ACCOUNTING CONSERVATISM OR EARNINGS MANAGEMENT: A STUDY OF THE ALLOWANCE FOR DOUBTFUL ACCOUNTS

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Abstract

This paper empirically examines the relationship between conservatism and earnings management in chemical and allied products manufacturers via an analysis of the allowance for doubtful accounts and bad debt expense. Data used in the study included total accounts receivable, the total allowance for uncollectible accounts, total assets, and other firm-level data from the COMPUSTAT database of North American firms for companies with the standardized industry code (SIC) of 28 which represents chemical and allied products manufacturers. Chemical and allied products manufacturers were deemed an ideal target for the study because the industry typically has large balances in accounts receivable and allowance for doubtful accounts. Bad debt expense and write-offs were also used; these were obtained from the firms’ forms 10K Schedule II filed with the Securities and Exchange Commission (SEC) during the study period from 2005-2017. Analysts reports were also used, as obtained from Bloomberg for each firm. Results from subsequent regression analyses indicate that firms utilized excessive conservatism within the allowance for doubtful accounts to manage earnings to achieve earnings goals throughout the study period.

Keywords: Accounting Conservatism, Earnings Management, Conditional Conservatism, Asymmetry, Manipulation, Allowance for Doubtful Accounts, Bad Debt Expense, Auditor

Authors’ individual contribution: Conceptualization - T.G.B.; Methodology - T.G.B. and R.H.; Formal Analysis - T.G.B. and R.H.; Writing - T.G.B. and M.A.M.; Investigation - T.G.B., M.A.M., and R.H.

Declaration of conflicting interests: The Authors declare that there is no conflict of interest.

1. INTRODUCTION

This research investigates earnings management for firms that are poorly performing or close to meeting or beating analysts’ projections. Few have researched the allowance for doubtful accounts even though accounts receivable is a material balance sheet account for numerous companies. McNichols and Wilson (1988) modeled bad debt expense based on economic determinants that explain significant portions of bad debt expense. Others found that firms manage earnings using receivables (Teoh, Wong, & Rao, 1998; Marquardt & Wiedmand, 2004; Caylor, 2010). Jackson and Liu (2010) performed extensive research on the allowance for doubtful accounts through 2004. However, no research has
been conducted since. Also, their research did not consider the allowance for doubtful accounts as a percentage of the accounts receivable balance. Prior research has considered the reasonableness of bad debt expense as a percentage of sales but did not consider the reasonableness of the allowance for doubtful accounts as a percentage of outstanding receivables (Jackson & Liu, 2010). Given that firms estimate bad debts using one of two methods and both the balance sheet and income statement are impacted, this research will add to the body of knowledge by investigating both the income statement impact and the balance sheet impact.

Our general research question is, "Do firms utilize the allowance for doubtful accounts to manage earnings?" The question is split into three categories: poorly performing firms, firms close to meeting analysts' projections, and firms close to exceeding analysts' projections. In addition, we had quality audit firms as a potential mitigating factor to firms managing their earnings.

We study the chemical and allied manufacturing industry for several reasons. First, the industry is relatively large and is actively followed by numerous analysts and investors. Next, the industry typically has large balances in accounts receivable and allowance for doubtful accounts. In addition, several firms within the industry are geographically located close to the authors, so they are of interest. Finally, one large industry group allowed for the timely completion of the study.

The present research begins with a review of relevant literature, followed by the hypotheses developed for the study in Section 2, and, subsequently the methodology in Section 3. Next reported are the study results in Section 4, as well as the conclusion in Section 5. The final section of the research presents the limitations of the study as well as some opportunities for future related research.

2. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

Unconditional conservatism is based on information known at the beginning of an asset's life while conditional conservatism is based on information obtained in future periods (Basu, 2005). Unconditional conservatism, as the name suggests, does not occur after a specific economic event. Rather, unconditional conservatism is an accounting principle being applied consistently and regularly (Ruch & Taylor, 2015).

Conditional conservatism happens when an event triggers significant negative news to be recognized in financial statements; however, similar significant positive news does not trigger recognition in the financial statements. Information leading to the belief that fixed assets are impaired would result in a loss being recorded; however, information leading to the belief that fixed assets have significantly appreciated would not result in a gain being recorded (Financial Accounting Foundation, 2017a).

Earnings that repeat over time are persistent. Applying conservatism, however, results in an asymmetry in the timeliness of information and persistence of earnings. Further, the bad news is timelier, yet less persistent, while the good news is less timely but more persistent (Basu, 1997). Research has indicated that conservatism understates accounting values of equity compared to fair values of equity. That is, assets and revenues are understated, and liabilities and expenses are overstated (Ruch & Taylor, 2015; Bryan, McKnight, & Houmes, 2021).

The Financial Accounting Standards Board (FASB) includes predictive and confirmatory values as relevant characteristics of financial information in the Financial Accounting Concepts (FASB, 2010). Predictive value means that a decision-maker can use the information to help forecast future outcomes (Gordon, Raedy, & Sannela, 2016). One element of accruals that investors will look toward is cash flows. Cash flows are often lagged by one or more periods from resulting accruals (Houmes & Skantz, 2010). In the case of applying conservatism, the bad news is recorded before the resulting decrease in cash flows or expenditure (Byzalov & Basu, 2016).

Confirmatory value means information provides feedback to allow a decision-maker to evaluate prior predictions (Gordon et al., 2016). The extent to which accounting information has predictive and confirmatory value to investors is known as value relevance. Balachandran and Monhanram (2011) observe that the utilization of conditional and unconditional conservatism has increased. They note a general trend of declining value relevance during the same period. However, they find no evidence of a decline in value relevance of accounting information in firms that also had increased conservatism.

Linking these two concepts of predictive value and confirmatory value, when investors can accurately identify earnings persistence using accounting information, accounting information is more relevant. However, conditional conservatism can reduce earnings persistence and predictive value and increase earnings volatility (Dichev & Tang, 2008; Chen, Folsom, Perek, & Sami, 2014). Dichev and Tang (2008) reported in a study covering 40 years that conditional conservatism increased volatility and reduced persistence confirming an earlier study by Givoly and Hayn (2000). Chen et al. (2014) add that conditional conservatism resulted in not only reduced earnings persistence but also lower pricing multiples for firms. Others find that while earnings are less persistent or more difficult to predict when conditional conservatism is present, the ability for analysts to predict future cash flows increases (Kim & Kross, 2005; Bandyopadhyay, Chen, Huang, & Jha, 2010). These studies confirm that conditional conservatism, which is conservatism applied due to an event occurring, reduces persistence.

Unconditional conservatism may or may not have a similar impact on earnings persistence, depending on the nature of the unconditional accounting practice employed. Applying accelerated depreciation could cause earnings persistence to decline due to expensing more depreciation early in an asset's life and less later (Bryan et al., 2021). However, it could increase persistence by having lower repairs and maintenance expenses early on when depreciation is higher and then higher repairs and maintenance expenses later in an asset's life when depreciation is lower. Penman and...
Zhang (2002) found expenditures related to research and development and advertising reduce earnings persistence to the extent firms had temporary fluctuations in these expenditures. While persistence, predictive value and confirmatory value are desirable characteristics of quality accounting information, earnings management in the context of conservatism is objectionable. Earnings management represents management’s intentional manipulation of accounting information to achieve targeted earnings (Schipper, 1989; Habib & Hansen, 2008; Ruch & Taylor, 2015). The financial statements submitted by management do not reflect the actual economic transactions that have occurred during the period. The FASB in the now superseded SFAC No. 2 recognized the potential of utilizing conservatism to understate income in a current period and then overstate in another period. In the concept statement, they specifically state conservatism should not be utilized to rationalize understatement of earnings (FASB, 1980). Prior research identifies earnings thresholds that could trigger management’s manipulation of earnings: no earnings surprise (meeting analysts’ forecasts), positive earnings (exceeding analysts’ forecasts), and earnings increase (initial earnings below analysts’ forecasts) (Burgstahler & Dichev, 1997; DeGeorge, Patel, & Zeckhauser, 1999). Francis, Hasan, and Wu (2013) find that earnings manipulation increased among firms during and immediately following the financial crisis.

