

The Joint Effect of the Sarbanes-Oxley Act and Earnings Management on Credit Ratings

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I examine whether a joint relationship exists among the Sarbanes-Oxley Act (SOX), earnings management, and credit ratings. Specifically, I investigate whether earnings management in the SOX period affects credit ratings. Differences-in-differences OLS regressions indicate that income-decreasing accruals in the SOX period are associated with higher short-term credit ratings compared to control firms. Also, income-increasing accruals in the SOX period are associated with lower short-term credit ratings compared to control firms. For long-term credit ratings, the joint effect of SOX and earnings management is null.

INTRODUCTION

A firm's credit rating is an important part of its information profile. Diamond (1989) and Kisgen and Strahan (2010) suggest that a firm with a low credit rating will have a high cost of borrowing, which typically reduces firm value. The reason is that a high cost of borrowing will prompt many firms to pass up growth projects, especially if those firms have reached their borrowing limit and do not wish to lower their market value by issuing equity to finance those projects (Myers and Majluf, 1984). Further underscoring the importance of credit ratings, Graham and Harvey (2001) report that credit ratings are the second-highest priority of CFOs when determining capital structure. Moreover, Kisgen (2009) suggests that managers appear to pursue credit ratings instead of capital structure.

For these reasons, a greater understanding of the factors that affect firms' credit ratings is important. Recent research finds a relationship between corporate governance, of which the Sarbanes-Oxley Act (SOX) is an example, and credit ratings (e.g., Ashbaugh-Skaife, Collins, and Lafond, 2006; Cheng and Neamtiu, 2009; Alp, 2013). Recent research also documents a relationship between earnings management and credit ratings (e.g., Jorion, Shi, and Zhang, 2009; Demirtas and Cornaggia, 2012; Jung, Soderstrom, and Yang, 2013). However, no study examines a potentially joint relationship among SOX, earnings management, and credit ratings.

In this paper, I examine this potentially joint relationship. Specifically, I investigate the way that earnings management in the SOX era affects credit ratings. The impact of earnings management on credit ratings in the SOX era cannot be inferred from existing research. On one hand, Akhigbe, Martin, and Newman (2008) find that SOX is associated with the release of bad news and with greater risk. To facilitate the reporting of smooth earnings after SOX, Graham, Harvey, and Rajgopal (2005) and Cohen, Dey, and Lys (2008) find that managers switch from accrual-based to real earnings management since the latter is more difficult to detect. The use of real earnings management implies that earnings will likely be smoother than before SOX. Smoother earnings will likely lead to higher credit ratings because rating

agencies base their rating decisions partly on firms' reported financial statements. On the other hand, some authors (e.g., Ashbaugh-Skaife, Collins, Kinney, and Lafond, 2009) find that SOX meets its objective of reducing earnings management, meaning that earnings are less smooth in the SOX era. Less smooth earnings will lead to greater uncertainty about firms' creditworthiness and, thus, lower credit ratings. Thus, the literature is divided as to the directional effect of earnings management on credit ratings in the SOX era. The goal of this paper is to document that effect.

To investigate the joint effect of SOX and earnings management on credit ratings, I use differences-in-differences OLS regression analysis. This technique is relevant because the sample used in this study consists of firms that are not subject to SOX as well as firms that are subject to SOX. Also, this technique is powerful in that it captures the effect of events that occurred around the passage of SOX but that are not controlled for in the regression model. In this analysis, firms that are headquartered in Canada and listed on a Canadian exchange are not subject to SOX and are considered control firms. Test firms include firms listed in the U.S., whether based in the U.S. or Canada. I further segment the test firms into two subsamples. One subsample consists of U.S. firms that are listed in the U.S., while the second sample consists of Canadian firms that are cross-listed in the U.S.

I find that a joint relationship exists among SOX, earnings management, and short-term credit ratings but not long-term credit ratings. The two specific findings are as follows. First, differences-in-differences regression results indicate that, compared to control firms, test firms that manage earnings downward in the SOX era have higher short-term credit ratings. This result is consistent with the idea that many managers in the SOX period switch from accrual-based to real earnings management, which is more difficult to detect (Graham, Harvey, and Rajgopal, 2005; Cohen, Dey, and Lys, 2008), possibly to smooth the bad news associated with SOX (Akhigbe, Martin, and Newman, 2008). This result is also consistent with the idea that managers manage earnings to improve (Jung, Soderstrom, and Yang, 2013) their firms' credit ratings. Second, compared to control firms, test firms that manage earnings upward after SOX have lower short-term credit ratings. This result is consistent with the idea that strong earnings management leads to less clear earnings and a higher cost of borrowing (Barth, Konchitchki, and Landsman, 2013), both of which will likely prompt credit rating agencies to lower firms' credit ratings. This result is also consistent with the aforementioned literature that suggests that credit ratings will be lower in the SOX era, possibly due to reputational concerns (Covitz and Harrison, 2003).

This study is similar to Cheng and Neamtiu (2009), who examine whether credit rating agencies improve the timeliness and accuracy of credit ratings in the SOX period. They find that, after SOX, credit rating agencies publish ratings faster and more closely agree on ratings. However, Cheng and Neamtiu (2009) do not document the direction of change in credit ratings after SOX. This phenomenon is investigated and documented in this paper. Also, this paper is similar to Alp (2013). Alp (2013) finds that credit rating standards are stiffer after SOX compared to before SOX, as the average firm experiences a rating downgrade of 1.5 levels after SOX. However, Alp (2013) does not examine the potential impact of earnings management on credit ratings after SOX. I investigate this issue in this paper.

