Wealth Effects of Bond Rating Announcements

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This paper employs meta-analysis methodology to reconcile the diverse international empirical evidence on the effects of bond rating announcements on the stock prices of the issuing firms. The random-effects model meta-analysis of 53 published studies and 421 sub-samples of data covering a range of countries and 44,713 bond rating announcements reveals an average cumulative abnormal stock return of -1.64% associated with the bond downgrades and an average cumulative abnormal stock return of 0.28% associated with the bond upgrades. Factors such as initial bond rating, issuer location, announcement period, and rating change size have significant effects on the size of the abnormal stock returns around the rating announcement dates. (JEL: G14)

Keywords: bond rating announcements; wealth effects; meta-analysis; information asymmetry

Article history: Received: 8 August 2017, Received in final revised form: 24 December 2018, Accepted: 18 January 2019, Available online: 30 August 2019

I. Introduction

Bond rating announcements convey information on the credit risk of the

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(*Multinational Finance Journal*, 2018, vol. 22, no. 3/4, pp. 211–254)

issuer. Changes in bond ratings can have a profound effect on the issuing firm stock price as they may signal a change in its creditworthiness.

There are two opposing theories concerning the effect of bond rating changes on security prices. Proponents of the private information hypothesis, such as Griffin and Sanvicente (1982), argue that credit rating agencies possess valuable private information about issuing firms, and, therefore, bond rating change announcements provide information not previously known to investors. This, in effect, is what affects the security prices. Proponents of the efficient market hypothesis argue that bond rating agencies estimate companies' credit risk based on the publicly available information. Weinstein (1977) shows that bond rating changes always lag the publicly available information that triggered the change. Therefore, announcements of bond rating changes do not carry new information and should have no effect on the stock prices.

There is a significant number of published studies that analyze bond rating announcements and their influence on the equity prices of the issuing firms. Many of these studies use the event study methodology and calculate abnormal returns associated with the announcements. Most of the event studies review both upgrade and downgrade announcements while some studies, such as Chandra and Nayar (1998), Followill and Martell (1997), Norden and Weber (2004), and Poon and Chan (2008) only consider downgrades.

Many studies such as those of Hand, Holthausen and Leftwich (1992), Goh and Ederington (1993), Nayar and Rozeff (1994), and Dichev and Piotroski (2001) find significant negative abnormal stock returns following bond downgrade announcements. The average size of an abnormal stock return associated with the downgrade announcements, however, ranges from –4.43% in Jorion and Zhang (2007) to –0.12% in Wansley and Clauretie (1985). The reaction of the equity prices to upgrade announcements, as reported in Holthausen and Leftwich (1986), Matolcsy and Lianto (1995), Ederington and Goh (1998), and Dichev and Piotroski (2001), is typically positive, albeit small and often insignificant. The short-term abnormal returns associated with the bond upgrade announcements range from statistically insignificant –0.58% in Afik, Feinstein, and Galil (2014) who studied a sample of Israeli rating announcement to highly significant 1.92% in Elayan, Hsu, and Meyer (2003) who examined upgrade announcements from New Zealand. While the variation in the results may be caused by the country-specific differences in governing laws and market structures, some studies that report the results for the same country also come with different conclusions. For example, Purda (2007) reports a statistically insignificant 3-day CAR of –0.03% using a sample of 886 US upgrade announcements from 1991-2002. At the same time, Chung, Frost, and Kim (2012) report a statistically significant 3-day CAR of 0.80% following 542 US upgrade announcements from 1992-2010. The differences in the reported results call for a careful review of the existing studies and indicate that the informativeness of bond upgrade announcements may have changed over time because of regulatory changes such as the implementation of the US SEC Regulation Fair Disclosure in October 2000. The empirical findings suggest that investors may view bond rating downgrades as more informative than upgrades. Ederington and Goh (1998) explain the asymmetric stock price reaction by arguing that firms are more likely to release positive news to the public while they would tend to withhold negative information, disclosing it selectively to rating agencies only when they have to. Thus, the downgrades provide information that was not known to the market while the upgrades only confirm the existing information.

The purpose of the study is to reconcile the diverse empirical evidence on the wealth effects of bond rating announcements and identify factors affecting the size of the abnormal returns associated with bond rating announcements using the meta-analysis methodology. Meta-analysis is a method of quantitative review of empirical evidence across multiple studies; it serves as an alternative to traditional literature reviews. While this method, which involves using statistical techniques to systematically summarize the results reported in multiple studies, presents certain benefits over the narrative reviews, it has some drawbacks which are addressed in this study.

For the meta-analysis, a comprehensive search for studies analyzing short-term effects of bond rating announcements on stock prices is performed in major Finance journals. The random-effects meta-analysis approach summarized in Borenstein et al. (2009) is used to calculate the average abnormal stock returns associated with the bond upgrade and downgrade announcements. The study follows the methodology of Datta, Pinches, and Narayanan (1992), Abdul Rahim, Goodacre, and Veld (2014), and Veld, Verwijmeren, and Zabolotnyuk (2019) who used meta-regressions to identify factors affecting abnormal returns associated with the announcements of mergers and acquisitions, convertible bond and warrant-bond offerings, and seasoned equity offerings, respectively.

The results indicate that the stock prices, on average, react negatively to bond downgrade announcements. The US market reacts more negatively to both downgrades and upgrades. The implementation of the *Regulation FD* had changed the information content of the US bond downgrade announcements. Certain bond characteristics such as the initial bond rating affect the magnitude of the stock price reaction to the rating announcements as well. On the other hand, the average stock price reaction to bond upgrade announcements is positive and statistically significant, albeit much smaller. This result may be explained by an increased informativeness of the upgrade announcements in the more recent period. The study finds a significant difference between the results of studies published in the top Finance journals and the results presented in the studies published in other peer-reviewed publications. The results of this study add to the body of literature on the effects of bond rating announcement on the stock market by providing a comprehensive quantitative review of the existing literature and leading to a better understanding of the wealth effects associated with credit rating changes.

The remainder of the paper is organized as follows: Section II provides a discussion of factors that may be associated with the size of the wealth effects and formulates the hypotheses to be tested. Section III discusses the meta-analysis methodology and describes the primary studies sample. The meta-regression models are presented in Section IV. Section V describes the main findings of the meta-analysis. The paper is concluded in Section VI.

II. Factors Affecting Stock Price Reaction to Bond Rating Announcements and Associated Hypotheses

A. Degree of Rating Change Anticipation

Announcements of bond rating changes provide market participants with valuable information. Holthausen and Leftwich (1986) argue that the effect of the announcements on stock prices, therefore, will depend on the level of anticipation of such information. Hsueh and Liu (1992) point out that the degree of anticipation, in turn, depends on the amount of the company information available to investors before the announcement. The less information is available, the more significant the effect of the bond rating announcement will be. The authors use dispersion of firm's equity ownership as a proxy for the quantity of the firm's information available in the market. Firms with high concentration of ownership, owned by large, institutional investors, will be closely monitored, and, therefore, can be considered high-information firms. Firms with highly dispersed ownership may not be monitored as closely and their information availability may be lower. The results of their study indicate that stock prices of firms with highly dispersed ownership exhibit more negative reaction around the announcement dates than stock prices of firms with more concentrated ownership.

At the aggregate market level, Hsueh and Liu (1992) use volatility of interest rates as a measure of information availability. They argue that information gets more valuable and scarcer during the periods of high interest rate volatility and market uncertainty. Their study reports the average cumulative abnormal two-day stock return of –1.47% during the periods of high uncertainty and the cumulative abnormal return of –0.68% during the low-uncertainty periods.

B. Reason for Rating Change

Ederington and Goh (1998) argue that not all unanticipated downgrades are bad news for the shareholders. A rating downgrade caused by the expectation of increased leverage may be bad news for the bondholders, but this is good news for the shareholders since the wealth transfer from the bondholders to the shareholders should increase the stock prices. In cases where downgrades are associated with deteriorating financial prospects which can decrease firm value and where interests of stockholders and bondholders are aligned, Goh and Ederington (1993) find that stock markets react negatively. Ederington and Goh (1998) separated all downgrades into three categories based on the rating change reasons provided by the rating agencies: (i) downgrades caused by the past known increase in financial leverage, (ii) downgrades caused by the expected deterioration in the firm's financial performance, and (iii) downgrades caused by all other reasons. They found that the CARs during the two-day announcement period were negative for all three groups and equal to –0.05% for the downgrades caused by the change of leverage, –0.47% for the downgrades caused by miscellaneous reasons, and –1.18% for the downgrades caused by deterioration in the firm's financial performance. However, only the latter group's abnormal returns were statistically significant. Authors concluded that rating changes could not be viewed as homogeneous and the reasons for the changes must be considered. Similarly, Goh and Ederington (1993) found no stock market reaction to the downgrades that were attributed to the changes in leverage.

Graham (2000) argued that most firms were under-levered and failed to exploit the debt tax shield fully. Therefore, one would expect that a rating upgrade caused by the firm's decision to decrease its leverage would be perceived as bad news by the shareholders because of the wealth transfer from the shareholders to the bondholders. On the other side, the shareholders would view downgrades related to the increases in leverage as good news.

C. Bond Rating Changes versus Credit Watch List Placements

In addition to immediate bond rating assignments, credit rating agencies may place currently rated bond issues on either a credit watch or a rating outlook list.[1] An addition to a credit watch list is used to indicate that the rating is under review for a possible rating change (upgrade, downgrade, or uncertain direction) in the short term.[2] Bond issues are removed from a credit watch after their rating is either changed or confirmed. In contrast to the bond rating changes that can be caused by a variety of events including deterioration of the firm's financial situation or increase in the firm's leverage, Chung, Frost, and Kim (2012) found that most of the credit watch placements are caused by the deterioration in credit quality.

Holthausen and Leftwich (1986) found that additions to a credit watch list were associated with negative abnormal stock returns when the additions indicated possible downgrades while they found no evidence of abnormal stock returns for the indicated upgrades. The authors concluded that bond rating change announcements were more anticipated and provided less information if they were preceded by the

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1. Standard and Poor's started their Credit Watch List in November 1981 while Moody's has been publishing its Watchlist of ratings on review since 1985. However, Moody's Watchlist assignments were not considered formal rating actions until 1991 (Hamilton and Cantor, 2004). Rating outlooks (stable, positive, negative, or developing) are opinions regarding the direction of a rating change in a medium term (6-24 months); rating outlooks are usually terminated over the period of 12-18 months.

2. Hamilton and Cantor (2004) show that the average duration of a rating review is approximately 3 months.

placement of the bonds on a credit watch. Hand, Holthausen and Leftwich (1992) found that unexpected additions of bonds to a credit watch list with indications of a possible downgrade produced a two-day cumulative abnormal return of –1.78% while the bond rating downgrade announcements caused a two-day cumulative abnormal return of –1.52%. They also found that both the credit watch placements with indicated upgrades and the actual bond upgrade announcements caused insignificant positive abnormal stock returns.

D. Rating Change Size

Bond rating change announcements are meant to signal a shift in the issuing company's default risk caused by developments in the four C's of credit (capacity, collateral, covenants, and character). Substantial changes in the factors defining the firm's credit quality are usually followed by multi-notch rating changes.[3] One would expect that the more sizable is the announced rating change, the stronger signal the announcement would carry, and, consequently, the more substantial the stock price reaction should be.