Firms utilize earnings management because the market reacts negatively to missing analysts’ forecasts (Lopez & Rees, 2002). However, stock returns are significantly higher for those companies that report earnings that meet or exceed analysts’ forecasts (Bartov, Givoly, & Hayn, 2002; Kasznick & McNichols, 2002). Studies find that firms seek to achieve no earnings surprise by both guiding analysts’ forecasts lower and manipulate earnings higher (Matsumoto, 2002; Burgstahler & Eames, 2006). Executives utilize active earnings management through conservatism in three basic forms: 1) big bath charge where bad news is intentionally made worse, 2) inappropriate valuation of or expensing acquisitions, and 3) miscellaneous “cookie jar reserves” (Watts, 2003b). Managers justify their overstating liabilities by stating it is conservatism; however, occasionally, asset write-downs or increased liabilities are performed so managers may inflate earnings in the future (Watts, 2003b). Levitt (1998) concludes that companies intentionally create reserves, understate their assets, or overstate their liabilities during good times and then reverse the adjustments to intentionally overstate income. Bryan et al. (2021) find that firms have increasingly understated their accounts receivable balances.

DeGeorge et al. (1999) observe that bad news write-downs associated with conditional conservatism may be excessive and refer to this as big bath theory. The term “big bath” is used to describe an accounting methodology whereby a firm overstates losses in a period of poor economic status (Kwon & Lee, 2016). The effect of a big bath is current profits are increased more than the actual economic events allowing for future provisions to be higher through reversals or lower than actual expenses (Lee, Chun, Park, & Choi, 2009; Kim, Kim, & Kwan, 2012). Stein and Wang (2016) find that firms facing high levels of negative uncertainty report more negative accruals and opportunistically manage earnings downward. They conclude that investors are likely to attribute the poor performance to the economic conditions rather than the firm performance. Their findings continue by showing firms managed earnings upward during economic expansions and downward during economic contractions because investors expected persistent earnings during better times (Stein & Wang, 2016).

Many studies suggest that management uses conservatism as a methodology to manage a firm’s earnings (Devine, 1963; FASB, 1980; Levitt, 1998; Penman & Zhang, 2002; Jackson & Liu, 2010; Ghyasi, 2017). Most studies have focused on estimates related to bad debts, estimated percentage complete, and other areas where a year-by-year comparison of estimated and actual can be made. Penman and Zhang (2002) report that the application of unconditional conservatism can create hidden reserves that can be released into income that distorts reported performance. Jackson and Liu (2010) research in conservatism studied conservatism and earnings management. “Accounting slack”, or hidden reserves as noted above, is created when unconditional conservatism is applied (Jackson & Liu, 2010). Bad economic news losses can be mitigated by this accounting slack. Jackson and Liu (2010) concluded that firms manage earnings through the allowance for bad debts. They investigated temporal changes in the allowance for doubtful accounts, whether bad debt expense appears to be managed, and if the conservative accounting is related to earnings management. However, they did not consider the possibility of firms utilizing consistent allowance for doubtful accounts as a percentage of sales.

Jackson and Liu (2010) were the first to assess conservatism on an individual accrual account, the allowance for doubtful accounts. In their study of firms from 1980 through 2004, they developed two measures of conservatism related to the allowance for doubtful accounts (Jackson & Liu, 2010):

\[
CON1_{it} = \frac{ALLOW_{it}}{WO_{it+1}}
\]

\[
CON2_{it} = \frac{(ALLOW_{it} - WO_{it+1})/SALE_{it}}{SALE_{it}}
\]

\(ALLOW_{it}\) is the allowance for doubtful accounts. \(WO_{it}\) is write-offs of uncollectible accounts. \(SALE_{it}\) is net sales; \(i\) and \(t\) are subscripts representing firm and year, respectively. \(CON1_{it}\) measures the conservative nature of the allowance for doubtful accounts by creating a ratio of the allowance for doubtful accounts for one year divided by the write-offs by the firm in the next year. If the firm has perfect information, the ratio will approximate one. If the allowance account is conservative the ratio will be greater than one. Their study finds that between 1980 and 2004, \(CON1\) averaged 2.54 for their sample of over 10,000 firm years (Jackson & Liu, 2010). Bryan et al. (2021) find that 92.9 percent of firms in their study have \(CON1\) of greater than one. In addition, they find the level of understatement of accounts receivable has increased since Jackson and Liu’s (2010) study to 3.81 or almost four years of write-offs in the allowance for doubtful accounts.
CON2 measures essentially the same thing as CON1, but here they utilize the difference between the allowance and the next year’s write-offs divided by sales. Again, if the firm has perfect information, the difference between the allowance and next year’s write-offs would be zero, so $CON2 = 0$. Jackson and Liu (2010) find the ratio averaged 0.0027 for firms from 1980 to 2004. Their measures only consider the allowance as it relates to the income statement rather than also reviewing the balance sheet impact. Bryan et al. (2021) find 58.23 percent of firms have CON2 greater than zero. In addition, they find firms have been increasingly understating allowances since 1985 and that Big 4 auditors are more likely to disallow or challenge the allowances in a more experienced auditors. Vann and Presley (2012) found large audit firms do a better job assessing qualitative audit firms do a better job of picking up material misstatements. Prior studies document that large audit firms perform higher audits. AUDIT will be used to indicate audit firm size is included. 

**3. METHODOLOGY**

The following variables were utilized in linear regression models. All continuously measured variables were winsorized to remove the impact of outliers at the 1 and 99 levels. The potential for the effect of within-firm correlation and heteroscedasticity was mitigated using clustered robust standard error clustering on gvkeynum. Utilizing Stata, the firm ID (gvkey) variable was destrung into a numerical variable – gvkeynum.

**H1a:** Chemical and allied products manufacturers with severe losses or substantially underperforming will report higher bad debt expense. Research has linked large audit firms and internal control quality within firms (Beneish & Press, 1993; Ge & McVay, 2005). Ge and McVay (2005) found large audit firms do a better job assessing internal controls and adapting audit procedures due to more experienced auditors. Vann and Presley (2012) found large audit firms do a better job assessing qualitative audit firms do a better job of picking up material misstatements. Prior studies document that large audit firms perform higher audits. AUDIT will be used to indicate audit firm size is included. 

**H1b:** Audit quality attenuates the tendency for manufacturers with severe losses or is substantially underperforming to report higher bad debt expense. Jackson and Liu (2010) and McNichols and Wilson (1988) have found that firms manage earnings through the allowance for doubtful accounts and bad debts. While Jackson and Liu (2010) compared analysts’ earnings projections, they attempted to model based on the highest performing and lowest performing and found no statistical significance in how far the firms were from estimates. Firms attempt to have zero earnings surprises between analysts’ projections and actual – or meeting the projection (Burgstahler & Dichev, 1997; Degeorge et al., 1999; Nefar, Halilou, & Ben Abdelaziz, 2016). Exceeding analysts’ projections, or what has been described as positive, results in higher financial reporting quality. Hence the tendency to manage earnings should be less for higher financial reporting quality. Hence the tendency to manage earnings should be less for higher financial reporting quality. Hence the tendency to manage earnings should be less for high-quality audit firms. Hence the tendency to manage earnings should be less for high-quality audit firms. A firm’s stock price is expected to increase if they achieve a few cents improvement in earnings per share, but more might be viewed as fraud rather than earnings management. It appears that high-quality audit firms do a better job of preventing earnings management. Therefore, hypotheses two and three are:

**H2a:** Chemical and allied products manufacturers will manage earnings by reducing bad debt expense, to even revenue-producing, when earnings per share before bad debt expense is at or slightly higher than analysts’ projections to obtain zero surprise or positive surprise.

**H2b:** Audit quality attenuates the tendency for manufacturers to manage earnings by reducing bad debt expense, to even revenue-producing, when earnings per share before bad debt expense is at or slightly higher than analysts’ projections to obtain zero surprise or positive surprise.

