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Capital Structure, Credit Ratings, and Sarbanes-Oxley

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by

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DEDICATION

I dedicate this dissertation to my father (Celester Carter (deceased)), my mother (Sandra Carter), family, and friends.

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ABSTRACT

Since Sarbanes-Oxley (SOX) is an exogenous shock to the information environment of U.S.-listed firms, those firms might adjust their capital structures to reflect the new information environment. Using univariate and multivariate tests, including differences-in-differences, I examine SOX's effect on the capital structure of U.S.-listed firms relative to Canadian firms listed in Canada, which are treated as control firms since they are not subject to SOX. The results indicate that, after the passage of SOX, U.S.-listed firms raise their long-term debt ratios by two to three percentage points, relative to the control group. U.S. firms listed in the U.S. drive this result, while Canadian firms cross-listed in the U.S. do not alter their long-term leverage ratios after SOX. The higher debt ratios do not occur because of lower rates of growth in equity and short-term debt after SOX for U.S.-listed firms, relative to control firms. In addition, firms that heavily (lightly) manage earnings prior to SOX use less (more) debt after SOX.

Previous research argues that the Sarbanes-Oxley Act (SOX) could require managers to reveal bad news about their firms. Bad news may cause market participants, including credit rating agencies, to update their beliefs about those firms and conclude that their outlook is not as profitable as initially thought. In this paper, I examine short- and long-term credit ratings after SOX. The main finding is that, in the SOX era, aggressive earnings management is associated with lower short- and long-term credit rating levels. This result is robust to size and suppliers' outlook on the economy.

Chapter One: Introduction (Capital Structure)

The capital structure literature suggests that information asymmetry affects firms' financing decisions. When asymmetric information exists to the detriment of outside investors, external financing is costlier than internal financing. Although this situation will discourage firms with high information asymmetry from raising external funds, firms with low information asymmetry might be motivated to raise funds externally.

However, the effect of asymmetric information on the relative use of debt versus equity is still debated. On one hand, the incentive-signaling theory of capital structure (Ross, 1977) predicts that debt ratios will rise only for the most valuable firms. This theory states that managers can mitigate information asymmetry by signaling their firms' value through increased leverage. Ross (1977) argues that only the most valuable firms will take on debt because of the need to allocate a portion of a firm's future cash flows to repay the debt.

On the other hand, Myers (1977) argues against Ross (1977) by suggesting that debt ratios will fall because of the debt-overhang problem. The debt-overhang problem states that the presence of debt increases a firm's probability of bankruptcy. As a firm increases its debt load, its cost of borrowing will increase. A high cost of borrowing will prevent some firms from borrowing external funds for growth. As a result, those firms will pass up growth projects, lowering firm value. Thus, Myers (1977) implies that lower leverage ratios are associated with more valuable firms.

The pecking-order model (Donaldson, 1961; Myers, 1984; Myers and Majluf, 1984) also predicts a relationship between capital structure and asymmetric information. The pecking-order model states that, because external investors face asymmetric information regarding the intrinsic value of firms' securities, managers finance projects with retained earnings, external debt, and external equity, in that order of preference. Managers are said to prefer internal funds because their value is known. However, if external funds are used, the model states that managers prefer to issue debt instead of common equity because debt, which stipulates cash flows to lenders, suffers from less value-related information asymmetry than common equity, which does not obligate managers to pay dividends to investors. Bharath, Pasquariello, and Wu (2009) show that information asymmetry indeed drives the pecking-order model.

While the above capital structure theories focus on the information asymmetry that external investors face relative to insiders, Easley and O'Hara (2004) address information asymmetry between two groups of external investors from a microstructure perspective. In their model, one set of external investors has a richer information set than a second group of external investors. Easley and O'Hara (2004) show that less-informed external investors require a higher rate of return on equity than more-informed external investors. The reason is that less-informed external investors are disadvantaged because more-informed external investors have a richer information set and will benefit from trading on that information. The higher rate of return on equity that less-informed external investors demand increases the required return on equity for external investors overall, leading to a higher cost of capital for the firm.

Easley and O'Hara (2004) suggest that lower information asymmetry decreases the cost of equity. Lower equity costs may encourage firms to finance projects with equity, leading to lower debt ratios. Consistent with Easley and O'Hara (2004), Agarwal and O’Hara (2008) find lower (higher) leverage in firms with low (high) information asymmetry between or among groups of external investors.

In this paper, I utilize a unique regulatory shock to firms’ information environment (the Sarbanes-Oxley Act, hereafter SOX) to empirically examine the relationship between asymmetric information and capital structure. Congress passed SOX after a string of accounting scandals eroded the confidence of investors in U.S. markets. In the early 2000s, several accounting scandals (e.g., Tyco, WorldCom, Enron), shook investors’ confidence in the U.S. markets. Inaccurate financial statements misled atomistic investors, who suffered from a large information asymmetry relative to smart money and firm insiders.

As a result, many atomistic investors and non-executive employees lost substantial portions of their life savings while executives landed safely into financial security via their golden parachutes. The passage of SOX is consistent with Bebchuk and Neeman (2010), who predict that legislators will pass laws to protect investors in the wake of fraud. SOX requires all U.S.-listed firms to take steps to accurately reveal relevant financial information so as to meet the Act’s goal of reducing the information asymmetry that outside investors face. The requirements in SOX are intended to reduce information asymmetry in the U.S. markets by prescribing a set of rules with which all firms listed on a U.S. exchange must comply.

I hypothesize that the reduction in information asymmetry associated with SOX may affect firms’ capital structure decisions. The reduction in information asymmetry could lead to more debt use or more equity use, suggesting that either higher debt ratios or higher equity ratios may result. One possibility is that firms’ long-term debt ratios will change. The logic is as follows. Heflin and Hsu (2008) find that SOX is associated with more accurate financial information, defined as a greater use of reported earnings based on generally-accepted accounting principles (GAAP) in computing permanent earnings. Since more accurate earnings are available to outside investors, their information set approaches that of insiders. External investors are thus better informed about the intrinsic value of securities and will demand only those securities for which they believe they will be appropriately compensated. To maximize proceeds from security issuance, managers will need to issue securities that investors prefer. Since investors may prefer either debt or equity, long-term debt ratios may change after SOX. However, since debt is cheaper than equity, I expect to observe a greater increase in the debt ratio.

On the other hand, some studies suggest that SOX could be associated with a greater reliance on equity, leading to lower debt ratios. Graham, Li, and Qiu (2008) find that banks penalize firms that restate fraudulent earnings with stiffer loan terms. Stringent loan terms may lead managers to issue equity to fund projects, leading to lower debt ratios, particularly in the short term. Boubakri and Ghouma (2008) document increased monitoring by investors and institutions in debt markets after SOX. Tighter monitoring benefits investors via increased scrutiny during the lending process, but such monitoring can lead to higher costs of debt. The reason for possibly higher costs of debt is that closer monitoring may reveal detrimental information about firms that wish to borrow funds, resulting in stiffer debt covenants (Graham, Li, and Qiu, 2008). Thus, more intensive monitoring could lead managers to issue equity instead of debt if the cost of debt outweighs that of equity, lowering debt ratios.

Continuing with papers that suggest that SOX is associated with lower debt ratios, Cohen, Dey, and Lys (2008) find that more firms use accrual-based earnings management prior to SOX but that more firms use real earnings management after SOX. This result suggests that firms use more conservative accounting techniques after SOX, allowing investors to better understand the intrinsic value of the firm. Thus, a lower cost of equity may result, leading to lower debt ratios. Chang, Fernando, and Liao (2009) find that, after SOX, the market believes that earnings quality has improved and that the cost of equity has decreased. Ashbaugh-Skaife, Collins, Kinney, and Lafond (2009) find that SOX's enhanced standards for internal controls are associated with a lower cost of equity. These results may lead to greater equity use after SOX, suggesting lower debt ratios.

On the other hand, other studies suggest that SOX is associated with higher debt ratios. Although Graham, Li, and Qiu (2008) suggest that debt ratios may fall in the short term, leverage use may increase in the long run. The reason is that managers are likely to enforce conservative, accurate financial reporting in their firms since they will not wish the stiff loan terms to persist. Greater earnings quality will result and may lead to less stringent loan terms, a lower cost of debt, greater debt use, and higher debt ratios.

Continuing with papers that imply higher leverage after SOX, Andrade, Bernile, and Hood (2009) document lower opacity and debt costs associated with SOX, and Garleanu and Zwiebel (2009) predict that lower opacity will lead to weaker debt covenants. Also, Easley and O'Hara (2010) show that reducing ambiguity at the microstructure level benefits issuing firms via a lower cost of capital. Their result also suggests that leverage ratios may rise after SOX. In addition, Hail and Leuz (2009) find that SOX is associated with lower costs of capital for firms cross-listed in the U.S. This result also implies that debt will be cheaper post-SOX, leading to higher debt ratios.

Holmstrom and Kaplan (2003), Chhaochharia and Grinstein (2007), Wintoki (2007), Zhang (2007), and Iliev (2009) find that SOX is associated with net costs or lower market value, either for all firms in general or for small firms in particular. In addition, Akhigbe, Martin, and Newman (2008) find that SOX is associated with greater market risk, idiosyncratic risk, and variance of total returns because the Act requires firms to reveal negative information. If managers do not wish to further lower stock prices by issuing new equity (Myers and Majluf, 1984) in the wake of greater levels of adverse information in the market and lower market value, they will follow the pecking-order model, leading to higher long-term debt ratios.

Bond, Goldstein, and Prescott (2010) imply that SOX may be associated with noisier stock prices. They argue that, since market prices reflect firm fundamentals as well as expected corrective action from regulators, SOX might make it more difficult to derive information about firms' fundamentals from stock prices. Noisier prices may lead investors to prefer relatively safer debt, which stipulates principal and interest payments. If managers prefer debt to equity, leverage ratios will rise.

Bargeron, Lehn, and Zutter (2010) find that SOX is associated with a decrease in risk-taking. This result implies that managers may pass up some positive net-present-value (NPV) projects after SOX that they would not have passed up before SOX. Passing up positive NPV projects will result in lower firm value (Myers and Majluf, 1984). Also, Baranchuk and Dybvig (2010) find that SOX might not result in greater incentives for managers to maximize shareholder value, suggesting that the market prices of common shares will not be maximized. As a result, managers may be more inclined to issue debt to fund projects, leading to higher leverage ratios.

In addition, some authors suggest that the effect of SOX on capital structure is inconclusive. Povel, Singh, and Winton (2007) argue that SOX might not lead to more accurate financial statements, meaning that the accuracy of financial statements could remain the same or even deteriorate. In their model, managers approach investors for financing for good or bad projects. To determine good from bad projects, investors can either rely on noisy, publicly-available information or incur search costs for more reliable information. Managers with bad projects might artificially enhance the attractiveness of the expected financials of those projects. At least one investor may finance the project if the financials appear sufficiently attractive. If financial statement accuracy remains unchanged, leverage ratios may rise or fall depending on the relative cost of debt to that of equity. If financial statements become less accurate after SOX, firms' cost of capital may increase, in accordance with Gao (2010). This situation will lead to higher debt ratios if the cost of debt is lower than that of equity or if managers prefer to follow the pecking-order model. On the other hand, debt ratios may decrease, as managers may decide to issue equity to finance the firm if the cost of debt is prohibitively high.

Patterson and Smith (2007) find improved auditing and control, leading to more accurate financial statements. More accurate financial statements may lead to lower costs of debt (equity), resulting in higher (lower) leverage ratios. Kang, Liu, and Qi (2010) find that firms use higher discount rates to evaluate projects after SOX. This result suggests that managers expect the cost of external funds, whether debt or equity, to increase after SOX. This situation could result in higher debt ratios since the cost of debt is typically less than that of equity. On the other hand, lower debt ratios could result if managers prefer equity to debt.

To examine the effect of asymmetric information on capital structure, I use a sample of U.S.-listed firms from both the U.S. and Canada since all U.S.-listed firms are subject to SOX. The control group in this study consists of Canadian firms based in Canada since those firms are not subject to SOX. To analyze subsamples, I decompose the test group into (1) firms headquartered and traded in the U.S. and (2) firms headquartered in Canada but cross-listed in the U.S. All analyses, including differences-in-differences as well as regression, are conducted with respect to the control group so that the effect of SOX on U.S.-listed firms can be cleanly separated.

To test whether or not the capital structures of U.S.- versus Canada-listed firms differ after SOX, I separate firms into four categories. The first category consists of the control group – Canadian firms listed in Canada. The second category consists of U.S. firms listed in the U.S. The third category of firms used in this analysis is comprised of Canadian firms cross-listed in the U.S. SOX applies to firms in the second and third categories because those firms, whether headquartered in the U.S. or Canada, are listed on a U.S. exchange. The fourth category, the union of firms in the second and third categories, consists of all U.S.-listed firms and is clearly subject to SOX.

Using t-tests based on differences-in-differences relative to Canadian firms listed in Canada, I find that SOX is associated with changes in capital structure. Differences in the book long-term debt ratios of U.S.- versus Canada-listed firms are greater after SOX compared to before SOX. This result is largely driven by U.S. firms listed in the U.S.

Overall, post-SOX differences in capital structure of Canadian firms cross-listed in the U.S. and Canadian firms listed in Canada do not differ based on t-tests.

In addition to conducting t-tests, I regress levels of and changes in long-term debt ratios against firms and market characteristics. When levels of long-term debt ratios are regressed on firm and market characteristics, I find that, after SOX, U.S.-listed firms have higher debt ratios than Canadian firms listed in Canada. U.S.-based firms that are listed in the U.S. drive this result. Long-term debt ratios do not change for Canadian firms cross-listed in the U.S. When changes in levels of long-term debt ratios are regressed on firm and market characteristics, I find that, in the SOX era, firms do not alter the rate of change in their long-term debt ratios. For completeness, I also examine changes in book equity ratios after SOX. SOX is not associated with changes in levels or rates of change in equity ratios.

In addition to examining SOX's impact on changes in long-term debt ratios, I analyze SOX's effect on changes in equity and short-term debt ratios. The reason is that, in addition to simply issuing long-term debt, higher long-term debt ratios may result from reducing equity or short-term debt. I find that SOX is associated with greater positive changes in short-term leverage, suggesting that firms take on short-term leverage at a faster rate after SOX compared to before SOX. One possible explanation is that firms hire new permanent employees or outside consultants to adjust reporting systems for compliance with SOX's provisions. Since firms often undertake short-term loans to finance payroll, the increase in the change in short-term debt may reflect this phenomenon.

Since SOX requires firms to reveal harmful information (Akhigbe, Martin, and Newman 2008), SOX's effect on capital structure should be directly related to earnings management prior to its passage. Graham, Li, and Qiu (2010) find that banks stiffen loan terms for firms that restate earnings because of prior fraud. This result suggests that firms that heavily manage earnings prior to SOX should be most affected by the Act because those firms will most drastically restate earnings after SOX. Once investors learn of the highly managed earnings, they will punish those firms with lower stock prices. If the cost of debt for firms that restate fraudulent earnings remains lower than the cost of equity, long-term debt ratios may increase after SOX.

To account for earnings management, I identify firms that SOX is most likely to affect based on earnings management prior to passage of the Act. One measure of earnings management used in this analysis is discretionary accruals, which include items that managers have latitude in marking up or down. Discretionary accruals can affect several accounts, including such uncollected items as accounts receivable or the allowance for doubtful accounts as well as such unpaid items as salaries and interest.