Holthausen and Leftwich (1986) found that the announcements of downgrades across rating classes were associated with a statistically significant two-day abnormal return of –2.66%, while the abnormal returns for the within-class downgrade announcements were not statistically significant.[4] The stock price reaction to the upgrade announcements in their study, however, exhibited no statistically significant abnormal returns regardless of the size of the bond rating change. Similarly, Chandra and Nayar (1998) found a statistically significant 3-day abnormal return of –1.88% for the severe downgrades and a statistically insignificant abnormal return of –0.22% for the mild downgrades.

E. Initial Bond Rating

The market reaction to bond rating changes may depend on the initial

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3. An example of a single-notch rating change is a change from AA to AA+, or from BBB– to BB+.

4. A within-class rating change keeps the new rating within the same major rating class (e.g., a change from BB+ to BB); an across-class rating change moves the new rating to a new rating class (e.g., a change from BB– to B+).

bond rating. Hand, Holthausen and Leftwich (1992) found a statistically significant two-day CAR of –0.83% for the companies issuing investment-grade bonds, and a CAR of –4.22% for the companies issuing speculative-grade bonds. Goh and Ederington (1999) found a two-day CAR of –0.75% and –2.41% for the rating announcements of investment-grade and speculative-grade bonds, respectively. Purda (2007) found a 3-day cumulative abnormal stock return of –3.57% for all firms in her sample, –5.18% for the sub-sample of speculative-grade firms, and –5.74% for the sub-sample of small firms which were more likely to have low ratings. The author concluded that this difference could be explained by the high opacity of firms issuing speculative-grade bonds and the low degree of anticipation of the speculative-grade bond rating announcements.

F. Regulation Fair Disclosure

On October 23, 2000, the US Securities and Exchange Commission implemented *Regulation Fair Disclosure* (*FD*) which required compulsory public disclosure of nonpublic information previously selectively disclosed by the US public companies to privileged persons, such as the securities market professionals and the holders of the issuer's securities. *Regulation FD* specified several exclusions from this rule, one of which was disclosure of non-public information to credit rating agencies. Because of the *Regulation FD*, credit rating agencies gained access to private information not publicly available to other market participants. This regulatory change may have increased information content of rating announcements. Jorion, Liu, and Shi (2005) compared the effects of bond rating announcements in the pre-*Regulation FD* and the post-*Regulation FD* periods. They found that a mean 3-day CAR following the downgrade announcements decreased from –4.57% in the pre-*Regulation FD* period to –6.93% for the post-*Regulation FD* announcements. At the same time, the mean CAR following the upgrade announcement increased from statistically insignificant –0.11% to statistically and economically significant 1.42%. In both cases, the differences between the pre-*Regulation FD* CARs and the post-*Regulation FD* CARs were statistically significant.

G. Contaminated and Non-contaminated Samples

The effects of bond rating announcements on equity prices may be influenced by other news on the company-related events reported at the same time. Several studies including Jorion, Liu, and Shi (2005), May (2010), and Chung, Frost, and Kim (2012) reported both contaminated and non-contaminated samples results. Nevertheless, most studies covered in the meta-analysis did not mention decontaminating their samples of other events. Unless a study explicitly mentioned decontaminating samples of other events, such samples were treated as contaminated.

H. Debt Maturity

Several published studies examined commercial paper rating announcements to identify differences in the effects of the long-term and the short-term debt rating announcements. Nayar and Rozeff (1994) found that commercial paper downgrades have negative information content while upgrades have no effect on equity prices. Barron, Clare, and Thomas (1997) found insignificant stock price reaction to the short-term debt upgrades and downgrades.

I. Publication Bias

The studies that report large and statistically significant results may be easier to publish than the studies that report economically and statistically insignificant results causing a so-called “publication bias”. Rothstein, Sutton, and Borenstein (2005) found publication bias in their overview of the meta-analysis studies. To test for publication bias in the sample and to compare the results reported in academic journals of different quality, a dummy variable approach is used to analyze the results reported in the primary studies published in the top Finance journals and elsewhere.

J. Bond Issuer Domicile

As indicated in La Porta et al. (1998), different countries and various governance systems may have heterogeneous effects on the informational content of bond rating announcements. The results of many studies analyzed in this paper are based on the US data. To test if the stock price reaction is different in the US and in other countries, separate results are provided for the US and the non-US studies.

K. Hypotheses

Considering the aforementioned factors that may potentially influence the magnitude of the stock price reaction to bond rating announcements, the following hypotheses were specified to be tested using the results reported in the published studies:

> Do stock prices react differently to bond rating downgrades than to bond rating upgrades?
>
> Do rating announcements have different information content in the US than in other countries?
>
> Did implementation of the *Regulation FD* affect information content of bond rating announcements in the US?
>
> Do more anticipated bond downgrades (upgrades) have less negative (positive) effect on the stock prices around the announcement dates?
>
> Are there differences in the stock price reaction to rating changes of speculative-grade bonds and investment-grade bonds?
>
> Do larger rating changes have greater effect on abnormal stock returns?
>
> Do short-term debt and long-term debt rating announcement have the same information content?
>
> Do stock prices react differently to credit watch placements than to actual rating changes?

III. Meta-Analysis Methodology and Sample of Primary Studies

Meta-analysis is a method of quantitative synthesis of empirical evidence from multiple studies using statistical techniques. It is used as an alternative to traditional narrative literature reviews. Narrative reviews bear inherent subjectivity and become less useful as more information becomes available (Borenstein et al., 2009). Meta-analysis uses a set of pre-determined rules to identify and select relevant studies, and to analyze the results presented in those studies. Unlike the traditional literature reviews where reviewers use subjective approach to decide on relevance and importance of each study, in meta-analysis each study is assigned a weight based on a statistical model.

While meta-analysis has some apparent benefits, it is often criticized for pooling primary studies of varying quality, engaging in double counting of data, and suffering from publication bias (Nelson and Kennedy, 2009). In order to deal with the first issue, the sample only includes papers published in peer-reviewed journals. To deal with the double-counting and potential correlation within and between the results published in the primary studies, a limited number of estimates from the individual primary studies is used in the analysis and weighted regression estimation procedures are employed. Finally, the differences in the results of the studies published in the top Finance journals and other journals are tested for using a dummy variable approach.

Meta-analysis allows us to calculate the summary effect (i.e., the average stock price reaction to the rating announcements) using the abnormal returns reported in individual studies, known as effect sizes. The summary effect can be calculated as a weighted average of individual effect sizes using either a fixed-effects model or a random-effects model. The former assumes a single true summary effect while the latter allows for different summary effect sizes that depend on certain characteristics of individual studies, such as different countries, time periods etc. This study employs the random-effects model estimation approach based on DerSimonian and Laird (1986) estimator and the fixed-effects model estimation results are presented for a comparison.

The sample of primary studies consists of academic peer-reviewed publications that researched stock market reaction to bond rating changes. First, these publications were identified by performing a comprehensive search for event studies reporting short-term abnormal stock returns following bond rating announcements that were published in the core 26 Finance journals as identified by Heck and Cooley (2009). Next, more relevant studies were identified by searching through the reference lists of those articles. The final sample contains 53 studies that were published or available online as of December 31, 2017. Thirty-two studies were published in journals that comprise the core 26 Finance journal list. The data in the studies covers the period from 1970 to 2015. Forty-three studies examined the effects of both

TABLE 1. Studies of the effects of bond rating changes on stock prices

					Downgrades			Upgrades		
Study	Journal	Country	Period	Event Window	Number	CAR, %	t-stat	Number	CAR, %	t-stat
Abad-Romero and Robles-Fernandez (2006)	JBFA	Spain	1990-2003	(–1, 1)	33	–0.40	–0.72	34	0.10	0.28
Afik, Fenstein, and Galil (2014)	JFS	Israel	2000-2009	(–1, 1)	117	–1.33	–3.38	21	–0.58	–1.42
Akhigbe, Madura, and Whyte (1997)	JFR	US	1980-1993	(–1, 0)	354	–1.03	–6.38	184	–0.01	–0.34
Alsakka et al. (2015)	EN	International	2008-2013	(–1, 0)	218	–0.63				
Anderson et al. (2012)	COC	US	1990-2001	(–1, 1)	828	–3.86	–7.57	486	0.24	1.09
Barron, Clare, and Thomas (1997)	JBFA	UK	1984-1992	(0, 1)	14	–3.07	–3.33	9	0.29	0.44
Bedendo, Cathcart, and El-Jahel (2018)*	JFS	US	1999-2015	(–1, 1)	6168	–3.40		3256	0.30	
Best (1997)	FR	US	1984-1992	(0, 1)	98	–0.81	–2.96	44	0.81	2.49
Byoun and Shin (2012)	APJFS	Japan	1996-2002	(–1, 0)	42	–2.80	–2.69	18	1.30	1.27
Caton and Goh (2003)	RQFA	US	1984-1990	(–1, 0)	489	–0.96	–6.48			
Chan et al. (2011)	JFR	US	1990-2006	(–1, 1)	1398	–2.06	–5.69			
Chandra and Nayar (1998)	JAAF	US	1977-1994	(–2, 0)	57	–1.01	–2.54			
Choy, Gray, and Ragunathan (2006)	AF	Australia	1989-2003	(–1, 0)	74	–3.41	–5.05	25	0.99	0.58
Chung, Frost, and Kim (2012)	FM	US	1992-2010	(–1, 1)	1033	–1.10	–6.88	542	0.80	4.95
Cornell, Landsman, and Shapiro (1989)	JAAF	US	1982-1985	(–1, 1)	205	–1.27	–3.85	116	0.62	2.04
Creighton, Gower, and Richards (2007)	PBFJ	Australia	1990-2003	(0, 1)	95	–1.30	–3.06	46	1.10	1.56
Di Cesare (2006)	EN	International	2001-2005	(–1, 1)	21	–0.60	–1.06	31	1.20	2.75
Dichev and Piotroski (2001)	JF	US	1970-1997	(–1, 1)	2940	–1.97	–11.47	1787	0.48	5.83
Dimitrov, Palia, and Tang (2015)*	JFE	US	2006-2012	(–1, 1)	1565	–2.23		1454	0.16	
Ederington and Goh (1998)	JFQA	US	1984-1990	(0, 1)	494	–1.29	–5.94	310	0.05	0.21

(Continued)

TABLE 1. (Continued)