This study adds to the literature on SOX (e.g., Akhigbe, Martin, and Newman, 2008; Johnston and Madura, 2009; Byun and Roland-Luttecke, 2014), earnings management (e.g., Banko, Frye, Wang, and White, 2013; Caton, Chiyachantana, Chua, and Goh, 2011; Das, Hong, and Kim, 2013; Hong, Huseynov, and Zhang, 2014; Kuang, Qin, and Wielhouwer, 2014), and credit ratings (e.g., Kisgen, 2006; Kisgen, 2009; Gul and Goodwin, 2010; Alissa, Bonsall, Koharki, and Penn, 2013; Chan, Hsu, and Lee, 2013; Jung, Soderstrom, and Yang, 2013; Kemper and Rao, 2013; Bowe and Larik, 2014). This analysis also extends Gul and Goodwin (2010) by examining joint interactions among three important phenomena. Although Gul and Goodwin (2010, p. 907) mention credit ratings, earnings management, and debt maturity (not SOX), they cannot list all joint relationships that need to be examined. In this paper, I examine the joint relationship that includes two of the variables that they mention (i.e., credit ratings and earnings management) and a third variable, SOX, that has undoubtedly altered the financial reporting environment.

The remainder of this paper is organized as follows. In the next section, I review the recent literature relevant to this study and develop the hypothesis to be tested. The section after that contains a description

of the data used in this study. Following the data description, I discuss the methods used to conduct this study. The results of the main analysis and robustness tests are then presented, followed by the conclusion.

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

A complete literature review is quite voluminous and is beyond the scope of this paper. Thus, I review only the most recent and closely-related papers. The main takeaway of this section is that, while various papers document a relationship between corporate governance (including SOX) and credit ratings as well as between earnings management and credit ratings, no study investigates a possible joint relationship among all three phenomena. This paper fills that gap in the literature and, in this way, complements the papers reviewed below.

Corporate Governance and Credit Ratings

Corporate Governance and Lower Credit Ratings

Akhigbe, Martin, and Newman (2008) argue that SOX requires managers to disclose bad news about their firms. This result implies that, although the information environment is enriched, it contains larger amounts of bad news, leading to higher idiosyncratic risk and a greater likelihood that firms will not be able to repay their debt. As a result, rating agencies will lower firms' credit ratings. Gao (2010) shows that the increased disclosure associated with any ruling could lead to a higher cost of capital. Although Gao (2010) does not specifically address SOX, his findings apply to SOX because SOX is a ruling that is shown to increase transparency. Gao's (2010) result, combined with the release of bad news surrounding SOX (Akhigbe, Martin, and Newman, 2008, Ashbaugh-Skaife, Collins, and Lafond, 2009), suggests that the higher cost of capital associated with SOX will lead to overall lower credit ratings.

Also, credit ratings will be lower in the SOX era if rating agencies suspend regulatory arbitrage to protect their reputations as effective monitors in the debt markets. Cornaggia and Cornaggia (2011) argue that credit rating agencies engage in regulatory arbitrage, which occurs when rating agencies deliberately refrain from publishing rating downgrades so that select investors, who know that actual credit ratings are lower than publicized, can profit by selling the bonds at higher prices before rating agencies publish the lower ratings. Since credit rating agencies are active monitors and are privy to information that equity analysts cannot access firsthand due to Regulation Fair Disclosure (Reg FD), rating agencies are likely aware of the true creditworthiness of the firms that they rate. Thus, rating agencies will not be able to effectively argue that they were misled by the information that they received from the companies that they rate because doing so would tarnish their reputations as prudent monitors. As a result, credit rating agencies will lower credit ratings to protect their credibility. This reputation-based argument is consistent with Covitz and Harrison (2003), who show that credit rating agencies downgrade credit ratings largely to preserve their reputation capital. This argument is also consistent with Cantor and Packer (1996) and Smith and Walter (2001), who find that a rating agency's reputation plays an important role in attracting clients.

In addition, Hermalin and Weisbach (2013) find that an optimal level of disclosure exists. Thus, beyond that level, disclosure can decrease firm value, largely due to managerial reluctance to take on risky growth projects. Consistent with this notion, Goel and Thakor (2008) predict that, although SOX will increase the precision of information available to investors, the Act will lead to suboptimal investment. These results, combined with greater firm-specific risk associated with SOX (Akhigbe, Martin, and Newman, 2008), suggests that firms will have lower and riskier profit and cash levels. This situation will lead to lower credit ratings. Furthermore, Alp (2013) finds that credit rating standards are stiffer after SOX compared to before SOX, as the average firm experiences a rating downgrade of 1.5 levels after SOX. This result implies lower credit ratings.

Corporate Governance and Higher Credit Ratings

Other authors imply that credit ratings will be higher in the SOX era. If the short-term financial concerns of credit rating agencies overshadow the reputational damage that they expect to incur from mis-rating companies, credit ratings will be higher than warranted. This situation is possible because Ederington and Yawitz (1987) estimate that 80 percent of a rating agency's revenue comes from the firms that it rates.

Bolton, Freixas, and Shapiro (2010) write that (1) a firm that seeks a credit rating pays the rating agency only if the former firm is satisfied with its credit rating and that (2) the firm can seek the services of a second rating agency if it is not satisfied with its rating from the first agency. Managers are likely in the SOX era to continue this practice of shopping around for favorable credit ratings because they may rationally expect Congress to pass measures to protect investors in the wake of fraud (Bond, Goldstein, and Prescott 2010) even though the measures require managers to reveal bad news (Akhigbe, Martin, and Newman, 2008). As a result, credit rating agencies will still be pressured to overlook negative information and offer higher ratings even when lower ratings are appropriate. In addition, Becker and Milbourn (2011) examine the impact of increased competition in the credit ratings industry on credit ratings. They find that, after Fitch enters the credit ratings business, joining Moody's and Standard and Poor's, credit ratings typically rise but do not accurately reflect firm quality. Ashbaugh-Skaife, Collins, and Lafond (2006) find that strong corporate governance, as measured by higher accruals quality, is associated with higher credit ratings.