Lower discretionary accruals may be associated with changes in financing decisions after SOX. One possibility is that debt ratios fall. This case is possible because reducing accruals will increase the amount charged against revenue, leading to lower net operating profit after taxes (NOPAT) and earnings before interest and taxes (EBIT). Lower NOPAT and EBIT imply that a firm is less able to meet financial obligations. Potential lenders will notice that situation and will be less willing to buy bonds from that firm. As a result, the firm will need to issue equity to finance new growth, leading to a higher cost of equity. With more equity financing, the firm's debt ratio will fall. The second way that lower discretionary accruals can affect capital structure is via higher debt ratios. Managers of firms with low stock prices due to earnings restatements arising from greater disclosure after SOX may choose not to further depress their stock prices by issuing more equity (Myers and Majluf 1984) and opt for debt financing.

Using the Kothari, Leone, and Wasley (KLM 2005) model to measure earnings management, I find that firms that manage earnings aggressively (modestly) decrease (increase) their leverage ratios post-SOX. Firms are said to aggressively manage earnings if their ratio of unexplained to total accruals equals or exceeds the median value. Listing status does not affect firms that aggressively manage earnings prior to SOX, possibly because the market punishes firms for earnings management without regard to the country of listing. However, firms that modestly manage earnings prior to SOX tend to increase their long-term debt ratios.

This paper contributes to three aspects of the finance and accounting literature. First, this analysis adds to the literature that examines the interplay between firms' information environment and their capital structure (Myers and Majluf, 1984; Titman and Wessels, 1988; Easley and O'Hara, 2004; Agarwal and O'Hara, 2008). By using SOX to represent an exogenous change in firms' information environment, I am able to overcome the potential endogeneity between information environment and capital structure. As such, I document higher post-SOX long-term debt ratios of U.S. firms listed in the U.S. but no change in the debt ratios of Canadian firms cross-listed in the U.S., relative to a control group of firms (Canadian firms listed in Canada).

Second, this paper also adds to the literature on the effect of exogenous regulatory change on investors or managers (Dahya, McConnell, and Travlos, 2002; Greenstone, Oyer, and Vissing-Jorgensen, 2005; Jorion, Liu, and Shi, 2005; Gomes, Gorton, and Madureira, 2007) by documenting the effect of SOX on managers' financing patterns. Third, this analysis contributes to the large literature on SOX (e.g., Holmstrom and Kaplan, 2003; Chhaochharia and Grinstein, 2007; Hochberg, Sapienza, and Vissing-Jorgensen, 2009) for straightforward reasons.

The remainder of this paper is organized as follows. Section 1 describes the data used in this analysis. Section 2 presents the methodology and data. Section 3 contains empirical results. Section 4 contains robustness tests. Section 5 concludes.

Chapter Two: Data

The data set used in this analysis consists of firm-quarters that meet the following criteria: (1) in Compustat from 2000 to 2004, (2) active, (3) not an American Depository Receipt (ADR) or foreign government, (4) positive and non-missing book value of assets, book value of debt, and revenue, (5) headquartered in either the U.S. or Canada, (6) traded in the U.S. or Canada, (7) non-negative quarterly closing prices, and (8) not a utility (SIC codes 4000-4999) or financial firm (SIC codes 6000-6999). Since the cross-listed Canadian firms used in this study are traded on U.S. exchanges and are not represented by indirect ownership of shares held on deposit in a Canadian bank, the cross-listed Canadian firms are not ADRs.

The U.S. exchanges included in this analysis are the New York, American, and Boston Stock Exchanges, the Midwest, Pacific, and Philadelphia Exchanges, the Over-the-Counter Bulletin Board, and the NASDAQ-NMS Stock Market. The Toronto, Montreal, Canadian Venture, and Alberta Stock Exchanges in Canada are used.

Chapter Three: Approach and Variables

The goal of this analysis is to test pre- and post-SOX differences in the capital structure of firms traded in the U.S. versus those headquartered and traded in Canada. I measure capital structure based on the book long-term debt ratio, defined as the ratio of the book value of long-term debt to the book value of total assets. I use long-term debt because it more closely reflects substantial financing and, unlike total debt, is not subject to short-term fluctuations in borrowing (e.g., for payroll). The null and alternative hypotheses for long-term debt use after SOX are below.

H_0: *The post-SOX long-term debt ratios of U.S.-listed firms, whether based in the U.S. or Canada, do not differ from those of Canadian firms listed in Canada.*

H_1: *The post-SOX long-term debt ratios of U.S.-listed firms, whether based in the U.S. or Canada, differ from those of Canadian firms listed in Canada.*

To test the above hypotheses, I segment the data into four categories and use both static and differences-in-differences approaches. The first category consists of firms headquartered and traded in Canada. These firms are considered the control group because they are not subject to SOX. SOX applies only to firms listed in the U.S., regardless of where the firms are headquartered. The second category consists of U.S.-based firms listed in the U.S. The third category is comprised of Canadian firms cross-listed in the U.S. The fourth category is composed of all firms listed in the U.S., regardless of where they are based. Thus, the fourth category of firms consists of firms in the second and third categories. Firms in the second, third and fourth categories are subject to SOX because they are listed on a U.S. exchange.

Segmenting the sample in the above manner facilitates testing SOX's impact on all U.S.-listed firms in my sample as well as specific categories of firms (i.e., Canadian firms cross-listed in the U.S and U.S.-based firms listed in the U.S.). Comparing the long-term debt ratios of firms in the control group (Canadian firms based and traded in Canada) with those of the fourth category (all firms traded in the U.S., whether based in the U.S. or Canada) tests the overall effect of SOX. Also, comparing the debt ratios of firms in the control group with those of the second (U.S.-based firms listed in the U.S.) and third categories (Canadian firms cross-listed in the U.S.) tests the effect of SOX on specific categories of firms listed on a U.S. exchange.

If SOX increases the level of unfavorable information in the market, lower stock prices and managerial reluctance to finance projects externally via debt or equity may result. However, if managers decide to raise capital externally after SOX, I expect them to prefer debt to equity as the pecking-order model states. The reason is that, since stock prices are already lower due to the release of harmful information, managers will not wish to conduct SEOs to further lower their firms' stock prices (Myers and Majluf, 1984). This expectation holds particularly for firms that highly managed earnings before SOX since those firms take strong measures to smooth earnings. Since SOX is associated with more conservative earnings (Cohen, Dey, and Lys, 2008), the reported earnings of firms that highly manage earnings before SOX will differ greatly after SOX. Ceteris paribus, greater earnings volatility will lead to greater changes in share prices than for firms that manage earnings lightly prior to SOX. Clearly, managers of high-earnings-management firms will be less willing to conduct SEOs in the wake of lower prices post-SOX.

Firm fixed effects may exist in the raw data because some firm characteristics change little in successive quarters. Such clustering of values of an independent variable leads to low standard errors, high t-statistics, and an overstated effect of that variable on the dependent variable. An example of firm fixed effects relates to capital structure itself, as debt ratios typically do not change much from one quarter to the next. Another example of firm fixed effects relates to dividends, as Lintner (1956) finds that dividends are sticky because managers tend to raise the dividend only when they believe that higher earnings can be sustained for the foreseeable future.

To address firm fixed effects that may exist in levels and ratios, I regress average capital structures on the average values of firm characteristics (Kennedy 2003). More specifically, I average each firm's pre- and post-SOX observations, resulting in one pre-SOX and one post-SOX observation per firm. I then regress average pre- and post-SOX long-term debt ratios on each firm's average characteristics.

To examine changes in financing patterns, I regress changes in quarterly long-term debt ratios on changes in firm characteristics. Since using changes introduces variability, fixed effects are mitigated via this approach.

Similar to models used in Meyer (1995), Leary (2009), and others, I estimate the model below in both static and differences-in-differences approaches:

$$D/A_{it} = b_0 + b_1\, SOX_t + b_2\, LISTING + b_3\, SOX{*}LISTING + b_4\, X'_{i,t-1}B + b_5\, Z'_{t-1}C + \varepsilon_{it} \quad (1)$$

The coefficient of primary interest is b_3, which captures the variation in debt ratios arising from SOX based on listing location relative to Canadian firms listed in Canada. The coefficient b_1 reflects changes in the debt ratio over the pre- and post-SOX periods that (1) are common to the control and test firms and (2) would exist even in the absence of SOX. The coefficient b_2 reflects differences (before the passing of SOX) in the mean debt ratio between two groups of firms. The sample of firms remains the same before and after SOX, reducing biases due to changes in the sample.

D/A_t, the book long-term debt ratio at time t, is the dependent variable. SOX is a dummy variable that equals one for all time periods on or after July 30, 2002, (the passage date of SOX) and zero otherwise. SOX is subscripted with "t" to highlight the time dimension. LISTING takes on one of three values: U.S.-LISTED, U.S. IN U.S., and X-LISTED. U.S.-LISTED is a dummy variable that equals one if a firm is listed on a U.S. exchange, regardless of whether the firm is based in the U.S. or Canada. Otherwise, U.S.-LISTED equals zero. U.S. IN U.S. is a dummy variable that equals one if a firm is both based and listed in the U.S. Otherwise, U.S. IN U.S. equals zero. X-LISTED is a dummy variable that equals one if a firm is based in Canada and cross-listed in the U.S. Otherwise, X-LISTED equals zero.

X_{it-1} is a matrix of firm characteristics that vary over time, while Z_{t-1} contains market and macroeconomic variables. The variables contained in those matrices are described in detail below.

VWMKTRET is the lagged (i.e., at time t-1) value-weighted market return, excluding dividends, found in CRSP. Shiller (1990) hypothesizes that the equity market is susceptible to investors' over-optimism, which leads investors to increase their demand for shares, bidding up prices. Supporting Shiller's (1990) hypothesis, Loughran and Ritter (1995, 1997) and Baker and Wurgler (2002) suggest that managers try to issue overpriced stock when the market is hot. In addition, Bayless and Chaplinsky (1996) find that a window of opportunity exists for SEOs, suggesting that managers conduct SEOs while conditions are favorable (i.e., strong equity market). As a result, I expect a high (low) market return to be associated with more (less) equity financing and lower (higher) long-term debt ratios.

To measure cash-flow commitment, I use the natural log of total dividends paid (DIV), computed as the quarter-end dividend per share times the number of outstanding common shares. The extent to which a firm's cash flows are committed to suppliers of capital can impact whether or not it raises external capital in general and, more specifically, whether it issues debt or common equity. For example, if a firm has a high dividend, its managers might decide not to issue more stock so that additional dividend payments will not burden the firm. If a firm has a low dividend, its managers might decide to issue additional equity because the existing dividend level may not be burdensome.

Firm size is measured in two ways. One variable is SIZE, the natural log of the market value of assets at time t-1. The market value of assets equals the sum of the market values of debt and equity. The book value of debt is used to proxy for the market value of debt, and the market value of equity is the quarter-end number of outstanding shares multiplied by that quarter's closing share price. Another proxy for firm size is REVENUE, defined as the natural log of revenue at time t-1.

GROWTH controls for a firm's status as value or growth. Value or growth status is based on Tobin's q, defined as the market-to-book ratio of total assets. GROWTH equals one if Tobin's q exceeds one (i.e., if the firm is a growth firm) and zero otherwise. Whenever the market value of assets is used, I sum the market values of debt and equity, where the market value of equity is computed as the product of the quarter-end number of outstanding shares and price of common stock. I approximate the market value of debt by its book value.

To control for the interest-rate environment, I include the variable INTRATE10T, which measures the contemporaneous rate on the 10-year U.S. Treasury note during a quarter. I use the 10-year Treasury note rate to proxy for the investment environment because a 10-year period is an appropriate intermediate horizon that reflects both short- and long-term investment horizons.

The primary measure of earnings management, EARNMGMT, is the natural log of unexplained accruals at time t-1. Unexplained accruals are defined as the residuals from the Kothari, Leone, and Watts (KLW, 2005) model. The KLW (2005) model builds on the Jones (1991) earnings-management model by controlling for the ratio of net income to total assets, where net income can be defined in either lagged or contemporaneous terms.[1] Since other numerators in the model are defined contemporaneously, I use contemporaneous net income as well. The KLW (2005) model is shown below:

$$TA_{i,t}/A_{i,t-1} = \beta_{0i}\, 1/A_{i,t-1} + \beta_{1i}\, \Delta REV_{i,t}/A_{it-1} + \beta_{2i}\, PPE_{i,t}/A_{i,t-1} + \beta_{3i}\, NI_{i,t}/A_{i,t-1} + \varepsilon_{i,t} \quad (2)$$

In the Jones (1991) model, total accruals are defined as the change in non-cash working capital before income taxes payable minus total depreciation expense. Formulaically, total accruals for each firm in each quarter, $TA_{i,t}$, are computed as ΔCurrent Assets$_{i,t}$ – ΔCash$_{i,t}$ – ΔCurrent Liabilities$_{i,t}$ + ΔCurrent Maturities of Long-Term Debt$_{i,t}$ + ΔIncome Taxes Payable$_{i,t}$ – Depreciation and Amortization Expense$_{i,t}$, where the first five terms are the change in current assets, cash, current liabilities, long-term debt,

[1] For more earnings management models, see Healy (1985), DeAngelo (1986), Dechow, Sloan, and Sweeney (1996), Guay, Kothari, and Watts (1996), Teoh, Welch, and Wong (1998), and Ball and Shivakumar (2005, 2006, 2008).

and income taxes payable from period t-1 to period t, and Depreciation and Amortization $Expense_t$ is the value incurred during period t. $A_{i,t-1}$ is the book value of total assets for firm i at time t-1. $\Delta REV_{i,t}$ is the change in revenue for firm i from period t-1 to t. $PPE_{i,t}$ is gross property, plant, and equipment for firm i at time t. $NI_{i,t-1}$ is lagged net income (i.e., at time t-1) for firm i.

Larger values of the residual term $\varepsilon_{i,t}$ indicate larger unexplained portions of total accruals. In accordance with the aforementioned papers on earnings management, I determine the firms within each industry that manage earnings more than their industry average before SOX. Each industry is defined as a one-thousand-value range of SIC codes. For example, the SIC range from 3000 to 3999 is defined as one industry, while the SIC code range 5000 to 5999 is defined as another industry.

I also estimate a model that uses changes in debt ratios as well as the controls described earlier in this paper. To examine the way financing patterns change on a quarterly basis, I regress quarterly changes in the book long-term debt ratio against quarterly changes from t-1 to t in the control variables described in Model (1).

Chapter Four: Results

Table 1 summarizes the data and presents the results of t-tests of differences relative to Canadian firms listed in Canada, the control group in this study. The data set consists mostly of U.S. firms listed on a U.S. exchange, while Canadian firms cross-listed in the U.S. comprise the smallest number of firms.

In terms of the variable of interest, the long-term book debt ratio, U.S. firms listed in the U.S. have an average ratio of 22%. This value is greater than the debt ratio for Canadian firms listed in Canada, which have an average ratio of 19%. All firms listed in the U.S., whether based in the U.S. or Canada, have an average long-term book debt ratio of 21%, which exceeds that of the control group. However, the book long-term debt ratios of Canadian firms cross-listed on a U.S. exchange do not differ from those of Canadian firms listed in Canada. Firms in the control group are smaller than firms in the other categories with respect to market value of assets, book value of assets, and growth as measured by the market-to-book ratio.

Table 2 presents pre- and post-SOX long-term book debt ratios and the results of t-tests of differences relative to Canadian firms listed in Canada, the control group. The overall point of Table 2 is that the debt ratios of U.S. firms listed in the U.S. as well as all U.S.-listed firms, whether based in Canada or the U.S., exceed those of Canadian firms listed in Canada both pre- and post-SOX. The pre- and post-SOX debt ratios for Canadian firms cross-listed in the U.S. generally do not differ from those of Canadian firms listed in Canada.