Study	Journal	Country	Period	Event Window	Downgrades Number	Downgrades CAR, %	Downgrades t-stat	Upgrades Number	Upgrades CAR, %	Upgrades t-stat
Elayan, Maris, and Maris (1990)	QJBE	US	1981-1985	(–1, 0)	187	–0.20	–1.21	54	0.07	0.69
Elayan, Maris, and Young (1996)	FR	US	1981-1990	(–1, 0)	26	–1.44	–1.90	9	–0.67	–0.39
Elayan, Hsu, and Meyer (2003)	JEF	New Zealand	1990-2000	(–1, 0)	34	–2.28	–5.32	27	1.92	4.66
Followill and Martell (1997)	JEF	US	1985-1988	(–1, 0)	35	–1.39	–2.85			
Glascock, Davidson, and Henderson (1987)	QJBE	US	1977-1981	(0, 0)	93	–0.39	–2.15	69	0.03	0.11
Goh and Ederington (1993)	JF	US	1984-1986	(0, 1)	243	–0.76	–3.61	185	–0.04	–0.26
Goh and Ederington (1999)	QREF	US	1984-1990	(0, 1)	483	–1.21	–6.19	312	0.10	0.63
Gropp and Richards (2001)	EN	International	1989-2000	(–1, 1)	66	–1.02	–1.76	37	–0.02	–0.02
Han et al. (2009)	JFSR	International	1990-2006	(–1, 1)	501	–1.16	–3.56	673	0.02	0.14
Hand, Holthausen, and Leftwich (1992)	JF	US	1977-1982	(0, 1)	205	–1.12	–1.82	66	–0.07	–0.16
Holthausen and Leftwich (1986)	JFE	US	1977-1982	(0, 1)	402	–2.66	–12.51	235	0.08	0.48
Hsueh and Liu (1992)	JBR	US	1982-1987	(0, 1)	270	–1.17	–3.91	138	0.68	2.51
Hu, Kaspereit, and Prokop (2016)	IRFA	International	1994-2013	(0, 1)	3337	–1.32	–8.75			
Hundt, Sprungk, and Horsch (2017)	EJF	International	2000-2010	(–1, 1)	129	–0.97	–1.94	102	0.47	0.55
Jorion, Liu, and Shi (2005)*	JFE	US	1998-2002	(–1, 1)	1350	–4.05		368	0.17	
Jorion and Zhang (2007)	JFI	US	1996-2002	(–1, 1)	1195	–4.43	–9.95	361	0.31	1.81
Jorion and Zhang (2010)	FR	US	1996-2002	(0, 1)	679	–1.70	–3.49	473	0.12	0.94
Kim and Nabar (2007)	JBF	US	1980-2003	(–1, 1)	427	–2.68		203	0.06	
Li, Shin, and Moore (2006)	JBF	Japan	1985-2003	(–1, 1)	1065	–1.71	–10.86	232	0.28	0.86
Li, Visaltanachoti, and Kesayan (2004)	IJF	Sweden	1992-2003	(–1, 1)	19	0.50	0.14	9	–2.08	–0.79

(Continued)

TABLE 1. (Continued)

Study	Journal	Country	Period	Event Window	Downgrades Number	Downgrades CAR, %	Downgrades t-stat	Upgrades Number	Upgrades CAR, %	Upgrades t-stat
Matolcsy and Lianto (1995)	JBF	Australia	1982-1991	(0, 6)	38	–0.47		34	0.23	
May (2010)	JBF	US	2002-2009	(0, 1)	401	–1.68	–4.29	263	0.17	1.13
Meyer, Hsu, and Elayan (2006)	JEF	US	1996-2002	(–1, 1)	121	–3.07	–5.22	68	0.14	0.31
Nayar and Rozeff (1994)	JF	US	1977-1985	(–1, 1)	44	–0.97	–2.21	28	0.53	0.87
Norden and Weber (2004)	JBF	International	2000-2002	(–1, 1)	68	–0.43	–1.47			
Poon and Chan (2008)	JBR	China	2002-2006	(–1, 1)	39	–0.59	–1.36			
Purda (2007)	JFR	US	1991-2002	(–1, 1)	1695	–3.57	–21.18	886	–0.03	–0.17
Schweitzer, Szewczyk, and Varma (1992)	JFSR	US	1977-1987	(0, 1)	47	–1.66	–4.89	18	1.12	2.06
Schweitzer, Szewczyk, and Varma (2001)	FR	US	1977-1998	(0, 1)	39	–2.85	–6.72			
Shi, Wang, and Zhang (2017)	JFR	US	2004-2009	(0, 1)	510	–1.38				
Taib et al.(2009)	JBPR	International	1997-2006	(–1, 0)	280	–2.02		126	–0.09	
Wansley and Clauretie (1985)	JFR	US	1981-1983	(–1, 0)	94	–0.12		46	0.20	
Yang et al. (2017)	EMR	South Korea	2000-2015	(–1, 1)	380	–2.48	–4.36	583	0.60	2.95

(*Continued*)

TABLE 1. (Continued)

Note: This table presents the studies that were used in the meta-analysis of the bond rating announcement effects on stock prices. Event window refers to the number of days relative to the bond rating announcement date. The papers listed below were published in the following journals: AF – Accounting and Finance, APJFS – Asia-Pacific Journal of Financial Studies, COC – Corporate Ownership and Control, EJF – European Journal of Finance, EMR – Emerging Markets Review, EN – Economic Notes, FM – Financial Management, FR – Financial Review, IJF – The International Journal of Finance, IRFA – International Review of Financial Analysis, JAAF – Journal of Accounting, Auditing and Finance, JBF – Journal of Banking and Finance, JBFA – Journal of Business Finance and Accounting, JBPR – Journal of Business and Policy Research, JBR – Journal of Business Research, JEF – Journal of Economics and Finance, JF –The Journal of Finance, JFE – Journal of Financial Economics, JFI – The Journal of Fixed Income, JFQA – The Journal of Financial and Quantitative Analysis, JFR-Journal of Financial Research, JFS – Journal of Financial Stability, JFSR – Journal of Financial Services Research, PBFJ – Pacific Basin Finance Journal, QJBE – Quarterly Journal of Business and Economics, QREF – Quarterly Review of Economics and Finance, and RFQA – Review of Quantitative Finance and Accounting. If a study reports both the results of contaminated and non-contaminated samples, the non-contaminated sample results are presented; if a study reports both market-model CARs and market-adjusted CARs, the market-model results are presented. *Bedendo, Cathcart, and El-Jahel (2018), Dimitrov, Palia, and Tang (2015), and Jorion, Liu, and Shi (2005) only reported results for different time sub-periods without reporting overall results. The reported CARs for these studies are calculated as weighted averages of the CARs reported in sub-samples.

bond downgrades and bond upgrades; ten studies investigated the effects of bond downgrades only. The US data was used in 33 studies, while the remaining studies used data from Australia (3 studies), Japan (2 studies), China, Israel, New Zealand, South Korea, Spain, Sweden, and the UK. Eight studies analyzed bond rating announcements from more than one country. The list of the studies reviewed in this paper is presented in table 1.[5]

The most popular event window used by the primary studies is the three-day window (–1, 1) centered on the announcement date; it is reported in 24 studies. The 2-day (0,1) window is reported in 15 studies and the 2-day (–1, 0) window is used in 11 studies.[6]

For a study to be included in the calculation of the overall effect (i.e., the average cumulative abnormal return) using the DerSimonian and Laird (1986) estimator, it must report daily cumulative abnormal returns (CAR) associated with the announcements of bond rating changes as well as standard errors of CARs (or t-statistics, or p-values of the t-tests). This reduces the sample to 36 studies reporting both bond upgrade and downgrade announcements and eight studies reporting bond downgrades only.

IV. Meta-Regression Analysis

In order to determine which bond characteristics explain the variation in the stock market reaction to bond rating announcements, the study uses the meta-regression analysis (MRA). The dependent variable in the meta-regressions is the daily abnormal stock return associated with the announcements of bond rating changes. The mean daily abnormal returns are calculated by dividing the cumulative abnormal returns reported in the primary studies by the number of days in the event windows reported by the studies. The CARs and the event windows for the primary studies used in the meta-analysis are reported in table 1.

The CARs in the primary studies are calculated using the

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5. If a study reported results for both contaminated and non-contaminated samples, the results of the non-contaminated samples were presented. If a study reported results for multiple announcement windows, the (–1, 1) window results were presented. If those results were unavailable, the results for the (–1, 0) window (or for the (0, 1) window if the former results were not available) were presented instead.

6. The remaining three studies used (–2, 0), (0, 0), and (0, 6) event windows.

event-study methodology by first finding the "normal" stock returns as predicted by a particular asset pricing model and then subtracting those from the observed stock returns during the event window $(-t_1, t_2)$, which is defined as a time period that starts t_1 days before a bond rating change is announced and ending t_2 days after the announcement is made. All the studies in the sample use the market model for calculating the abnormal returns during the event windows.[7]

The independent variables in the meta-regressions are binary dummy variables that are based on the characteristics of the data and the research designs reported by the primary studies. These variables represent potential sources of heterogeneity in the market response to bond rating announcements. Since meta-analysis approach relies on results reported in the primary studies as an input, the choice of the independent variables is limited by the data characteristics that primary investigators chose to reveal.[8] These characteristics can be grouped into three categories: (i) the characteristics that are observable from the study description (e.g., the publication journal, the country, the sample period, the event window); (ii) the characteristics that are revealed by the primary investigators when they describe their data samples or methodology (e.g., the industry of the companies used in the study, the credit watch placements, the bond maturities, data sample decontamination); and (iii) the characteristics chosen by the primary investigators to separate their data in sub-samples (e.g., the reason for the rating change, the degree of the rating change anticipation, the bond ratings before and after the announcement).

The data characteristics from the first category are the easiest to observe. All studies report the country and the sample period of the data they use; the name of the journal where the study is published is also identifiable. In addition, unlike the data characteristics in the latter two categories that may only be applicable to certain sub-samples reported in a primary study and can vary between the full sample and the sub-samples, the sample data period, the country, and the journal of publication mostly remain the same for the full sample and the sub-samples reported in a given study.[9] Also, in order to control for

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7. Anderson et. al (2012) present separate results for the market-model and the market-adjusted model.

8. Meta-analysis methodology relies on the results published in primary studies and the author did not have access to the data used in the reviewed studies.

9. Some studies, however, use data from more than one country or report results for

possible differences in the daily abnormal returns attributed to the choice of the event window length, dummy variables for different reported event windows are used. Because of the above-mentioned reasons, the meta-regression analysis starts with the following regression model that uses only five independent variables:

$$DAR_{ij} = \alpha_{ij} + \beta_1 US_{ij} + \beta_2 Top_i + \beta_3 RegulationFD_{ij}$$
$$+ \beta_4 ThreeDayWindow_{ij} + \beta_5 OtherWindow_{ij} + \varepsilon_{ij} \tag{1}$$

where

DAR_{ij} is the daily abnormal return calculated from the CAR reported in sub-sample *i* of study *j*;

US_{ij} - dummy variable equal to 1 for sub-sample *i* in study *j* if the sub-sample *i* reports results for the US announcements (equal to 0 otherwise);

Top_j - dummy variable equal to 1 for sub-samples reported in study *j* if the study *j* is published in the top 4 finance journals (Journal of Finance, Journal of Financial Economics, Journal of Financial and Quantitative Analysis, and Review of Financial Studies), and equal to 0 otherwise;

$RegulationFD_{ij}$ - dummy variable equal to 1 for sub-sample *i* in study *j* if the sub-sample *i* contains US bond rating announcements that were made after the implementation of the Regulation Fair Disclosure in October 2000 (equal to 0 otherwise);

$Three\text{-}Day\ Window_{ij}$ - dummy variable equal to 1 for sub-sample *i* reported in study *j* if the sub-sample *i* reports CARs over a three-day event window, and equal to 0 otherwise;

$Other\ Window_{ij}$ - dummy variable equal to 1 for sub-sample *i* reported in study *j* if the sub-sample *i* reports CAR for an event window other than a two-day or a three-day window (equal to 0 otherwise).