Other Corporate Governance and Credit Ratings

Cheng and Neamtiu (2009) examine the behavior of credit rating agencies after SOX compared to before SOX. They find that, after SOX, credit rating agencies improve the timeliness and accuracy of credit ratings. Cheng and Neamtiu (2009) find that, in the post-SOX period, rating agencies publish ratings faster and more closely agree on ratings. More accurate ratings can result in either rating upgrades or downgrades.

Earnings Management and Credit Ratings

Graham, Harvey, and Rajgopal (2008) find that banks tighten loan terms to firms that restate earnings because of prior mis-reporting. Since credit rating agencies are active monitors just like banks, they are likely to follow suit and lower the credit rating of firms that aggressively manage earnings. Jorion, Shi, and Zhang (2009) disentangle two reasons that credit rating levels of U.S. corporations appear to fall over a 20-year period. One reason, put forth by Blume, Lim, and MacKinlay (1998), is that credit rating agencies tighten their rating standards. Another reason is that the creditworthiness of U.S. corporations genuinely falls over that 20-year period. Before including earnings quality in their analysis, Jorion, Shi, and Zhang (2009) find that the declining credit rating levels reported by Blume, Kim, and MacKinlay (1998) apply only to investment-grade firms. However, after including earnings quality in their analysis, Jorion, Shi, and Zhang (2009) find that credit rating agencies do not seem to have tightened their rating standards.

Graham, Harvey, and Rajgopal (2005) and Cohen, Dey, and Lys (2008) find increased use of real earnings management, which is more difficult to detect than accrual-based earnings management, in the SOX era. Thus, real earnings management can lead to financial statements that enhance or smooth earnings although the statements are actually less accurate than before SOX, leading to higher credit ratings. In addition, managers are shown to have incentives to manage earnings. Demirtas and Cornaggia (2012) find that managers manage earnings so that their firms can receive favorable credit ratings, and Jung, Soderstrom, and Yang (2013) find that managers manage earnings to maintain or improve their firms' credit ratings. If credit rating agencies cannot quickly and accurately detect earnings management, whether accrual- or real-based, they are likely to increase credit ratings when they should lower ratings.

Section Summary and Hypothesis

As the sub-sections above show, pairwise relationships of corporate governance and earnings management, earnings management and credit ratings, and corporate governance and credit ratings exist. Stated differently, the literature that examines any two of these topics does not examine the third topic. Investigating the joint relationship among corporate governance, earnings management, and credit ratings is the purpose of this paper. I investigate the way that earnings management in the SOX period affects credit ratings. The null hypothesis is that SOX and earnings management do not jointly affect credit ratings, while the alternative hypothesis claims that SOX and earnings management jointly affect credit ratings. Since the direction of change in credit ratings cannot be inferred from the existing literature, empirical analysis is needed to resolve this issue. I test the hypothesis stated below.

H1: Corporate governance and earnings management jointly affect credit ratings.

DATA

The data for this study consist of all firms in CRSP and Compustat from 2000 to 2004 that are (1) based in either the U.S. or Canada and (2) listed in either the U.S. or Canada, including cross-listing from Canada onto a U.S. exchange but excluding the reverse. I use a period of 2000 to 2004 to capture the impact of SOX in a relatively narrow window about its announcement date of July 30, 2002. To be included in the sample, firms must also be active and cannot be an American Depository Receipt or foreign government. Firms must also have a positive and non-missing book value of assets, book value of debt, and revenue. In addition, firms must have S&P Short- and Long-Term Issuer Credit Ratings in Compustat. Consistent with traditional literature, utilities (SIC codes 4000-4999) and financial firms (SIC codes 6000-6999) are excluded. I control for new-listing bias by excluding firms that are not included in Compustat for the first quarter of 2000 but are in Compustat at any other point in the sample period.

APPROACH

To determine whether a joint relationship exists among SOX, earnings management, and credit ratings, I use the differences-in-differences model below.¹ By using a differences-in-differences OLS model, I am able to examine the change in credit ratings of test firms before and after SOX with the change in credit ratings of control firms before and after SOX. Also, differences-in-differences regression captures any events that are specific to either the control or test environment but that are not explicitly controlled for in the regression model. For example, the model captures the effect of legislation that may have been enacted in Canada or the U.S. around the time of SOX but that may or may not be relevant to SOX. In accordance with Bertrand, Duflo, and Mullainathan (2004), I correct for serial correlation in standard errors.

$$CreditRating_{i,t} = f_{i,t-1}(SOX, INTCOV, IGRADE, BORDERLINE, D/A, EM, LISTING, MKTRET, SOX*EM, SOX*LISTING, LISTING*EM, SOX*EM*LISTING) \quad (1)$$

I consider U.S.-listed firms as test firms. U.S.-listed firms consist of (1) U.S. firms that are listed on a U.S. exchange and (2) Canadian firms that are cross-listed on a U.S. exchange. Since Canadian firms listed on a Canadian exchange are not subject to SOX's provisions, I consider those firms as control firms. Thus, I include a LISTING variable, in accordance with Carter (2013). The coefficient of LISTING estimates the difference in the credit rating levels of the control and test firms before SOX was passed. Listing location can affect post-SOX credit rating levels because SOX applies only to U.S.-listed firms, regardless of where those firms are based. Thus, the release of negative firm-related news associated with SOX (Akhigbe, Martin, and Newman, 2008) may apply only to U.S.-listed firms, whether those firms are headquartered in the U.S. or in another country (e.g., Canada). As in Carter (2013), LISTING can take on one of three values – U.S.-LISTED, U.S-IN-U.S., or X-LISTED. U.S.-LISTED equals one if a firm,

whether based on Canada or in the U.S., is listed on a U.S. exchange. U.S.-IN-U.S. equals one if a firm is based in the U.S. and listed on a U.S. exchange. X-LISTED equals one if a firm is headquartered in Canada but cross-listed in the U.S.