**H3a:** Chemical and allied products manufacturers will manage earnings by reducing bad debt expense, to even revenue-producing, when earnings per share before bad debt expense are slightly lower than analysts’ projections to obtain zero surprise.

**H3b:** Audit quality attenuates the tendency for manufacturers to manage earnings by reducing bad debt expense, to even revenue-producing, when earnings per share before bad debt expense are slightly lower than analysts’ projections to obtain zero surprise.

**EPS_CLOSE_OVER** is coded 1 for firms that have pre-bad debt expense earnings per share that was no more than three percent above analysts’ forecast and 0 otherwise. Bad debt expense is expected to be lower.

**EPS BELOW** is coded 1 for firms that have pre-bad debt expense earnings per share that was no more than three percent below analysts’ forecast and 0 otherwise. Bad debt expense is expected to be lower, so the firms can meet expectations.

Large firms with more sophisticated financial reporting and internal controls should produce higher financial reporting quality. Hence the tendency to manage earnings should be less for large companies. We control for this result by including the variable, LogASSETS defined as the log of total firm assets.

Highly levered companies with greater financial risk have incentives that include contractual obligations related to fixed debt costs as well as the potential avoidance of debt covenant violations to manage earnings. To control for these effects we include LEV and measure it as total long-term debt divided by total assets.
CASHFLOW/ASSETS is the firm’s net cash flow from operations divided by total assets. Highly liquid firms may have fewer incentives to manage earnings through bad debts expense.

Prior studies document that managers of high price-earnings (PE) growth firms use accruals to manage earnings higher. Hence highly valued high PE firms with incentives to meet analysts’ predicted earnings may be more likely to use bad debts expense to manage earnings. We further include the control, PE, and measure it as the company’s price-earnings ratio for the prior period or lagged one period. PE<sub>t-1</sub> is the firm’s price-earnings ratio lagged one period.

Also included is CURRENT, the firm’s current ratio.

ALT is the firm’s Altman’s Z-score which is a measure of a firm’s credit quality (Altman, 1968). Prior literature, such as Bhagat and Bolton (2008) and Ashbaugh-Skaife, Collins, Kinney, and Lafond (2009), have used Altman’s Z-score as a measure of credit quality. Credit quality could impact the firm’s decision to manipulate the allowance for bad debts. It is measured as:

\[
Z = 1.2A \times 1.4B \times 3.3C \times 0.6D \times 0.99E
\]  

A = Working capital/Total assets [measures the relative amount of liquid assets];
B = Retained earnings/Total assets [determines cumulative profitability];
C = Earnings before interest and taxes/Total assets [measures earnings away from the effects of taxes and leverage];
D = Market value of equity/Book value of total liabilities [incorporates the effects of a decline in the market value of a company’s shares];
E = Sales/Total assets [measures asset turnover].

The Altman’s (1968) Z-score is interpreted as:

\[ Z > 2.99 \rightarrow \text{“Safe” zone}; \]
\[ 1.81 < Z < 2.99 \rightarrow \text{“Grey” zone}; \]
\[ Z < 1.81 \rightarrow \text{“Distress” zone}. \]

BANKRUPT is the total number of business bankruptcies in the country (American Bankruptcy Institute, 2019). Firms may have incentives to change their bad debt expense based on the business’ economic condition or the general economic condition of the nation. Of interest is the period of the financial crisis of 2007-2008. Consistent with Stein and Wang (2016), downward earnings management or a big bath is more likely during the financial crisis and BANKRUPT is a measure of financial uncertainty. It is included as a possible alternative explanation for changes in bad debt expense. The magnitude of a firm’s cash flow may affect the need to manage earnings. More specifically, companies with greater (less) cash flow should have lower (greater) incentives to manage earnings.

LogBANKRUPT represents the log of the number of firms declaring bankruptcy during the year.

### 3.1. Models

**H1a** states that companies with severe losses or poor performing firms will increase their bad debt expense or take a “big bath”. **H1b** states that audit quality attenuates the tendency for manufacturers with severe losses of are substantially underperforming to report high bad debt expense. Both were tested using the following regressions:

**Model 1a.** Regressing bad debt expense as a percentage of sales

\[
\frac{\text{BDE}_{it}}{\text{Sales}_{it}} = \beta_0 + \beta_1 \text{BOTDEC}_{it} + \beta_2 \log \text{ASSETS}_{it} + \beta_3 \text{LEV}_{it} + \beta_4 \frac{\text{CASHFLOW}}{\text{ASSETS}}_{it} + \beta_5 \text{PE}_{it-1} + \beta_6 \text{CURRENT}_{it} + \beta_7 \text{ALT}_{it} + \beta_8 \log \text{BANKRUPT}_{it} + \beta_9 \text{AUDIT}_{it} + \beta_{10} \text{AUDIT}_{it} \times \text{BDE}_{it} + \epsilon_{it}
\]  

**Model 1b.** Regressing the allowance for doubtful accounts as a percentage of accounts receivable

\[
\frac{\text{ALLOW}_{it}}{\text{AR}_{it}} = \beta_0 + \beta_1 \text{BOTDEC}_{it} + \beta_2 \log \text{ASSETS}_{it} + \beta_3 \text{LEV}_{it} + \beta_4 \frac{\text{CASHFLOW}}{\text{ASSETS}}_{it} + \beta_5 \text{PE}_{it-1} + \beta_6 \text{CURRENT}_{it} + \beta_7 \text{ALT}_{it} + \beta_8 \log \text{BANKRUPT}_{it} + \beta_9 \text{AUDIT}_{it} + \beta_{10} \text{AUDIT}_{it} \times \text{BDE}_{it} + \epsilon_{it}
\]  

Initially, **H2a** and **H3a** will be tested by looking for significant changes in bad debt expense as a percentage of sales and allowance for a doubtful account as a percentage of accounts receivable for an indication of manipulation.

Models for **H2a**, **H2b**, **H3a**, and **H3b** will focus on variables of interest described above. **H2a** postulates that firms’ with earnings before bad debt expense that is slightly over analysts’ projections will manage earnings by reducing bad debt expense. **H2b** states that audit quality attenuates the tendency for manufacturers to manage earnings by reducing bad debt expense, to even revenue-producing, when earnings per share before bad debt expense are at or slightly higher than analysts’ projections to obtain zero surprise or positive surprise.

Models proposed to test these hypotheses are Models 2a and 2b.

**Model 2a.** Model of bad debt expense to sales

\[
\frac{\text{BDE}_{it}}{\text{Sales}_{it}} = \beta_0 + \beta_1 \text{EPS\_CLOSE\_OVER}_{it} + \beta_2 \log \text{ASSETS}_{it} + \beta_3 \text{LEV}_{it} + \beta_4 \frac{\text{CASHFLOW}}{\text{ASSETS}}_{it} + \beta_5 \text{PE}_{it-1} + \beta_6 \text{CURRENT}_{it} + \beta_7 \text{ALT}_{it} + \beta_8 \log \text{BANKRUPT}_{it} + \beta_9 \text{EPS\_CLOSE\_OVER}_{it} \times \text{AUDIT}_{it} + \beta_{10} \text{AUDIT}_{it} + \epsilon_{it}
\]  

\[
\frac{\text{ALLOW}_{it}}{\text{AR}_{it}} = \beta_0 + \beta_1 \text{BOTDEC}_{it} + \beta_2 \log \text{ASSETS}_{it} + \beta_3 \text{LEV}_{it} + \beta_4 \frac{\text{CASHFLOW}}{\text{ASSETS}}_{it} + \beta_5 \text{PE}_{it-1} + \beta_6 \text{CURRENT}_{it} + \beta_7 \text{ALT}_{it} + \beta_8 \log \text{BANKRUPT}_{it} + \beta_9 \text{AUDIT}_{it} + \beta_{10} \text{AUDIT}_{it} \times \text{BDE}_{it} + \epsilon_{it}
\]
Model 2b. Model of allowance for doubtful accounts as a percentage of accounts receivable

\[
\frac{\text{ALLOW}_{it}}{AR_{it}} = \beta_0 + \beta_1 \text{EPS}_\text{CLOSE,OVER}_{it} + \beta_2 \log \text{ASSETS}_{it} + \beta_3 \text{LEV}_{it} + \beta_4 \text{CASHFLOW}/\text{ASSETS}_{it} + \beta_5 \text{PE}_{it-1} + \beta_6 \text{CURRENT}_{it} + \beta_7 \text{ALT}_{it} + \beta_8 \log \text{BANKRUPT}_{it} + \beta_9 \text{EPS, CLOSE, OVER}_{it} \cdot \text{AUDIT}_{it} + \beta_{10} \text{AUDIT}_{it} + \epsilon_{it}
\]  

(6)

H3a postulates that firms with earnings before bad debt expense that is slightly under analysts’ projections will manage earnings by reducing bad debt expense. H3b states that audit quality attenuates the tendency for manufacturers to manage earnings by reducing bad debt expense, to even revenue-producing, when earnings per share before bad debt expense are slightly lower than analysts’ projections to obtain zero surprise.