Thirty-nine out of 53 primary studies used in the meta-analysis report cumulative abnormal returns for full samples of upgrades and/or downgrades as well as for sub-samples that are formed based on some identifying characteristics. These characteristics include the initial bond

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different time periods. For example, Taib et al. (2009) report separate stock price reactions to bond rating changes in Asutralia and in the UK, while Dimitrov et al. (2015) report separate results for non-overlapping periods.

rating, the magnitude of rating change, and the reason for rating change among others. To identify which of these characteristics can explain the heterogeneity in the reported abnormal returns, Model (1) is augmented with additional independent variables.[10] The updated model has the following form:

$$\begin{aligned} DAR_{ij} = \alpha_{ij} &+ \beta_1 US_{ij} + \beta_2 Top_{ij} + \beta_3 US\,\mathrm{Re}\,gulationFD_{ij} \\ &+ \beta_4 High_{ij} + \beta_5 Financial_{ij} + \beta_6 Leverage_{ij} \\ &+ \beta_7 Junk_{ij} + \beta_8 Across\ Class_{ij} + \beta_9 Watch_{ij} \\ &+ \beta_{10} Short\ Term\ Debt_{ij} + \beta_{11} Contaminated_{ij} \\ &+ \beta_{12} ThreeDayWindow_{ij} + \beta_{13} OtherWindow_{ij} + \varepsilon_{ij} \end{aligned} \tag{2}$$

The independent variables are defined as following:[11]

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10. In order for an independent variable to be included in the augmented meta-regression model, it has to be based on a data characteristics that was used to form sub-samples in two or more studies.

11. Coding of the independent variables is demonstrated by the following example: Goh and Ederington (1999) report 7 estimates of the cumulative abnormal returns: (i) for the full sample of downgrades, (ii) for the sub-sample of downgrades that were attributed to changes in the firm's financial prospects, (iii) for the sub-sample of downgrades where new ratings became investment-grade, (iv) for the sub-sample of downgrades where new ratings remained speculative-grade, (v) for the sub-sample of downgrades where ratings changed from investment grade to speculative grade; (vi) for the full sample of upgrades and (vii) for the sub-sample of upgrades attributed to changes in the firm's financial situation.
For subsample (ii) above the independent variables would be coded as following:

High = 0, since Goh and Ederington (1999) do not report any sub-samples based on some proxy measure of rating announcement anticipation (e.g., low ownership dispersion or low interest rate volatility as in Hsueh and Liu (1992) or sub-samples of downgrades preceded by negative credit watch).

Financial = 1, since all downgrade announcements in this sub-sample are caused by changes in firm's financial situation.

Leverage = 0, since all downgrades in this sub-sample were related to changes in the firm's financial situation and not to changes in the firm's leverage.

High$_{ij}$ - dummy variable equal to 1 for sub-sample *i* in study *j* if the rating announcements in the sub-sample *i* have some characteristics that make the announcements highly anticipated. This would include cases where a credit watch precedes the rating announcements or cases where the underlying firms have low ownership dispersion, or where the announcements are made during the periods of low interest volatility, as in Hsueh and Liu (1992) (equal to 0 otherwise).

Financial$_{ij}$ - dummy variable equal to 1 for sub-sample *i* in study *j* if the sub-sample *i* reports only rating announcements attributed to changes in the firm's financial position (equal to 0 otherwise).

Leverage$_{ij}$ - dummy variable equal to 1 for sub-sample *i* in study *j* if the sub-sample *i* reports only rating announcements attributed to changes in the firm's capital structure (equal to 0 otherwise).

Junk$_{ij}$ - dummy variable equal to 1 for sub-sample *i* in study *j* if the sub-sample *i* reports only rating announcements for speculative-grade bonds (equal to 0 otherwise).

Across$_{ij}$ - dummy variable equal to 1 for sub-sample *i* in study *j* if the sub-sample *i* reports only bond rating changes that place the new rating in a different rating class, i.e., a change from AA to A+ (equal to 0 otherwise).

Watch$_{ij}$ - dummy variable equal to 1 for sub-sample *i* in study *j* if the sub-sample *i* reports only announcements of credit watch placements (equal to 0 otherwise).

Short-Term Debt$_{ij}$ - dummy variable equal to 1 for sub-sample *i* in study *j* if the sub-sample *i* reports only short-term debt rating announcements (equal to 0 otherwise).

Contaminated$_{ij}$ - dummy variable equal to 1 for sub-sample *i* in study

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Junk = 0, since this is not an exclusive sub-sample of speculative-grade bonds. However, the sub-sample (iv) above would have the dummy variable Junk assigned a value of 1.

Across-Class = 0, since not all rating changes in this sub-sample moved the new rating to a different rating class. However, the sub-sample (v) above would have a value of ACROSS assigned equal to 1.

Watch = 0, since the sub-sample contains rating downgrades and not credit watch placements.

Short-Term Debt = 0, since this is not an exclusive sub-sample of short-term bonds.

Contaminated = 0, since Goh and Ederington (1999) decontaminated their samples by eliminating rating announcements that coincided with other announcements by or about the firm during the event window.

j if the sub-sample *i* reports contaminated sample results (equal to 0 otherwise).

The next section provides the discussion of the result of the meta-analysis and the meta-regression analysis.

V. Results and Discussion

The descriptive statistics of the abnormal returns reported in the reviewed studies is presented in table 2.

Panel A presents the descriptive statistics of the cumulative abnormal returns reported in all studies, the US studies, and the non-US studies separately. Overall, the CARs that follow the downgrade announcements range from –4.43% to 0.50%, with the mean and the median being –1.64% and –1.32% respectively. Both the mean and the median are statistically significantly different from zero at the 1% level. The standard deviation of the cumulative abnormal returns is higher around the downgrade events (1.1%) than around the upgrade events (0.61%). The reported US CARs associated with the bond downgrades are all negative and range from –4.43% to –0.12%. The mean CAR for the US and the non-US studies is equal to –1.8% and –1.37% respectively; the t-test cannot reject the hypothesis that the means are equal.

The cumulative abnormal returns associated with the bond upgrades range from –2.08% to 1.92% indicating large variability of the reported results. The mean CAR associated with the bond upgrades is equal to 0.28% and is statistically different from zero at the 1% level. The result indicates that the bond upgrade announcements carry less information content than the downgrade announcement, a finding supported by multiple previous studies. The mean CAR associated with the upgrades reported in the US studies is 0.24% and is statistically significant. This finding is in line with the results of Hsueh and Liu (1992) and Dichev and Piotroski (2001) who found positive, small, and statistically significant abnormal returns associated with the US bond upgrades. Interestingly, the mean upgrade CAR associated with the non-US upgrades is equal to 0.36% but is not statistically significant. This contrasts the results of Elayan, Hsu, and Meyer (2003) and Yang et al. (2017) who found positive and statistically significant abnormal returns associated with bond upgrades in New Zealand and South Korea respectively.

TABLE 2. Descriptive statistics of stock CARs following bond announcements

	Downgrades			Upgrades		
	All studies	US studies	Non-US studies	All studies	US studies	Non-US studies
A. Cumulative abnormal returns, %						
Mean	–1.64***	–1.80***	–1.37***	0.28***	0.24***	0.36
Standard deviation	1.1	1.13	1.02	0.61	0.35	0.91
t-statistics	–10.82	–9.12	–6.00	3.02	3.48	1.57
p-value of t-test of equal means for US and non-US samples		0.16			0.62	
Median	–1.32***	–1.39***	–1.23***	0.17***	0.16***	0.29*
p-value of the Signed Rank test of median equal to zero	0.00	0.00	0.00	0.00	0.00	0.08
Maximum	0.5	–0.12	0.5	1.92	1.12	1.92
Minimum	–4.43	–4.43	–3.41	–2.08	–0.67	–2.08
B. Daily abnormal returns, %						
Mean	–0.68***	–0.73***	–0.59***	0.13***	0.10***	0.17*
Standard deviation	0.44	0.38	0.52	0.26	0.16	0.38
t-statistics	–11.27	–11.08	–5.09	3.10	3.06	1.82
p-value of t-test of equal means for US and non-US samples		0.33			0.45	
Median	–0.65***	–0.69***	–0.42***	0.06***	0.06***	0.12*
p-value of the Signed Rank test of median equal to zero	0.00	0.00	0.00	0.00	0.00	0.08
Maximum	0.17	–0.06	0.17	0.96	0.56	0.96
Minimum	–1.71	–1.48	–1.71	–0.69	–0.34	–0.69

(*Continued*)

TABLE 2. (Continued)

	Downgrades			Upgrades		
	All studies	US studies	Non-US studies	All studies	US studies	Non-US studies
C. Sample sizes						
Number of studies	53	33	20	43	27	16
Number of sub-samples	252	136	116	169	98	71
Number of rating announcements (non-unique)	30,745	24,175	6,570	13,968	11,961	2,007

Note: This table reports descriptive statistics for cumulative abnormal returns (CARs) and daily abnormal returns (*DAR*) reported in peer-reviewed studies on the wealth effects of bond rating announcements on stock prices. Panel A provides descriptive statistics for CARs reported in papers published in the top 26 Finance journals as specified by Heck and Cooley (2009) with the addition of papers published in Accounting and Finance, Corporate Ownership and Control, Economic Notes, Emerging Markets Review, European Journal of Finance, International Journal of Finance, International Review of Financial Analysis, Journal of Accounting, Auditing and Finance, Journal of Business and Policy Research, Journal of Business Research, Journal of Economics and Finance, Journal of Fixed Income, Journal of Financial Stability, and Quarterly Journal of Business and Economics. Panel B provide descriptive statistics for *DAR*s which are calculated by dividing the CARs by the number of days in the announcement windows. Separate results are reported for bond rating downgrades and upgrades. The last three rows in Panel C indicate the overall number of the published studies reporting wealth effects of bond downgrades and upgrades, the total number of subsamples reported in those studies and the total number of the downgrade announcements and the upgrade announcements. ***, **, *- indicate statistical significance at the 1%, 5%, and 10% levels respectively.

Panel B reports the descriptive statistics for the daily mean abnormal returns (*DAR*) which were calculated by dividing the CARs reported in the primary studies by the number of days in the reported event windows. The daily abnormal returns range from –1.71% to 0.17% for the downgrades and from –0.69% to 0.96% for the upgrades. The mean daily abnormal return associated with the bond downgrades (upgrades) is equal to –0.68% (0.13%) for all studies and is statistically significantly different from zero at the 1% level. The mean *DAR*s associated with the bond downgrades are similar for the US and the non-US studies. The mean *DAR* associated with the non-US upgrades is equal to 0.17% and is statistically different from zero at the 10% level.

Panel C reports the total number of the primary studies examining both bond downgrade and upgrade announcements, the number of sub-samples reported in the studies as well as the number of the rating downgrade or upgrade announcements.[12] The sample includes 53 published studies on the effects of bond downgrades that report CARs for 252 sub-samples with 30,745 announcements. Thirty-three studies use the US bond downgrades data, while the remaining 20 studies use the non-US data for their analysis. Forty-three studies analyze bond upgrades and report CARs for 169 sub-samples with 13,968 rating announcements. Of these, 27 papers analyze the US bond upgrades and 16 papers use the non-US rating upgrade announcements.