TABLE 1
MAPPING OF SHORT-TERM CREDIT RATINGS TO NUMERIC VALUES

Credit Rating	#	Pre-SOX	Post-SOX	N
A-1+	1	214	123	337
A-1	2	413	276	689
A-2	3	526	292	818
A-3	4	94	65	159
B	5	7	6	13
B-1	6	0	0	0
B-2	7	0	0	0
B-3	8	0	0	0
C	9	0	0	0
D	10	0	0	0
Total		1254	762	2016

The dependent variable, $CreditRating_{i,t}$, consists of numeric values that correspond to credit ratings. Similar to Alissa, Bonsall, Koharki, and Penn (2013), I map short-term credit ratings to ordinal values. However, unlike Alissa, Bonsall, Koharki, and Penn (2013), but consistent with Cheng and Subramanyam (2008), I map higher credit ratings to smaller numbers. Accordingly, larger numbers reflect lower (i.e., worse) credit ratings. The mapping of credit ratings to numeric values is shown in Table 1. For short-term credit ratings, I use the quarterly S&P Short-Term Issuer Credit Ratings found in Compustat.

The intercept is an estimate of the credit rating level of control firms (i.e., Canadian firms listed in Canada, which are not subject to SOX) before SOX was passed. The coefficient of SOX estimates the difference in credit rating levels of control firms before SOX versus after SOX. INTCOV measures a firm's interest coverage ratio, defined as earnings before interest and taxes (EBIT) divided by interest expense. Including this variable is necessary because Goh and Ederington (1993) find that credit ratings reflect a firm's expected ability to repay interest and principal. Values of INTCOV that exceed one imply that (1) repaying interest does not exhaust EBIT and (2) excess EBIT from a prior period may be combined with contemporaneous EBIT to cover contemporaneous interest. Thus, values of INTCOV greater than one indicate that firms will be able to meet future debt obligations, suggesting higher credit ratings.

In accordance with Jorion, Liu, and Shi (2005), I control for whether a firm's debt is investment-grade (IGRADE). IGRADE equals one if either a firm's credit rating is investment-grade and zero otherwise. I include separate variables for short- and long-term credit ratings. Controlling for IGRADE is

important because the effect of investment-grade status on $CreditRating_{i,t}$ is not clear at the outset. On one hand, since investment-grade firms are considered safer than speculative-grade firms, IGRADE could be associated with higher credit ratings. On the other hand, if investment-grade firms reveal sufficiently bad news in the wake of SOX, their credit ratings could fall. In this study, a short-term credit rating of A-1+, A-1, A-2, or A-3 is considered investment-grade, while long-term credit ratings from AAA to A- are classified as investment-grade.

Consistent with Kisgen (2006) and Jung, Soderstrom, and Yang (2013), I also control for whether a firm's credit rating is borderline. This situation needs to be controlled for because, compared to firms with credit ratings that are solidly within a rating letter range, firms with ratings on the upper border of a rating letter range are more likely to manage earnings in order to experience a rating upgrade (Jung, Soderstrom, and Yang, 2013). Also, firms with a credit rating on the lower border of a rating letter range (e.g., A-) are just meeting the requirements of that broad category (e.g., the "A" category). Thus, a poorly-performing firm with an A- rating may be more likely than a firm with a credit rating solidly in the "A" category to experience a rating downgrade, an event that would place the former firm in the next broad category (the "B" category). This prediction is consistent with Diamond (1989) because firms that are on the lower border (e.g., A-) of a rating range should be the least creditworthy of all firms in that broad category (e.g., all "A" rating groups), making them the most likely candidates to experience lower ratings. To capture this phenomenon, I introduce BORDERLINE, represented by UPPERBORDER or LOWERBORDER. Typically, UPPERBORDER (LOWERBORDER) equals one if a firm's credit rating ends with a plus (minus), signifying that the rating is on the upper (lower) border of a rating range. In this study, A-3, B, B-3, and C are considered short-term borderline credit ratings since S&P does not use pluses or minuses for short-term credit ratings. AA+, AA-, A+, A-, BBB+, BBB-, BB+, BB-, B+, B-, CCC+, and CCC- are considered long-term borderline credit ratings.

D/A is a firm's debt-to-assets ratio in book-value terms. I use book values because book debt ratios directly reflect managers' financing decisions (Kisgen, 2006). Controlling for leverage is important because Carter (2013) finds that SOX is associated with higher leverage. I include separate variables for short- and long-term debt ratios. It is not clear *ex ante* whether a higher debt ratio is associated with a higher or lower credit rating level. On one hand, Myers (1977) argues that debt reduces a firm's value by decreasing its ability to take on growth projects, a situation to which he refers as the debt-overhang problem. Thus, the debt overhang problem will lead to weaker earnings and will lower the firm's ability to repay future debt, suggesting a lower credit rating. On the other hand, Ross (1977) suggests that higher leverage is associated with a higher credit rating. The reason is that, since additional funds are needed to service additional debt, only the strongest firms will take on more debt. Thus, Ross (1977) argues that debt creates a separating equilibrium in which strong firms can signal their value.

