INTER-INDUSTRY VARIATION IN THE RELATION BETWEEN ABNORMAL ACCRUALS & AUDIT ENGAGEMENT LIFE EXPECTANCY

JOHN SHON

Lustgarten and Shon (2011) exploit a hazard model to examine the determinants of the expected remaining length (i.e. life expectancy) of audit engagements. Their main finding is that the life expectancies of audit engagements decrease when firms make relatively large positive or large negative abnormal accruals, but such life expectancies increase with relatively modest abnormal accruals. In this study, I examine the inter-industry variation in this relation across 48 different industry classifications (Fama and French, 1997). Audit engagement life expectancies for six industries (Apparel, Automobiles and Trucks, Electrical Equipment, Miscellaneous, Pharmaceutical Products, Retail) are found to be particularly sensitive to large negative abnormal accruals Similarly, five industries (Banking, Fabricated Products, Real Estate, Rubber and Plastic Products, Wholesale) are sensitive to large positive abnormal accruals. Lastly, three industries (Communication, Precious Metals, Transportation) are sensitive to both negative and positive accruals. These findings help inform auditors, client firms and industry regulators that are more susceptible to contentious disagreements that may arise during audit engagements.

INTRODUCTION

Lustgarten and Shon (2011) examine the cross-sectional determinants of audit engagement length, paying particular attention to abnormal accruals as a potential driver. They hypothesise that potentially incongruent incentives of managers and auditors — found in their preferences toward accounting accruals — can cause friction, and in turn affect the audit engagement's life expectancy (defined as the likelihood of the engagement continuing into future years; see Dye, 1991; Defond and Jiambalvo, 1994; Bradshaw et al, 2001). Exploiting a duration/hazard model, where the expected remaining length of the audit engagement is the dependent variable with abnormal accruals as the independent variables, the authors find that relatively large abnormal accruals — both income-increasing and income-decreasing — reduce engagement life expectancy, while relatively moderate abnormal accruals increase life expectancy. Extreme income-increasing abnormal accruals shortening engagement life expectancy suggests that auditors fear higher litigation risks and therefore terminate the engagement to reduce such risks. Conversely, extreme income-decreasing abnormal accruals shortening engagement life expectancy suggests that managers who desire income-increasing accruals terminate the engagement to find a more lenient auditor.

In this study, I extend the work of Lustgarten and Shon (2011) by examining the potential cross-sectional variation in the relation between abnormal accruals and audit engagement life expectancy. Specifically, I examine whether this key relation varies across different industry groupings. To the extent that the accounting accrual process is applied differently across various industries, this suggests that abnormal accruals may also vary across such industries, and may therefore create differences in the incentives (and frictions) between the client firm and the auditor. For instance, the current financial reporting model is embedded with notions of accounting conservatism (for example, Watts, 2003). Some aspects of conservatism may be viewed as fairly innocuous, with little material difference in its application. For instance, the application of the Lower of Cost or Market rule for inventory is generally viewed as a broad application of accounting conservatism that affects all industries with inventory and a declining product market (though service-oriented industries are less affected). However, other applications of conservatism (most prominent being the immediate expensing of R&D expenses) can be significant — and can materially impact certain industries more than others. For instance, the application of R&D expensing is considered to have a much more prominent impact on financial reporting in the Biotechnology industry, and much less of an impact in the utilities industry. Such differences in the application of accounting conservatism may affect the nature of income-increasing and income-decreasing accruals — and the nature of how manager and auditor incentives related to such accruals may affect the life expectancy of an audit engagement. In this study, we examine these cross-sectional differences across industries.

SAMPLE AND RESEARCH DESIGN

Sample

The sample is comprised of 73,595 firm-year observations with available data from the annual Compustat files (full, industrial and research) from 1988 to 2006; we exclude financial and utility firms. The sample is not limited to those audit engagements that have terminated. It includes all firm-year observations, including those from ongoing engagements. An auditor's identity in 2006 is used to determine whether an audit engagement in 2005 continued or terminated. Including the observations of ongoing engagements mitigates the selection bias of studying only terminated engagements; it also mitigates biases introduced by the right-censoring of data.

Research design and empirical model

I follow the empirical model in Lustgarten and Shon (2011), which is an application of a duration/hazard model. Duration and hazard models are most appropriate where the passage of time naturally affects the probability of an event occurring, and have been found to produce improved power in bankruptcy prediction models relative to discriminant analysis or OLS regression models (for example, Shumway, 2001; Beaver et al., 2005; Beatty et al., 2002; Lin et al., 2003). In this study, I consider the possibility that passage of time affects the life expectancy of an audit engagement. As in Lustgarten and Shon, I estimate a discrete-time multi-period hazard model. Shumway (2001) shows that a discrete-time hazard model is equivalent to a multi-period logit model. The hazard written in logit form is: $\log (P_{it} / 1\text{-}P_{it}) = \alpha(t_i) + \beta' X_{it}$, where $P_{it} = h(t_i)$, and $\alpha(t_i)$ is the baseline hazard function. In the context of my study, the baseline hazard function is represented by the tenure of the engagement up to time *t*. This baseline hazard is therefore a function of the current age of the engagement as of time *t*. (In prior studies, this is sometimes referred to as the past tenure of the

engagement and used as the dependent variable; in the current study, it is an independent variable.) X_{it} is a vector of other determinants of the hazard function.