While simple means may estimate average abnormal stock returns associated with bond rating announcements, they tend to ignore different levels of precision employed in primary studies. The level of precision of primary studies is manifested by their reported standard errors, which are largely influenced by their sample sizes.[13] The meta-analysis methodology incorporates sample sizes into the calculation of the summary effect (i.e., the average abnormal return). Both the fixed-effects and the random-effects meta-analysis approaches assign more weight to studies with lower standard errors. However, the random-effects method assigns less relative weight to larger studies and more relative weight to smaller studies than the fixed-effects method

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12. These announcements are not unique as some studies use the same databases and identify rating announcements over similar time periods.

13. Since many studies in the sample do not report standard errors of their CARs but report t-statistics, the standard errors are calculated by dividing the reported CARs by their t-statistics.

(Borenstein et al., 2009).[14]

The summary effects associated with the bond downgrade announcements are presented in table 3.

The average abnormal return associated with the bond downgrades calculated with the random-effects model is –1.58% and is equal to –1.42% when calculated using the fixed-effect model. The difference may be caused by the more uniform weights assigned to the primary studies by the random-effects model. Both numbers are significantly different from zero at the 1% level. The results support the hypothesis that rating agencies possess valuable private information which gets revealed during rating downgrade announcements.

For a better illustration of the varying results presented in the individual studies, a forest plot of the CARs associated with the bond downgrades is presented in figure 1.

The shaded circles represent the weights assigned to each primary study by the random-effects model. The CARs reported in the primary studies are indicated by the black diamonds inside the circles. The horizontal lines represent the 95% confidence intervals around the individual CARs. The weighted average CAR of –1.58% for all downgrade studies is represented by the vertical dashed line and its 95% confidence interval that ranges from –1.87% to –1.29% is indicated by the white diamond at the bottom of the plot. The I^2 measure (Higgins and Thompson (2002)) value of 90.9% indicates a high degree of heterogeneity between the results reported in the studies analyzing bond downgrade announcements. This signals that varying bond rating announcements characteristics (e.g., a country, a time period, an event window etc.) may be affecting the reported cumulative abnormal returns.

To accommodate different event windows used in the published studies, daily abnormal returns are calculated by dividing the CARs by the number of days in the event windows. The mean daily abnormal return (*DAR*) associated with the bond downgrades and calculated using the random-effects model is –0.63% (untabulated) and is statistically significant at the 1% level. The I^2 value of 72% for the *DAR*s indicates lower level of heterogeneity between the daily abnormal returns than between the cumulative abnormal returns.

To check whether the implementation of the *US Regulation FD*

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14. Borenstein et al. (2009) provides an excellent discussion of both random-effects and fixed-effects weights and summary effects calculations.

TABLE 3. Meta-analysis results for studies reporting CARs associated with bond downgrade announcements

Study	Number	CAR, %	Standard Error	% Weight (Random-effects)	% Weight (Fixed-effects)
Abad-Romero and Robles-Fernandez (2006)	33	–0.40	0.56	2.01	0.54
Afik and Fenstein (2014)	117	–1.33	0.39	2.35	1.08
Akhigbe, Madura, and Whyte (1997)	354	–1.03	0.16	2.74	6.41
Anderson et al. (2012)	828	–3.86	0.51	2.11	0.64
Barron, Clare, Thomas (1997)	14	–3.07	0.92	1.33	0.20
Best (1997)	98	–0.81	0.27	2.58	2.23
Byoun and Shin (2012)	42	–2.80	1.04	1.16	0.15
Caton and Goh (2003)	489	–0.96	0.15	2.76	7.61
Chan et al. (2011)	1398	–2.06	0.36	2.42	1.28
Chandra and Nayar (1998)	57	–1.01	0.40	2.35	1.06
Choy, Gray, and Ragunathan (2006)	74	–3.41	0.68	1.77	0.37
Chung, Frost, and Kim (2012)	1033	–1.10	0.16	2.75	6.54
Cornell, Landsman, and Shapiro (1989)	205	–1.27	0.33	2.48	1.54
Creighton, Gower, and Richards (2007)	95	–1.30	0.42	2.29	0.93
Di Cesare (2006)	21	–0.60	0.57	1.99	0.52
Dichev and Piotroski (2001)	2940	–1.97	0.17	2.73	5.67
Ederington and Goh (1998)	494	–1.29	0.22	2.67	3.54
Elayan, Hsu, and Meyer (2003)	34	–2.28	0.43	2.28	0.91
Elayan, Maris, and Maris (1990)	187	–0.20	0.17	2.74	6.12
Elayan, Maris, and Young (1996)	26	–1.44	0.76	1.61	0.29
Followill and Martell (1997)	35	–1.39	0.49	2.16	0.70
Glascock, Davidson, and Henderson (1987)	93	–0.39	0.18	2.72	5.08

(*Continued*)

TABLE 3. (Continued)

Study	Number	CAR, %	Standard Error	% Weight (Random-effects)	% Weight (Fixed-effects)
Goh and Ederington (1993)	243	–0.76	0.21	2.68	3.77
Goh and Ederington (1999)	483	–1.21	0.20	2.70	4.37
Gropp and Richards (2001)	66	–1.02	0.58	1.96	0.50
Han et al. (2009)	501	–1.16	0.33	2.49	1.57
Hand, Holthausen, and Leftwich (1992)	205	–1.12	0.62	1.89	0.44
Holthausen and Leftwich (1986)	402	–2.66	0.21	2.68	3.70
Hsueh and Liu (1992)	270	–1.17	0.30	2.54	1.87
Hu, Kaspereit, and Prokop (2016)	3337	–1.32	0.15	2.76	7.34
Hundt, Sprungk, and Horsch (2017)	129	–0.97	0.50	2.13	0.67
Jorion and Zhang (2007)	1195	–4.43	0.45	2.25	0.84
Jorion and Zhang (2010)	679	–1.70	0.49	2.16	0.70
Li, Shin, and Moore (2006)	1065	–1.71	0.16	2.75	6.74
Li, Visaltanachoti, and Kesayan (2004)	19	0.50	3.57	0.16	0.01
May (2010)	401	–1.68	0.39	2.36	1.09
Meyer, Hsu, and Elayan (2006)	121	–3.07	0.59	1.95	0.48
Nayar and Rozeff (1994)	44	–0.97	0.44	2.26	0.87
Norden and Weber (2004)	68	–0.43	0.29	2.55	1.95
Poon and Chan (2008)	39	–0.59	0.43	2.27	0.89
Purda (2007)	1695	–3.57	0.17	2.74	5.88
Schweitzer, Szewczyk, and Varma (1992)	47	–1.66	0.34	2.46	1.45
Schweitzer, Szewczyk, and Varma (2001)	39	–2.85	0.42	2.29	0.93
Yang et al. (2017)	380	–2.48	0.57	1.99	0.52

(*Continued*)

TABLE 3. (Continued)

Study	Number	CAR, %	Standard Error	% Weight (Random-effects)	% Weight (Fixed-effects)
Overall CAR (Fixed-Effects Model)		–1.42***			100.00
Overall CAR (Random-Effects Model)		–1.58***		100.00	

Note: This table provides results of the meta-analysis of the studies of stock price reaction to bond downgrades. CAR represents stock cumulative abnormal return following an announcement of bond downgrades. Standard Error is the standard deviation of reported CAR. The number represents the sample size; %Weight represents relative weight of each study in the meta-analysis. ***- indicates statistical significance at the 1% level.

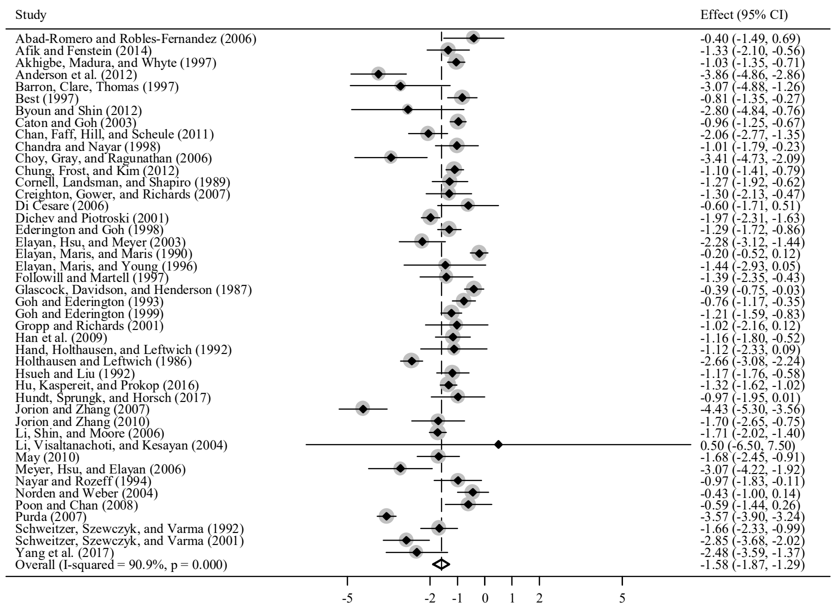

FIGURE 1.— Forest plot of CARs reported in bond downgrade studies

Note: This figure reports point estimates (black diamonds) and 95% confidence intervals (black horizontal lines) for the CARs (effect sizes) reported in the primary studies as well as the weighted average stock cumulative abnormal return (summary effect) associated with the bond downgrade announcements. Calculation of the weighted-average cumulative abnormal return is based on weights from the random-effects DerSimonian-Laird (1986) estimator. The areas of the shaded circles indicate the weights of each study. The vertical dashed line represents the size of the summary effect and the white diamond at the bottom of the figure represents its 95% confidence interval.

influenced bond rating announcement informativeness, the studies were separated into two sub-samples depending on whether they used announcements from before or after *Regulation FD* implementation date of October 2000. The average CAR associated with the bond downgrades (untabulated) for the pre-*Regulation FD* studies is –1.62% and for the post-*Regulation FD* studies is –1.01; both numbers are significant at the 1% level.

The summary effects for the bond upgrades studies are presented in table 4.