Models proposed to test this hypothesis are Models 3a and 3b.

Model 3a. Model of bad debt expense as a percentage of sales

\[
\frac{\text{BDE}_{it}}{\text{Sales}_{it}} = \beta_0 + \beta_1 \text{EPSBELOW}_{it} + \beta_2 \log \text{ASSETS}_{it} + \beta_3 \text{LEV}_{it} + \beta_4 \text{CASHFLOW}/\text{ASSETS}_{it} + \beta_5 \text{PE}_{it-1} + \beta_6 \text{CURRENT}_{it} + \beta_7 \text{ALT}_{it} + \beta_8 \log \text{BANKRUPT}_{it} + \beta_9 \text{EPSBELOW}_{it} \cdot \text{AUDIT}_{it} + \beta_{10} \text{AUDIT}_{it} + \epsilon_{it}
\]  

(7)

Model 3b. Model of allowance for doubtful accounts as a percentage of accounts receivable

\[
\frac{\text{ALLOW}_{it}}{\text{AR}_{it}} = \beta_0 + \beta_1 \text{EPSBELOW}_{it} + \beta_2 \log \text{ASSETS}_{it} + \beta_3 \text{LEV}_{it} + \beta_4 \text{CASHFLOW}/\text{ASSETS}_{it} + \beta_5 \text{PE}_{it-1} + \beta_6 \text{CURRENT}_{it} + \beta_7 \text{ALT}_{it} + \beta_8 \log \text{BANKRUPT}_{it} + \beta_9 \text{EPSBELOW}_{it} \cdot \text{AUDIT}_{it} + \beta_{10} \text{AUDIT}_{it} + \epsilon_{it}
\]  

(8)

Traditionally, the allowance for doubtful accounts has been viewed as unconditional conservatism (Ruch & Taylor, 2015). However, unconditional conservatism is based on information known at the beginning of an asset’s life while conditional conservatism is based on information obtained future periods (Basu, 2005). Changes in the methodology for determining bad debt expense based on current conditions rather than consistently applied processes would indicate that the allowance for doubtful accounts is conditional conservatism.

The dependent variables noted above BDE/Sales and ALLOW/AR are measures of consistency in determining the allowance for doubtful accounts. One methodology for determining the allowance for doubtful accounts is as a percentage of accounts receivable (Gordon et al., 2016). Prior research has only considered the income statement impact, bad debt as a percentage of sales and not the balance sheet impact; therefore, it is believed this research should measure the allowance as a percentage of accounts receivable as a measure of reasonableness and consistency in addition to bad debt as a percentage of sales. Significant changes in these ratios would indicate the allowance for doubtful accounts is conditional conservatism. If H1a, H2a, and H3a hold to be true, this is further evidence that bad debt expense is conditional (as opposed to unconditional) conservatism.

3.2. Data

In gathering the data, this study obtained total accounts receivable, the total allowance for uncollectible accounts, total assets, and other firm-level data from the COMPUSTAT database of North American firms for companies with the standardized industry code (SIC) of 28 which represents chemical and allied products manufacturers. Bad debt expense and write-offs are not reported by COMPUSTAT, so they were obtained from the firms’ forms 10K Schedule II filed with the Securities and Exchange Commission (SEC) during the study period from 2005 (the period after the Jackson & Liu, 2010, research) through 2017. Analysts’ reports for the period were obtained from Bloomberg for each firm.

3.3. Sample

The initial extraction from COMPUSTAT of firms with the SIC of 28 from 2005 through 2017 with accounts receivable balances and allowance for doubtful accounts resulted in 285 firms and 4,128 total observations. As noted earlier, utilizing Stata, the firm ID (gvkey) variable was destrung into a numerical variable - gvkeynum. The resulting companies were sorted by gvkeynum and fiscal year. Included in these companies were foreign registered firms that do not report a Schedule II (or equivalent) for disclosures in changes of valuation accounts, which were dropped for lack of data needed for the study. Also dropped were all firms that did not have an allowance for doubtful accounts. Finally, the EDGAR database was searched and Forms 10K were reviewed for bad debt expense (BDE) and net write-offs (WO) for each firm-year. Those firms that did not disclose these changes in their allowance for doubtful accounts, typically citing immateriality, were also dropped. The resulting sample was 88 total firms representing 795 firm years. Of the 88 firms, 30 had data for the entire period from 2005 through 2017.

The manual entries of BDE and WO were reviewed to reduce researcher error by a research assistant reading the amounts back to the researcher for confirmation with the 10K. Subsequent verification of amounts by starting with the beginning of the year allowance for doubtful accounts adding bad debt expense and then subtracting net recoveries, as has been referenced in earlier research (Jackson & Liu, 2010), is impossible because virtually 100 percent of the companies have other activity in the allowance for doubtful accounts, such as acquisitions, divestitures, and most commonly, foreign currency changes. In addition,
prior research has indicated the use of gross write-offs and gross recoveries in modeling (Jackson & Liu, 2010). Again, this was not possible. Substantially all companies reported net write-offs or recoveries. Table 1 presents the summary descriptive statistics for the sample companies.

### Table 1. Summary statistics for the sample

| Total observations: 795 | Mean | Standard deviation | Minimum | Maximum |
|-------------------------|------|--------------------|---------|---------|
| Total assets (millions) | 9,356 | 18,395             | 38      | 192,164 |
| Sales (millions)        | 6,274 | 10,532             | 5       | 71,112  |
| Market value (millions)| 13,949| 28,557             | 0       | 258,741 |
| Accounts receivable to assets | 0.91% | 2.0%             | 0.0% | 13.9% |
| Accounts receivable to current assets | 2.36% | 4.9%             | 0.0% | 34.5% |
| Bad debt expense to net income | 1.10% | 165.2%            | 4345.5% | 1009.1% |
| Write-offs to net income | 1.48% | 17.3%              | 44.36% | 1100.0% |

### 4. RESULTS

**H1a** states that companies with severe losses or significantly underperforming will increase their bad debt expense or take a “big bath”. **H3b** states that audit quality attenuates the tendency for manufacturers with severe losses of are substantially underperforming to report high bad debt expense. Both **H1a** and **H1b** were tested using Model 1a and Model 1b (see equations (3), (4)).

| Independent variable | Mean | Standard deviation | Minimum | Maximum |
|----------------------|------|--------------------|---------|---------|
| BOT_DEC              | 0.0866 | 0.2814             | -       | 1.0000  |
| logAssets            | 8.070 | 13.30              | 3.640   | 11.778  |
| LEV                  | 0.293 | 0.272              | -       | 1.386   |
| CASHFLOW/ASSETS      | 0.096 | 0.067              | (0.203)| 0.392   |
| Lagged PE            | 13.819| 48.029             | (117,000)| 149.167 |
| CURRENT              | 2.325 | 1.4320             | 0.682   | 9.406   |
| ALT                  | 3.936 | 3.649              | 0.672   | 22.510  |
| logBANKRUPT          | 10.548| 0.327              | 10.091  | 11.016  |
| AUDIT                | 0.930 | 0.236              | -       | 1.000   |
| AUDIT*BOT_DEC        | 0.048 | 0.213              | -       | 1.000   |