Panel A shows that, overall, the long-term debt ratios for all firms listed in the U.S. are higher than those for Canadian firms listed in Canada both pre- and post-SOX. Also, the differences in debt ratios of Canadian firms listed in Canada and those of all U.S.-listed firms are driven by U.S. firms listed in the U.S. Similar results hold overall for Panel B, which breaks out firms by Tobin's q, defined as the market-to-book value of assets.

Although not shown, t-tests of long-term leverage ratios within each group (i.e., the pre-SOX debt ratio for Canadian firms listed in Canada vs. the post-SOX debt ratio for that group) are insignificant. This result implies that, in the univariate case, the long-term debt ratios of each group do not change after SOX.

A greater number of firms in the pre-SOX period in Panel B, which breaks out firms by the market-to-book ratio of assets, means that more firms transition from value to growth status in the pre-SOX period, implying that fewer firms become growth firms in the post-SOX period. A lower number of growth firms post-SOX may imply that fewer firms take risky positive-net-present-value projects, supporting the argument that SOX is associated with lower risk-taking (Bargeron, Lehn, and Zutter, 2010).

Table 3 contains univariate results of t-tests of quarterly changes in different combinations of U.S.-listed firms relative to Canadian firms listed in Canada (the control group) during the pre- and post-SOX periods. The main point of Table 3 is that, prior to SOX, U.S.-listed firms increase their quarterly debt ratios on average, leading to the higher debt ratios shown in Table 2. U.S. firms headquartered and listed in the U.S. drive this result.

For example, Panel A of Table 3 shows that, prior to SOX, all U.S.-listed firms experience an average quarterly increase of five basis points (0.0005) relative to the control firms, which lower their debt ratios by 60 basis points (-0.0060). U.S. firms listed in the U.S. drive this result, as those firms raise their pre-SOX long-term debt ratios by nine basis points (0.0009) while Canadian firms cross listed in the U.S. change their debt ratios in a fashion similar to the control firms. Since small firms (i.e, with a market capitalization not exceeding $1 billion) listed in the U.S. lower their long-term debt ratios by eight basis points (-0.0008) per quarter, large U.S. firms traded in the U.S. drive the above results.

Panel B of Table 3 shows that U.S.-listed growth firms, led by those headquartered in the U.S., increase their long-term leverage on a quarterly basis relative to Canadian firms listed in Canada. Both Panels A and B show that no difference in capital structure change exists for any subgroup relative to control firms.

Table 4 contains results of multivariate regressions of levels of debt ratios against market and firm characteristics. The results generally confirm the pattern found in the univariate results in Tables 2 and 3. The main point of Table 4 is that, when controlling for several factors that influence debt ratios, U.S.-listed firms increase their long-term debt ratios after SOX relative to Canadian firms listed in Canada (the control group). U.S.-based and -listed firms drive this result. The long-term debt ratios of Canadian firms cross-listed in the U.S. do not change relative to control firms. An explanation is that cross-listed firms may choose to report earnings based on Canadian GAAP, U.S. GAAP, or International Accounting Standards (IAS) GAAP (Rouse, 2003). Because of the lack of conformity among various accounting rule sets, cross-listed firms have more latitude in reporting their earnings, which might be perceived as smoother compared to U.S.-based firms, which use U.S. GAAP rules.[2]

In Table 4, Models (1) and (2), which compare the long-term debt ratios of all U.S.-listed firms (whether based in the U.S. or Canada) to the control firms, show that, in the SOX era, firms listed in the U.S. on average have higher long-term leverage ratios. The interaction term, SOX*U.S.-LISTED, indicates that U.S.-listed firms have long-term debt ratios after SOX that differ from pre-SOX levels. The magnitude of the increase in long-term debt ratios is 2.3 to 3.2 percentage points, depending on the model estimated. In Models (3) and (4), the interaction term, SOX*U.S. IN U.S., shows that, in the SOX era, U.S.-based firms that are listed in the U.S. have higher long-term debt ratios by 2.6 or 3.2 percentage points, depending on the model used, relative to control firms. However, in Models (5) and (6), the interaction term, SOX*X-LISTED, shows that, after SOX, Canadian firms cross-listed in the U.S. do not change their long-term debt ratio levels compared to control firms.

The stand-alone variable SOX captures the general change in the level of long-term debt ratios for all firms after SOX. All models in Table 4 indicate that, for the average firm in the sample (including both control and test firms), there is no change in the long-term debt ratio after SOX. This result follows from the insignificance of the dummy variable SOX. Also, across all models, the lagged level of dividends (DIV) is directly related to long-term leverage. This finding makes sense because, as managers commit more of a firm's profits to paying dividends, they signal the strength of their

[2] John Kelly, Audit Partner at the Canadian accounting firm of Scarrow and Donald LLP, suggests that different accounting standards lack general conformity and argues in favor of uniform accounting rules worldwide. See http://www.acsbcanada.org/documents/item19697.pdf.

firms' cash flows. Cash-flow strength will make a firm more attractive to lenders, likely increasing leverage.

Table 4 also shows that the 10-year Treasury rate (INTRATE10T) does not affect leverage ratios over the sample period. This result requires explanation. Typically, a negative relationship between the interest rate environment and leverage might be expected because lower rates make debt cheaper, increasing its attractiveness. However, the lack of a relationship between leverage and the interest rate found in this study can be explained as follows. The sample period, which runs from 2000 to 2004, covers a period during which consumers' expectations about the U.S. economy waned. Although Figure 1 shows that the National Association of Purchasing Managers' (NAPM) Index (now known as the Institute of Supply Management (ISM) Index) remains below 50 – indicating an economic slowdown – for much of the sample period prior to the end of 2003, the Index rises and remains above 50 for all of 2004, suggesting a more vibrant economy for the latter part of the sample. However, Figure 2 shows that the University of Michigan Consumer Sentiment Index falls over the period from 2000 to 2004, indicating consumers' declining confidence in the U.S. economy. Declining consumer sentiment manifests itself in less consumer spending and affects businesses via lower cash flows. Lower cash inflows mean that a firm's ability to repay debt is reduced. This situation will lead many firms to refrain from borrowing.

Table 4 shows that growth firms are associated with less debt, based on the negative coefficient for GROWTH. This finding is consistent with Titman and Wessels (1988), who find that growth firms prefer the flexible use of proceeds from equity offerings. In addition, high earnings management prior to SOX (EARNMGMT) is associated with lower long-term debt ratios. One reason is that, after the market punishes guilty firms with lower stock prices after learning about misreported earnings (e.g., Hand, Holthausen, and Leftwich, 1992; Michaley, Thaler, and Womack, 1995), managers of those firms may need to better position those firms to raise capital. Managers can do that by lowering the percentage of long-term debt and, simultaneously, interest payments so that lenders will not point out the firm's high leverage as a deterrent to lending to the firm. Also, making a firm attractive to lenders so that low-priced shares will not need to be issued to finance the firm is consistent with Myers and Majluf (1984).

Table 5 shows the results of the regressions of changes in long-term debt ratios before and after SOX. The results of Table 5 need to be interpreted in light of Table 4. Recall that Table 4 shows that, relative to the control firms, all U.S.-listed firms in general – and U.S.-based and -listed firms in particular – have higher long-term leverage ratios after SOX. The main point of Table 5 is that, after SOX, relative to Canadian firms listed in Canada, U.S.-listed firms in the aggregate do not change the rate of increase in their long-term debt ratios. This result is shown via the interaction term, SOX*U.S.-LISTED. This result also holds for the two subgroups – namely, U.S.-based and -listed firms as well as Canadian firms cross-listed in the U.S, as shown by SOX*U.S. IN U.S. and SOX*X-LISTED, respectively. Also, in all models in Table 5, the stand-alone variable SOX indicates that all firms in the sample (whether control or test firms) do not change the rate of change in their long-term debt ratios compared to before SOX.

Table 6 shows quarterly changes in long-term debt ratios surrounding SOX and is useful in explaining the lack of significance of the interaction terms in Table 5. Consistent with Bebchuk and Neeman (2010), Table 6 suggests that managers increased leverage in anticipation of SOX. Table 6 shows that all firms in the sample increase leverage from time *t-3* to time *t-2*, where time t is the quarter in which SOX is ratified. Although firms decrease leverage from *t-2* to *t-1*, the net change for long-term leverage is positive leading up to time *t*. This result also holds for all U.S.-listed firms and is driven by U.S.-based and -listed firms. However, Canadian firms cross-listed in the U.S. and their Canada-listed counterparts reduce leverage prior to SOX.

Table 7 shows the results of the regressions of changes in short-term debt ratios before and after SOX. Analyzing short-term debt use is important because firms may decide to issue short-term debt instead of long-term debt. Flannery (1986) argues that firms with lower information asymmetry will be less concerned than firms with high information asymmetry about signaling their value via issuing debt of a specific maturity, making those firms more likely to issue long-term debt. However, if SOX reduces information asymmetry in the overall market, making firms more transparent in general, firms could issue greater amounts of short-term debt for the same reason that they might issue long-term debt.

Table 7 shows that the stand-alone variable SOX and the interaction terms alone do not explain short-term debt use. This result is not surprising since short-term debt is less sensitive to information asymmetry compared to long-term debt. The interaction terms suggest that, after SOX, a firm's listing location does not affect its short-term debt use.

For completeness, I also examine changes in book equity ratios after SOX. Managers might substitute equity for debt if the cost of debt is too high or if they wish to lower their firms' debt ratios. Although not shown, no sub-group of firms – control firms, U.S.-listed firms, U.S.-based and -listed firms, or Canadian firms cross-listed in the U.S. – changes its rate of change in book equity ratios post-SOX.

Table 8 contains regression results based on earnings management prior to SOX. The sample is broken out into firms that manage earnings aggressively versus modestly before SOX. A firm is said to aggressively manage earnings if its ratio of unexplained accruals to total accruals exceeds 50%. For high-earnings-management firms, the dummy variable SOX is generally associated with lower leverage for all firms in the sample. While the interaction (difference-in-difference) terms alone do not explain leverage use for high-earnings-management firms after SOX, the interaction terms explain higher leverage use in low-earnings-management firms after SOX.

Table 1 – Summary Statistics

Listing Status	N	MV Assets (in US$ bil.)	BV Assets (in US$ bil.)	Debt Ratio	M/B
CAN Firms Listed in CAN	579	0.53	0.39	0.19	1.83
U.S. Firms Listed in the U.S.	2324	3.91***	1.77***	0.22***	2.55***
CAN Firms Cross-Listed in the U.S.	129	2.15***	1.37***	0.18	2.42***
All Firms Listed in the U.S.	2453	3.82***	1.74***	0.21***	2.54***
All	3032	3.19	1.49	0.21	2.41

Table 2 – Pre- versus Post-SOX Debt Ratios

Panel A – Breakout by Market Value of Assets

	Pre-SOX				Post-SOX			
MV ($ Bil.)	CAN Firms Listed in CAN	U.S. Firms Listed in the U.S.	CAN Firms Cross-Listed in the U.S.	All Firms Listed in the U.S.	CAN Firms Listed in CAN	U.S. Firms Listed in the U.S.	CAN Firms Cross-Listed in the U.S.	All Firms Listed in the U.S.
≤ 1	0.18	0.18	0.15	0.18	0.17	0.18	0.13**	0.18
	(533)	(1733)	(100)	(1833)	(525)	(1688)	(96)	(1784)
> 1	0.30	0.27	0.27	0.27	0.30	0.29	0.28	0.29
	(73)	(984)	(48)	(1032)	(80)	(904)	(47)	(951)
All	0.19	0.21**	0.21	0.21**	0.18	0.22***	0.18	0.22***
	(606)	(2717)	(148)	(2865)	(605)	(2592)	(143)	(2735)

Panel B – Breakout by Tobin's Q

	Pre-SOX				Post-SOX			
Value/ Growth	CAN Firms Listed in CAN	U.S. Firms Listed in the U.S.	CAN Firms Cross-Listed in the U.S.	All Firms Listed in the U.S.	CAN Firms Listed in CAN	U.S. Firms Listed in the U.S.	CAN Firms Cross-Listed in the U.S.	All Firms Listed in the U.S.
Value	0.18	0.22***	0.19	0.22***	0.17	0.21***	0.13	0.21***
(q ≤ 1)	(267)	(882)	(47)	(929)	(219)	(735)	(33)	(768)
Growth	0.19	0.21**	0.18	0.21**	0.18	0.22***	0.19	0.22***
(q > 1)	(515)	(2245)	(122)	(2367)	(505)	(2222)	(125)	(2347)
All	0.19	0.22***	0.19	0.21***	0.18	0.22***	0.18	0.21***
	(782)	(3127)	(169)	(3296)	(724)	(2957)	(158)	(3115)

Table 3 – Changes in Debt Ratios

Panel A – Breakout by Market Value of Assets

	Pre-SOX				Post-SOX			
MV ($ Bil.)	CAN Firms Listed in CAN	U.S. Firms Listed in the U.S.	CAN Firms Cross-Listed in the U.S.	All Firms Listed in the U.S.	CAN Firms Listed in CAN	U.S. Firms Listed in the U.S.	CAN Firms Cross-Listed in the U.S.	All Firms Listed in the U.S.
≤ 1	-0.0080	-0.0003 *	-0.0091	-0.0008 *	-0.0040	-0.0006	0.0003	-0.0006
	(533)	(1733)	(100)	(1833)	(525)	(1688)	(96)	(1784)
> 1	0.0087	0.0031	-0.0040	0.0028	0.0007	-0.0009	0.0087	-0.0005
	(73)	(984)	(48)	(1032)	(80)	(904)	(47)	(951)
All	-0.0060	0.0009**	-0.0074	0.0005**	-0.0034	-0.0007	0.0031	-0.0005
	(606)	(2717)	(148)	(2865)	(605)	(2592)	(143)	(2735)

Panel B – Breakout by Tobin's Q

	Pre-SOX				Post-SOX			
Value/ Growth	CAN Firms Listed in CAN	U.S. Firms Listed in the U.S.	CAN Firms Cross-Listed in the U.S.	All Firms Listed in the U.S.	CAN Firms Listed in CAN	U.S. Firms Listed in the U.S.	CAN Firms Cross-Listed in the U.S.	All Firms Listed in the U.S.
Value	0.0007	-0.0032	-0.0084	-0.0035	0.0007	0.0009	0.0022	0.0009
($q \leq 1$)	(267)	(882)	(47)	(929)	(219)	(735)	(33)	(768)
Growth	-0.0066	0.0009**	-0.0080	0.0004*	0.0037	-0.0011	0.0027	-0.0009
($q > 1$)	(515)	(2245)	(122)	(2367)	(505)	(2222)	(125)	(2347)
All	-0.0041	-0.0003	-0.0081	-0.0007	-0.0023	-0.0006	0.0026	-0.0004
	(782)	(3127)	(169)	(3296)	(724)	(2957)	(158)	(3115)

Table 4 – Regressions of Long-Term Debt Ratios

	Relative to Control Group (Canadian Firms Listed in Canada)					
Dependent Variable:	All U.S.-Listed Firms		U.S. Firms Listed in U.S.		Canadian Firms Cross-Listed in U.S.	
BLTD	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	0.151***	0.076	0.092*	0.126**	0.068	-0.068
	(2.93)	(1.51)	(1.75)	(2.36)	(0.72)	(-0.73)
SOX	-0.009	-0.016	-0.017	-0.008	-0.009	-0.010
	(-0.79)	(-1.45)	(-1.52)	(-0.65)	(-0.74)	(-0.86)
U.S.-LISTED	0.001	-0.019**				
	(0.09)	(-2.10)				
SOX*U.S.-LISTED	0.023*	0.032***				
	(1.91)	(2.67)				
U.S. IN U.S.			-0.017*	0.011		
			(-1.89)	(1.20)		
SOX*U.S. IN U.S.			0.032***	0.026**		
			(2.63)	(2.09)		
X-LISTED					-0.028*	-0.032*
					(-1.68)	(-1.94)
SOX*X-LISTED					0.019	0.021
					(0.85)	(0.93)
DIV	0.019***	0.016***	0.016***	0.040***	0.024***	0.030***
	(6.24)	(5.89)	(5.52)	(16.19)	(3.41)	(4.69)
INTRATE10T	1.417	1.303	1.028	1.745	2.458	3.776*