I identify the auditor for each firm-year observation in the sample. The first year of an auditor-client engagement is defined as the first year in which Compustat pairs the client-firm with the auditor. The final length of the engagement is calculated from when the pairing terminates.

The goal of the study is to examine the inter-industry cross-sectional variation of the relation between abnormal accruals and the life expectancy of audit engagements. The life expectancy is the inverse of the hazard function. The empirical model I estimate is as follows:

$$LASTYR = \beta0 + \beta1\ POS\_ABN\_ACCR + \beta2\ NEG\_ABN\_ACCR + \beta3\ TENURE + \beta4\ DROA + \beta5\ DLEVERAGE + \beta6\ DALTMAN\_Z + \beta7\ MTB + \beta8\ SIZE + \beta9\ BIG\_N + \beta10\ QUALIFIED + \beta11\ DCLIENTS + \beta12\ LITIG\_YR + \varepsilon$$

where LASTYR = 1 if year t is the last year of engagement, = 0 otherwise.

POS_ABN_ACCR = abnormal accruals if abnormal accruals are positive, = 0 otherwise,

NEG_ABN_ACCR = abnormal accruals if abnormal accruals are negative, = 0 otherwise,

(such that ABN_ACCR = POS_ABN_ACCR + NEG_ABN_ACCR)

TENURE = current age of engagement in year t,
DROA = change in earnings / lagged total assets,
DLEVERAGE = change in (total liabilities / total assets),
DALTMAN_Z = change in Altman's Z-score,
MTB = prior-period market-to-book value of equity ratio,
SIZE = log of prior-period market value of equity,
BIG_N = 1 if auditor is Big-N auditor, = 0 otherwise,
QUALIFIED = 1 if qualified opinion is issued, = 0 otherwise,
DCLIENTS = change in market share of firms the auditor audits in given industry-year, where market share is based on count of total number of firms in industry-year,
LITIG_YR = 1 if year is high litigation risk year, = 0 otherwise.

Because life expectancy is the inverse of the hazard function, the sign on estimated coefficients from estimation of the above model must be flipped to interpret the life expectancy of engagements. A positive (negative) estimated coefficient on any variable indicates that a decrease (increase) in the life expectancy is associated with an increase in the variable.

My main variable of interest is abnormal accruals (ABN_ACCR), defined as the residual from a standard performance-adjusted, modified-Jones model regression (for example, Kothari et al, 2005). I bifurcate ABN_ACCR into positive (POS_ABN_ACCR) and negative (NEG_ABN_ACCR) abnormal accruals. The bifurcation allows for positive and negative abnormal accruals to impact life expectancy in potentially different directions, which may be important given the asymmetric and potentially opposing incentives of each party. I am particularly interested in how the estimated coefficients for these variables may vary across different industries.

Below, I briefly motivate the control variables included in the model. The past tenure of the audit engagement (TENURE) is the baseline hazard function. TENURE represents the age of the engagement up to time t. Including this baseline hazard enables us to examine the relation between the age of an engagement at time t and the life expectancy of the engagement. Put differently, the baseline hazard function shows how past tenure potentially impacts expected future tenure. Auditors have the incentives to increase the life expectancy of an engagement (for example, DeAngelo, 1981; Johnson et al., 2002; Myers et al., 2003; Geiger and Raghunandan, 2002). As past engagement tenure increases, the future expected tenure of the engagement increases. TENURE is therefore predicted to be positively related to engagement life expectancy.

Because there exists no complete theoretical model for the determinants of audit engagement life expectancy, I include several additional variables to control for other plausible economic forces that may affect life expectancy. Inclusion of these variables mitigates potential concerns that our abnormal accruals variables are proxying for uncontrolled factors (i.e., correlated omitted variables). Below, we discuss the economic motivation for each variable.

Change in earnings (DROA) are proxies for firm performance. Deteriorating firm performance may

cause auditors to increase the firm's audit risk and/or going-concern risk, and may therefore increase auditors' litigation risk (e.g., Francis et al., 1994; Skinner, 1997), thus increasing the likelihood of the auditor resigning from the engagement (i.e., a decrease in engagement life expectancy). Changes in leverage (DLEVERAGE) and changes in the probability of bankruptcy (DALTMAN_Z) proxy for changes in financial distress and the probability of technical default on debt covenants (e.g., Butler et al., 2004). Managers faced with higher levels of technical default risk are more likely to make income-increasing accounting choices (e.g., Watts and Zimmerman, 1986; Bowen et al., 1995). Such forces can therefore increase audit risk, and can also increase the auditor's litigation risk.