The estimate of an average stock price reaction to the bond upgrade announcements calculated with the random-effects model is equal to

TABLE 4. Meta-analysis results for studies reporting CARs associated with bond upgrade announcements

Study	Number	CAR, %	Standard Error	% Weight (Random-effects)	% Weight (Fixed-effects)
Abad-Romero and Robles-Fernandez (2006)	34	0.10	0.35	3.04	0.56
Afik and Fenstein (2014)	21	–0.58	0.41	2.74	0.42
Akhigbe, Madura, and Whyte (1997)	184	–0.01	0.03	4.49	54.08
Anderson et al. (2012)	486	0.24	0.22	3.80	1.45
Barron, Clare, Thomas (1997)	9	0.29	0.66	1.28	0.11
Best (1997)	44	0.81	0.33	2.79	0.44
Byoun and Shin (2012)	18	1.30	1.02	0.64	0.04
Choy, Gray, and Ragunathan (2006)	25	0.99	1.71	0.25	0.02
Chung, Frost, and Kim (2012)	542	0.80	0.16	4.10	2.69
Cornell, Landsman, and Shapiro (1989)	116	0.62	0.30	3.32	0.76
Creighton, Gower, and Richards (2007)	46	1.10	0.71	1.15	0.09
Di Cesare (2006)	31	1.20	0.44	2.60	0.37
Dichev and Piotroski (2001)	1787	0.48	0.08	4.40	10.35
Ederington and Goh (1998)	310	0.05	0.24	3.39	0.83
Elayan, Hsu, and Meyer (2003)	27	1.92	0.41	2.27	0.28
Elayan, Maris, and Maris (1990)	54	0.07	0.10	4.26	4.55
Elayan, Maris, and Young (1996)	9	–0.67	1.72	0.25	0.02
Glascock, Davidson, and Henderson (1987)	69	0.03	0.27	2.42	0.31
Goh and Ederington (1993)	185	–0.04	0.15	3.97	1.98
Goh and Ederington (1999)	312	0.10	0.16	3.94	1.86
Gropp and Richards (2001)	37	–0.02	1.00	0.92	0.07
Han et al. (2009)	673	0.02	0.14	4.18	3.44

(Continued)

TABLE 4. (Continued)

Study	Number	CAR, %	Standard Error	% Weight (Random-effects)	% Weight (Fixed-effects)
Hand, Holthausen, and Leftwich (1992)	66	–0.07	0.44	2.14	0.24
Holthausen and Leftwich (1986)	235	0.08	0.17	3.88	1.68
Hsueh and Liu (1992)	138	0.68	0.27	3.16	0.64
Hundt, Sprungk, and Horsch (2017)	102	0.47	0.85	1.18	0.10
Jorion and Zhang (2007)	361	0.31	0.17	4.05	2.39
Jorion and Zhang (2010)	473	0.12	0.13	4.12	2.87
Li, Shin, and Moore (2006)	232	0.28	0.33	3.20	0.66
Li, Visaltanachoti, and Kesayan (2004)	9	–2.08	2.63	0.16	0.01
May (2010)	263	0.17	0.15	3.99	2.07
Meyer, Hsu, and Elayan (2006)	68	0.14	0.45	2.51	0.34
Nayar and Rozeff (1994)	28	0.53	0.61	1.85	0.19
Purda (2007)	886	–0.03	0.18	4.03	2.25
Schweitzer, Szewczyk, and Varma (1992)	18	1.12	0.54	1.66	0.16
Yang et al. (2017)	583	0.60	0.20	3.89	1.70
Overall CAR (Fixed-Effects Model)		0.13***			100.00
Overall CAR (Random-Effects Model)		0.31***		100.00	

Note: This table provides results of the meta-analysis of the studies of stock price reaction to bond upgrades. CAR represents the stock cumulative abnormal return following an announcement of bond downgrades. Standard Error is the standard deviation of reported CAR. The number represents the sample size; %Weight represents relative weight of each study in the meta-analysis. ***- indicates statistical significance at the 1% level.

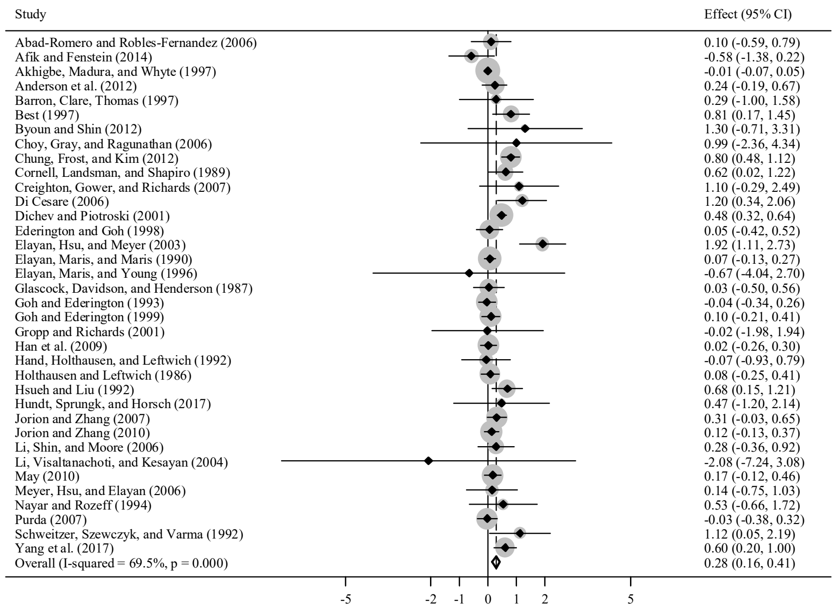

FIGURE 2.— Forest plot of CARs reported in bond upgrade studies

Note: This figure reports point estimates (black diamonds) and 95% confidence intervals (black horizontal lines) for CARs (effect sizes) reported in the primary studies as well as the weighted average stock cumulative abnormal return (summary effect) associated with the bond upgrade announcements. Calculation of the weighted-average cumulative abnormal return is based on the weights from the random-effects DerSimonian-Laird (1986) estimator. The areas of the shaded circles indicate the weights of each study. The vertical dashed line represents the size of the summary effect and the white diamond at the bottom of the figure represents its 95% confidence interval.

0.31% and is statistically different from zero at the 1% level. For comparison, the fixed-effects model average CAR associated with the bond upgrades is equal to 0.13% and is also significant at the 1% level. The average CARs associated with the upgrade announcements from the before (after) *Regulation FD* implementation period are 0.27% (0.60%).

The forest plot of the meta-analysis results of the bond upgrade announcement studies is exhibited in figure 2.

The standard error of the CARs reported in the upgrade studies is smaller than the standard error of the CARs reported in the downgrade studies; the 95% confidence interval for the upgrade studies summary effect stretches from 0.16% to 0.41%. While the I^2 measure is lower for the upgrades (69.5%) than for the downgrades, it still indicates significant heterogeneity among the individual study results and reiterates the need to analyze factors that may influence the size of the abnormal returns.

The mean daily abnormal return associated with the bond upgrades (untabulated) is statistically significant 0.086%. The I^2 value of 19.4% for the upgrade *DAR*s indicates that the daily abnormal returns associated with the bond upgrades are less heterogeneous than the cumulative abnormal returns associated with the bond upgrades.

While the meta-analysis allows for accurate calculation of the mean stock price reaction to the bond rating announcements using the results reported in individual studies, it is possible that the selected studies are a biased sample of all relevant studies as the analysis excludes results reported in unpublished studies. Also, papers published in top-tier publications may be subject to more scrutiny from their expert referees. This may cause authors to perform elaborate robustness checks and analysis which, ultimately, may provide results that differ in magnitude and statistical significance from the results of studies that are either unpublished or published in lower-tier journals. To test this hypothesis, a dummy variable for studies published in the Top 4 Finance journals is introduced to the meta-regressions.[15]

The meta-regression analysis is performed to identify factors that affect the size of stock price reaction to the rating announcements. Since the level of heterogeneity in the daily abnormal returns is significantly lower than the level of heterogeneity of the cumulative abnormal returns, the mean daily abnormal return is used as a dependent variable in the meta-regressions.

Considering that many studies may be using the same observations in their samples, the analysis may be affected by the overlapping samples problem. To alleviate this problem, the full sample results are not used in the regressions whenever a study reports CARs for a full sample and for subsamples. The regression models are estimated using a weighted GLS estimation with square roots of the sample sizes as the weights and use the robust standard errors.

The results of the meta-regressions for the bond downgrades studies and for the bond upgrades studies are displayed in table 5 with the results for the bond downgrades presented in Models 1-3 in Panel A and the results for the bond upgrades are presented in Models 4-6 in Panel B.

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15. A visual inspection of the funnel plots of the standard errors of abnormal returns reported in the primary studies was performed as a robustness check. Assymetry of the funnel plots confirmed potential presence of the publication bias in both downgrade and upgrade samples.

TABLE 5. Meta-regression results for bond downgrade and upgrade announcements

	A. Bond Downgrades			B. Bond Upgrades		
	(1)	(2)	(3)	(4)	(5)	(6)
US	–0.9839***	–1.6231***	–1.6111***	–0.0622*	–0.0453	–0.0449
	(0.19)	(0.07)	(0.07)	(0.04)	(0.04)	(0.04)
Top	0.4767***	0.4992***	0.4923***	0.0791***	0.0884***	0.0877***
	(0.11)	(0.15)	(0.15)	(0.03)	(0.03)	(0.03)
Regulation FD	0.2045	0.5964**	0.5878**	0.0124	0.0217	0.0222
	(0.23)	(0.26)	(0.26)	(0.02)	(0.02)	(0.02)
High		0.8051	0.7977		0.0003	0.0057
		(1.04)	(1.03)		(0.18)	(0.18)
Financial		0.0243			–0.1656	
		(2.28)			(0.19)	
Leverage		0.3602			0.0000	
		(5.60)			(0.00)	
Junk		–0.6628***	–0.6763***		0.0858*	0.0869*
		(0.02)	(0.02)		(0.05)	(0.05)
Across-class		0.0527	0.0444		0.3113***	0.3158***
		(0.35)	(0.34)		(0.11)	(0.11)
Watch		–0.4213	–0.4197		0.2095	0.2150
		(3.42)	(3.37)		(0.27)	(0.27)
Short-term debt		1.0391	1.0310		–0.3266	–0.3224
		(2.80)	(2.75)		(0.35)	(0.35)

(*Continued*)

TABLE 5. (Continued)

	A. Bond Downgrades			B. Bond Upgrades		
	(1)	(2)	(3)	(4)	(5)	(6)
Contaminated		–0.5382	–0.5374		0.1353	0.1359
		(1.24)	(1.22)		(0.08)	(0.08)
Three-day window	–0.5845***	–1.1190***	–1.1095***	–0.0564	–0.0259	–0.0185
	(0.11)	(0.06)	(0.0603)	(0.05)	(0.05)	(0.05)
Other window	0.4220	0.2288	0.2286	–0.0969	–0.0494	–0.0414
	(2.60)	(3.32)	(3.2689)	(0.32)	(0.31)	(0.31)
Constant	0.0920	0.7386***	0.7303***	0.1628***	0.1058*	0.0976*
	(0.20)	(0.09)	(0.0881)	(0.05)	(0.05)	(0.05)
Observations	226	226	226	155	155	155
R^2	0.61	0.92	0.93	0.08	0.19	0.19

Note: The dependent variables in these meta-regressions are the mean daily abnormal returns (*DAR*, %) reported in 226 sub-samples of data in 53 published studies on the wealth effects of bond downgrade announcements (Panel A) and 155 sub-samples of data in 43 published studies on the wealth effects of bond upgrade announcements (Panel B). The independent variables are: *US* (=1 for sub-samples in studies using the US data, =0 otherwise), *Top* (=1 for sub-samples in studies published in Top 4 Finance journals, i.e. Journal of Finance, Journal of Financial Economics, Review of Financial Studies, Journal of Financial and Quantitative Analysis, =0 otherwise), *Regulation FD* (=1 for US sub-samples with rating announcements following implementation of the Regulation Fair Disclosure in October 2000, =0 otherwise), *High* (=1 for sub-samples with highly anticipated rating announcements, =0 otherwise), *Financial* (=1 for sub-samples where rating change is related to company's financial situation, =0 otherwise), *Leverage* (=1 for sub-samples where rating change is related to changes in firm's capital structure, =0 otherwise), *Junk* (=1 for sub-samples with speculative-grade bonds, =0 otherwise), *Across-class* (=1 for sub-samples where rating change announcement moved new rating to different rating class , =0 otherwise), *Watch* (=1 for sub-samples with credit watch announcements =0 for actual rating change announcements), *Short-term debt* (=1 for sub-samples with short-term bond rating change announcements, =0 otherwise), *Contaminated* (=1 for sub-sample with announcements that were not decontaminated from other company-related events around event window, =0 otherwise), *Three-day window* (=1 for sub-samples with 3-day event windows, =0 otherwise), *Other window* (=1 for sub-samples with event windows other then 2-day or 3-day windows, =0 otherwise) The regressions models are weighted GLS regressions using the square roots of the sample sizes as weights. Robust standard errors are reported in parentheses. *, **, ***- indicate statistical significance at the 10%, 5%, and 1% levels respectively.