	(1.34)	(1.25)	(0.95)	(1.58)	(1.25)	(1.94)
GROWTH	-0.046***	-0.054***	-0.056***	-0.031***	-0.005	-0.009
	(-5.78)	(-6.77)	(-6.83)	(-3.79)	(-0.38)	(-0.72)
MKTRET	-0.624**	-0.604**	-0.595**	-0.658**	-0.684	-0.550
	(-2.32)	(-2.28)	(-2.17)	(-2.35)	(-1.55)	(-1.25)
EARNMGMT	-0.045***	-0.043***	-0.044***	-0.046***	-0.094***	-0.096***
	(-4.77)	(-4.60)	(-4.59)	(-4.70)	(-7.97)	(-8.11)
PROFITABILITY	0.022***				0.030***	
	(11.37)				(7.04)	
MKTVAL		0.022***	0.022***			0.020***
		(15.85)	(15.11)			(7.13)
H0: b1 + b3 = 0	p = 0.0695	p = 0.042				
H0: b1 + b5 = 0			p = 0.068	p = 0.026		
H0: b1 + b7 = 0					p = 0.635	p = 0.628
N	5562	5562	5313	5313	1333	1333
Adj. R^2	0.081	0.101	0.096	0.057	0.143	0.144
F	55.72	70.14	63.76	41.40	25.70	25.87
Pr > F	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001

Table 5 – Regressions of Quarterly Changes in Long-Term Debt Ratios

Dependent Variable: BLTD	Relative to Control Group (Canadian Firms Listed in Canada): All U.S.-Listed Firms (1)	(2)	U.S. Firms Listed in U.S. (3)	(4)	Canadian Firms Cross-Listed in U.S. (5)	(6)
Intercept	-0.001	-0.001	-0.002	-0.001	-0.001	0.001
	(-1.02)	(-0.54)	(-1.06)	(-0.51)	(-0.57)	(0.17)
SOX	-0.001	-0.002	-0.001	-0.002	-0.001	-0.002
	(-0.33)	(-0.67)	(-0.28)	(-0.67)	(-0.14)	(-0.69)
U.S.-LISTED	0.002	0.001				
	(1.15)	(0.60)				
SOX*U.S.-LISTED	-0.001	-0.001				
	(-0.55)	(-0.25)				
U.S. IN U.S.			0.002	0.001		
			(1.26)	(0.62)		
SOX*U.S. IN U.S.			-0.002	-0.001		
			(-0.65)	(-0.30)		
X-LISTED					0.001	0.001
					(0.34)	(0.12)
SOX*X-LISTED					0.001	0.002
					(0.19)	(0.34)
ΔDIV	0.003**	0.003**	0.003**	0.003***	0.002	0.003

	(2.26)	(2.42)	(2.52)	(2.66)	(1.23)	(1.59)
ΔINTRATE10T	-1.559***	-1.509***	-1.565***	-1.520***	0.350	-0.620
	(-7.04)	(-6.78)	(-6.82)	(-6.59)	(1.64)	(-1.35)
GROWTH	0.001	0.001	0.001	0.001	-0.001	-0.001
	(0.43)	(0.54)	(0.33)	(0.48)	(-0.37)	(-0.53)
ΔMKTRET	0.050***	0.051***	0.050***	0.052***	0.039*	0.041**
	(4.99)	(5.16)	(4.90)	(5.10)	(1.89)	(1.98)
EARNMGMT	0.007***	0.007***	0.007***	0.007***	0.005**	0.005**
	(4.22)	(4.25)	(4.28)	(4.30)	(2.25)	(2.30)
ΔMVASSETS	0.002***		0.003***		0.003***	
	(2.92)		(3.18)		(3.30)	
ΔREVENUE		0.002**		0.002***		0.010***
		(2.54)		(1.99)		(7.10)
H0: b1 + b3 = 0	p =0.043	p = 0.042				
H0: b1 + b5 = 0			p = 0.037	p = 0.037		
H0: b1 + b7 = 0					p = 0.893	p = 0.984
N	32042	32042	30719	30719	6567	6567
Adj. R^2	0.003	0.003	0.003	0.003	0.003	0.009
F	12.24	12.01	11.51	12.19	3.23	7.63
Pr > F	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.0007	< 0.0001

Table 6 – Summary Statistics of Quarterly Changes in Long-Term Debt Ratios Surrounding SOX

	t-3	t-2	t-1	t	t+1	
Full Sample	-0.000	0.006***	-0.004***	-0.002	0.001	
		(2.42)	(-2.69)	(0.31)	(1.34)	
All U.S.-Listed Firms	-0.001	0.006**	-0.001*	0.000	0.001	
		(2.56)	(1.85)	(0.29)	(0.09)	
U.S.-Based and	-0.002	0.007***	-0.001**	0.001	0.001	
-Listed Firms		(2.79)	(-2.04)	(0.61)	(0.28)	
CAN Firms Cross-	0.008	-0.005*	0.009	-0.016**	0.004**	
Listed in U.S.		(-1.68)	(1.63)	(-2.63)	(2.53)	
CAN Firms Listed	0.005	0.005	-0.019**	-0.018	0.003**	
in CAN			(0.07)	(-2.21)	(0.01)	(2.15)

Table 7 – Regressions of Quarterly Changes in Short-Term Debt Ratios

	Relative to Control Group (Canadian Firms Listed in Canada)					
Dependent Variable:	All U.S.-Listed Firms		U.S. Firms Listed in U.S.		Canadian Firms Cross-Listed in U.S.	
BSTD	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	0.001	0.001	0.001	0.001	-0.001	0.001
	(0.36)	(0.83)	(0.20)	(0.75)	(-0.21)	(0.19)
SOX	0.003	0.002	0.003	0.002	0.003	0.002
	(1.24)	(0.92)	(1.29)	(0.91)	(1.03)	(0.75)
U.S.-LISTED	-0.001	-0.002				
	(-0.72)	(-1.21)				
SOX*U.S.-LISTED	-0.001	0.001				
	(-0.17)	(0.13)				
U.S. IN U.S.			-0.001	-0.002		
			(-0.59)	(-1.19)		
SOX*U.S. IN U.S.			-0.001	0.001		
			(-0.24)	(0.12)		
X-LISTED					-0.003	-0.004
					(-0.92)	(-1.05)
SOX*X-LISTED					0.001	0.002
					(0.22)	(0.31)
ΔDIV	-0.001	-.002	-0.001	-0.002	-0.004	-0.003
	(-1.08)	(-1.35)	(-1.15)	(-1.48)	(-1.63)	(-1.59)
ΔINTRATE10T	-1.096***	-0.851***	-1.102***	-0.826***	-1.335***	-0.889*

	(-4.84)	(-3.75)	(-4.71)	(-3.52)	(-2.68)	(-1.77)
GROWTH	-0.001	-0.001	-0.001	-0.001	0.002	0.001
	(-0.26)	(-0.45)	(-0.13)	(-0.29)	(0.63)	(0.44)
ΔMKTRET	-0.019*	-0.018*	-0.021**	-0.019*	-0.014	-0.014
	(-1.86)	(-1.75)	(-1.96)	(-1.84)	(-0.64)	(-0.60)
EARNMGMT	-0.001	-0.001	-0.001	-0.007	-0.003	-0.003
	(-0.17)	(-0.10)	(-0.15)	(-0.07)	(-1.33)	(-1.30)
ΔMVASSETS	0.001*		0.002**		0.001	
	(1.66)		(1.99)		(1.16)	
ΔREVENUE		0.010**		-0.001		0.010***
		(11.42)		(-0.07)		(6.67)
H0: b1 + b3 = 0	p =0.023	p = 0.022				
H0: b1 + b5 = 0			p = 0.030	p = 0.028		
H0: b1 + b7 = 0					p = 0.436	p = 0.467
N	32042	32042	30719	30719	6567	6567
Adj. R^2	0.001	0.005	0.001	0.005	0.001	0.008
F	4.06	18.26	4.01	19.06	1.76	6.57
Pr > F	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.071	< 0.0001

Table 8 – Regressions of High- versus Low-Earnings-Management Firms

	High Earnings Management			Low Earnings Management		
	(1)	(2)	(3)	(1)	(2)	(3)
Intercept	0.071	0.091	-0.086	0.062	0.076	0.035
	(0.86)	(1.06)	(-0.61)	(0.97)	(1.17)	(0.26)
SOX	-0.032*	-0.033*	-0.17	0.012	0.10	0.007
	(-1.85)	(-1.88)	(-0.89)	(0.79)	(0.69)	(0.43)
U.S.-LISTED	-0.015			-0.008		
	(-1.11)			(-0.62)		
SOX*U.S.-LISTED	0.003			0.038**		
	(0.14)			(2.42)		
U.S. IN U.S.		-0.013			-0.005	
		(-0.94)			(-0.38)	
SOX*U.S. IN U.S.		0.001			0.038**	
		(0.07)			(2.36)	
X-LISTED			-0.025			-0.068***
			(-1.09)			(-2.73)
SOX*X-LISTED			0.006			0.058*
			(0.16)			(1.86)
DIV	0.009**	0.009**	0.020**	0.018***	0.018***	0.039***
	(2.21)	(2.00)	(1.97)	(4.75)	(4.59)	(4.57)
GROWTH	-0.024*	-0.027**	0.022	-0.082***	-0.083***	-0.037**

	(-1.89)	(-2.04)	(1.03)	(-8.25)	(-8.09)	(-2.33)
INTEREST	1.208	0.831	4.167	1.497	1.222	1.664
	(0.71)	(0.47)	(1.42)	(1.15)	(0.92)	(0.61)
MKTRET	-1.315***	-1.340***	-2.003***	-0.171	-0.141	0.166
	(-2.93)	(-2.87)	(-2.62)	(-0.53)	(-0.43)	(0.31)
MVASSETS	0.026***	0.026***	0.022***	0.021***	0.020***	0.017***
	(11.68)	(11.13)	(4.68)	(11.65)	(11.11)	(4.65)
H0: b1 + b3 = 0	p =0.017	p = 0.015				
H0: b1 + b5 = 0			p = 0.750	p < 0.0001		
H0: b1 + b7 = 0					p < 0.0001	p = 0.035
N	2433	2300	633	3129	3013	700
Adj. R^2	0.124	0.118	0.115	0.103	0.098	0.110
F	44.08	39.47	11.23	45.64	41.99	11.81
Pr > F	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001

Chapter Five: Robustness Tests

This section contains the results of robustness tests based on business' and households' perceptions of the U.S. economy. To control for the outlook of managers on the economy, I include the National Association of Purchasing Managers' (NAPM), now known as the Institute of Supply Management (ISM), Index. Values of the ISM Index over 50 are traditionally assumed to indicate economic expansion, while values of at most 50 are assumed to suggest an economic slowdown. To control for households' view of the U.S. economy, I use the University of Michigan's Consumer Sentiment Index (CSI). Higher (Lower) values of the CSI suggest that household consumers are more (less) confident about the current and future overall economy as well as their own financial well-being. Thus, high (low) values of the CSI imply that household consumers might increase (decrease) consumption and personal investment. Greater investment on the part of consumers will increase volume and liquidity in the stock market, possibly increasing the attractiveness of new or seasoned equity issues. Lower levels of investment on the part of consumers will make issuing equity less attractive. This situation will lead to higher long-term debt ratios if managers choose to issue long- rather than short-term debt.

Table 9 contains the results of robustness tests while controlling for changes in purchasing managers' views of the economy via the ISM Index. To capture suppliers' views of the economy, I include ΔNAPMISM in all six regression models. ΔNAPMISM equals one if ISM Index increases between two successive quarters and zero otherwise. Thus, a value of one for ΔNAPMISM indicates that suppliers' expectations of economic performance increase from one quarter to the next. A value of zero suggests that the economic outlook of suppliers either does not change or decreases between two successive quarters.

The stand-alone variable SOX indicates that firms in the sample do not change the rate of increase in their long-term debt ratios after SOX. Also, the three interaction terms – SOX*U.S.-LISTED, SOX*U.S. IN U.S., and SOX*X-LISTED – indicate that, in the SOX era, listing location is robust to changes in suppliers' economic expectations in that the changes in expectations do not affect the rate of change in long-term leverage after SOX.

Table 10 contains the results of robustness tests based on the direction of change in household consumers' views of the economy. To capture consumer sentiment, I include ΔUMICHCSI in regression models. ΔUMICHCSI equals one if the CSI Index moves upward between two successive quarters and zero otherwise. If consumer sentiment improves, consumers may expect their income to grow, enabling them to increase their investment in – and demand for – stocks and bonds. As in Table 9, Table 10 shows that firms in the sample do not change the rate of increase in their long-term debt ratios after SOX (i.e., the stand-alone variable SOX is not significant). Also, the three interaction terms – SOX*U.S.-LISTED, SOX*U.S. IN U.S., and SOX*X-LISTED – indicate that, in the SOX era, changes in consumer sentiment do not affect the rate of change in firms' long-term debt ratios.

Table 9 – Robustness Test Based on Quarterly Changes in Manufacturing Activity

This table contains the results of robustness tests based on manufacturing output, based on the National Association of Purchasing Managers' (NAPM) Index (now known as the Institute of Supply Management (ISM) Index). A value of the ISM Index over 50 suggests economic expansion, as managers of manufacturing firms increase production of goods. The dependent variable is the change in the book long-term debt ratio (BLTD) for U.S. and Canadian firms in Compustat from 2000 to 2004. The book long-term debt ratio is defined as the ratio of the book values of long-term debt to total assets. The book value of debt is used to proxy for the market value of debt. The market value of assets equals the market value of debt plus the market value of equity, defined as the product of the quarter-end number of outstanding common shares and the quarter-end stock price. SOX is a dummy variable that equals one on or after July 30, 2002, and zero otherwise. U.S.-LISTED is a dummy variable that equals one if a firm is listed on a U.S. exchange, regardless of whether the firm is based in the U.S. or Canada, and zero otherwise. U.S. IN U.S. is a dummy variable that equals one if a firm is based in the U.S. and listed in the U.S.; otherwise, U.S. IN U.S. equals zero. X-LISTED is a dummy variable that equals one if a firm is based in Canada and cross-listed in the U.S. and zero otherwise. ΔDIV is the natural log of the difference in contemporaneous and lagged total dividends. ΔINTRATE10T is the annual change in the 10-year Treasury rate. GROWTH is a dummy variable that equals one if a firm is a growth firm, defined as having Tobin's q > 1, and zero otherwise. Tobin's q is the market-to-book ratio of total assets. ΔMKTRET is the natural log of the change in the contemporaneous and lagged value-weighted market return found in CRSP. ΔMVASSETS is the natural log of the change in the contemporaneous and lagged value of the market value of assets. ΔREVENUE is the natural log of the change in the contemporaneous and lagged value of the market value of assets. EARNMGMT measures a firm's pre-SOX earnings management, defined as the residuals from the Kothari, Leone, and Wasley (2005) model. ΔNAPMISM is the change in the ISM Index value. *, **, and *** denote significance at the 10%-, 5%-, and 1% levels, respectively. T-values are in parentheses.