Market-to-book ratio (MTB) is a proxy for firm growth. Firms experiencing higher growth are more likely to switch to a larger auditor that will be better suited in handling their growing needs (e.g., Johnson and Lys, 1990). Such firms are also more likely to exhibit economic characteristics that are more difficult to audit (e.g., high tech firms' R&D expenditures), which increases the auditor's audit risk. Firm size (SIZE) may affect the life expectancy of engagements. Smaller firms are more likely to be in a less-developed stage of their life cycle, and are more likely to exhibit volatile performance (e.g., Banz, 1981; Chan and Chen, 1988), which increases audit risk and litigation risk for the auditor. Larger firms tend to be more stable, and more established in their industry, therefore posing lower going-concern risks.

BIG_N is a proxy for Big-N auditor (i.e. being one of the largest audit firms). Clients with Big-N auditors are more likely to continue with their current auditor because of the limited number of large-scope auditors with good reputations and specialised expertise, making switching auditors a lower-probability event (Ghosh and Lustgarten, 2006). Firms that receive a qualified audit opinion (QUALIFIED) are more likely to dismiss their auditor; and auditors are also more likely to abandon such clients due to the additional risk that such firms carry (e.g., Krishnan and Krishnan, 1997; Davidson et al., 2006). The change in market share of audit clients in a given industry-year (DCLIENTS) is a proxy for the auditor's activity in its product market (i.e., the market for audits). Increases in the number of clients in a given industry-year may signal the auditor's attempt to increase its visibility in the industry, or its attempt to be viewed as an 'industry leader', or simply its attempt to increase market share. These forces create the incremental incentive to retain clients (e.g., Levitt, 1998; Choi et al., 2004). LITIG_YR is a proxy for the years that are relatively high in litigation risk, determined from ex post litigation rates from prior studies (Kothari et al., 1988; Francis et al., 1994; Basu et al., 2001; Li, 2007). A major economic factor that affects the auditor's decisions during its audit engagement is the presence of heightened litigation risk. For instance, Heninger (2001) finds that positive accruals increase the probability of auditor litigation. Thus, when litigation risk is high, auditors are less likely to allow income-increasing accruals and more likely to impose income-decreasing accruals on its clients (e.g., Krishnan and Krishnan, 1997; Basu et al., 2001).

Descriptive statistics

Table 1 presents descriptive statistics. Panel A shows that 16.6 per cent of all firm-year observations represent the final year of an audit engagement (i.e., where LASTYR=1). Equivalently, 83.4 per cent of our sample represents ongoing engagements. The mean (median) age of each engagement at time t, TENURE, is 5.622 (4) years. The mean (median) abnormal accrual, ABN_ACCR, in any given year is 0.001 (0.003).

The mean BIG_N is 0.913, suggesting that 91.3 per cent of firm-year observations are audited by Big-N auditing firms. Only 0.3 per cent of the sample exhibits qualified audit opinions, QUALIFIED.

Approximately 41.4 per cent of the sample is in a high litigation risk year, LITIG_YR. Because we use the full universe of observations, the descriptive statistics for our other control variables are indicative of the population of publicly-traded firms.

Panel B splits the sample between firm-years that represent the final year of an audit engagement (LASTYR=1) versus those that are continuations of engagements (LASTYR=0). Mean abnormal accruals, ABN_ACCR, are more income-decreasing in the final year relative to continuation years (-0.013 vs. 0.004, respectively; t-stat=12.23). These differences are all statistically significant. Continuation years exhibit a higher proportion of BIG_N auditors relative to final years (0.924 vs. 0.860; t-stat=22.99). Continuation years have a lower proportion of QUALIFIED opinions (0.002 vs. 0.008; t-stat=-12.14). And they are less likely to be in high litigation risk years (0.410 vs. 0.433; t-stat=-4.80). Continuation years are larger in firm size, SIZE (4.958 vs. 4.056, t-stat=40.48), and

exhibit lower changes in leverage, DLEVERAGE (0.017 vs. 0.079, t-stat=28.66).