To measure earnings management (EM), I use the residuals from the Kothari, Leone, and Wasley (2005) model to identify the firms that SOX is most likely to affect. MKTRET, which controls for market conditions surrounding SOX, is the CRSP value-weighted return on the market. The coefficient of SOX*EM captures the difference in credit rating levels based on earnings management after SOX relative to before SOX. The coefficient of SOX*LISTING captures, relative to control firms, the difference in credit rating levels after SOX based on listing location. The coefficient of LISTING*EM captures the difference in credit rating levels due to earnings management for test firms relative to control firms. The coefficient of the independent variable of interest, SOX*EM*LISTING, captures the difference in the credit rating levels of test firms after SOX based on earnings management, relative to control firms.

RESULTS

TABLE 2
DIFFERENCES-IN-DIFFERENCES REGRESSIONS TO EXPLAIN
SHORT-TERM RATINGS AFTER SOX

	Dep. Var.: Short-Term Rating Level	
	<u>EM ≤ 0</u>	<u>EM > 0</u>
Intercept	3.636*** (11.59)	2.308*** (4.38)
SOX	0.287 (0.74)	1.282 (1.52)
INTCOV	-0.005*** (-11.35)	-0.015*** (-9.52)
IGRADE	0.001 (0.01)	-0.102 (-0.80)
UPPERBORDER	2.440*** (4.23)	2.187*** (6.11)
D/A	-0.559*** (-2.59)	-0.713** (-2.31)
MKTRET	0.080 (0.13)	-0.362 (-0.38)
EM	8.586*** (3.64)	8.662 (1.41)
SOX*EM	-7.270*** (-3.07)	-16.743* (-1.92)
U.S.-IN-U.S.	-1.056*** (-3.52)	0.593 (1.15)
SOX*U.S.-IN-U.S.	0.043 (0.11)	-1.121 (-1.32)
U.S.-IN-U.S.*EM	-9.074*** (-3.83)	-7.485 (-1.21)
SOX*U.S.-IN-U.S.*EM	8.340*** (3.50)	15.495* (1.77)
N	1290	497
Adj. R ²	0.173	0.238
F	23.54	13.93
Pr>F	<0.0001	<0.0001

*, **, and *** denote significance at the 10, 5, and 1 percent levels, respectively. T-values are in parentheses.

Table 2 shows the results of differences-in-differences OLS regressions that seek to explain the level of short-term credit ratings for firms in Compustat from 2000 to 2004, a time frame that constitutes a narrow, symmetric window about SOX's enactment.² I use differences-in-differences OLS regression for the ease of interpreting the marginal effects of the interactive effect of SOX and earnings management on credit rating levels.³

Table 2 shows OLS regression results when earnings management is non-positive (i.e., when either income-decreasing or no accruals exist) versus positive (i.e., when managers engage in income-increasing accruals). (In the rest of this paper, I refer to this partition simply as negative versus positive earnings management because no firm in the sample has accruals exactly equal to zero.) I partition the sample into income-decreasing and income-increasing accrual sets for two reasons. First, although not shown, the results of tests of a curvilinear relationship (i.e., a quadratic term) between EM and credit ratings were insignificant. Second, running an OLS model with SOX*EM on the full sample would yield illogical results. For example, if the coefficient on SOX*EM were positive and significant, this result would suggest that positive earnings management, however small, in the SOX era leads to higher cardinal values of credit ratings (i.e., lower actual credit ratings), whereas negative earnings management, however large in magnitude, in the SOX era leads to lower cardinal values of credit ratings (i.e., higher actual credit ratings). Thus, to address this illogical issue, I partition the sample into separate sets that contain firms with either income-increasing or income-decreasing accruals.

Table 2 shows that U.S. firms that are headquartered and listed in the U.S. in the SOX era experience more drastic changes in short-term credit ratings compared to control firms.⁴ The left- (right-) hand model shows results for firms with negative (positive) earnings management. The left-hand model indicates that, relative to control firms, the use of negative discretionary accruals by U.S. firms that are listed in the U.S. in the SOX era is associated with higher short-term ratings. For those firms, EM is negative, as will be $8.340*EM$ when U.S.-IN-U.S. equals one. This negative quantity leads to lower cardinal values of credit ratings, which correspond to higher actual credit ratings.

To quantify the change in short-term credit ratings, the average dollar value of negative earnings management on the part of U.S. firms listed on a U.S. exchange in this sample is $-\$22,528$ (recorded in the data set as -0.22528). Based on the leftmost equation in Table 2, the average U.S. firm listed on a U.S. exchange experiences a rating change of $8.340 \times (-0.22528) = -1.9$ levels in the SOX era. Since this negative product corresponds to an increase in credit ratings, the average U.S. firm listed in the U.S. has a credit rating that is 1.9 levels higher in the SOX era, relative to control firms. This result is consistent with the idea that many managers in the SOX period switch from accrual-based to real earnings management, which is more difficult to detect (Graham, Harvey, and Rajgopal, 2005; Cohen, Dey, and Lys, 2008), possibly to smooth the effects of the bad news associated with SOX (Akhigbe, Martin, and Newman, 2008). This result is also consistent with the idea that managers manage earnings to improve their firms' credit ratings (Jung, Soderstrom, and Yang, 2013).