	Relative to Control Group (Canadian Firms Listed in Canada)					
Dependent Variable:	All U.S.-Listed Firms		U.S. Firms Listed in U.S.		Canadian Firms Cross-Listed in U.S.	
BLTD	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	-0.002	-0.001	-0.002	-0.001	-0.001	0.001
	(-1.03)	(-0.54)	(-1.07)	(-0.52)	(-0.52)	(0.20)
SOX	-0.001	-0.002	-0.001	-0.002	-0.001	-0.002
	(-0.33)	(-0.67)	(-0.28)	(-0.66)	(-0.15)	(-0.69)
U.S.-LISTED	0.002	0.001				

	(1.16)	(0.60)					
SOX*U.S.-LISTED	-0.001	-0.001					
	(-0.56)	(-0.25)					
U.S. IN U.S.			0.002	0.001			
			(1.29)	(0.64)			
SOX*U.S. IN U.S.			-0.002	-0.001			
			(-0.67)	(-0.31)			
X-LISTED						0.001	0.001
						(0.27)	(0.04)
SOX*X-LISTED						0.001	0.002
						(0.24)	(0.40)
ΔNAPMISM	0.001	0.001	0.001	0.001		-0.001***	-0.001***
	(0.23)	(0.10)	(0.65)	(0.49)		(-3.00)	(-3.28)
SOX* ΔNAPMISM							
ΔDIV	0.003**	0.003**	0.003**	0.003***		0.003	0.003
	(2.25)	(2.42)	(2.51)	(2.66)		(1.24)	(1.60)
ΔINTRATE10T	-1.563***	-1.511***	-1.577***	-1.529***		-0.930**	-0.554
	(-7.03)	(-6.77)	(-6.85)	(-6.61)		(-2.03)	(-1.20)
GROWTH	0.001	0.001	0.001	0.001		-0.001	-0.001
	(0.42)	(0.54)	(0.31)	(0.47)		(-0.29)	(-0.46)
ΔMKTRET	0.050***	0.051***	0.051***	0.053***		0.035*	0.036*
	(4.99)	(5.15)	(4.93)	(5.12)		(1.67)	(1.74)

EARNMGMT	0.007***	0.007***	0.007***	0.007***	0.005**	0.005**
	(4.22)	(4.25)	(4.28)	(4.30)	(2.24)	(2.29)
ΔMVASSETS	0.002***		0.003***		0.003***	
	(2.93)		(3.21)		(3.19)	
ΔREVENUE		0.002**		0.002**		0.010***
		(2.54)		(1.99)		(7.17)
H0: b1 + b3 = 0	p =0.042	p = 0.042				
H0: b1 + b5 = 0			p = 0.034	p = 0.035		
H0: b1 + b7 = 0					p = 0.851	p = 0.935
N	32042	32042	30719	30719	6567	6567
Adj. R^2	0.003	0.003	0.003	0.003	0.004	0.011
F	11.02	10.81	11.01	10.38	3.81	7.95
Pr > F	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001

Table 10 – Robustness Test Based on Changes in Consumer Sentiment

This table contains the results of robustness tests based on consumers' beliefs about the economy as reflected in the direction of change in the University of Michigan's Consumer Sentiment Index (UMICHCSI). The dependent variable is the change in the book long-term debt ratio (BLTD) for U.S. and Canadian firms in Compustat from 2000 to 2004. The book long-term debt ratio is defined as the ratio of the book values of long-term debt to total assets. The book value of debt is used to proxy for the market value of debt. The market value of assets equals the market value of debt plus the market value of equity, defined as the product of the quarter-end number of outstanding common shares and the quarter-end stock price. SOX is a dummy variable that equals one on or after July 30, 2002, and zero otherwise. U.S.-LISTED is a dummy variable that equals one if a firm is listed on a U.S. exchange, regardless of whether the firm is based in the U.S. or Canada, and zero otherwise. U.S. IN U.S. is a dummy variable that equals one if a firm is based in the U.S. and listed in the U.S.; otherwise, U.S. IN U.S. equals zero. X-LISTED is a dummy variable that equals one if a firm is based in Canada and cross-listed in the U.S. and zero otherwise. ΔDIV is the natural log of the difference in contemporaneous and lagged total dividends. ΔINTRATE10T is the annual change in the 10-year Treasury rate. GROWTH is a dummy variable that equals one if a firm is a growth firm, defined as having Tobin's q > 1, and zero otherwise. Tobin's q is the market-to-book ratio of total assets. ΔMKTRET is the natural log of the change in the contemporaneous and lagged value-weighted market return found in CRSP. ΔMVASSETS is the natural log of the change in the contemporaneous and lagged value of the market value of assets. ΔREVENUE is the natural log of the change in the contemporaneous and lagged value of the market value of assets. EARNMGMT measures a firm's pre-SOX earnings management, defined as the residuals from the Kothari, Leone, and Wasley (2005) model. ΔUMICHCSI is the direction of change in the UMICHSCI value. *, **, and *** denote significance at the 10%-, 5%-, and 1% levels, respectively. T-values are in parentheses.

	Relative to Control Group (Canadian Firms Listed in Canada)					
Dependent Variable:	All U.S.-Listed Firms		U.S. Firms Listed in U.S.		Canadian Firms Cross-Listed in U.S.	
BLTD	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	-0.001	-0.001	-0.001	-0.001	-0.001	0.001
	(-0.63)	(-0.15)	(-0.64)	(-0.10)	(-0.11)	(0.50)
SOX	-0.001	-0.002	-0.001	-0.002	-0.001	-0.002
	(-0.47)	(-0.81)	(-0.43)	(-0.82)	(-0.35)	(-0.86)
U.S.-LISTED	0.002	0.001				
	(1.13)	(0.58)				
SOX*U.S.-LISTED	-0.001	-0.001				
	(-0.54)	(-0.24)				

U.S. IN U.S.			0.002	0.001		
			(1.24)	(0.60)		
SOX*U.S. IN U.S.			-0.002	-0.001		
			(-0.63)	(-0.29)		
X-LISTED					0.001	0.001
					(0.34)	(0.11)
SOX*X-LISTED					0.001	0.002
					(0.19)	(0.34)
ΔUMICHCSI	-0.001	-0.001	-0.001	-0.002	-0.002	-0.002
	(-1.01)	(-1.07)	(-1.04)	(-1.13)	(-0.74)	(-0.69)
ΔDIV	0.003**	0.003**	0.003**	0.003***	0.002	0.003
	(2.27)	(2.43)	(2.53)	(2.67)	(1.24)	(1.61)
ΔINTRATE10T	-1.554***	-1.504***	-1.561***	-1.515***	-0.984**	-0.621
	(-7.02)	(-6.76)	(-6.80)	(-6.56)	(-2.14)	(-1.35)
GROWTH	0.001	0.001	0.001	0.001	-0.001	-0.001
	(0.45)	(0.57)	(0.36)	(0.51)	(-0.35)	(-0.52)
ΔMKTRET	0.042***	0.044***	0.043***	0.044***	0.029	0.031
	(3.45)	(3.55)	(3.36)	(3.46)	(1.14)	(1.24)
EARNMGMT	0.007***	0.007***	0.007***	0.007***	0.005**	0.005**
	(4.22)	(4.25)	(4.28)	(4.30)	(2.24)	(2.30)
ΔMVASSETS	0.002***		0.003***		0.003***	
	(2.91)		(3.16)		(3.32)	

ΔREVENUE		0.002**		0.002***		0.010***
		(2.55)		(2.00)		(7.10)
H0: b1 + b3 = 0	p =0.026	p = 0.025				
H0: b1 + b5 = 0			p = 0.022	p = 0.021		
H0: b1 + b7 = 0					p = 0.983	p = 0.933
N	32042	32042	30719	30719	6567	6567
Adj. R^2	0.003	0.003	0.003	0.003	0.003	0.009
F	11.12	10.92	11.08	10.48	2.96	6.91
Pr > F	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.001	< 0.0001

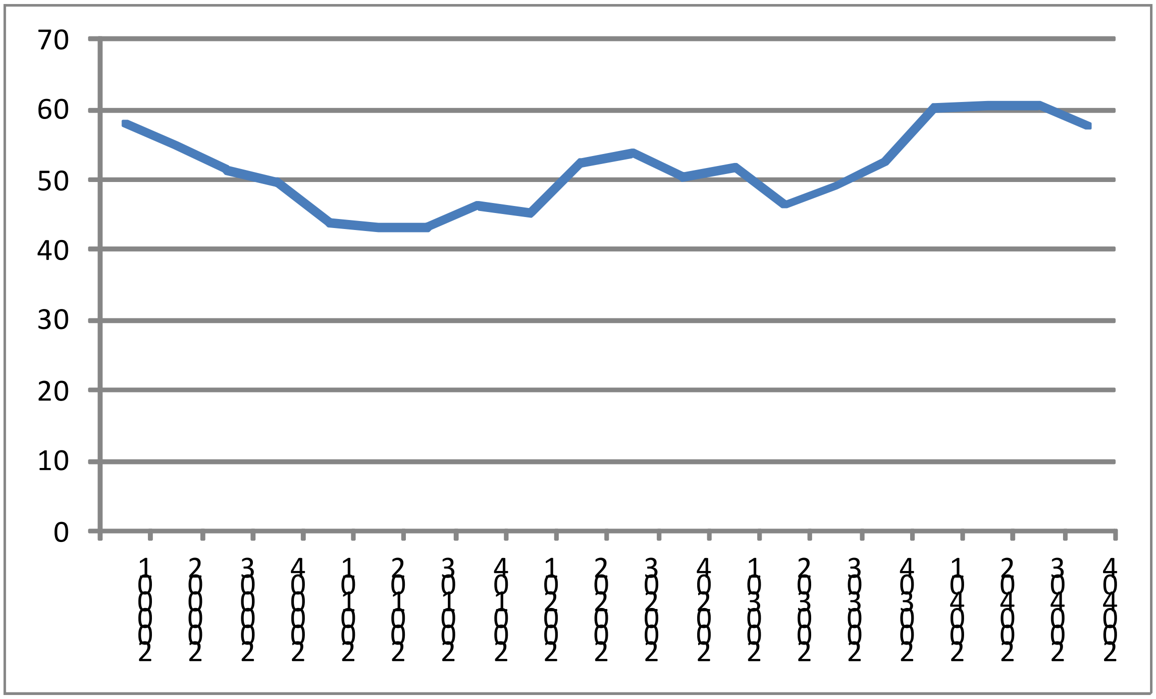

Figure 1 – NAPM/ISM Index

Quarterly values of the National Association of Purchasing Managers' Index, now known as the Institute for Supply Management Index, from 2000 to 2004 are shown below.

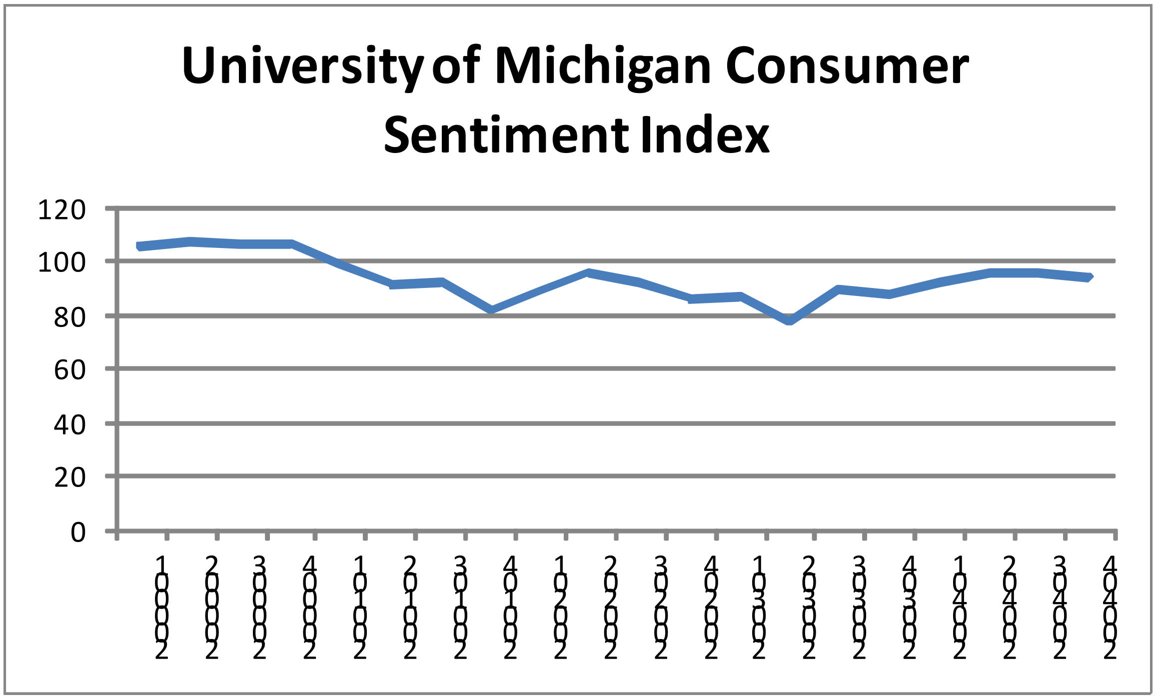

Figure 2 – University of Michigan Consumer Sentiment Index

Quarterly values of the University of Michigan Consumer Sentiment Index (CSI) from 2000 to 2004 are shown below.

Chapter Six: Conclusion

In this paper, I examine the impact of the Sarbanes-Oxley Act (SOX) on capital structure. This analysis focuses on the long-term debt ratio, defined as book value of long-term debt divided by the book value of total assets. Since SOX applies only to firms listed in the U.S. regardless of where the firms are headquartered, the control group for this study consists of Canadian firms listed in Canada. The test groups are (1) U.S.-based firms listed in the U.S., (2) Canadian firms cross-listed in the U.S., and (3) all U.S.-listed firms, whether based in the U.S. or Canada.

Relative to Canadian firms listed in Canada (i.e., the control group, since those firms are not subject to SOX), SOX is associated with higher book long-term debt ratios for all U.S.-listed firms in general. This result is consistent with the view that SOX requires managers to release negative news, leading to lower stock prices and greater reluctance to issue equity. U.S. firms listed in the U.S. drive this result, as Canadian firms cross-listed in the U.S. do not alter their debt ratios. Also, relative to the control firms, SOX is associated with smaller quarterly changes in book long-term debt ratios. Again, U.S. firms listed on a U.S. exchange drive this result. In addition, firms that heavily (modestly) manage pre-SOX earnings decrease (increase) their long-term leverage ratios after SOX. These results are robust to suppliers' and consumers' expectations about the economy.

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Chapter Seven: Introduction (Credit Ratings)

Diamond (1989) argues that a firm can establish a reputation over time as a sound borrower by repaying debt in a timely manner. That reputation is conveyed by rating agencies, which use both public and private information to form opinions about borrowers' payment history and their expected ability to repay debt (Goh and Ederington, 1993). Therefore, if a firm's operating or information environment changes, that change can impact the firm's credit rating. An increase (decrease) in a firm's credit rating affects that firm's ability to borrow by lowering (raising) its cost of debt. If a firm's cost of debt is too high, that firm might pass up positive net-present-value opportunities. Since the value of a firm equals the sum of assets in place and the present value of growth opportunities (Myers and Majluf, 1984), a firm's ability to borrow impacts its value. It also follows that credit rating agencies provide valuable information to potential lenders to assist them in their decisions to lend to corporate borrowers.