Table 2 presents Pearson and Spearman correlations for selected variables. We discuss Pearson correlations. LASTYR is negatively correlated with ABN_ACCR (-0.045, p=0.000), suggesting that relatively more negative abnormal accruals increase the likelihood of an engagement ending. Note that TENURE is not significantly related to ABN_ACCR, suggesting that there is no statistically significant correlation between abnormal accruals and the past tenure of engagements; this relation is the subject many prior studies (e.g., Myers et al., 2003). These correlations indicate that the relation between accruals and past tenure is not the same as the relation between accruals and future tenure, or life expectancy. Specifically, the univariate correlation between past tenure (TENURE) and the variable we use to calculate future tenure (LASTYR) is significantly negative (-0.061, p=0.000), suggesting that, at any point in time, the longer is past tenure, the less likely the engagement is to continue into the future.

EMPIRICAL RESULTS

Preliminary results of full population

In Table 3, I present results for the estimation of the discrete-time hazard model, in the form of a multi-period logit model (Shumway, 2001), for the full population. I consider two alternative specifications of abnormal accruals. In Model 1, I present results from the absolute value of ABN_ACCR. In Model 2, I present results for the bifurcated accrual variables, POS_ABN_ACCR and NEG_ABN_ACCR, as specified in Section 2.2. Recall that because life expectancy is the inverse of the hazard function, a positive (negative) estimated coefficient is interpreted as a decrease (increase) in the life expectancy of the engagement.

Consistent with Lustgarten and Shon (2011), in Model 1, the coefficient for absolute abnormal accruals (ABS_ABN_ACCR) is significantly positive (0.978, p=0.000). This suggests that relatively large magnitude abnormal accruals decrease the life expectancy of audit engagements, while relatively small abnormal accruals increase life expectancy. However, these results do not help us discern between positive versus negative abnormal accruals. Results from Model 2 help complete this picture. In Model 2, the coefficient for POS_ABN_ACCR is significantly positive (0.625, p=0.000), suggesting that firms that engage in relatively large income-increasing earnings management face resistance from their auditors. Fearful of higher litigation risk, auditors dispute the accruals, and these disagreements increase the likelihood of engagement termination, thus decreasing the life expectancy of the engagement. Put differently, while positive abnormal accruals generally satisfy the client, they can cause dissatisfaction on the part of the auditor, which increases the likelihood of the auditor resigning from the engagement. Similarly, the coefficient for NEG_ABN_ACCR is significantly negative (-1.277, p=0.000), suggesting that auditors may impose relatively large income-decreasing accruals on their clients. Client firms (that have their own earnings benchmarks and expectations that they must meet) dispute the accruals, and these disagreements increase the likelihood of engagement termination, thus decreasing the life expectancy of the engagement. Put differently, while income-decreasing abnormal accruals generally satisfy the auditor, they can cause dissatisfaction on the part of the client, which increases the likelihood of the client terminating the engagement.

Overall, these preliminary results are consistent with the findings of Lustgarten and Shon (2011). Abnormal accruals are a significant determinant of the life expectancy of engagements. The direction of the control variables are in line with predicted directions discussed in Section 2.2. For further discussion of the control variables, we direct the reader to Lustgarten and Shon.

Main empirical results: Inter-industry variation

In this section, I present results from estimating the main empirical model separately for each of 48 industries, as demarcated in Fama and French (1997). The inter-industry variation results are presented across two tables. Table 4 presents the estimated coefficient of absolute abnormal accruals, ABS_ABN_ACCR, for each industry; this table can be compared with Model 1 of Table 3. Table 5 presents the estimated coefficients of the bifurcated accruals variables, POS_ABN_ACCR and NEG_ABN_ACCR; this table is the inter-industry analog to Model 2 of Table 3. For east of exposition, I omit the estimated coefficients of all the control variables from both Tables 4 and 5, only presenting the coefficients for the abnormal accrual variables.

In Table 4, there are nine industries that have statistically significant estimated coefficients for ABS_ABN_ACCR. They are Communication, Computers, Electrical Equipment, Machinery, Pharmaceutical Products, Precious Metals, Real Estate, Retail, and Transportation. All significant coefficients are

positive, consistent with the full population's positive estimated coefficient, suggesting that for these nine industries, higher absolute abnormal accruals lead to a higher probability of audit engagement termination. The remaining industries do not have statistically significant coefficients, suggesting that absolute abnormal accruals do not have a significant relation to the life expectancy of audit engagements in these industries. However, these results do not make a distinction between positive and negative abnormal accruals.

In Table 5, my main empirical results show the effect of positive and negative abnormal accruals on the life expectancy of audit engagements. The following industries have at least one of the positive or negative accruals variables estimated as statistically significant: Apparel, Automobiles and Trucks, Banking, Communication, Electrical Equipment, Fabricated Products, Miscellaneous, Pharmaceutical Products, Precious Metals, Real Estate, Retail, Rubber and Plastic Products, Transportation, and Wholesale. The remaining industries reveal no significant relation between abnormal accruals and audit engagement life expectancy.