The following Pearson correlation matrix in Table 3 indicates that the Altman Z-score is correlated with both leverage and the current ratio. This is expected since all measure the financial condition of a firm. In addition, **AUDIT*BOT_DEC** and **BOT_DEC** are also correlated as is expected and part of the hypothesis.

| Variables | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10   |
|-----------|------|------|------|------|------|------|------|------|------|------|
| 1 BOT_DEC | 1.000|      |      |      |      |      |      |      |      |      |
| 2 logAssets | 0.179| 1.000|      |      |      |      |      |      |      |      |
| 3 LEV     | 0.042| 0.346| 1.000|      |      |      |      |      |      |      |
| 4 CASHFLOW/ASSETS | -0.352| 0.078| -0.233| 1.000|      |      |      |      |      |      |
| 5 Lagged PE | 0.043| -0.010| -0.074| 0.060| 1.000|      |      |      |      |      |
| 6 CURRENT | -0.040| -0.268| -0.324| 0.122| 0.031| 1.000|      |      |      |      |
| 7 ALT     | -0.103| -0.275| -0.337| 0.491| 0.060| 0.584| 1.000|      |      |      |
| 8 logBANKRUPT | -0.041| -0.154| -0.327| 0.129| 0.074| 0.115| 0.094| 1.000|      |      |
| 9 AUDIT   | -0.103| 0.376| 0.327| 0.177| 0.011| -0.361| -0.058| -0.045| 1.000|      |
| 10 AUDIT*BOT_DEC | 0.0777| -0.048| 0.1162| -0.282| 0.0085| -0.045| -0.098| -0.035| 0.0755| 1.000|

The regressions produced the following results:

### Table 4. Regression results for Model 1a: Dependent variable - Bad Debt Expense to Sales

(Observations: 491) | Pred. sign | Coefficient | Robust Std. err. | t-stat | p-value | 95% Confidence interval |
|-------------------|------------|-------------|------------------|-------|---------|-------------------------|
| Constant           |            | 0.0102      | 0.0302           | 0.56  | 0.574   | 0.0431                  | 0.0771 |
| BOT_DEC            | +          | 0.0875      | 0.1282           | 6.82  | 0.000   | 0.6193                  | 0.1130 |
| logAssets          | -          | -0.0013     | 0.00010          | -1.23 | 0.216   | -0.0003                 | 0.0008 |
| LEV                | +          | 0.0053      | 0.0057           | 0.37  | 0.314   | -0.0038                 | 0.0017 |
| CASHFLOW/ASSETS    | -          | -0.0143     | 0.0143           | -1.00 | 0.323   | -0.4282                 | 0.0143 |
| Lagged PE          | -          | 0.0000      | 0.0000           | -0.99 | 0.324   | 0.0000                  | 0.0000 |
| CURRENT            | +          | 0.0015      | 0.0012           | 1.27  | 0.209   | -0.0009                 | 0.0038 |
| ALT                | +          | 0.0013      | 0.0007           | 1.85  | 0.069   | -0.0011                 | 0.0027 |
| logBANKRUPT        | -          | -0.0009     | 0.0024           | -0.37 | 0.716   | -0.0036                 | 0.0018 |
| AUDIT              | -          | -0.0018     | 0.0074           | -0.24 | 0.811   | -0.0165                 | 0.0130 |
| AUDIT*BOT_DEC      | -          | -0.0880     | 0.0125           | -7.06 | 0.000   | -0.1129                 | -0.0632 |

| R^2                | 0.4218     |             |                  |       |         |                         |       |
| Prob > F            | 0.1590     |             |                  |       |         |                         |       |
| Prob > F            | 0.0000     |             |                  |       |         |                         |       |
These results show that the worst performing firms tend to increase their bad debt expense; however, this is mitigated by quality audit firms. With p-values of zero, the results have a 99 percent confidence level. Prior studies have researched bad debt expense as a percentage of sales. Model 1b expands this prior research to analyze the allowance for doubtful accounts as a percentage of accounts receivable shown in Table 5.

These results provide support for H1a and H1b. The estimates for our BOT_DEC, and AUDIT*BOT_DEC, interaction term are significantly positive and negative respectively. Companies that are unable or unwilling to avoid large losses will report higher bad debt expense, but high-quality auditors attenuate this positive relation. With p-values of 0.002, the results have a 95 percent confidence level.

**Table 5.** Regression results Model 1b: Dependent variable – Allowance as Percentage of Accounts Receivable

| (Observations: 491) | Pred. sign | Coefficient | Robust Std. err. | t-stat | p-value | 95% Confidence Interval |
|---------------------|------------|-------------|------------------|--------|---------|------------------------|
| Constant            | 7          | 0.262       | 0.2101           | 1.26   | 0.002   | -0.1822 0.0045        |
| BOT_DEC             | +          | 0.5353      | 0.1683           | 3.18   | 0.000  | 0.2003 0.8704         |
| logAssets           | -          | -0.0130     | 0.0068           | -2.21  | 0.030  | -0.0287 -0.00015      |
| LEV                 | +          | 0.0047      | 0.0407           | 0.33   | 0.740   | -0.0945 0.0674        |
| CASHFLOW/ASSETS     | -          | 0.1318      | 0.0970           | 1.36   | 0.178  | -0.0612 0.3248        |
| Logged PE           | -          | -0.0001     | 0.0689           | -1.32  | 0.190  | -0.0002 0.0000       |
| CURRENT             | +          | -0.0048     | 0.0082           | -0.58  | 0.562  | -0.2110 0.1156        |
| ALT                 | +          | -0.0001     | 0.0038           | -0.03  | 0.974  | -0.0076 0.0074        |
| logBANKRUPT        | -          | -0.0009     | 0.0116           | -0.06  | 0.954  | -0.0319 0.0301        |
| AUDIT               | -          | -0.0661     | 0.0568           | -1.16  | 0.248  | -0.1791 0.0470        |
| AUDIT*BOT_DEC       | -          | -0.5244     | 0.1656           | -3.17  | 0.002  | -0.8541 -0.1948       |

H2a and H3a posit that firms with earnings per share close to analysts’ projected earnings per share will utilize bad debt expense to manipulate earnings per share to either meet or beat the analysts’ projections following the financial crisis of 2007-2008. Analysts’ projections were obtained through the Bloomberg Terminal. The analysts represented a variety of sources and not just one analyst for the entire sample of companies. Analyst projections were obtained for 458 of the 543 firm years from 2009 through 2017, mostly due to analysts not following particular stocks.

In addition to modeling attempts, we reviewed companies reporting negative, or income-producing, bad debt expense. These were compared to those companies reporting negative bad debt expense with either a near miss (over or under) analysts’ projections. Table 6 illustrates those findings.

**Table 6.** Near miss companies and negative bad debt expense

| Year | Negative bad debt expense (Companies reporting) | Near miss before BDE | Near miss & neg. BDE |
|------|-------------------------------------------------|----------------------|---------------------|
|      | Number | Percentage | Under | Over |
| 2009 | 5      | 7.69%      | 1     | 2    | 0    |
| 2010 | 8      | 12.50%     | 6     | 3    | 2    |
| 2011 | 8      | 13.66%     | 3     | 3    | 0    |
| 2012 | 2      | 3.08%      | 3     | 3    | 0    |
| 2013 | 6      | 9.68%      | 2     | 2    | 1    |
| 2014 | 7      | 11.11%     | 4     | 3    | 3    |
| 2015 | 0      | 0.00%      | 2     | 3    | 0    |
| 2016 | 3      | 5.66%      | 2     | 3    | 0    |
| Total| 49     |            | 28    | 20   | 9    |

Of the 39 companies reporting negative bad debt expense during the study period, only six (15.4%) also had near misses from analysts’ projections. Six companies reported both near misses and negative bad debt expense. Each of these six companies also had near misses under analysts’ projections or 21.4% of the near misses under.

Statistics related to the variables from Model 2a and Model 2b (see equations (5) and (6)) are as follows:

**Table 7.** Summary statistics for independent variables (Model 2a and 2b)
The following Pearson correlation matrix for these variables indicates AUDIT and EPS_CLOSE_OVER are highly correlated. This is consistent with the expectation that high-quality auditors have an impact on unreasonably accruals such as modifications to bad debt expense. Also, the ALT is correlated with both LEV and CURRENT. Again, this is expected because all are measures of a firm's financial stability.