Jorion, Liu, and Shi (2005) find that the information content of announcements of credit rating changes increases after Regulation Fair Disclosure (Reg FD). Prior to Reg FD, firms routinely disclosed information to selected parties (typically, equity analysts), which profited from that information. To address the issue of selective disclosure and level the playing field among market participants, the U.S. Congress passed Reg FD in August, 2000, and enacted it on October 23, 2000. Reg FD attempts to reduce selective disclosure by (1) allowing credit rating agencies to continue to access information that other market participants learn only when the rating agencies issue credit ratings and (2) prohibiting equity analysts from receiving that information firsthand. By mandating that only credit rating agencies receive certain information directly, managers cannot choose to reveal (i.e., selectively disclose) that information to equity analysts or other market participants. As a result of Reg FD, rating agencies have relatively early access to information that other market participants, including equity analysts, can no longer access firsthand.

Even after Reg FD, several accounting and financial scandals occurred in the U.S. markets. Many executives misled investors and credit rating agencies about their firms' operations and financials, leading to erroneously high ratings and, ultimately, the collapse of several firms. To address those issues in the U.S. financial markets, the U.S. Congress passed the Sarbanes-Oxley Act ("SOX" or "the Act") on July 30, 2002. SOX requires all firms listed on a U.S. exchange to take steps to accurately report accounting and financial information.

In this paper, I examine changes in credit ratings after SOX. I analyze the odds and the magnitude of changes in short- versus long-term credit ratings as well as rating upgrades versus downgrades. If SOX enhances the information environment, rating agencies should adjust credit ratings accordingly. Akhigbe, Martin, and Newman (2008) conclude that SOX requires managers to report information that they would prefer to retain. Although rating agencies are informed market participants relative to atomistic investors, they are external monitors. Thus, one possibility is that credit rating agencies are subject to some degree of information asymmetry and will learn bad news about some firms. This situation will lead rating agencies to downgrade the credit ratings of those firms.

A second possibility is that credit ratings increase after SOX. Povel, Singh, and Winton (2007) argue that SOX might not be associated with improved accuracy in financial statements. One implication of Povel, Singh, and Winton (2007) is that the quality of financial statements may become lower than before SOX due to greater earnings management after SOX. In this case, rating agencies' perceptions of firms may erroneously increase, leading to higher credit ratings.

A third possibility is that credit ratings do not change after SOX. The reason is that a second implication of Povel, Singh, and Winton (2007) is that the quality of financial reports may not worsen but may remain the same after SOX. Clearly, ratings will not change in this case. Another reason credit ratings may not change after SOX is that any news, whether positive or negative, about firms may not surprise credit rating agencies since the agencies (1) are active monitors, suggesting that they are somewhat informed market participants, and (2) are privy to information that equity analysts cannot access firsthand due to Reg FD.

The revelation of pre-SOX earnings management is a possible source of bad news after SOX because, once the fraudulent reporting is revealed, investors will realize that their views of firms' intrinsic earnings, cash flows, and, consequently, firm value, have been distorted. Thus, I hypothesize that pre-SOX earnings management is directly related to the magnitude and odds of a rating downgrade after SOX. The reason is as follows. Patterson and Smith (2007) find that auditing and control improve after SOX, and Cohen, Dey, and Lys (2008) find that firms use more conservative accounting techniques after SOX. Accordingly, Chang, Fernando, and Liao (2009) find that the market believes that earnings quality improves after SOX. Although the use of more conservative accounting techniques will lead to more accurate financial statements, the financial results will be worse than the market expects. This outcome is consistent with Akhigbe, Martin, and Newman (2008). In response to the bad news, credit rating agencies will lower those firms' credit ratings because the rating agencies will realize that those firms' outlook is not as bright as once believed.[3] Thus, to prevent lower credit ratings, firms may engage in more sophisticated earnings-management techniques after SOX.

The primary finding in this paper is that, in the SOX era, aggressive earnings management is associated with short- and long-term credit rating downgrades. Ordinal regression results show that, after SOX, the probability that the short-term credit rating of a firm that aggressively manages earnings is downgraded is approximately 1.5% higher. For long-term rating downgrades, the increase in probability is approximately 1.4%. These results are robust to firm size and economic outlook, as measured by the Institute of Supply Management (formerly known as the National Association of Purchasing Managers) Index. Although (1) SOX is shown

[3] Another reason for the possible downgrading of a firm's credit rating due to earnings management is as follows. Although Graham, Li, and Qiu (2008) do not specifically address SOX, they find that banks tighten loan terms to firms that restate earnings because of prior fraudulent reporting. Since credit rating agencies are active monitors just like banks, they may follow suit and punish firms that manage earnings by lowering their credit rating.

to be associated with higher long-term leverage use and (2) higher leverage is generally associated with a lower credit rating, the results of this study, that SOX is associated with both lower short- and long-term credit ratings, cannot be inferred from the facts above. SOX may affect short-term credit ratings moreso than long-term ratings because SOX is intended to quickly restore and sustain investor confidence in U.S. markets. Clearly, SOX will immediately impact the short term. However, if rating agencies believe that the fraud that led to SOX will not impact the long-term solvency of firms, long-term credit ratings may not change.

Given that credit ratings reflect the creditworthiness of an entire firm and that a change in that firm's credit ratings should affect its bond ratings, this study contributes to the literature on bond rating changes. Prior research shows that bond rating changes provide relevant information, as evidenced by cumulative abnormal returns (e.g., Griffin and Sanvicente, 1982; Holthausen and Leftwich, 1986; Goh and Ederington, 1993). My analysis examines the impact of the enactment of SOX on the direction and magnitude of changes in credit ratings.

This paper joins a growing list of papers that study the impact of legislative changes on firm operations, where such changes represent unique structural breaks in different aspects of firm behavior (e.g., Dahya, McConnell, and Travlos, 2002). In using an exogenous change in firms' information environment associated with SOX, this approach mitigates the endogenous relationship between a firm's credit ratings and its information environment. This paper also adds to the existing literature by examining how changes in the information environment affect firms' credit ratings, which ultimately influence the cost of capital.

In addition, this paper contributes to the literature on SOX by documenting the Act's effect on credit rating changes. My results suggests that, since SOX is associated with lower credit ratings, SOX has achieved one of its goals – namely, to spur managers to reveal information that accurately shows the way they manage their firms' operations, even though that information might be negative. Regarding the benefits of SOX, Jain and Rezaee (2006), Li, Pincus, and Rego (2008), and Hochberg, Sapienza, and Vissing-Jorgensen (2009) document positive announcement returns associated with SOX.[4]

The paper closest to this paper is Cheng and Neamtiu (2009). Cheng and Neamtiu (2009) examine whether credit rating agencies, which face stiffer government regulation and consumer criticism in the post-SOX era, improve the timeliness, accuracy, and volatility of credit ratings after SOX. They find that, in the post-SOX era of greater regulation and expectations of higher standards from investors, rating agencies (1) release rating information sooner, suggesting improved timeliness of ratings, (2) correctly rate firms more often, suggesting improved accuracy, and (3) lower the standard deviations of rating levels, implying lower volatility of ratings. These findings contradict rating agencies' assertion that a tradeoff exists between the accuracy and timeliness of ratings (Cantor and Mann, 2003). Cheng and Neamtiu (2009) base their study on academic (Altman and Rijken, 2004; Loffler, 2004; Beaver, Shakespeare, and Soliman, 2006) and industry (Cantor and Mann, 2003) literature that identifies the timeliness, accuracy, and volatility of credit ratings as most important to users of those ratings.

The primary difference between this paper and Cheng and Neamtiu (2009) is that this paper examines the interplay between an important aspect of firm behavior – earnings management – and legislative change on firms' credit ratings. Earnings management generates smoother earnings and cash flows, leading to higher perceived firm value. Since a firm's ability to repay its debts stems directly from the cash that creditors expect that firm to generate, and since credit ratings are directly related to expected cash flows, high (low) earnings management prior to SOX can greatly (modestly) impact credit ratings after SOX.

[4] Other benefits associated with SOX include lower pay for CEOs of firms that do not comply with SOX's director-independence provisions prior to SOX (Chhaochharia and Grinstein, 2009) and less insider trading (Cheng, Nagar, and Rajan, 2007; Brochet, 2010). At the same time, some costs associated with SOX include noisier stock prices (Bond, Goldstein, and Prescott, 2010), a lower supply of, a greater demand for, and higher pay for directors (Linck, Netter, and Yang, 2009), greater opacity (Garleanu and Zwiebel, 2009), stagnant market values (Harris and Raviv, 2008), lower market values (Zhang, 2007; Wintoki, 2007; Holmstrom and Kaplan, 2003; Chhaochharia and Grinstein, 2007; Iliev, 2009), and profitable insider trading by the audit committee (Ravina and Sapienza, 2009).

This paper also differs from Cheng and Neamtiu (2009) in that it documents the actual direction of change in credit ratings after SOX. With respect to the accuracy of ratings, Cheng and Neamtiu (2009) find fewer Type I and Type II errors after SOX. They define a Type I error as failing to downgrade the rating of a firm that eventually defaults and a Type II error as downgrading the rating of a firm that does not default. Although Cheng and Neamtiu (2009) document greater accuracy and improved timeliness of credit ratings, their results do not imply that credit ratings will be lower post-SOX compared to pre-SOX. Their findings suggest that credit agencies rate firms more accurately and publish rating changes in a more timely manner after SOX, whether ratings are adjusted upward or downward. My analysis documents (1) the odds of a rating increase, decrease, or non-change after SOX and (2) the factors that affect credit ratings after SOX.

The remainder of this paper is as follows. Section II describes the data and approach used in this analysis. Section III discusses the results. Section IV contains robustness tests. Section V concludes.

Chapter Eight: Data and Approach

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. Additional criteria for inclusion in the sample are (1) active, (2) not an American Depository Receipt or foreign government, (3) positive and non-missing book value of assets, book value of debt, and revenue, (4) non-negative quarterly closing prices, and (5) non-missing values of the S&P Short- and Long-Term Issuer Credit Ratings found in Compustat. Consistent with traditional finance literature, utilities (SIC codes 4000-4999) and financial firms (SIC codes 6000-6999) are excluded. Also, I control for new-listing bias by excluding firms that (1) do not have data in Compustat for the first quarter of 2000 but (2) appear in Compustat at another point between 2000 and 2004. In addition, I control for survivorship bias by including only those firms with entries in Compustat across the sample period.

The null and alternative hypotheses for credit-rating changes after SOX are below.

H_0: *SOX does not affect firms' credit ratings.*

SOX may not materially affect the information environment for credit rating agencies. This situation may occur because credit rating agencies may not suffer from a large information asymmetry prior to SOX.

H_1: *SOX affects firms' credit ratings.*

This situation is likely to occur because SOX is related to the release of negative information about firms (Akhigbe, Martin, and Newman, 2008). Although credit rating agencies are informed market participants to a large degree, they still suffer from some degree of information asymmetry since they are separate from the firms that they follow. Thus, rating agencies may be surprised by negative news and lower firms' credit ratings. The reason is that, if news emerges that some firms managed earnings prior to SOX, rating agencies may believe that the earnings of those firms were inflated and that the actual earnings level is lower than reported. As a result, rating agencies will have less confidence in those firms' ability to repay their debts on time and in full, particularly in the short term. Rating agencies' lower confidence in the ability of firms to honor their debts will lead to lower short-term credit ratings for those firms.

The expected behavior of long-term credit ratings is less clear at the outset. On one hand, long-term ratings will fall if rating agencies believe that the negative information revealed after SOX impacts firms' ability to repay debts over the long term. On the other hand, long-term credit ratings will not change (will increase) if rating agencies believe that firms' ability to repay debt will not change (will strengthen) in the long term, defined as one year after SOX.

To determine whether the likelihood of a credit rating change is persistently different after SOX, I use the binary logistic model below.

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

The dependent variable equals one if firm *i*'s credit rating is downgraded from time t-1 to time t and zero otherwise. In this paper, quarterly intervals are used. SOX equals one on or after July 30, 2002, and zero otherwise. If SOX is associated with the increased revelation of negative news (Akhigbe, Martin, and Newman 2008), the chance of a downgrade should increase. Short- (Long-) term credit ratings are the S&P Short- (Long-) Term Issuer Credit Ratings found in Compustat. Long-Term Issuer Credit Ratings range from AAA (highest) to SD (Selective Default), the lowest ranking. Short-Term Issuer Credit Ratings range from A-1+ (highest) to D (lowest). The short- and long-term ratings appear on a quarterly basis.

To assess the impact of earnings management in the SOX era on credit ratings, I use an interaction term, SOX*EM. As such, this variable is the primary variable of interest in this analysis. SOX*EM equals one if a firm's magnitude (i.e., absolute value) of earnings management exceeds the median magnitude and zero otherwise. I use the absolute value of earnings management in accordance with Klein (2002), Bergstresser and Philippon (2006), and Cornett, Marcus, and Tehranian (2008).

Since Goh and Ederington (1993) document that credit ratings reflect a firm's expected ability to repay any debt borrowed in the future, I include a firm's interest coverage ratio (INTCOV), defined as earnings before interest and taxes (EBIT) divided by interest expense. Values of INTCOV that exceed one imply that (1) repaying interest does not exhaust EBIT and (2) such excess EBIT from a prior period may be combined with contemporaneous EBIT to cover contemporaneous interest. Thus, values of INTCOV greater than one may contain information about a firm's ability to meet future debt obligations and, if so, should be associated with a lower chance of a rating downgrade.

In accordance with Jorion, Liu, and Shi (2005), I control for whether a firm's debt is rated as investment grade (IGRADE). IGRADE equals one if either a firm's short- or long-term credit rating is investment grade and zero otherwise. Investment-grade firms are considered safer relative to speculative-grade firms and may be less likely to be downgraded. Thus, I expect IGRADE to be associated with a lower likelihood of a rating decrease. 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.[5]

I also control for whether a firm's credit rating is borderline. This situation needs to be controlled for because firms with ratings on the border of a rating range may be more likely to experience a rating change compared to firms whose credit ratings are solidly within a rating range. For example, firms with a borderline long-term credit rating (e.g., A-) are just meeting the requirements of the broad "A" category, so even a minor mishap in performance may result in a rating downgrade to the next broad category (the "B" range, in this case). BORDERLINE equals one if a firm's credit rating ends with a plus or a minus, signifying that the rating is on either the upper or lower end of a rating range. Otherwise, BORDERLINE equals zero. For short-term

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[5] Since Jorion, Liu, and Shi (2005) examine CARs to shareholders associated with Reg FD and firm characteristics, they set IGRADE equal to one if a firm's credit rating is either downgraded from investment grade to speculative grade or upgraded from speculative grade to investment grade. Otherwise, they set IGRADE equal to zero.

ratings, the values A-3, B, B-3, and C are considered borderline ratings. AA+, AA-, A+, A-, BBB+, BBB-, BB+, BB-, B+, B-, CCC+, and CCC- constitute borderline ratings.

D/A is a firm's debt-to-assets ratio in book-value terms. On one hand, debt may reduce a firm's value by decreasing its ability to take on projects with a positive net present value, a situation to which Myers (1977) refers as the debt-overhang problem. Thus, debt overhang will lead to weaker expected profits and will lower the firm's ability to repay future debt, suggesting a lower credit rating. On the other hand, since firms might take on debt to signal their quality (Ross 1977), high leverage might reduce the odds of a downgrade because high-leverage firms might reveal their higher quality through the private information provided to credit rating agencies.

EM represents earnings management. If SOX leads to increased revelations of negative information (Akhigbe, Martin, and Newman, 2008), I expect the magnitude of change in a firm's credit rating after SOX to be directly related to earnings management before SOX. To control for earnings management, I identify firms that SOX is most likely to affect based on earnings management prior to passage of the Act. One measure of earnings management used in this analysis is discretionary accruals, which include items that managers have latitude in marking up or down. Discretionary accruals can affect several accounts, including such uncollected items as accounts receivable or the allowance for doubtful accounts as well as such unpaid items as salaries and interest.