Of these above industries, the following industries have a significantly negative coefficient on the negative accruals variable, NEG_ABN_ACCR: Apparel, Automobiles and Trucks, Electrical Equipment, Miscellaneous, Pharmaceutical Products, and Retail. For instance, the Apparel industry has a negative coefficient (-1.985, p-value=0.79) on the negative accrual, suggesting that abnormally large negative accruals increase the likelihood of the audit engagement being terminated. One interpretation of this finding is that in the Apparel industry, if auditors press too hard in imposing negative accruals on firms, there is a relatively higher likelihood that such Apparel firms will terminate the engagement. Similar interpretations can be made for the other industries mentioned above. Note that these industries do not seem to have similar economic forces existing for positive abnormal accruals.

The following industries have a significantly positive coefficient on the positive accruals variable, POS_ABN_ACCR: Banking, Fabricated Products, Real Estate, Rubber and Plastic Products, Wholesale. For instance, the Banking industry has a positive coefficient (3.658, p-value=0.066) on the positive accruals variable, suggesting that abnormally large positive accruals increase the likelihood of the audit engagement being terminated. One interpretation of this finding is that in the banking industry, if the firm is too aggressive and continues to press auditors in accepting very large positive accruals (to, say, meet earnings targets), then there is a relatively higher likelihood that the auditor will terminate the engagement by resigning from the engagement. Similar interpretations can be made for the other industries mentioned above. Note that these industries do not seem to have similar economic forces existing for negative abnormal accruals.

Lastly, there is a small group of industries that seem to be sensitive to both positive and negative abnormal accruals. These industries are: Communication, Precious Metals, Transportation. These industries have statistically significant coefficients estimated for both the POS_ABN_ACCR and NEG_ABN_ACCR variables. For instance, the Communication industry has a positive estimated coefficient for POS_ABN_ACCR (1.127, p-value=0.053), and also has a negative estimated coefficient for NEG_ABN_ACCR (-1.271, p-value-0.013). This suggests that the life expectancy of audit engagements in the Communication industry are sensitive to both positive and negative that are large in magnitude. This suggests that in such industries, extra caution should be exercised by both parties in regards to abnormal accruals, because of its potential to be a contentious subject.

SUMMARY

Lustgarten and Shon (2011) exploit a hazard model to examine the determinants of the expected remaining length (i.e., life expectancy) of audit engagements, and find that such life expectancies decrease when firms make relatively large positive or large negative abnormal accruals. In this study, I examine the inter-industry variation in this relation across 48 different industry classifications and find the following: (1) Audit engagement life expectancies are particularly sensitive to large negative abnormal accruals in the Apparel, Automobiles and Trucks, Electrical Equipment, Miscellaneous, Pharmaceutical Products, and Retail industries. (2) Similarly, life expectancies are particularly sensitive to large positive abnormal accruals in the Banking, Fabricated Products, Real Estate, Rubber and Plastic Products, and Wholesale industries. (3) Lastly, life expectancies are sensitive to both large positive and negative abnormal accruals in the Communication, Precious Metals and Transportation industries. These findings help inform auditors, client firms and regulators to the industries that are more susceptible to contentious disagreements that may arise during audit engagements.

One important caveat of our work is that a complete theoretical model of audit engagement tenure has not been developed, and to the extent that I have not sufficiently controlled for alternative explanations or correlated omitted variables, results should be interpreted with caution. Nonetheless, the study is the first to document the inter-industry variation of the life expectancy issue documented by Lustgarten and Shon (2011).

NOTES

[1] In untabulated robustness tests, we expand the period to include observations starting in 1974; results are unchanged.

[2] A change in auditor due to Big N-related mergers (e.g., PriceWaterhouse and Coopers & Lybrand merging into PwC) is considered a continuation of the pre-merger engagement. All firm-years related to the engagements that terminated as a result of the 2001 dissolution of Arthur Andersen are excluded from the study.

[3] Altman's Z-score is calculated as: 1.2 * (net current assets / total asset) + 1.4 * (retained earnings / total assets) + 3.3 * (operating income / total assets) + 0.6 * (equity market value / total liabilities) + (revenues / total assets).

[4] High litigation risk years are determined from the ex post rate of lawsuits in each year as well as the nature of certain court case proceedings, as determined by prior studies (see Kothari et al., 1988; Basu et al., 2001; Li, 2007). These years are: 1975, 1983-85, 1988-91, 2002-05; results are robust to excluding 2002-05 as high litigation years.

[5] The model (estimated at the two-digit SIC industry-year level) is: $TACC_t = \beta_1 INT_t + \beta_2 \Delta REV_t + \beta_3 PPE_t + \beta_4 NI_t + \varepsilon_t$. Where TACC = change in non-cash current assets – change in current liabilities + change in current portion of long term debt – depreciation expense), $INT_t = 1$, ΔREV_t = change in revenues – change in accounts receivable, PPE = property, plant, and equipment, NI = net income. All variables are scaled by lagged total assets. In robustness tests, we also estimate the model using the Fama and French (1997) 48 industry classification; results are unchanged.