### Table 8. Pearson correlation matrix for Model 2a and 2b: Independent variables

| Variables          | 1      | 2      | 3      | 4      | 5      | 6      | 7      | 8      | 9      | 10     |
|--------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| EPS_CLOSE_OVER     | 1.000  |        |        |        |        |        |        |        |        |        |
| logASSETS          | 0.033  | 1.000  |        |        |        |        |        |        |        |        |
| LEV                | -0.027 | 0.346  | 1.000  |        |        |        |        |        |        |        |
| CASHFLOW/ASSETS    | 0.137  | 0.378  | -0.233 | 1.000  |        |        |        |        |        |        |
| Logged PE          | 0.033  | 0.034  | -0.079 | 0.088  | 1.000  |        |        |        |        |        |
| CURRENT            | 0.004  | -0.268 | -0.124 | 0.122  | 0.012  | 1.000  |        |        |        |        |
| ALT                | 0.001  | -0.075 | -0.347 | 0.191  | 0.090  | 0.548  | 1.000  |        |        |        |
| logBANKRUPT       | -0.044 | -0.014 | -0.327 | 0.129  | 0.032  | 0.115  | 0.094  | 1.000  |        |        |
| EPS_CLOSE_OVER*AUDIT | 0.039 | 0.376  | 0.327  | 0.177  | 0.072  | -0.361 | -0.058 | -0.045 | 1.000  |        |
| AUDIT              | 0.982  | 0.042  | 0.020  | 0.164  | 0.031  | -0.003 | 0.094  | -0.033 | 0.071  | 1.000  |

The regression of bad debt expense to sales with Model 2a produced the following results:

### Table 9. Model 2a regression results: Dependent variable – Bad Debt Expense to Sales

| (Observations: 491) | Pred. sign | Coefficient | t-statistic | p-value |
|---------------------|------------|-------------|-------------|---------|
| Constant            | ?          | 0.071055    | 1.14        | 0.202   |
| EPS_CLOSE_OVER      | -          | -0.031667   | -2.28       | 0.026   |
| logASSETS           | -          | -0.02941    | -1.94       | 0.055   |
| LEV                 | +          | 0.003268    | 0.38        | 0.704   |
| CASHFLOW/ASSETS     | -          | -0.030182   | -2.12       | 0.037   |
| Logged PE           | -          | -0.0900608  | -3.54       | 0.001   |
| CURRENT             | -          | -0.000139   | -0.09       | 0.925   |
| ALT                 | -          | 0.0001327   | 1.45        | 0.151   |
| logBANKRUPT        | -          | -0.0002430  | -0.3      | 0.618   |
| EPS_CLOSE_OVER*AUDIT| +         | 0.003040    | 2.15        | 0.034   |
| AUDIT               | +          | -0.024156   | -1.82       | 0.073   |

The regression also identified that when companies are just slightly over analysts’ projections the allowance account as a percentage of accounts receivable is lower at a 95 percent significant level. As was the case with the previous regression, this tendency is mitigated by high-quality audit firms again with p-values of less than 0.05, the results are significant at the 95 percent confidence level.

### Table 10. Model 2b regression results: Dependent variable – Allowance as % of Accounts Receivable

| (Observations: 491) | Pred. sign | Coefficient | t-statistic | p-value |
|---------------------|------------|-------------|-------------|---------|
| Constant            | ?          | 0.573044    | 1.31        | 0.193   |
| EPS_CLOSE_OVER      | -          | -0.246515   | -2.69       | 0.009   |
| logASSETS           | -          | -0.021464   | -2.83       | 0.006   |
| LEV                 | +          | -0.025113   | -0.4        | 0.689   |
| CASHFLOW/ASSETS     | -          | -0.020020   | -0.13       | 0.896   |
| Logged PE           | -          | -0.000054   | -0.63       | 0.533   |
| CURRENT             | -          | -0.014853   | -1.15       | 0.253   |
| ALT                 | +          | 0.000094    | 0.02        | 0.986   |
| logBANKRUPT        | -          | -0.000773   | -0.13       | 0.739   |
| EPS_CLOSE_OVER*AUDIT| +         | 0.239293    | 2.39        | 0.011   |
| AUDIT               | +          | -0.206975   | -2.10       | 0.035   |

The regression also identified that when companies were only slightly under analysts’ projections were used to produce regression of bad debt expense to sales and regression of the allowance for doubtful accounts to accounts receivable to test H3a and H3b using Models 3a and 3b.

Statistics related to the variables (see equations (7) and (8)) are as follows:

Companies that were only slightly under analysts’ projections were used to produce regression of bad debt expense to sales and regression of the allowance for doubtful accounts to accounts receivable to test H3a and H3b using Models 3a and 3b.
The regression of bad debt expense to sales utilizing these independent variables produced statistically significant results. Firm's with earnings slightly below analysts' forecasts were likely to lower their bad debt expense, which was statistically significant. This tendency to lower bad debt expense was offset by high-quality audit firms.

Model 3b modeling the allowance for doubtful accounts as a percentage of accounts receivable produced the following regression.

Table 14. Model 3b regression results: Dependent variable – Allowance for Doubtful Accounts as % of Accounts Receivable

| (Observations: 491) | Pred. sign | Coefficient | t-statistic | p-value |
|---------------------|------------|-------------|-------------|---------|
| Constant            | ?          | 0.75429     | 1.32        | 0.192   |
| EPSBELOW            | -          | 0.25197     | 2.70        | 0.008   |
| logASSETS           | -          | -0.02146    | 0.93        | 0.35    |
| LEV                 | +          | 0.35145     | 1.43        | 0.151   |
| CASHFLOW/ASSETS     | -          | 0.00127     | 1.14        | 0.249   |
| Lagged PE           | +          | 0.00013     | 0.02        | 0.981   |
| logBANKRUPT        | +          | 0.24768     | 2.67        | 0.009   |
| EPSBELOW*AUDIT     | +          | 0.03445     | 2.19        | 0.031   |

R²: 0.306

Consistent with firms that were only slightly over analysts' projections, firms slightly under analysts' projections resulted in a coefficient of negative 0.25197 and with p-values of less than 0.05 are statistically significant at the 95 percent level. This negative tendency was again significantly attenuated by high-quality audit firms also statistically significant at the 95 percent level.
The market fluctuations during the study period mirror the fluctuations in BDE/Sales and ALLOW/AR, which provides further evidence that companies react to conditions in the environment when recording bad debt expense.

Robustness
An estimation of bad debt expense (estBDE) as a percent of sales for each year was calculated using the following:

$$\frac{\text{estBDE}_{it}}{\text{SALE}_{it}} = \beta_0 + \frac{\beta_1 \text{AR}_{it}}{\text{SALE}_{it}} + \epsilon_{it}$$  \hspace{1cm} (9)

Upon obtaining the coefficients for each year, estimated bad debt as a percentage of sales was calculated for each year. Following those annual calculations of estimated bad debt as a percentage of sales for each year, abnormal bad debt as a percentage of sales (ABNBDE) was calculated using actual bad debt as a percentage of sales less estimated bad debt as a percentage of sales. A regression model was run again using ABNBDE as the dependent variable rather than BDE/Sales and ALLOW/AR.

