-0.29)	-894.4295 (-1.12)	-372.1026 (-0.18)	-1447.775 (-1.24)
Baa-DUMMY		-22.6043** (-2.24)	-12.7594 (-1.47)		-16.8608 (-1.29)	-15.7046 (-1.00)		-38.9133* (-1.93)
Year fixed effects	yes	yes	yes	yes	yes	yes	yes	yes
Industry fixed effects	yes	yes	yes	yes	yes	yes	yes	yes
Adj. R^2 (%)	8.55	12.08	8.76	9.13	15.42	14.57	29.23	25.11
F	1.37	1.92***	2.23***	1.05	2.34***	1.16		
Observations	313	367	487	250	237	193	63	130

Table 9: Stock Market Response to Rating Downgrades: Direct / Watch-Preceded Downgrades

The table provides the cumulative abnormal returns following direct and watch-preceded downgrades. The sample consists of 1810 uncontaminated rating events in the post-watchlist period from October 1, 1991, to December 31, 2004. The cumulative abnormal return (CAR) is calculated over a three-day event window (-1,+1) around the date the rating change becomes effective. The CAR is the cumulative abnormal stock return minus the return of the market portfolio, where the market portfolio is given by the value-weighted portfolio from CRSP. Wilcoxon T values are given below the median and t-values below the mean. ***, **, and* indicate significance at the 1%, 5%, and 10% level. Mean and median values are tested using one-sided t-test and Wilcoxon T test, respectively.

Panel A: All Downgrades			
	Mean	Median	CAR<0 (%)
Direct	-3.65 (-8.38)***	-1.50 (-8.07)***	60
From Watchlist	-2.19 (-4.89)***	-0.42 (-4.27)***	56
Difference (From Watchlist-Direct)	1.46 (-2.34)***	1.08 (-2.37)**	-4
Panel B: Event-Driven Downgrades			
	Mean	Median	CAR<0 (%)
Direct	-3.65 (-8.38)***	-1.50 (-8.07)***	60
From Watchlist	-2.53 (-3.13)***	-0.41 (-2.18)***	55
Difference (From Watchlist-Direct)	1.12 (-1.22)	1.09 (-1.78)*	-5
Panel C: Non-Event Driven Downgrades			
	Mean	Median	CAR<0 (%)
Direct	-3.65 (-8.38)***	-1.50 (-8.07)***	60
From Watchlist	-2.05 (-3.82)***	-0.43 (-3.68)***	56
Difference (From Watchlist-Direct)	1.6 (-2.31)**	1.07 (-1.95)*	-4

Table 10: Overall Stock Market Response to Rating Downgrades: Direct / Watch-Preceded Downgrades

The table provides the cumulative abnormal returns following direct and watch-preceded downgrades. The sample consists of 1810 uncontaminated rating events in the post-watchlist period from October 1, 1991, to December 31, 2004. The cumulative abnormal return (CAR) is calculated over a event window beginning one day before the watchlist placement and ending one day after the watchlist resolution for firms coming from watchlist. For direct downgrades the event window is set as the the median length of the watchlist period in our sample. The CAR is the cumulative abnormal stock return minus the return of the market portfolio, where the market portfolio is given by the value-weighted portfolio from CRSP. Wilcoxon T values are given below the median and t-values below the mean. ***, **, and* indicate significance at the 1%, 5%, and 10% level. Mean and median values are tested using one-sided t-test and Wilcoxon T test, respectively.

	Mean	Median	CAR<0 (%)
Direct	-13.96 (-8.71)***	-9.36 (-7.97)***	61
From watchlist	-0.96 (-0.56)	-1.65 (-2.22)**	60
Difference	13 (-5.57)***	7.71 (-4.29)***	1
<i>(From watchlist-direct)</i>			

Table 11: Market Reaction to Watch-preceded Downgrades vs. Direct Downgrades

The sample consists of 1810 non-contaminated downgrades in the period between October 1, 1991 and December 31, 2004. Ratings are issuer ratings provided by Moody's. The sample contains direct downgrades as well as downgrades following watchlist placements. The dependent variable is the cumulative abnormal return (CAR). It is calculated over a three-day event window (-1,+1) around the date the rating change becomes effective. The CAR is the cumulative abnormal stock return minus the return of the market portfolio, where the market portfolio is given by the value-weighted portfolio from CRSP. RCHANGE is the absolute value of rating change in notches; IGRADE is a dummy variable equal to 1 if the rating downgrade crosses the investment grade boundary, and 0 otherwise; DAYS is the log of the number of days since the last rating change (downgrades as well as upgrades); WATCHLIST is an estimated variable following from the earlier probit regressions. ***, **, and * indicate significance at the 1%, 5%, and 10% level. t-values are given in parenthesis. Robust standard errors are used.

Explanatory variables	non-event + NIG	non-event + IG	event + NIG	event + IG
INTERCEPT	-0.0090 (-0.19)	-0.1225*** (-3.81)	-0.0666 (-1.35)	-0.0873*** (-2.88)
RCHANGE	-0.0343*** (-3.48)	-0.0023 (-0.27)	-0.0351*** (-3.09)	-0.0052 (-0.50)
IGRADE		-0.0074 (-0.83)		-0.0109 (-1.09)
DAYS	0.0043 (0.84)	0.0157*** (3.41)	0.0137** (2.30)	0.0132*** (2.75)
WATCHLIST*RCHANGE	0.0443** (2.15)	-0.0038 (-0.27)	0.0780*** (3.45)	0.0051 (0.35)
Year fixed effects	yes	yes	yes	yes
Industry fixed effects	yes	yes	yes	yes
Adj. R^2 (%)	3.50	9.09	7.61	11.60
F	1.34	2.17***	2.39***	2.30***
Observations	1024	593	837	486

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