AUTHOR PROFILE

John Shon is an Assistant Professor of Accounting at Fordham University. He received his Ph.D. in Accounting from the University of Chicago's Graduate School of Business, with an emphasis in corporate finance and microeconomics.

Professor Shon has teaching experience at the undergraduate, MBA, Executive MBA, and International Executive MBA levels, in the US, Europe and Asia. He has won multiple Excellence in Teaching awards, at the undergraduate and graduate level. Prior to joining Fordham, Professor Shon taught at Baruch College.

Professor Shon is a Certified Public Accountant and Commodity Futures Representative (Series 3). In a different life, he worked for KPMG in their Assurance practice, as well as their Risk Management Consulting practice. Professor Shon has consulted for hedge funds, biotech startup companies and distance learning companies.

Table 1: Descriptive statistics
Panel A: Pooled sample

Variable	N	Mean	25%	50%	75%
LASTYR	73,595	0.166	0	0	0
ABN_ACCR	73,595	0.001	-0.053	0.003	0.057
TENURE	73,595	5.622	2	4	8
DROA	73,595	0.010	-0.048	0.007	0.051
DLEVERAGE	73,595	0.028	-0.038	0.005	0.064
DALTMAN_Z	73,595	-1.266	-1.193	-0.098	0.573
MTB	73,595	3.167	1.069	1.918	3.517
SIZE	73,595	4.809	3.211	4.675	6.311
BIG_N	73,595	0.913	1	1	1
QUALIFIED	73,595	0.003	0	0	0
DCLIENTS	73,595	0.004	-0.010	0.001	0.014
LITIG_YR	73,595	0.414	0	0	1

Table 1 (cont'd)
Panel B: LASTYR subsamples

	LASTYR = 0			**LASTYR = 1**			**Difference**	
	N	Mean	Median	N	Mean	Median	t Value	Pr > |t|
ABN_ACCR	61,395	0.004	0.004	12,200	-0.013	-0.004	12.23	0.000
TENURE	61,395	5.732	5	12,200	5.070	4	16.49	0.000
ROA	61,395	-0.046	0.032	12,200	-0.178	-0.023	36.26	0.000
DLEVERAGE	61,395	0.017	0.003	12,200	0.079	0.020	-28.66	0.000
DALTMAN_Z	61,395	-0.995	-0.066	12,200	-2.627	-0.327	14.68	0.000
MTB	61,395	3.154	1.952	12,200	3.230	1.744	-1.18	0.236
SIZE	61,395	4.958	4.829	12,200	4.056	3.931	40.48	0.000
BIG_N	61,395	0.924	1	12,200	0.860	1	22.99	0.000
QUALIFIED	61,395	0.002	0	12,200	0.008	0	-12.14	0.000
DCLIENTS	61,395	0.005	0.001	12,200	0.004	0.000	2.62	0.009
LITIG_YR	61,395	0.410	0	12,200	0.433	0	-4.80	0.000

Table 2: Selected Pearson and Spearman correlations (above and below the diagonal)

	LASTYR	ABN_ ACCR	TENURE	MTB	SIZE	BIG_N	LITIG_ YR
LASTYR		-0.045	-0.061	0.004	-0.148	-0.084	0.018
		0.000	0.000	0.236	0.000	0.000	0.000
ABN_ACCR	-0.038		-0.004	-0.016	0.025	-0.006	0.003
	0.000		0.292	0.000	0.000	0.110	0.367
TENURE	-0.071	-0.017		-0.028	0.277	0.146	-0.075
	0.000	0.000		0.000	0.000	0.000	0.000
MTB	-0.045	0.034	-0.022		0.126	-0.012	-0.051
	0.000	0.000	0.000		0.000	0.002	0.000
SIZE	-0.146	0.032	0.238	0.365		0.240	0.011
	0.000	0.000	0.000	0.000		0.000	0.004
BIG_N	-0.084	-0.007	0.164	0.038	0.245		-0.019
	0.000	0.062	0.000	0.000	0.000		0.000
LITIG_YR	0.018	0.006	-0.158	-0.094	0.011	-0.019	
	0.000	0.121	0.000	0.000	0.002	0.000	

Table 3: Audit engagement life expectancy and abnormal accruals for full population (Dependent variable: LASTYR)