On the other hand, the right-hand model shows that, relative to control firms, the use of positive discretionary accruals by U.S. firms that are listed in the U.S. in the SOX era is associated with lower short-term ratings. Short-term ratings are lower because, in this model, EM is positive, as will be $15.495*EM$ when U.S.-IN-U.S. equals one. This positive quantity leads to higher cardinal values, which correspond to lower credit ratings. Since the average dollar value of positive earnings management on the part of U.S. firms listed on a U.S. exchange in this sample is $\$15,318$ (recorded in the data set as 0.15318), the average U.S. firm listed on a U.S. exchange experiences a rating change of $15.495 \times 0.15318 = 2.37$ lower levels in the SOX era, compared to control firms. The finding of lower credit ratings in the SOX period is consistent with Alp (2013) although I document a larger change. The finding of lower credit ratings is also consistent with Barth, Konchitchki, and Landsman (2013) in that greater earnings management leads to less clear earnings, which lead to a higher cost of borrowing. *Ceteris paribus*, a higher cost of borrowing impairs a firm's ability to repay its debt, leading to a lower credit rating.

In both models, the coefficient on the variable SOX suggests that the post-SOX credit rating levels of control firms do not differ from their pre-SOX levels. Also, in both models, SOX*U.S.-IN-U.S. does not

affect the change in the credit rating of test firms in the SOX era relative to control firms. However, the first model shows that negative earnings management by U.S.-based and -listed firms (i.e., U.S.-IN-U.S.*EM) is associated with lower short-term credit ratings, relative to control firms. The reason is that the negative coefficient multiplied by a negative value of EM leads to a positive product, which corresponds to a lower credit rating.

Table 2 shows that a higher interest coverage ratio (INTCOV) is associated with lower cardinal values for credit ratings (i.e., higher credit ratings). This result is consistent with finance theory, which suggests that a firm will experience a higher credit rating if its ability to meet its payments is increased (e.g., Diamond, 1989; Kisgen and Strahan, 2010). Also, an investment-grade credit rating (IGRADE) is not associated with a change in short-term credit ratings. However, the existence of a firm's short-term credit rating on the upper border of a rating range (i.e., UPPERBORDER) is associated with a lower credit rating. This result is consistent with the idea that rating agencies are concerned about their reputation as effective monitors (Covitz and Harrison, 2003), particularly in an era in which market participants expect Congress to pass laws such as SOX to protect them in the wake of fraud (Bond, Goldstein, and Prescott, 2010).

Table 2 shows that the coefficient of D/A is negative, suggesting that a higher short-term debt ratio is associated with lower cardinal values of credit ratings and, thus, higher credit ratings. This finding is consistent with Ross (1977), who shows that taking on debt signals greater firm value because, given that debt requires firms to repay both interest and principal, only the strongest firms will take on additional debt. The higher value will be reflected in those firms' credit ratings. Moreover, since investors expect Congress to pass investor-protection laws following the accounting scandals that preceded SOX (Bond, Goldstein, and Prescott, 2010), firms that increase debt in that environment are further signaling their strength.

Table 2 shows that the return on the market (MKTRET) does not affect credit ratings. However, over the entire sample period, earnings management (EM) is associated with higher cardinal values of short-term credit ratings (i.e., lower short-term credit ratings). These results are consistent with Barth, Konchitchki, and Landsman (2013) in that greater earnings management leads to less clear earnings, which in turn lead to a higher cost of borrowing. *Ceteris paribus*, a higher cost of borrowing impairs a firm's ability to repay its debt, leading to a lower credit rating.

ROBUSTNESS TESTS

In this section, I present the results of robustness tests of this paper's main result, which is that SOX and earnings management jointly affect credit ratings. I test for robustness against the magnitude of earnings management, firm size, and economic expectations.⁵

TABLE 3

The preceding tables show the results of regressions in which the full sample is decomposed into non-positive versus positive values of EM. By contrast, Table 3 shows the results of full-sample differences-in-differences OLS robustness tests that include the magnitude, or absolute value, of EM as well as its interaction with SOX, LISTING, and SOX*LISTING. Examining the impact of the magnitude of earnings management on the relationship between credit ratings and SOX is a relevant robustness test because a larger magnitude, regardless of the direction, of earnings management will lead to less clear earnings. Barth, Konchitchki, and Landsman (2013) find that less accurate earnings lead to a higher cost of borrowing. *Ceteris paribus*, this situation will lead to lower credit ratings, thus overturning the earlier finding of higher short-term credit ratings when managers engage in income-decreasing accruals.

To test this conjecture, I introduce the variable ABSEM, defined as the absolute value of EM. Accordingly, SOX*ABSEM equals the magnitude of earnings management in the SOX era and zero otherwise. U.S.-IN-U.S.*ABSEM is the magnitude of earnings management for U.S. firms that are listed on a U.S. exchange. SOX*U.S.-IN-U.S.*ABSEM, the independent variable of interest in this robustness test, equals the magnitude of earnings management for U.S. firms that are listed in the U.S. in the SOX era.

ROBUSTNESS TEST AGAINST THE MAGNITUDE OF EARNINGS MANAGEMENT

	Dep. Var.: Short-Term Credit Rating	
Intercept	2.880*** (11.59)	3.376*** (12.44)
SOX	0.271 (0.87)	0.381 (1.11)
INTCOV	-0.005*** (-13.84)	-0.006*** (-13.88)
IGRADE	-0.312*** (-4.45)	-0.063 (-0.80)
LOWERBORDER	1.467*** (20.79)	
UPPERBORDER		2.348*** (7.51)
D/A	-0.436*** (-2.69)	-0.561*** (-3.15)
MKTRET	-0.205 (-0.42)	-0.079 (-0.15)
ABSEM	-2.718 (-1.39)	-6.043*** (-2.82)
SOX*ABSEM	2.024 (1.03)	4.896** (2.27)
U.S.-IN-U.S.	-0.110 (-0.46)	-0.700*** (-2.68)
SOX*U.S.-IN-U.S.	-0.009 (-0.03)	-0.137 (-0.40)
U.S.-IN-U.S.*ABSEM	3.470* (1.76)	6.726*** (3.12)
SOX*U.S.-IN-U.S.*ABSEM	-3.255* (1.65)	-6.081*** (-2.81)
N	1787	1787
Adj. R ²	0.316	0.176
F	69.83	32.74
Pr>F	<0.0001	<0.0001

*, **, and *** denote significance at the 10, 5, and 1 percent levels, respectively. T-values are in parentheses.