To measure earnings management, I use the Kothari, Leone, and Wasley (KLW, 2005) model, in which total accruals are regressed on the reciprocal of lagged total assets, the change in sales, the level of PPE, and either the contemporaneous or lagged level of return on assets (ROA), where ROA is defined as net income divided by total assets.[6] The KLW (2005) model is below.

$$TA_{i,t}/A_{i,t-1} = \beta_{0i}\, 1/A_{i,t-1} + \beta_{1i}\, \Delta REV_{i,t}/A_{it-1} + \beta_{2i}\, PPE_{i,t}/A_{i,t-1} + \beta_{3i}\, NI_{i,t}/A_{i,t-1} + \varepsilon_{i,t} \quad (2)$$

[6] For other earnings management models, see Jones (1991), Guay, Kothari, and Watts (1996), Teoh, Welch, and Wong (1998), and Ball and Shivakumar (2005, 2006, 2008).

In the KLW (2005) model, total accruals are defined as the change in non-cash working capital before income taxes payable minus total depreciation expense. $A_{i,t-1}$ is the book value of total assets for firm *i* at time *t-1*. $\Delta REV_{i,t}$ is the change in revenue for firm *i* from period *t-1* to *t*. $PPE_{i,t}$ is gross property, plant, and equipment for firm *i* at time *t*. $NI_{i,t-1}$ is lagged net income (i.e., at time *t-1*) for firm *i*.

If SOX prompts managers to reduce discretionary accruals in an effort to promote accurate earnings, lower credit ratings may result. This case is possible because reducing accruals will increase the amount charged against revenue, leading to lower net operating profit after taxes (NOPAT) and earnings before interest and taxes (EBIT). Lower NOPAT and EBIT imply that a firm is less able to meet financial obligations. Rating agencies will notice this situation and will downgrade the firm's credit rating.

MKTRET, which controls for market conditions surrounding SOX, is the value-weighted return on the market surrounding SOX. Kahneman and Tversky (1973) provide a basis for including this variable, as they find that market participants tend to base decisions too much on immediate news and too little on underlying trends. Building on Kahneman and Tversky (1973), DeBondt and Thaler (1990) find that, while overreaction is conventionally attributed to atomistic investors, security analysts (sometimes referred to as "smart money" since they are traditionally more informed that atomistic investors) also overreact. They measure overreaction based on the extremity of analysts' forecasts, given the information available at the time of the forecast. Also, Easterwood and Nutt (1999) find that analysts underreact to bad news but overreact to good news, suggesting optimism on the part of security analysts. Since credit rating analysts can also be considered smart money, the market's performance surrounding SOX could affect the decision and/or magnitude of a rating change. If market returns are strong, analysts may be optimistic about firms' performance in the short term, leading to less drastic changes in credit ratings.

To explain the level of credit ratings after SOX, I use two variations of Model (1). For the first variation, I treat Model (1) as an ordered logit model. In the ordered logit model, the dependent variable, $CreditRating_{i,t}$, is sorted in descending order. As a result, the ordered logit model explains achieving higher cardinal values of $CreditRating_{i,t}$, which correspond to lower credit ratings. A mapping of short- and long-term credit ratings to ordinal values is contained in Table 1. For the second variation, I treat Model (1) as an ordered logistic model in explaining the level of credit ratings.

Chapter Nine: Results and Robustness Tests

Table 2 contains summary statistics of the quantitative independent variables used in this analysis. Panels A and B contain pre- and post-SOX measures, respectively. Table 2 also shows that, based on tests of differences, the mean, median, and standard deviation of EM post-SOX differ from the respective pre-SOX values at the 1% level. The mean level of EM increases from $2,000 (0.002) before SOX to -$183,000 after SOX. At the same time, the standard deviation of EM increases from $250,000 (0.25) before SOX to $460,000 (0.46) after SOX. These results suggest that the magnitude of earnings management increases after SOX.

Table 3 shows the number of short- and long-term rating changes annually. Panel A shows that, from 2000 to 2004, the number of short-term rating downgrades increases while the number of short-term rating upgrades decreases. This result is consistent with the notions that (1) SOX, which became law in 2002, could be associated with the release of bad news about firms (Akhigbe, Martin, and Newman 2008) and (2) rating agencies expect the bad news to impact firms' creditworthiness in the short term. Panel B shows that downgrades and upgrades decrease from 2000 to 2004. At the same time, the number of non-changes increases over that time frame.

In the remainder of this section, I discuss regression results. Tables 4 through 9 show the results of regressions that seek to explain (1) the odds of a short- or long-term credit rating downgrade after SOX or (2) the levels of short- or long-term credit ratings. For each term other than the intercept in the models shown in Tables 4 and 5, three numbers are presented in the following order: (1) the logistic regression coefficient, (2) the probability, based on the χ^2 test, of obtaining a regression coefficient larger than the one shown, and (3) the odds ratio, or the factor by which the odds of a rating downgrade are affected by a unit increase in the given explanatory variable. For the intercept, only the first two numbers are shown. To interpret the marginal effects associated with interaction terms in logit models, I use the method shown in Ai and Norton (2003). They demonstrate that cross-partial derivatives are needed to accurately interpret the marginal effects of interactions in logit models. Since the models used in this paper do not contain any higher-order terms, the cross-partial derivatives result in the coefficient of the interaction term.

The main result of Table 4 is that, in the SOX era, earnings management affects the odds of a credit rating downgrade. The interaction term, SOX*EM, captures the difference in the odds of a rating downgrade for high- vs. low-earnings-management firms after SOX. Model (1) shows that, after SOX, high-earnings-management firms' odds of a short-term rating decrease are 1.278 times higher than before SOX. The increase in odds of a rating downgrade is equivalent to a 1.3% (i.e., $e^{0.245}$) greater chance of a downgrade. Similarly, Model (4) shows that, after SOX, firms that aggressively manage earnings have higher odds of a long-term rating decrease by a factor of 1.788, equal to a 1.8% (i.e., $e^{0.581}$) greater chance of a downgrade.

The variable SOX captures changes over time after SOX that affect all firms in the sample. In Table 4, Models (1) through (3) indicate that SOX is associated with greater odds of a short-term rating downgrade for all firms. For example, the odds ratio of 1.141 for Model (1) shows that the odds of a short-term credit rating decrease are 1.141 times greater in the SOX era compared to pre-SOX. This result translates to a 1.1% increase (i.e., $e^{0.132}$) in the probability of a lower short-term credit rating after SOX**.** This result is consistent with the view that SOX requires managers to reveal negative information about their firms (Akhigbe, Martin, and Newman 2008) and that the news surprises credit rating agencies, which are relatively well-informed market participants.

However, Models (4) through (6) in Table 4 show that SOX is associated with lower odds of a long-term rating downgrade. For example, the odds ratio of 0.162 in Model (4) indicates that the odds of a long-term rating downgrade fall by a factor of 0.652, or a 0.2% (i.e., $e^{-1.819}$) lower probability of a long-term rating downgrade after SOX. This result is consistent with SOX's association with financial reports that are both actually (Patterson and Smith, 2007; Cohen, Dey, and Lys, 2008) and perceived by market participants (Chang, Fernando, and Liao, 2009) to be more credible. The result is also consistent with the hypothesis that firms' credit ratings may suffer in the short term due to negative news but that the news is not expected to adversely impact firms in the long run.

Table 4 also shows that the interest coverage ratio (INTCOV) impacts the odds of a short-term rating downgrade after SOX. The coefficient on INTCOV is negative, implying that, for a one-percentage-point increase in the interest coverage ratio, the odds of a short-term credit rating downgrade decrease. Model (2) shows that a one percentage-point increase in a firm's interest coverage ratio lowers the odds of a rating downgrade by a factor of 0.993, which is equivalent to a 1% (i.e., $e^{-0.008}$) reduction in the probability of a lower credit rating. This result suggests that, in the short term, a firm's ability to meet its interest payments lowers the odds that its credit rating will be lowered.

Table 4 shows that the existence of a firm's debt on the upper border of a rating range (UPPERBORDER) is associated with lower odds of a downgrade. This result is logical because, if a firm's credit rating is just below the next higher rating category, investors expect that firm to be close to meeting the criteria to be included in the higher category. Table 4 also shows that, if a firm's credit rating is on the lower border of a rating range (LOWERBORDER), the odds that the firm's credit rating is downgraded increases. This result can be explained in two ways. One explanation is based on statistics from my sample of firms. In my sample, firms with borderline short-term ratings manage earnings more firms with borderline long-term ratings. The magnitude of earnings management for firms with a borderline short- (long-) term credit rating is $207,980 ($154,152). Another explanation is that credit rating agencies are slow to downgrade ratings since regulatory arbitrage allows holders of riskier bonds to earn higher returns (Cornaggia and Cornaggia, 2011). Regarding the debt ratio, D/A, higher leverage ratios are associated with lower odds and probabilities of a rating downgrade. This result is consistent with Ross (1977).

Table 4 also shows that earnings management (EM) affects the odds of a downgrade of both short- and long-term credit ratings. For example, Model (1) shows that EM increases the odds of a short-term credit rating downgrade by a factor of 3.392. This result is equivalent to a higher probability of a downgrade of 3.4%. Similarly, Model (4) shows that EM increases the odds of a long-term rating downgrade by a factor of 1.569, equivalent to a 1.6% greater chance of a downgrade.

Table 5 shows the results of ordered logistic regressions that seek to explain the level of short- and long-term credit ratings. The ordered logistic regressions are run with values of credit ratings in descending order. Thus, the regressions model the odds of receiving a credit rating with a higher cardinal value (e.g., a short-term credit rating move from 3 to 4 or a long-term rating move from 6 to 7). Ratings with higher cardinal values correspond to lower credit ratings.

Table 5 shows that the variable of interest, SOX*EM, which reflects the difference in the SOX era in credit rating levels for firms that manage earnings more aggressively versus those that do not, explains both short- and long-term rating levels. Models (1) and (4) show that, in the SOX era, firms that manage earnings more aggressively than the median have higher odds of short- and long-term ratings in a lower category (i.e., rating downgrades) by a factor of 1.440 and 1.321, respectively. Those respective increases in odds equal increases in the probability of lower ratings of 1.4% and 1.3%.

In Table 5, Models (1) through (3) show that the dummy variable SOX, which captures changes surrounding SOX that affect all firms in the sample, does not affect the level of short-term credit ratings. However, Models (4) through (6) show that SOX is associated with lower long-term credit ratings. These results make sense because companies were allowed to implement some provisions of SOX well after July 30, 2002, the date of enactment. Since those provisions would clearly take effect in the future, it makes sense that SOX, which captures changes related to SOX over time for all firms, does not affect short-term credit rating levels but does explain long-term rating levels.

Table 5 shows that INTCOV is associated with lower cardinal values mapped to long-term ratings, corresponding to higher actual ratings. This result makes sense because, as a firm's interest coverage ratio increases, its ability to meet its interest obligations increases, making that firm a more creditworthy borrower. Table 5 also shows that IGRADE is associated with a lower cardinal value (i.e., higher credit rating) for long-term credit ratings. This result suggests that, as expected, an investment-grade credit rating is less likely to be downgraded. EM, which captures differences in the short- and long-term rating levels of high- and low-earnings-management firms across the sample period, is associated with higher short- and long-term rating levels.

For short-term rating levels, D/A is negative, suggesting that a higher debt ratio is associated with a lower cardinal value (higher credit rating). This result is consistent with Ross (1977), as taking more debt in the short-term may signal high firm value to rating agencies. On the other hand, a higher debt ratio is associated with lower long-term credit ratings. This result is consistent with Myers (1977), as rating agencies may believe that higher leverage may reduce firm value in the long run due to debt overhang.

Table 6 shows the results of ordinal logistic regressions where the sample is broken out by high or low earnings management. A firm is said to have high (low) earnings management if the absolute value of its earnings management exceeds the median absolute level for all firms. The main result is that SOX is associated with higher cardinal values (lower credit ratings). SOX is associated with lower short-term credit rating levels, regardless of the degree of earnings management. For example, the first two models show that low-earnings-management firms have higher odds of a short- (long-) term rating downgrade by factors of 1.313 (1.242), respectively. These increases in odds correspond to 1.3% and 1.2% increases, respectively, in the probability of a short- or long-term rating downgrade. The third model shows that high-earnings-management firms have higher odds of a short-term rating decrease by a factor of 1.399. This result equates to a 1.4% higher probability of a downgrade. These results are consistent with the idea that SOX requires managers to reveal bad news, which they would prefer to conceal (Akhigbe, Martin, and Newman, 2008). These results are also consistent with the intent of SOX, which was to spur managers to take steps to report financial results accurately.

However, the fourth model in Table 6 shows that SOX does not affect the level of long-term credit ratings for high-earnings-management firms. An explanation for this result is that investors could expect managers to conservatively report earnings in the long run, over which time investors will know more about the true value of firms. This explanation is consistent with Cohen, Dey, and Lys (2008) and Chang, Fernando, and Liao (2009). Table 6 also shows that investment-grade status (IGRADE) is associated with lower cardinal rating values (higher credit ratings). Also, the existence of a firm's credit rating on the upper (lower) border of a rating range is associated with higher (lower) credit ratings. In addition, higher leverage is associated with lower credit ratings, consistent with Myers (1977).

Table 7 contains ordered logistic regression results based on whether a firm is listed in the U.S. or Canada. Listing location may impact the results of this study because SOX applies only to firms listed in the U.S. Thus, the negative news about firms associated with SOX (Akhigbe, Martin, and Newman, 2008) may apply to only U.S.-listed firms, regardless of where they are headquartered.

To test the effect of listing on credit rating changes, I introduce the variables U.S.-LISTED, U.S.-IN-U.S., and X-LISTED to the models discussed above. U.S.-LISTED equals one for U.S.-listed firms, regardless of whether those firms are based in the U.S or Canada, and zero otherwise. U.S.-IN-U.S. equals one if a firm is based in the U.S. and listed on a U.S. exchange and zero otherwise. X-LISTED equals one if a firm is headquartered in Canada and cross-listed in the U.S. and zero otherwise.

Consistent with earlier tables, Table 7 shows that high earnings management in the SOX era explains lower credit rating levels (i.e., that the interaction term, SOX*EM, explains lower short- and long-term credit rating levels). For example, U.S.-based and -listed firms that aggressively manage earnings in the SOX era have higher odds of a rating downgrade by a factor of 1.393, translating to a higher probability of downgrade of 1.4%. Also, across the sample period, EM explains lower credit ratings. As in prior tables, high earnings management is associated with lower credit rating levels. In addition, the variable SOX, which captures the effect of environmental changes specifically related to SOX on firms in the sample, generally explains lower credit ratings. This result is also consistent with prior findings.

Table 8 contains robustness tests that show the results of ordered logistic regressions that explain credit rating levels for all quarters from 2000 to 2004 by firm size, defined as the market value of assets. The book value of debt is used as the market value of debt. The market value of equity is the product of the number of outstanding shares and the closing stock price, both as of the end of each quarter. Sorting by size is relevant because large firms typically have greater analyst coverage compared to small firms. Greater analyst coverage means that investors are exposed to less information asymmetry from large firms relative to small firms. As a result, large firms might be less likely to experience a credit rating downgrade even in the SOX era. Two market-value ranges are considered in Table 7: (1) small firms, defined as those with a market value of assets of less than $10 billion and (2) large firms, with market value of assets of at least $10 billion.