The dependent variable in Models 1-3 is the mean daily abnormal return reported in 226 sub-samples in 53 studies on the wealth effects of bond downgrade announcements.[16] The coefficient of *US* is negative and statistically significant at the 1% level in all model specifications indicating that the US downgrade announcements are associated with more negative abnormal stock returns around the downgrade announcement dates than the non-US downgrade announcements. The coefficient of *Top* is positive and statistically significant pointing to significant differences between the abnormal returns reported in the papers published in the Top 4 Finance journals and the ones published in other scholarly outlets. The coefficient of *Regulation FD* is also positive and statistically significant in Models 2-3. This may indicate that the implementation of the *Regulation FD* in the US in October 2000 have affected the information content of the US downgrade announcements. Contrary to the conclusions of Jorion, Liu, and Shi (2005) who found that the US downgrades announced during 2001-2002 were associated with more negative abnormal returns than the US downgrades announced during 1998-2000, the results suggest that the US downgrade announcements made after the *Regulation FD* implementation are associated with less negative abnormal returns. The sample, however, includes the announcements from 2001-2015 and the results, therefore, can be influenced by the effects of the financial crisis of 2007-2008 or other regulatory changes. Adding the independent variables that assess other bond announcement characteristics significantly improves the explanatory power of the regressions. The R-squared increases from 61% in Model 1 to 92% in Model 2 and 93% in Model 3. The added independent variables are used to test several economic theories that may potentially explain stock price reaction to bond rating changes, such as the efficient market hypothesis, the asymmetric information theory, and the trade-off capital structure theory.

It should be noted that the additional independent variables added to the augmented regression Model 2 and Model 3 are qualitatively different from the independent variables used in the short regression Model 1. Specifically, the country, the study period, the event window, and the journal of publication apply to all sub-samples reported in each study. On the contrary, the remaining independent variables are based

16. As a robustness check, the meta-regression analysis was performed using only a sub-sample of studies with 2-day or 3-day event windows. However, the estimation results were very similar to the presented results. Detailed results are available from the author on request.

on the data characteristics that may only be applicable to certain sub-samples. This may cause the regression results to underestimate the true relationships between these independent variables and the dependent variable.[17]

The statistically insignificant coefficients of *High* in Model 2 and Model 3 indicate that the measures of the downgrade announcements anticipation used in the studies do not tend to explain variation in the stock daily abnormal returns following the bond downgrade announcements.[18]

The regression results indicate that the downgrades triggered by deterioration of the company's financial situation or changes in the firm's capital structure are associated with similar abnormal returns as the downgrades caused by other reasons. This result belies the findings of Graham (2000) who argues that most firms are under-levered and would benefit from issuing more debt.

Interestingly, contrary to Holthausen and Leftwich (1986) who found that the across-class downgrades were associated with more negative abnormal returns because of their larger information content, the effect of the across-class downgrades in this study is similar to the effect of the within-class downgrades.

The findings indicate that stocks react more negatively to downgrades of speculative-grade bonds. This finding is consistent across Model 2 and Model 3 specifications. This result may be explained by the higher opacity of the firms with low-rated debt which makes their downgrade announcements more surprising. Alternatively, the more negative stock price reaction to the speculative-grade bond downgrades can be explained by the larger differences in yields between adjacent ratings for the lower-rated bonds. Thus, downgrades of the

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17. For example, a study may report results for a full sample of investment-grade and speculative-grade rating announcements and separately for a sub-sample of speculative-grade bond announcements. For the sub-sample the value of the dummy variable *Junk* would be set equal to 1. For the full sample, the value of *Junk* would be set equal to 0. Results of the regression analysis may find the coefficient of *Junk* to be small and/or insignificant indicating that abnormal returns caused by speculative-grade bond rating announcements do not differ form abnormal returns caused by investment-grade bond rating changes. However, since the full sample may contain some speculative-grade announcements, one is not comparing speculative-grade announcements to investment-grade announcements but rather to a mix of investment-grade and speculative grade announcements.

18. At the recommendation of the anonymous referee, a robustness check was performed where a measure of firm opacity was used instead of a measure of a degree of announcement anticipation. The findings from the robustness check did not materially differ from the findings presented in this paper. Detailed results are available from the author upon request.

same magnitude would affect the firm's cost of capital and its equity value more if it had lower-rated bonds outstanding than if it issued higher-rated bonds (Goh and Ederington, 1999).

The results indicate that the short-term bond downgrades are associated with similar negative abnormal stock returns as the long-term debt downgrades. Also, the findings demonstrate that there is no difference in the stock market reaction reported in the contaminated and the non-contaminated samples or in the stock market reaction to the credit watch announcements as compared to the rating change announcements. Finally, the daily abnormal returns are lower in the studies that use three-day event windows than in the studies that report two-day event windows which, in turn, have similar daily abnormal returns as studies that use other event windows.[19]

Models 4-6 presented in Panel B use daily abnormal returns calculated from the CARs reported in 155 sub-samples of data in 43 published studies on the wealth effects of bond upgrade announcement as dependent variables. Overall, the explanatory power of the meta-regressions of the bond upgrades is lower than the explanatory power of the bond downgrades regressions. The R-squared for the upgrade models ranges from 8% to 19%.

Model 4 coefficient for *US* is negative and significant at the 10% level which indicates that the US bond upgrades are associated with lower abnormal returns. This may be caused by the higher propensity of the US firms to disseminate positive news, which, in turn, makes their upgrade announcements less informative. However, the regression results of Model 5 and Model 6 establish that the US and the non-US bond upgrade announcements are associated with similar abnormal stock returns.

The daily abnormal returns associated with the bond upgrades reported in the studies published in the Top 4 finance journals tend to be larger than the daily abnormal returns reported in the studies published in other journals. This difference can be partially explained by more frequent use of shorter event windows in the studies published in the Top 4 journals.[20]

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19. Out of 226 sub-samples reporting cumulative abnormal returns associated with bond downgrades, 119 sub-samples reported 2-day event windows, 104 sub-samples reported 3-day event windows, 2 sub-samples reported 1-day event window and 1 sub-sample came from a study with a 7-day event window.

20. Out of 155 sub-samples reporting CARs associated with bond upgrades, 23 sub-samples were reported in papers published in Journal of Finance, Journal of Financial

Upgrades that are triggered by changes in the firm's financial situation or by changes in the firm's leverage and upgrades caused by other reasons are associated with similar positive abnormal returns. The coefficient of *Junk* is positive and statistically significant at the 10% level in Model 5 and Model 6 pointing to higher opacity of the companies issuing speculative grade bonds. The coefficient of *Across* is positive and significant at the 1% level in Model 5 and Model 6, which suggests that larger upgrade announcements are associated with more positive abnormal returns. Finally, the mean daily abnormal returns are not influenced by the choice of an event window.

VI. Conclusions

The meta-analysis based on the extensive review of 53 event studies of the wealth effects of bond rating announcements published in peer-reviewed journals indicates that bond downgrade announcements are associated with negative and statistically significant mean cumulative abnormal stock return of –1.64% around the announcement dates. This result confirms findings of multiple previous studies. Bond upgrade announcements, on the other hand, are associated with positive and statistically significant mean cumulative abnormal return of 0.28%. The mean abnormal return associated with the bond upgrade announcements is positive and statistically significant even after accounting for different announcement windows used in the primary studies. This finding contradicts the results of several previous studies that found no statistically significant stock price reaction to bond upgrades.

The stock market reaction to the bond rating announcements confirms the hypothesis that rating agencies possess private information about bond issues and that the announcements reveal information not previously known to investors. The larger stock price reaction associated with the downgrade announcements can be viewed as the evidence of their higher information content.

Further analysis shows that stock prices are more volatile around the downgrade announcements than around the upgrade announcements. The results of the heterogeneity tests suggest that true abnormal returns

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Economics, Review of Financial Studies, and Journal of Financial and Quantitative Analysis and 14 of these sub-samples (61%) used 1- or 2-day event windows. Out of the remaining 132 sub-samples 58(44%) used 1- or 2-day event windows.

vary substantially from study to study. The variation in reported abnormal returns is caused by the differences in bond characteristics as well as by the differences in methodological assumptions used by the primary studies. The heterogeneity in daily abnormal returns is significantly lower which makes them a better measure for the meta-regression analysis.

The meta-regression analysis reveals certain bond characteristics that have significant effect on the size of the abnormal returns. First, both bond upgrades and bond downgrades in the US are associated with lower abnormal returns than in other countries. Second, the results published in the top finance journals are statistically different from the results published elsewhere. The findings also indicate that the US downgrades announced after implementation of the *Regulation FD* in October 2000 are associated with less negative abnormal returns. However, these results could be influenced by other major events such as the financial crisis of 2007-2008 and general change in attitude towards the role of rating agencies. The characteristics that make announcements more surprising or more informative, such as the size of an announcement or the initial bond rating also have a significant effect on the stock abnormal returns around the announcement dates. The results of the meta-regression analysis call for a comprehensive study of bond characteristics that could explain the heterogeneity of the stock price reaction to bond rating changes set up in an international context.

Overall, the results of the meta-analysis show that there is a case to study the effects of more recent rating changes, especially upgrades, in both developed and developing markets, which could lead to a better understanding of the costs and the benefits associated with credit rating decisions.

Accepted by: *Prof. P. Theodossiou, PhD, Editor-in-Chief* , *January* 2019

References

(Studies used in the meta-analysis are marked by asterisk.)

Abad-Romero, P., and Robles-Fernandez., M. D. 2006. Risk and return around bond rating changes: New evidence from the Spanish stock market. *Journal of Business Finance and Accounting* 33(5-6): 885-908.*

Abdul Rahim, N.; Goodacre, A.; and Veld, C. 2014. Wealth effects of convertible bond and warrant-bond offerings: a meta-analysis. *The European Journal of Finance* 20(4): 380-398.