Consistent with the main results of this study, Table 3 shows that the magnitude of earnings management for U.S. firms that are listed in the U.S. in the SOX era affects credit ratings. In both models, the coefficient of SOX*U.S.-IN-U.S.*ABSEM shows that the magnitude of earnings management of U.S.-based and -listed firms in the SOX era is associated with lower cardinal values of credit ratings, equivalent to higher credit ratings. Since the typical firm in the sample has ABSEM equal to \$20,407 (recorded in the data set 0.20407), the left model shows that the average U.S. firm listed on a U.S. exchange experiences a rating change of $-3.255 \times 0.20407 = -0.66$ levels, compared to control firms. This value corresponds to credit ratings that are higher by 0.66 levels.

TABLE 4
ROBUSTNESS TEST AGAINST FIRM SIZE

	Dep. Var.: Short-Term Rating Level		
	<u>EM ≤ 0</u>		<u>EM > 0</u>
Intercept	2.862*** (11.23)	3.612*** (12.71)	2.366*** (4.69)
SOX	0.299 (0.96)	0.265 (0.75)	1.236 (1.53)
INTCOV	-0.002*** (-6.28)	-0.003*** (-6.22)	-0.013*** (-8.31)
IGRADE	-0.137* (-1.76)	0.049 (0.55)	-0.129 (-1.05)
LOWERBORDER	1.434*** (19.49)		
UPPERBORDER		2.477*** (4.74)	2.235*** (6.52)
D/A	-0.350** (-2.01)	-0.417** (-2.13)	-0.495* (-1.67)
MKTRET	0.202 (0.40)	0.293 (0.51)	-0.084 (-0.09)
EM	4.116** (2.16)	8.667*** (4.05)	8.274 (1.40)
SOX*EM	-3.283* (-1.72)	-7.342*** (-3.42)	-15.828* (-1.90)
U.S.-IN-U.S.	-0.150 (-0.61)	-0.931*** (-3.42)	0.646 (1.30)
SOX*U.S.-IN-U.S.	-0.028 (-0.09)	-0.026 (-0.07)	-1.094 (-1.35)

U.S.-IN-U.S.*EM	-4.530** (-2.37)	-8.943*** (-4.16)	-7.347 (-1.24)
SOX*U.S.-IN-U.S.*EM	4.098** (2.13)	8.031*** (3.72)	14.683* (1.75)
SIZE	-0.001*** (-17.65)	-0.001*** (-16.73)	-0.001*** (-6.73)
N	1290	1290	497
Adj. R ²	0.468	0.322	0.302
F	88.24	47.99	17.52
Pr>F	<0.0001	<0.0001	<0.0001

*, **, and *** denote significance at the 10, 5, and 1 percent levels, respectively. T-values are in parentheses.

Table 4 contains the results of a robustness test based on firm size. SIZE is defined as the market value of assets, or the sum of the market value of equity plus the book value of debt. The market value of equity is defined as the product of the quarter-end share price and the number of shares outstanding. Yu (2008) and Hong, Huseynov, and Zhang (2014) find that greater analyst coverage is associated with lower earnings management. Since large firms tend to have greater analyst coverage than small firms, firm size is a suitable proxy for analyst coverage. Thus, large firms should exhibit less earnings management than small firms, leading to more transparent earnings. Although some researchers suggest that greater transparency can lead to higher firm value (Easley and O'Hara, 2004; Chang, Fernando, and Liao, 2009) and, potentially, higher credit ratings, Akhigbe, Martin, and Newman (2008) suggest that the greater transparency provided by SOX will lead to lower credit ratings. The reason is that, although SOX increases transparency, SOX requires managers to release bad news, which will lead credit rating agencies to conclude that earnings and cash flows are not as strong as once believed. This situation is likely to lead to lower credit ratings, overturning the earlier finding that income-decreasing earnings management and SOX are jointly associated with higher short-term credit ratings.

The first two models show that SOX and income-decreasing earnings management are jointly associated with higher credit ratings, implying robustness to firm size. In the first two models, the coefficient of SOX*U.S.-IN-U.S.*EM is positive. That coefficient, when multiplied by negative values of EM, produces a negative value, which leads to a lower cardinal value – and higher actual value – of credit ratings. For completeness, I also examine the robustness of the earlier finding that income-increasing accruals in the SOX period are associated with lower short-term credit ratings. The third model shows that this relationship is also robust to firm size. In that model, the positive coefficient of the triple-interaction term produces a positive product when multiplied by positive values of EM. The positive product implies a higher cardinal value, which corresponds to a lower actual value of, short-term credit ratings.