	Model 1			Model 2		
	Coefficient	Wald Chi-square	p-value	Coefficient	Wald Chi-square	p-value
Intercept	-0.777	420.6	0.000	-0.772	414.4	0.000
ABS_ABN_ACCR	0.978	117.0	0.000			
POS_ABN_ACCR				0.625	28.1	0.000
NEG_ABN_ACCR				-1.277	137.3	0.000
TENURE	-0.008	7.7	0.006	-0.008	8.3	0.004
DROA	0.011	0.1	0.719	0.032	1.0	0.314
DLEVERAGE	0.753	284.7	0.000	0.718	251.5	0.000
DALTMAN_Z	-0.004	19.9	0.000	-0.004	20.0	0.000
MTB	0.005	10.8	0.001	0.005	10.3	0.001
SIZE	-0.152	876.2	0.000	-0.151	868.5	0.000
BIG_N	-0.340	112.7	0.000	-0.343	114.5	0.000
QUALIFIED	1.017	49.9	0.000	1.005	48.5	0.000
DCLIENTS	-1.156	10.8	0.001	-1.151	10.7	0.001
LITIG_YR	0.104	25.5	0.000	0.103	24.9	0.000
Pseudo-R2	0.059			0.059		

Table 4: Estimated Coefficient for Absolute Abnormal Accruals (ABS_ABN_ACCR) for each of 48 Industries

	Coefficient	Wald Chi-square	p	R2	n
Agriculture	0.729	0.057	0.811	0.142	235
Aircraft	0.420	0.034	0.854	0.138	320
Apparel	1.290	2.227	0.136	0.118	1,180
Automobiles and Trucks	0.171	0.029	0.865	0.070	1,196
Banking	2.072	1.499	0.221	0.321	94
Beer & Liquor	2.140	0.975	0.324	0.147	303
Business Services	0.050	0.052	0.820	0.052	9,264
Business Supplies	-1.482	1.086	0.297	0.096	1,155
Candy & Soda	2.889	1.132	0.287	0.205	168
Chemicals	1.062	0.940	0.332	0.093	1,529
Coal	15.271	0.003	0.956	0.999	33
Communication	1.212	7.678	0.006**	0.048	2,781
Computers	0.574	2.720	0.099*	0.068	3,950
Construction	1.599	1.942	0.164	0.128	605
Construction Materials	1.413	2.124	0.145	0.035	1,591
Consumer Goods	0.670	0.764	0.382	0.140	1,549
Defense	-19.168	2.440	0.118	0.444	37
Electrical Equipment	1.474	3.136	0.077*	0.068	1,339
Electronic Equipment	0.322	0.684	0.408	0.079	5,113
Entertainment	-0.770	1.310	0.252	0.044	1,196
Fabricated Products	-1.763	0.345	0.557	0.139	348
Food Products	0.541	0.258	0.611	0.074	1,417
Healthcare	0.115	0.028	0.868	0.082	1,574
Insurance	0.623	0.606	0.436	0.066	738
Machinery	1.931	13.007	0.000**	0.075	2,831
Measuring and Control Equipment	0.428	0.362	0.547	0.067	1,935
Medical Equipment	0.358	0.546	0.460	0.063	2,863
Miscellaneous	0.868	2.573	0.109	0.101	968
Non-Metallic, Industrial Metal Mining	-1.217	0.452	0.501	0.164	497
Personal Services	-0.054	0.003	0.960	0.120	856
Petroleum and Natural Gas	0.428	0.788	0.375	0.051	3,265
Pharmaceutical Products	0.670	3.406	0.065*	0.047	4,561
Precious Metals	2.632	6.524	0.011**	0.143	800
Printing and Publishing	1.989	1.811	0.178	0.152	813
Real Estate	3.250	7.540	0.006**	0.167	279
Recreation	0.570	0.485	0.486	0.110	761
Restaurants, Hotels, Motels	0.484	0.289	0.591	0.082	1,702
Retail	1.056	5.638	0.018**	0.133	4,480
Rubber and Plastic Products	-1.114	0.824	0.364	0.080	805
Shipbuilding, Railroad Equipment	1.725	0.041	0.839	0.405	77
Shipping Containers	4.248	0.856	0.355	0.143	283
Steel Works	0.287	0.070	0.792	0.070	1,393
Textiles	-1.681	0.420	0.517	0.156	529
Trading	-0.014	0.000	0.984	0.099	1,012
Transportation	2.095	8.950	0.003**	0.070	1,987
Wholesale	-0.140	0.098	0.754	0.075	3,190

Table 5: Estimated Coefficient for Positive and Negative Abnormal Accruals (POS_ABN_ACCR and POS_ABN_ACCR) for each of 48 Industries