Afik, Z.; Fenstein, I.; and Galil, K. 2014. The (un)informative value of credit rating announcements in small markets. *Journal of Financial Stability* 14: 66-80.*

Akhigbe, A.; Madura, J.; and Whyte, A. 1997. Intra-industry effects of bond rating adjustments. *Journal of Financial Research* 20(4): 545-561.*

Alsakka, R.; ap Gwilym, O.; Klusak, P.; and Tran, V. 2015. Market impact under a new regulatory regime: credit rating agencies in Europe. *Economic Notes* 44(2): 275-307.*

Anderson, S.; Bhabra, G.; Bhabra, H.; and Lamba, A. 2012. Do corporate bond rating revisions convey information about earnings and dividend changes? *Corporate Ownership and Control* 9(3): 371-391.*

Barron, M. J.; Clare, A.; and Thomas, S. 1997. The effect of bond rating changes and new ratings on UK stock returns. *Journal of Business Finance and Accounting* 24(3): 497-509.*

Bedendo, M.; Cathcart, L.; and El-Jahel, L. 2018. Reputational shocks and the information content of credit ratings. *Journal of Financial Stability* 34: 44-60.*

Best, R.W. 1997. The role of default risk in determining the market reaction to debt announcements. *The Financial Review* 32(1): 87-105.*

Borenstein, M.; Hedges, L. V.; Higgins, J. P. T.; and Rothstein, H. R. 2009. Introduction to Meta-Analysis. John Wiley & Sons.

Byoun, S., and Shin, Y. S. 2012. Information content of unsolicited credit ratings: evidence from Japanese firms. *Asia-Pacific Journal of Financial Studies* 41 (1): 59-86.*

Caton, G.L., and Goh, J. 2003. Are all rivals affected equally by bond rating downgrades? *Review of Quantitative Finance and Accounting* 20(1): 49-62.*

Chan, H.; Faff, R.; Hill, P.; and Scheule, H. 2011. Are watch procedures a critical informational event in the credit ratings process? An empirical investigation. *Journal of Financial Research* 34: 617-640.*

Chandra, U., and Nayar, N. 1998. The information content of commercial paper rating downgrades: further evidence. *Journal of Accounting, Auditing, and Finance* 13(4): 417-435.*

Choy, E.; Gray, S.; and Ragunathan, V. 2006. Effect of Credit Rating Changes on Australian Stock returns. *Accounting and Finance* 46(5): 755-769.*

Chung, K. H.; Frost, C.A.; and Kim, M. 2012. Characteristics and information value of credit watches. *Financial Management* 41(1): 119-158.*

Cornell, B.; Landsman, W.; and Shapiro, A. 1989. Cross-sectional regularities in the response of stock prices to bond rating changes. *Journal of Accounting, Auditing, and Finance* 4(4): 460-479.*

Creighton, A.; Gower, L.; and Richards, A. J. 2007. The impact of rating changes in Australian financial markets. *Pacific-Basin Finance Journal* 15(1): 1-17.*

Datta, D.K.; Pinches, G.E.; and Narayanan, V.K. 1992. Factors influencing wealth creation from mergers and acquisitions: a meta-analysis. *Strategic Management Journal* 13: 67-84.

DerSimonian, R., and Laird, N. 1986. Meta-analysis in clinical trials. *Controlled Clinical Trials* 7(3): 177-187.

Di Cesare, A. 2006. Do market-based indicators anticipate rating agencies? Evidence for international banks. *Economic Notes* 35(1): 121-150.*

Dichev, I.D., and Piotroski, J.D. 2001. The long-run stock returns following bond ratings changes. *The Journal of Finance* 56(1): 173-203.*

Dimitrov, V.; Palia, D.; and Tang, L. 2015. Impact of the Dodd-Frank act on credit ratings. *Journal of Financial Economics* 115(3): 505-520.*

Ederington, L. H., and Goh, J.C. 1998. Bond rating agencies and stock analysts: Who knows what when? *Journal of Financial and Quantitative Analysis* 33(4): 569-585.*

Elayan, F. A.; Maris, B.A.; and Maris, J.B. 1990. Common stock response to false signal from credit watch placement. *Quarterly Journal of Business and Economics* 29 (Summer): 16-35.*

Elayan, F.A.; Maris, B.A.; and Young, P.J. 1996. The effect of commercial paper rating changes and credit watch placement on common stock prices. *The Financial Review* 31: 149-167.*

Elayan, F.A.; Hsu, W-H.; and Meyer, T.O. 2003. The informational content of credit rating announcements for share prices in a small market. *Journal of Economics and Finance* 27(3): 337-356.*

Followill, R.A., and Martell, T. 1997. Bond review and rating change announcements: an examination of informational value and market efficiency. *Journal of Economics and Finance* 21(2): 75–82.*

Glascock, J.L.; Davidson, W.N. III; and Henderson, G.V. Jr. 1987. Announcement effects of Moody's bond rating changes on equity returns. *Quarterly Journal of Business and Economics* 26: 67-78.*

Goh, J.C., and Ederington, L.H. 1993. Is a bond rating downgrade bad news, good news, or no news for stockholders? *The Journal of Finance* 48(5): 2001-2008.*

Goh, J.C., and Ederington, L.H. 1999. Cross-sectional variation in the stock market reaction to bond rating changes. *The Quarterly Review of Economics and Finance* 39(1): 101-112.*

Graham, J. R. 2000. How big are the tax benefits of debt? *Journal of Finance* 55(5): 1901-1941.

Griffin, P.A., and Sanvicente, A. 1982. Common stock returns and rating changes: a methodological comparison. *The Journal of Finance* 37(1): 103-119.

Gropp, R., and Richards, A.J. 2001. Rating agency actions and the pricing of debt and equity of European banks: what can we infer about private sector monitoring of bank soundness? *Economic Notes* 30(3): 373-398.*

Hamilton, D.T., and Cantor, R. 2004. Rating transition and default rates conditioned on outlooks. *Journal of Fixed Income* 14(2): 54-70.

Han, S.H.; Shin, Y.S.; Reinhart, W.; and Moore, W.T. 2009. Market segmentation effects in corporate credit rating changes: the case of emerging markets. *Journal of Financial Services Research* 35(2): 141-166.*

Hand, J. R. M.; Holthausen, R.W.; and Leftwich, R.W. 1992. The effect of bond rating agency announcements on bond and stock prices. *The Journal of Finance* 47(2): 733-752.*

Heck, J.L.; and Cooley, P. 2009. Most prolific authors in the finance literature: 1959-2008. *SSRN Electronic Journal*. 10.2139/ssrn.1355675.

Higgins, J.P.T., and Thompson, S.G. 2002. Quantifying heterogeneity in a meta-analysis. *Statistics in Medicine* 21(11): 1539-1558.

Holthausen, R.W.; and Leftwich, R.W. 1986. The effect of bond rating changes on common stock prices. *Journal of Financial Economics* 17(1): 57-89.*

Hsueh, L., and Liu, Y. 1992. Market anticipation and the effect of bond rating changes on common stock prices. *Journal of Business Research* 24(3): 225-239.*

Hu, H.; Kaspereit, T.; and Prokop, J. 2016. The information content of issuer rating changes: evidence for the G7 stock markets. *International Review of Financial Analysis* 47(C): 99-108.*

Hundt, S.; Sprungk, B.; and Horsch, A. 2017. The information content of credit ratings: evidence from European convertible bond markets. *The European Journal of Finance* 23(14): 1414-1445.

Jorion, P.; Liu, Z.; and Shi, C. 2005. Informational effects of Regulation FD: evidence from rating agencies. *Journal of Financial Economics* 76(2): 309-330.*

Jorion, P., and Zhang, G. 2007. Information effects of bond rating changes: the role of the rating prior to the announcement. *The Journal of Fixed Income* 16(4): 45-59.*

Jorion, P., and Zhang, G. 2010. Information transfer effects of bond rating downgrades. *The Financial Review* 45(3): 683-706.*

Kim, Y, and Nabar, S. 2007. Bankruptcy probability changes and the differential informativeness of bond upgrades and downgrades. *Journal of Banking and Finance* 31(12): 3843-3861.*

La Porta, R.; Lopez-de-Silanes, F.; Shleifer, A.; and Vishny, R. 1998. Law and Finance. *Journal of Political Economy* 106(6): 1113-1155.

Li, J.; Shin, Y.S.; and Moore, W.T. 2006. Reactions of Japanese markets to changes in credit ratings by global and local agencies. *Journal of Banking and Finance* 30(3): 1007-1021.*

Li, X.H.; Visaltanachoti, N.; and Kesayan, P. 2004. Effects of credit rating announcements: the Swedish stock market. *International Journal of Finance* 16(1): 2872-2891.*

Matolcsy, Z., and Lianto, T. 1995. The incremental information content of bond rating revisions: the Australian evidence. *Journal of Banking and Finance* 19(5): 891-902.*

May, A.D. 2010. The impact of bond rating changes on corporate bond prices: new evidence from the over-the-counter market. *Journal of Banking and Finance* 34(11): 2822-2836.*

Meyer, T.O.; Hsu, W.-H.; and Elayan, F.A. 2006. The valuation effects of bank loan ratings in the presence of multiple monitors. *Journal of Economics and*

Finance 30(3): 325-346.*
Nayar, N., and Rozeff, M.S. 1994. Ratings, commercial paper, and equity returns. *The Journal of Finance* 49(4): 1431-1449.*
Nelson, J.P., and Kennedy, P.E. 2009. The use (and abuse) of meta-analysis in environmental and natural resource economics: an assessment. *Environmental and Resource Economics* 42(3): 345-377.
Norden, L., and Weber, M. 2004. Informational efficiency of credit default swap and stock markets: the impact of credit rating announcements. *Journal of Banking and Finance* 28(11): 2813-2843.*
Poon, W.P.H., and Chan, K.C. 2008. An empirical examination of the informational content of credit ratings in China. *Journal of Business Research* 61(7): 790-797.*
Purda, L.D. 2007. Stock market reaction to anticipated versus surprise rating changes. *Journal of Financial Research* 30(2): 301-320.*
Rothstein, H. R.; Sutton, A.J.; and Borenstein, M. 2005. Publication Bias in Meta-Analysis: Prevention, Assessment, and Adjustments. Chichester, UK: John Wiley & Sons Ltd.
Schweitzer, R.; Szewczyk, S.H.; and Varma, R. 1992. Bond rating agencies and their role in bank market discipline. *Journal of Financial Services Research* 6(3): 249-263.*
Schweitzer, R.; Szewczyk, S.H.; and Varma, R. 2001. The effect of bank debt downgrades on stock prices of other banks. *The Financial Review* 36: 139-156.*
Shi, J.; Wang, J.; and Zhang, T. 2017. Are short sellers informed? Evidence from credit rating agency announcements. *The Journal of Financial Research* 40(2): 179-221.*
Sterne J.A.C., and Egger, M. 2001. Funnel plots for detecting bias in meta-analysis: guidelines on choice of axis. *Journal of Clinical Epidemiology* 54(10):1046-1055.
Taib, H.M.; Di Iorio, A.; Hallahan, T.A.; and Bissoondoyal, B. 2009. The share price reaction during corporate bond rating revision. *Journal of Business and Policy Research* 4(2): 170-188.*
Veld, C.; Verwijmeren, P., and Zabolotnyuk, Y. 2019. Wealth effects of seasoned equity offerings: a meta-analysis. *International Review of Finance* (forthcoming).
Wansley, J.W., and Clauretie, T.M. 1985. The impact of CreditWatch placement on equity returns and bond prices. *The Journal of Financial Research* 8(1): 31-42.*
Weinstein, M. 1977. The effect of a rating change announcement on bond price. *Journal of Financial Economics* 5(3): 329-350.
Yang, H.; Ahn, H.-J.; Kim, M. H.; and Ryu, D. 2017. Information asymmetry and investor trading behavior around bond rating change announcements. *Emerging Markets Review* 32(C): 38-51.*