The main result of Table 8 is that the previous finding that, in the SOX era, high earnings management is associated with lower credit rating levels is generally robust to size. The second leftmost model, with a coefficient of 0.436 on SOX*EM, indicates that relatively large firms that aggressively manage earnings after SOX have higher odds of a short-term credit rating downgrade by a factor of 1.546. This result corresponds to a higher probability of a downgrade of 1.5%. This finding is also consistent with Table 5, which shows that, in the SOX era, high earnings management is associated with lower credit rating levels for firms in general. For long-term ratings, the coefficient of 0.444 for relatively small firms implies higher odds (probability) of a rating downgrade of 1.559 (1.6%) after SOX. In addition, Table 7 shows that EM is robust to size. All models show that, as earnings management increases, both short- and long-term credit rating levels decrease. The variable SOX is generally robust to size, as it explains lower credit rating levels for relatively large firms. The results of the remaining explanatory variables are also consistent with prior results.

Table 9 contains robustness tests that include ordered logistic regression results based on changes in suppliers' expectations about the economy. Controlling for economic expectations constitutes a relevant robustness test because lower credit ratings could be due to unfavorable prospects for the economy, irrespective of SOX. To proxy for suppliers' expectations, I include in regression models the values of the Institute of Supply Management (ISM) Index, which used to be known as the National Association of Purchasing Managers' (NAPM) Index. An Index value greater than 50 implies that suppliers have a positive outlook about the economy.

The ISM index is used to explain the inventories of U.S. firms (Chen, Frank, and Wu, 2005) and to serve as an economy-wide measure of U.S. national economic activity (Evans, Liu, and Pham-Kanter, 2002). If credit rating agencies believe that those firms' values will increase in either the short or long run by undertaking investment, which will enhance those firms' ability to repay their debts by generating positive profit and cash flow, rating agencies will increase credit ratings. The variable NAPMISM contains data on suppliers' economic expectations, reflecting their outlook on the economy.

The main result of Table 9 is that, consistent with earlier results, lower credit rating levels in the SOX era are generally robust to economic expectations (i.e., that SOX*EM is robust to NAPMISM). Also, consistent with prior tables, SOX and EM individually explain lower credit rating levels.

Chapter Ten: Conclusion

Previous research argues that SOX requires managers to reveal bad news about their firms. Bad news may cause market participants – including credit rating agencies – to update their beliefs about those firms and conclude that their outlook is not as profitable as initially thought. In this paper, I examine short- and long-term credit ratings after SOX. The main finding is that, using ordinal logistic regression, aggressive earnings management is associated with lower credit rating levels in the SOX era. This result is robust to size and suppliers' expectations of the economy.

Table 1 – Short- and Long-Term Credit Ratings

Panel A – Short-Term Credit Ratings

Credit Rating	#	Pre-SOX	Post-SOX	Total
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
All		1254	762	2016

Panel B – Long-Term Credit Ratings

Credit Rating	#	Pre-SOX	Post-SOX	Total
AAA	1	57	32	89
AA+	2	9	6	15
AA	3	68	46	114
AA-	4	84	37	121
A+	5	152	86	238
A	6	313	216	529
A-	7	226	183	409
BBB+	8	417	217	634

BBB	9	497	366	863
BBB-	10	447	255	702
BB+	11	335	220	555
BB	12	409	286	695
BB-	13	456	352	808
B+	14	404	246	650
B	15	147	143	290
B-	16	48	57	105
CCC+	17	30	12	42
CCC	18	1	3	4
CCC-	19	0	1	1
CC	20	1	1	2
D	21	16	3	19
SD	22	4	1	5
All		4121	2769	6890

Table 2 – Summary Statistics

Panel A – Pre-SOX

Variable	Mean	Median	Std. Dev.
INTCOV	8.63	7.29	45.91
D/A	0.38	0.38	0.16
EM	0.002	-0.011	0.25
MKTRET	-0.001	0.002	0.0004

Panel B – Post-SOX

Variable	Mean	Median	Std. Dev.
INTCOV	8.50	8.47	33.91
D/A	0.37	0.38	0.16
EM	-0.183***	-0.196***	0.46***
MKTRET	0.006	0.016	0.0005

Table 3 – Rating Changes

Panel A – Short-Term Credit Rating Changes

	Rating Change			
Year	Downgrades	None	Upgrades	Total
2000	1017	148	22	1187
2001	944	349	18	1311
2002	1045	381	15	1441
2003	1074	362	16	1452
2004	1111	381	7	1499
All	5191	1621	78	6890

Panel B – Long-Term Credit Rating Changes

	Rating Change			
Year	Downgrades	None	Upgrades	Total
2000	604	389	194	1187
2001	170	1031	110	1311
2002	115	1205	121	1441
2003	95	1263	94	1452
2004	99	1330	70	1499
All	1083	5218	589	6890

Table 4 – Odds of Credit Rating Downgrade

	Short-Term Downgrades			Long-Term Downgrades		
	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	1.088***	1.061***	1.135***	-1.256***	-1.026***	-1.241***
	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
SOX	0.132*	0.135*	0.134*	-1.819***	-1.829**	-1.847***
	.0941	.0885	.0972	<.0001	<.0001	<.0001
	1.141	1.145	1.144	0.162	0.161	0.158
INTCOV		-0.007***	-0.008***			
		<.0001	<.0001			
		0.993	0.992			
UPPERBORDER		-1.822***				
		.0040				
		0.162				
LOWERBORDER	-2.245***		-2.331***			
	<.0001		<.0001			
	0.106		0.097			
D/A					-0.626***	
					.0017	
					0.535	
EM	1.221***	1.192***	1.185***	0.450**	0.448***	0.448***
	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
	3.392	3.294	3.272	1.569	1.565	1.565

MKTRET			0.578	-3.368	-3.380***	
			.4975	.0005	.0005	
			1.783	0.034	0.034	
SOX*EM	0.245**	0.303***	0.278***	0.581***	0.593***	0.570***
	.0190	.0043	.0100	.0009	.0007	.0011
	1.278	1.354	1.320	1.788	1.809	1.768
Wald Tests:						
SOX + SOX*EM = 0	p<0.0001	p<0.0001	p<0.0001	p<0.0001	p<0.0001	p<0.0001
EM + SOX*EM = 0	p<0.0001	p<0.0001	p<0.0001	p<0.0001	p<0.0001	p<0.0001
N	6257	5962	5962	6873	6873	6257
-2LogL	6986.632	6772.883	6614.925	5527.843	5517.977	3193.487
Wald	280.859	207.563	325.502	327.646	335.848	86.064
Wald Test Pr > χ^2	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001

Table 5 –Credit Rating Levels

	Short-Term Ratings			Long-Term Ratings		
	(1)	(2)	(3)	(4)	(5)	(6)
SOX	0.146 .2339 1.157	0.179 .1359 1.196	0.085 .5009 1.088	0.169*** .0040 1.184	0.176*** .0031 1.193	0.144** .0163 1.155
INTCOV					-0.011*** <.0001 0.989	-0.006*** <.0001 0.994
IGRADE	-0.144 .4078 0.866			-5.473*** <.0001 0.004		-5.631*** <.0001 0.004
UPPERBORDER				-0.430*** <.0001 0.650		-0.450*** <.0001 0.638
LOWERBORDER			5.254*** <.0001 191.392		0.348*** <.0001 1.417	
D/A	-1.121*** .0055 0.326	-1.143*** .0027 0.319		3.161*** <.0001 23.585		
EM	1.387*** <.0001 4.003	1.315*** <.0001 3.723	1.356*** <.0001 3.879	1.069*** <.0001 2.913	1.311*** <.0001 3.710	0.852*** <.0001 2.344

MKTRET	-1.013	-0.751	-1.165			
	.4051	.5294	.3497			
	0.363	0.472	0.312			
SOX*EM	0.364**	0.303*	0.427**	0.278***	0.364***	0.290***
	.0304	.0670	.0146	.0001	<.0001	.0001
	1.440	1.354	1.533	1.321	1.439	1.336
Wald Tests:						
SOX + SOX*EM = 0	p=0.0002	p=0.0002	p=0.0003	p<0.0001	p<0.0001	p<0.0001
EM + SOX*EM = 0	p<0.0001	p<0.0001	p<0.0001	p<0.0001	p<0.0001	p<0.0001
N	1849	2016	1849	6257	5962	5962
-2LogL	4583.651	5004.744	4049.069	26765.774	29975.079	25859.590
Wald	93.310	92.524	409.982	3171.984	679.130	2661.341
Wald Test Pr > χ^2	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001

Table 6 – Regressions of High- versus Low-Earnings-Management Firms

	Low Earnings Management		High Earnings Management	
	Short-Term Ratings	Long-Term Ratings	Short-Term Ratings	Long-Term Ratings
SOX	0.272**	0.217***	0.335***	-0.003
	.0465	.0007	<.0001	.9673
	1.313	1.242	1.399	0.997
IGRADE	-0.412*	-5.148***		-6.136***
	.0758	<.0001		<.0001
	0.662	0.618		0.002
UPPERBORDER		-0.564***		-0.259***
		<.0001		.0003
		0.569		0.772
LOWERBORDER	5.231***		0.471***	
	<.0001		<.0001	
	187.013		1.601	
D/A	5.023***	2.967***	4.379***	3.081***
	<.0001	<.0001	<.0001	<.0001
	151.931	19.430	79.735	21.773
N	974	3332	3332	2938
-2LogL	2027.582	14391.785	16471.109	12550.082
Wald	271.928	1648.746	544.034	1323.428
Wald Test Pr > χ^2	<.0001	<.0001	<.0001	<.0001

Table 7 – Listing Location

	Short-Term Credit Ratings			Long-Term Credit Ratings		
	All U.S.-Listed Firms (1)	U.S.-Based, -Listed Firms (2)	Cross-Listed Firms (3)	All U.S.-Listed Firms (4)	U.S.-Based, -Listed Firms (5)	Cross-Listed Firms (6)
SOX	-0.670	1.210**	0.184	0.280	0.279*	0.192***
	.6043	.0209	.1246	.1934	.0828	.0015
	0.512	3.354	1.202	1.324	1.322	1.212
INTCOV	-0.039***			-0.011***	-0.011***	-0.011***
	<.0001			<.0001	<.0001	<.0001
	0.961			0.989	0.989	0.989
LOWERBORDER	4.853***			0.348***	0.349***	-0.241
	<.0001			<.0001	<.0001	.1016
	128.142			1.417	1.417	0.786
EM	0.987***	1.337***	1.297***	1.314***	1.299***	1.293***
	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
	2.684	3.808	3.657	3.720	3.664	3.642
MKTRET				0.506	0.543	
				.4294	.3965	
				1.659	1.721	
SOX*EM	0.277	0.332**	0.290*	0.364***	0.357***	0.326***
	.1376	.0461	.0806	<.0001	<.0001	<.0001
	1.319	1.393	1.336	1.439	1.430	1.385
U.S.-LISTED	-1.240			-0.018		
	.1456			.9128		

	0.289			0.983		
U.S.-IN-U.S.		-0.240			0.234**	
		.4703			.0444	
		0.787			1.264	
CROSS-LISTED			-0.858**			-0.494***
			.0236			.0024
			0.424			0.610
SOX*U.S.-LISTED	0.850			-0.116		
	.5134			.5928		
	2.339			0.891		
SOX*U.S.-IN-U.S.		-1.043**			-0.113	
		.0479			.4874	
		0.353			0.893	
SOX*CROSS-LISTED			1.025*			0.032
			.0916			.8918
			2.786			1.033
Wald Tests:						
SOX + SOX*EM + SOX*USLISTED = 0	p=0.0023			p<0.0001		
SOX + SOX*EM + SOX*USINUS = 0		p=0.0001			p<0.0001	
SOX + SOX*EM + SOX*CROSS_LISTED = 0			p=0.0150			p=0.0203
EM + SOX*EM = 0	p=0.0001	p<0.0001	p<0.0001	p<0.0001	p<0.0001	p<0.0001
N	1787	2016	2016	5962	5962	5962
-2LogL	3598.493	5006.247	5009.478	29973.573	29968.842	30006.555

Wald	571.821	92.550	89.390	680.154	684.0100	643.723
Wald Test Pr > χ^2	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001

Table 8 – Size Regressions

	Short-Term Ratings		Long-Term Ratings	
	[0, 10)	≥ 10	[0, 10)	≥ 10
SOX	0.170	0.350**	0.063	0.319***
	0.385	0.025	0.350	0.008
	1.186	1.419	1.065	1.376
INTCOV				
IGRADE			-5.324***	-5.256***
			<.0001	<.0001
			0.005	0.005
UPPERBORDER			-0.194***	-0.982***
			0.0004	<.0001
			0.823	0.374
LOWERBORDER				
D/A	0.154	-1.381***		
	0.801	0.006		
	1.166	0.251		
EM	0.682**	1.561***	1.038***	0.602***
	0.015	<.0001	<.0001	<.0001
	1.977	4.762	2.823	1.826
MKTRET	-0.072	0.130		
	0.970	0.935		
	0.930	1.139		
SOX*EM	-0.124	0.436**	0.444***	-0.004
	0.664	0.035	<.0001	0..9768
	0.884	1.546	1.559	0.996
Wald Tests:				
SOX + SOX*EM = 0	p=0.8358	p<0.0001	p<0.0001	p=0.0086
EM + SOX*EM = 0	p=0.2656	p<0.0001	p<0.0001	p=0.0090
N	841	1175	4677	1580
-2LogL	1808.133	2901.456	20363.760	5957.184
Wald	11.682	85.431	1487.367	886.703
Wald Test Pr > χ^2	0.039	<0.0001	<0.0001	<0.0001

Table 9 – Economic Expectations

	Short-Term Ratings			Long-Term Ratings		
	(1)	(2)	(3)	(4)	(5)	(6)
SOX	0.261**	0.179	0.124	0.156**	0.114*	0.183***
	.0447	.1672	.3717	.0105	.0704	.0030
	1.298	1.196	1.132	1.169	1.121	1.201
INTCOV	-0.045***		-0.040***	-0.011***	-0.011***	
	<.0001		<.0001	<.0001	<.0001	
	0.956		0.961	0.989	0.989	
IGRADE		-0.151				
		.3842				
		0.860				
UPPERBORDER						0.145***
						.0025
						1.156
LOWERBORDER			4.922***		0.349***	
			<.0001		<.0001	
			137.323		1.418	
D/A		-1.130***				4.291***
		.0051				<.0001
		0.323				73.038
EM	0.897***	1.384***	0.986***	1.107***	1.310***	1.550***
	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001

	2.452	3.990	2.680	3.025	3.707	4.710
MKTRET		-1.118		0.770	0.717	0.543
		.3614		.2219	.2656	.3873
		0.327		2.159	2.049	1.721
SOX*EM	0.175	0.361**	0.275	0.262***	0.361***	0.282***
	.3219	.0318	.1388	.0003	<.0001	.0001
	1.191	1.435	1.317	1.299	1.434	1.326
NAPMISM	0.012	-0.007	0.012	0.011**	0.013***	0.012***
	.1745	.4397	.2234	.0142	.0044	.0052
	1.012	0.993	1.012	1.011	1.013	1.012
Wald Tests:						
SOX + SOX*EM = 0	p=0.0024	p=0.0001	p=0.0100	p<0.0001	p<0.0001	p<0.0001
EM + SOX*EM = 0	p=0.0004	p<0.0001	p=0.0001	p<0.0001	p<0.0001	p<0.0001
N	1948	1849	1787	6535	5962	6257
-2LogL	4434.216	4583.056	3599.105	32937.172	29966.332	30846.681
Wald	326.242	93.916	573.227	634.376	686.832	1319.327
Wald Test Pr > χ^2	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001

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