H1a and H1b were further tested using three additional models for robustness. Abnormal bad debt was also regressed using the same independent variables that were used for the testing of bad debt expense to sales and the allowance for doubtful accounts to accounts receivable as follows for Model 1R1:

Model 1R1. Regression results using Abnormal Bad Debt as dependent variable

$$\text{ABNBDE} = \beta_0 + \beta_1 \text{BDE}_{it} + \beta_2 \text{logAssets}_{it} + \beta_3 \text{LEV}_{it} + \beta_4 \frac{\text{CASHFLOW}}{\text{ASSETS}}_{it} + \beta_5 \text{PE}_{it-1} + \beta_6 \text{CURRENT}_{it} + \beta_7 \text{ALT}_{it} + \beta_8 \text{logBANKRUPT}_{it} + \beta_9 \text{AUDIT}_{it} + \beta_{10} \text{AUDIT}_{it} + \beta_11 \text{BDE}_{it} + \epsilon_{it}$$  \hspace{1cm} (10)

The regression produced the following results:

| Table 15. Regression results of Abnormal Bad Debt Expense (Model 1R1) |
|---------------------------------|-----------------|-----------|-----------|-----------|
| (Observations: 491)            | Pred. sign      | Coefficient | t-stat | p-value |
|---------------------------------|-----------------|-----------|-----------|-----------|
| Constant                        | ?               | 0.0142    | 0.43     | 0.652     |
| BOT_DEC                         | +               | 0.0707    | 5.21     | 0.000     |
| logAssets                       | -               | -0.0013   | -1.43    | 0.150     |
| LEV                             | +               | 0.0052    | 0.91     | 0.366     |
| CASHFLOW/ASSETS                 | -               | -0.0012   | -0.08    | 0.937     |
| Logged PE                       | -               | 0.0000    | -1.03    | 0.279     |
| CURRENT                         | +               | 0.0087    | 0.75     | 0.455     |
| ALT                             | +               | 0.0015    | 2.20     | 0.030     |
| logBANKRUPT                     | -               | -0.0015   | -0.37    | 0.732     |
| AUDIT                           | -               | 0.0039    | 0.25     | 0.801     |
| AUDIT*BOT_DEC                   | -               | -0.0702   | -5.28    | 0.000     |
| $R^2$                           | 0.3209          |           |          |           |
| $F$                             | 22.670          |           |          |           |
| Prob > F                        | 0.0000          |           |          |           |

These results are also consistent with the initial regressions. Underperforming firms increase bad debt expense; however, audit quality attenuates this tendency with both independent variables having p-values of zero are at the 99 percent confidence level.

An estimation of the allowance for doubtful accounts (estALLOW) as a percentage of accounts receivable for each year was calculated using the following:

$$\frac{\text{estALLOW}_{it}}{\text{AR}_{it}} = \beta_0 + \frac{\beta_1 \text{AR}_{it}}{\text{SALE}_{it}} + \epsilon_{it}$$  \hspace{1cm} (11)

Upon obtaining the coefficients for each year, the estimated allowance for doubtful accounts as a percentage of accounts receivable was calculated for each year. Following those annual calculations of estimated allowance for doubtful accounts as a percentage of accounts receivable for each year, abnormal allowance for doubtful accounts as a percentage of accounts receivable (ABNALLOW) was calculated using actual bad debt as a percentage of sales less estimated bad debt as a percentage of sales. A regression Model 1R2 was run again using ABNALLOW as the dependent variable.

Model 1R2. Regression results using Abnormal Allowances as dependent variable

$$\text{ABNALLOW} = \beta_0 + \beta_1 \text{BDE}_{it} + \beta_2 \text{logAssets}_{it} + \beta_3 \text{LEV}_{it} + \beta_4 \frac{\text{CASHFLOW}}{\text{ASSETS}}_{it} + \beta_5 \text{PE}_{it-1} + \beta_6 \text{CURRENT}_{it} + \beta_7 \text{ALT}_{it} + \beta_8 \text{logBANKRUPT}_{it} + \beta_9 \text{AUDIT}_{it} + \beta_{10} \text{AUDIT}_{it} + \beta_{11} \text{BDE}_{it} + \epsilon_{it}$$  \hspace{1cm} (12)
The regression results of abnormal allowance for doubtful accounts produced the following:

Table 16. Regression results of Abnormal Allowance for Doubtful Accounts (Model 1R2)

| (Observations: 491) | Pred. sign | Coefficient | t-stat | p-value |
|---------------------|------------|-------------|--------|---------|
| Constant            | ?          | 0.3054      | 1.31   | 0.193   |
| BOT_DEC             | +          | 0.4582      | 2.73   | 0.008   |
| logAssets           |            | -0.0149     | -2.39  | 0.019   |
| LEV                 | +          | 0.0142      | 0.33   | 0.742   |
| CASHFLOW/ASSETS     | -          | 0.1943      | 1.75   | 0.085   |
| Lagged PE           | -          | -0.0001     | -1.28  | 0.203   |
| CURRENT             | +          | -0.0068     | -0.87  | 0.385   |
| ALT                 | +          | 0.0008      | 0.21   | 0.837   |
| logBANKRUPT        | -          | -0.0137     | -0.74  | 0.461   |
| AUDIT               | -          | -0.0311     | -0.96  | 0.339   |
| AUDIT*BOT_DEC       | -          | -0.4392     | -2.65  | 0.010   |

| K                   | 0.4279     |
|                     | 10.180     |
| Prob > F            | 0.0000     |

Once again, these results are consistent with the initial regressions. Underperforming firms increase bad debt expense (higher allowance for doubtful accounts); however, audit quality attenuates this tendency with both independent variables having p-values of less than 0.05 are statistically significant at the 95 percent confidence level.

Model 2R1. Regression results using Abnormal Allowances as dependent variable

\[ \text{ABNBDE} = \beta_0 + \beta_1 \text{EPSCLOSEOVER}_{it} + \beta_2 \text{logASSETS}_{it} + \beta_3 \text{LEV}_{it} + \beta_4 \text{CASHFLOW/ASSETS}_{it} + \beta_5 \text{PE}_{it-1} + \beta_6 \text{CURRENT}_{it} + \beta_7 \text{ALT}_{it} + \beta_8 \text{logBANKRUPT}_{it} + \beta_9 \text{EPSCLOSEOVER}_{it} \times \text{AUDIT}_{it} + \beta_{10} \text{AUDIT}_{it} + \epsilon_{it} \]  

(13)

The results of the regressions produced the following results:

Table 17. Model 2R1 regression results: Dependent variable - Abnormal Bad Debt

| (Observations: 491) | Coefficient | t-statistic | p-value |
|---------------------|-------------|-------------|---------|
| Constant            | 0.057988    | 0.99        | 0.325   |
| EPS CLOSE OVER      | -0.002120   | -2.15       | 0.034   |
| logASSETS           | -0.002706   | -2.55       | 0.013   |
| LEV                 | 0.001605    | 0.44        | 0.658   |
| CASHFLOW/ASSETS     | -0.020220   | -1.28       | 0.206   |
| Lagged PE           | -0.000012   | -0.27       | 0.762   |
| CURRENT             | -0.000434   | -0.30       | 0.762   |
| ALT                 | 0.001537    | 1.79        | 0.077   |
| logBANKRUPT        | -0.002713   | -0.58       | 0.565   |
| EPS_CLOSE_OVER*AUDIT| 0.231049    | 2.42        | 0.018   |
| AUDIT               | -0.016113   | -1.60       | 0.113   |
| R                   | 0.1662      |

The variables of interest are significant. Firms just over analysts’ projections decrease bad debt expense. Again, this is mitigated by quality auditors. Both variables have p-values less than 0.05 and are significant at the 95 percent level.

Model 2R2. Regression results using Abnormal Allowances as dependent variable

\[ \text{ABNALLOW} = \beta_0 + \beta_1 \text{EPSCLOSEOVER}_{it} + \beta_2 \text{logASSETS}_{it} + \beta_3 \text{LEV}_{it} + \beta_4 \text{CASHFLOW/ASSETS}_{it} + \beta_5 \text{PE}_{it-1} + \beta_6 \text{CURRENT}_{it} + \beta_7 \text{ALT}_{it} + \beta_8 \text{logBANKRUPT}_{it} + \beta_9 \text{EPSCLOSEOVER}_{it} \times \text{AUDIT}_{it} + \beta_{10} \text{AUDIT}_{it} + \epsilon_{it} \]  

(14)
Table 18. Model 2R2 regression results: Dependent variable - Abnormal Allowance

| (Observations: 491) | Coefficient | t-statistic | p-value |
|---------------------|-------------|-------------|---------|
| Constant            | 0.391387    | 1.42        | 0.158   |
| EPS_CLOSE_OVER      | -0.217381   | -2.88       | 0.005   |
| logASSETS           | -0.020562   | -3.01       | 0.003   |
| LAG               | -0.023360   | -0.04       | 0.719   |
| CASHFLOW/ASSETS     | 0.051408    | 0.33        | 0.740   |
| Logged PE           | -0.000075   | -0.79       | 0.432   |
| CURRENT             | -0.135183   | -1.26       | 0.211   |
| ALT                 | 0.001029    | 0.2         | 0.840   |
| LogBANKRUPT        | -0.020100   | 0.63        | 0.528   |
| EPS_CLOSE_OVER*AUDIT | 0.212850   | 2.80        | 0.006   |
| AUDIT               | -0.167402   | -2.15       | 0.034   |
| R²                  | 0.2504      |             |         |

The results of this regression are also consistent with prior models. Underperforming firms increase bad debt expense (higher allowance for doubtful accounts); however, audit quality attenuates this tendency with both independent variables having p-values of less than 0.05 are significant at the 95 percent confidence level.