	Coefficient				
	POS_ABS NEG_ABS	Wald Chi-square	p	R2	n
Agriculture	1.083	0.108	0.742	0.143	235
	0.087	0.000	0.985		
Aircraft	1.003	0.127	0.721	0.139	320
	0.067	0.001	0.981		
Apparel	0.821	0.653	0.419	0.120	1,180
	-1.985	3.087	0.079*		
Automobiles and Trucks	-0.986	0.692	0.406	0.077	1,196
	-2.252	3.025	0.082*		
Banking	3.658	3.391	0.066*	0.360	94
	0.274	0.014	0.907		
Beer & Liquor	0.654	0.046	0.830	0.150	303
	-3.256	1.567	0.211		
Business Services	0.086	0.089	0.765	0.052	9,264
	-0.024	0.009	0.926		
Business Supplies	-2.262	1.398	0.237	0.097	1,155
	0.856	0.259	0.611		
Candy & Soda	5.848	2.593	0.107	0.242	168
	4.917	0.780	0.377		
Chemicals	0.620	0.190	0.663	0.094	1,529
	-1.441	1.204	0.273		
Coal	21.687	0.006	0.939	0.999	33
	-9.899	0.001	0.971		
Communication	1.127	3.738	0.053*	0.048	2,781
	-1.271	6.151	0.013**		
Computers	0.618	2.218	0.136	0.068	3,950
	-0.523	1.451	0.228		
Construction	2.035	2.519	0.113	0.129	605
	-0.887	0.337	0.562		
Construction Materials	1.598	2.014	0.156	0.035	1,591
	-1.146	0.787	0.375		
Consumer Goods	0.680	0.557	0.455	0.140	1,549
	-0.657	0.449	0.503		
Defense	-69.738	1.852	0.174	0.560	37
	-0.410	0.001	0.981		
Electrical Equipment	1.157	1.578	0.209	0.069	1,339
	-2.172	3.579	0.059*		

Table 5: Cont'd

	Coefficient				
	POS_ABS NEG_ABS	Wald Chi-square	p	R2	n
Electronic Equipment	0.439	0.933	0.334	0.079	5,113
	-0.166	0.108	0.743		
Entertainment	-0.610	0.451	0.502	0.044	1,196
	0.863	1.263	0.261		
Fabricated Products	-7.760	2.789	0.095*	0.156	348
	-0.738	0.052	0.821		
Food Products	0.495	0.167	0.683	0.074	1,417
	-0.621	0.183	0.669		
Healthcare	-0.090	0.011	0.915	0.082	1,574
	-0.348	0.162	0.688		
Insurance	0.087	0.007	0.935	0.068	738
	-0.982	1.172	0.279		
Machinery	1.010	2.481	0.115	0.081	2,831
	-3.294	22.556	0.000**		
Measuring and Control Equipment	-0.414	0.188	0.665	0.069	1,935
	-1.048	1.606	0.205		
Medical Equipment	-0.127	0.042	0.838	0.064	2,863
	-0.805	1.899	0.168		
Miscellaneous	0.278	0.170	0.680	0.104	968
	-1.439	4.919	0.027**		
Non-Metallic and Industrial Metal Mining	-1.288	0.373	0.541	0.164	497
	1.130	0.254	0.614		
Personal Services	1.307	1.133	0.287	0.127	856
	1.742	1.390	0.238		
Petroleum and Natural Gas	0.217	0.093	0.760	0.051	3,265
	-0.525	0.965	0.326		
Pharmaceutical Products	0.470	0.986	0.321	0.048	4,561
	-0.839	3.657	0.056*		
Precious Metals	3.030	3.256	0.071*	0.143	800
	-2.551	5.740	0.017**		
Printing and Publishing	2.767	1.486	0.223	0.152	813
	-1.756	1.236	0.266		
Real Estate	4.080	8.655	0.003**	0.174	279
	-1.958	1.379	0.240		
Recreation	0.119	0.013	0.909	0.111	761
	-0.993	1.018	0.313		

Table 5: Cont'd

	Coefficient				
	POS_ABS NEG_ABS	Wald Chi-square	p	R2	n
Restaurants, Hotels, Motels	0.826	0.538	0.464	0.082	1,702
	-0.152	0.018	0.894		
Retail	0.311	0.289	0.591	0.135	4,480
	-1.724	10.293	0.001**		
Rubber and Plastic Products	-3.193	2.788	0.095*	0.086	805
	-0.263	0.034	0.853		
Shipbuilding, Railroad Equipment	0.652	0.004	0.950	0.406	77
	-2.736	0.074	0.786		
Shipping Containers	3.169	0.179	0.672	0.144	283
	-4.542	0.878	0.349		
Steel Works	0.385	0.080	0.778	0.071	1,393
	-0.189	0.019	0.891		
Textiles	-3.221	0.911	0.340	0.158	529
	0.400	0.018	0.895		
Trading	0.188	0.046	0.831	0.099	1,012
	0.144	0.035	0.852		
Transportation	1.753	3.661	0.056*	0.070	1,987
	-2.378	7.908	0.005**		
Wholesale	-1.046	3.375	0.066*	0.079	3,190
	-0.887	2.621	0.106		

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