TABLE 5
ROBUSTNESS TEST AGAINST ECONOMIC EXPECTATIONS

	Dep. Var.: Short-Term Rating Level		
	EM \leq 0		EM > 0
Intercept	2.872*** (8.37)	3.476*** (9.10)	2.328*** (3.61)
SOX	0.327 (0.93)	0.265 (0.68)	1.285 (1.52)
INTCOV	-0.005*** (-11.45)	-0.005*** (-11.37)	-0.015*** (-9.47)
IGRADE	-0.189** (-2.16)	0.004 (0.04)	-0.103 (-0.80)
LOWERBORDER	1.513*** (18.46)		
UPPERBORDER		2.448*** (4.24)	2.186*** (6.09)
D/A	-0.479** (-2.47)	-0.560*** (-2.59)	-0.714** (-2.31)
MKTRET	-0.012 (-0.02)	0.128 (0.20)	-0.369 (-0.38)
EM	3.780* (1.78)	8.640*** (3.66)	8.681 (1.41)
SOX*EM	-2.982 (-1.40)	-7.326*** (-3.09)	-16.779* (-1.92)
U.S.-IN-U.S.	-0.222 (-0.82)	-1.063*** (-3.54)	0.593 (1.15)
SOX*U.S.-IN-U.S.	0.034 (0.10)	0.051 (0.13)	-1.122 (-1.32)
U.S.-IN-U.S.*EM	-4.399** (-2.06)	-9.123*** (-3.85)	-7.505 (-1.21)
SOX*U.S.-IN-U.S.*EM	4.158* (1.94)	8.390*** (3.52)	15.512* (1.77)
ECONOMY	-0.001 (-0.17)	0.003 (0.74)	-0.001 (-0.05)
N	1290	1290	497
Adj. R ²	0.338	0.173	0.237
F	51.67	21.76	12.83
Pr>F	<0.0001	<0.0001	<0.0001

*, **, and *** denote significance at the 10, 5, and 1 percent levels, respectively.
T-values are in parentheses.

Table 5 contains the results of a robustness test based on changes in suppliers' expectations about the economy (ECONOMY). This robustness test is necessary because lower credit ratings could be due primarily to unfavorable prospects for the economy, irrespective of SOX. Thus, controlling for expectations of the performance of the economy could overturn the main results of this paper. To proxy for suppliers' economic expectations, I include in regression models the values of the Institute of Supply Management (ISM) Index, formerly known as the National Association of Purchasing Managers' Index. An ISM Index value greater than (less than) 50 implies that suppliers have a positive (negative) outlook about the economy. An Index value equal to 50 suggests that suppliers expect no change in the economy. Table 5 shows that the main results of this paper are robust to economic expectations. The first two models show that, for firms that engage in negative earnings management, the coefficient on $SOX * U.S.-IN-U.S.*EM$ is positive. Those positive coefficients, when multiplied by negative values of EM, lead to lower cardinal values for short-term credit ratings, equivalent to higher short-term credit ratings. The third model shows that, for firms that engage in positive earnings management, the coefficient on $SOX * U.S.-IN-U.S.*EM$ is positive. Since the product of the positive coefficient and a positive value of EM is positive, a higher cardinal value for credit ratings is generated, equivalent to a lower short-term credit rating.

CONCLUSION

A firm's credit rating impacts its ability to borrow funds, an action that directly affects firm value. Also, recent papers document the importance that managers give to preserving or improving their firms' credit ratings. Thus, understanding the factors that affect credit ratings is important. To that end, existing research examines relationships between earnings management and credit ratings or between corporate governance (e.g., SOX) and credit ratings. In this paper, I examine a joint relationship among corporate governance, earnings management, and credit ratings. Specifically, I investigate whether the relationship between credit ratings and SOX depends on earnings management.

Differences-in-differences OLS regression analysis indicates that income-decreasing earnings management in the SOX period is associated with higher short-term credit ratings. This result can be explained by the use of more sophisticated earnings management techniques post-SOX and by the idea that managers manage earnings to improve their firms' credit ratings, possibly to counteract the bad news associated with SOX. However, differences-in-differences regression indicates that income-increasing earnings management in the SOX era is associated with lower short-term credit ratings. A possible explanation for this result is that earnings management in the SOX era lessens the confidence of credit rating agencies in the ability of firms to meet their debt obligations. This situation leads to lower credit ratings. The main results of this paper are robust to firm size, economic expectations, and the magnitude of earnings management.

ENDNOTES

1. I do not control for profitability because it is correlated with the interest coverage ratio and because interest expense has already been deducted by the time a firm determines its profit. Also, in contrast with Klein (2002), I do not control for audit committee independence because of multi-collinearity issues. Since SOX mandates audit committee independence, an interaction term that involves SOX and audit committee independence will be correlated with the main-effects variable SOX. Klein (2002) does not incur this issue because her study uses pre-SOX data. Furthermore, unlike Chan, Hsu, and Lee, (2013), I do not control for mandatory adoption of IFRS because, according to FASB (<http://www.fasb.org>), Canada committed to adopt IFRS in 2011, a year that is outside my sample period of 2000 to 2004.
2. Regarding long-term credit ratings, I find that earnings management in the SOX era does not explain differences for any subset of U.S.-listed firms relative to control firms. A possible explanation is that, in the future, credit rating agencies expect firms to recover from any negative news that managers were required to release surrounding SOX. Thus, in the SOX era, rating agencies do not downgrade long-term credit ratings significantly differently from the pre-SOX era, relative to control firms.

3. I also treat Model (1) as binary and ordered logistic regression models and use the Ai and Norton (2003) method to interpret the marginal effect of the interaction term. In the binary model, the dependent variable equals one if a firm's credit rating is downgraded from time t-1 to time t and zero otherwise. The results of both models are consistent with those of the differences-in-differences OLS models for firms with positive earnings management.
4. No significance is found when using SOX*EM*U.S.-LISTED or SOX*EM*X-LISTED and the related main-effects and double-interaction variables.
5. Although some studies find that credit rating levels explain earnings management, I do not test for reverse causality in this analysis. The reason is that those studies focus on the explanatory power of a main-effects measure of credit ratings on earnings management, not on credit ratings interacted with another variable. Since my study focuses on the joint effect of SOX and earnings management on credit ratings, a true test of reverse causality with respect to this study would have SOX*EM or SOX*EM*LISTING as the dependent variable.

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