Model 3R1. Using abnormal bad debt as the dependent variable

\[
\text{ABNBDE} = \beta_0 + \beta_1 \text{EPSBELOW}_{it} + \beta_2 \text{logASSETS}_{it} + \beta_3 \text{LEV}_{it} + \beta_4 \text{CASHFLOW}/\text{ASSETS}_{it} + \beta_5 \text{PE}_{it-1} + \beta_6 \text{CURRENT}_{it} + \beta_7 \text{ALT}_{it} + \beta_8 \text{logBANKRUPT}_{it} + \beta_9 \text{EPSBELOW}_{it} \times \text{AUDIT}_{it} + \beta_{10} \text{AUDIT}_{it} + \epsilon_{it} \tag{15}
\]

Table 19. Model 3R1 regression results: Dependent variable - Abnormal Bad Debt Expense

| (Observations: 491) | Coefficient | t-statistic | p-value |
|---------------------|-------------|-------------|---------|
| Constant            | 0.057829    | 0.98        | 0.328   |
| EPSBELOW            | -0.024388   | -2.29       | 0.025   |
| logASSETS           | -0.002118   | -2.15       | 0.034   |
| LEV                 | 0.001663    | 0.45        | 0.654   |
| CASHFLOW/ASSETS     | -0.020203   | -1.27       | 0.207   |
| Logged PE           | -0.000012   | -0.87       | 0.423   |
| CURRENT             | -0.004694   | -0.31       | 0.754   |
| ALT                 | 0.001143    | 1.81        | 0.075   |
| LogBANKRUPT        | -0.002792   | -0.57       | 0.568   |
| EPSBELOW*AUDIT      | 0.022643    | 2.1         | 0.039   |
| AUDIT               | -0.016061   | -1.59       | 0.115   |
| R²                  | 0.1662      |             |         |

This regression shows those firms with net income before bad debt expense that is just under analysts' projections modify bad debt expense to meet expectations. H3b states that this tendency is attenuated by high-quality audits. H3a and H3b are also further tested using abnormal bad debt expense and abnormal allowance as dependent variables.

Model 3R2. Using Abnormal Allowance as the dependent variable

\[
\text{ABNALLOW} = \beta_0 + \beta_1 \text{EPSBELOW}_{it} + \beta_2 \text{logASSETS}_{it} + \beta_3 \text{LEV}_{it} + \beta_4 \text{CASHFLOW}/\text{ASSETS}_{it} + \beta_5 \text{PE}_{it-1} + \beta_6 \text{CURRENT}_{it} + \beta_7 \text{ALT}_{it} + \beta_8 \text{logBANKRUPT}_{it} + \beta_9 \text{EPSBELOW}_{it} \times \text{AUDIT}_{it} + \beta_{10} \text{AUDIT}_{it} + \epsilon_{it} \tag{16}
\]

The regression produced the following results:

Table 20. Model 3R2 regression results: Dependent variable - Abnormal Allowance

| (Observations: 491) | Coefficient | t-statistic | p-value |
|---------------------|-------------|-------------|---------|
| Constant            | 0.306567    | 1.43        | 0.156   |
| EPSBELOW            | -0.232600   | -3.04       | 0.003   |
| logASSETS           | -0.020549   | -3.01       | 0.003   |
| LEV                 | -0.020302   | -0.37       | 0.713   |
| CASHFLOW/ASSETS     | 0.050273    | 0.33        | 0.743   |
| Logged PE           | -0.000076   | -0.80       | 0.426   |
| CURRENT             | -0.156419   | -1.27       | 0.070   |
| ALT                 | 0.001063    | 0.21        | 0.815   |
| LogBANKRUPT        | -0.222317   | -0.64       | 0.224   |
| EPSBELOW*AUDIT      | 0.229152    | 3.01        | 0.004   |
| AUDIT               | -0.160874   | -2.14       | 0.033   |
| R²                  | 0.2513      |             |         |
As was the case with Model 3R1, this regression also shows that those firms with net income before bad debt expense that is just under analysts’ projections are a significant factor in creating abnormal bad debt expense - lower bad debt expense. This tendency is attenuated by quality audit firms. Both independent variables have p-values of less than 0.05 and significant at a 95 percent confidence level. All the above are consistent with earlier findings.

In addition to the above alternative models, the study included both measures of bad debt expense as a percentage of the sale and the allowance for doubtful accounts as a percentage of accounts receivable.

5. CONCLUSION

H1a states that companies with severe losses or severely underperforming will increase their bad debt expense or take a “big bath” to build an excessive allowance for doubtful accounts. In testing this, the poorest performing firms, those whose net income to assets, were in the bottom decile of the sample (BOT_DEC) were the variable of interest. The null hypothesis is rejected. Poorest performing firms increase their bad debt expense. H1b states that high-quality audits attenuate the tendency for firms with severe losses to substantially underperforming to report high bad debt expense. This null hypothesis is also rejected. High quality auditors attenuate the tendency for underperforming firms to increase bad debt expense.

Stated simply, H2 and H3 provide an answer to why companies have overstated their allowance for doubtful accounts as Bryan et al. (2021) have reported. We postulated that companies would utilize their excess reserves created through either cookie jar reserves (excessive conservatism applied over time) or a big bath charge (making the allowance even larger during the crisis) (Watts, 2003b), by reversing them when earnings are slightly below analysts’ projections to create zero surprises or when earnings before bad debt expense are slightly above analysts' projections to create positive surprise. In addition, H2b and H2b state that high-quality audits attenuate the tendency for firms in these circumstances to understate bad debt expense.

The results of Models 2a, 2b, 3a, and 3b provide significant results. These results were confirmed via robustness testing of Models 2R1, 2R2, 3R1, and 3R2 where abnormal bad debt and abnormal allowances were regressed. Companies whose net income before bad debt expense that was either slightly over or slightly under analysts’ projections reduced their bad debt expense. H2b and H3b state that high-quality audits reduce the tendency for forms described above to reduce their bad debt expense to meet or beat analysts’ projection. Companies that are close to meeting or beating analysts’ projections will, relative to other firms, report lower bad debt expense, but high-quality auditors attenuate this negative relation. Therefore, the null hypotheses for H2b and H3b are rejected.

The data only looked at companies in the chemical and allied products manufacturing industry; therefore, the results may not hold true for other industries. Only a small percentage of companies met the thresholds for earnings manipulation. With such a small sample, even if misses had been significant, conclusions of earnings manipulation would be difficult to generalize. Also, models had low R² results due to the small percentage of companies meeting the criteria.

Since the study is in only one industry, additional research into other industries should be completed to determine to what extent results can be generalized. Other valuation accounts, such as those for inventory and taxes, are also required by generally accepted accounting principles. These accounts could be subject to manipulation by management and are worthy of study. As is the case with the allowance for doubtful accounts, both the inventory reserve account and the income tax valuation account require disclosure of activity in Schedule II. Inventory valuation reserves would change in a manner like the allowance for doubtful accounts. The current period’s reserve should be realized as losses in the next period. Therefore, the methodology utilized in this study could be modified to test inventory valuations in companies with significant inventories.

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