

## **MD&A Disclosure and the Firm's Ability to Continue as a Going Concern**

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## **Abstract**

This paper explores the role of textual disclosures in the firm's financial statements to predict a firm's ability to continue as a going concern. Using a sample of 262 firms that filed for bankruptcy over the period 1995-2011 and a matched set of control firms we find that both management's opinion about going concern and textual features of MD&A disclosures together provide significant explanatory power in predicting whether a firm will cease as a going concern. Moreover, the predictive ability of the MD&A disclosure is incremental to financial ratios, market based variables and auditor going concern opinion. The striking feature of our findings is that the information in MD&A disclosures are useful in predicting bankruptcy as early as three years prior to bankruptcy suggesting that MD&A disclosures are more timely than financial ratios in assessing going concern problems. Our findings have important implications for standard setters as they deliberate on whether to mandate qualitative disclosures about management's assessment of the firm's ability to continue as a going concern.

Key words: Bankruptcy prediction, going concern, PCAOB, voluntary disclosure, auditor opinion

# **MD&A Disclosure and the Firm's Ability to Continue as a Going Concern**

## **1. Introduction**

In January 2012, the Financial Accounting Standards Board decided by a narrow margin of 4-3 to not require management to perform an assessment of the entity's ability to continue as a going concern. By May 2012, the FASB reconsidered the requirement for managers to provide a going concern assessment and the board is expected to issue a revised exposure draft early next year. Proponents of this requirement contend that more information is needed from management to inform investors and creditors of impending firm failure, given the spate of recent bankruptcies that have occurred seemingly without warning from either the management or the firm's auditors. Opponents contend, among other reasons, that managers already disclose sufficient information in their MD&A voluntarily. As such, their view is that regulation is an unnecessary imposition. The purpose of this paper is to directly inform this debate by assessing whether, to what extent, and when do existing disclosures in a firm's MD&A inform about a firm's ability to continue as a going concern.

We use a matched pair sample and conditional logistic regression models to assess the ability of current year MD&A textual features to discriminate between (control) firms that continue as a going concern and (treatment) firms that file for bankruptcy in subsequent years. We examine two textual features: (1) explicit mention by management of the possibility that the firm may not be able to continue as a going concern in the MD&A, and (2) the linguistic tone in the MD&A. Our estimation reveals that firms which explicitly mention the potential inability to continue as a going concern, as well as those using more (less) negative (positive) words in the MD&A, are more likely to cease as a going concern. In terms of economic significance, these three determinants alone yield an area under the ROC (receiver operating characteristics) curve

(AUC) of 85%.<sup>1</sup> As 50% represents chance levels and 100% represents perfect ability to discriminate, the evidence is consistent with existing MD&A disclosures providing substantial predictive ability with respect to a firm continuing as a going concern.

After controlling for other information from the financial statements such as financial ratios and the presence of an auditor's going concern opinion, we find that positive and negative words maintain their statistical significance and the model's overall diagnostic accuracy improves to 91%, an improvement of 6% over the MD&A only model. That linguistic content is an incremental predictor of bankruptcy and that such predictive accuracy is economically significant supports the view of opponents to regulation who contend that MD&A information along with other information in the financial statements is sufficient to assess a firm's ability to continue as a going concern (Bloomberg BNA, April 2012). Given our findings, it is unclear whether mandatory disclosure requirements would improve the predictive accuracy in a meaningful way for two reasons. First, the room for improvement (over and above an accuracy level of 91%) is likely to be marginal. Second, in our estimations, both the explicit discussion of the ability to continue as a going concern by management and the presence of an auditor's going concern opinion are statistically insignificant after controlling for inputs that likely inform both managers and auditors assessment of the ability to continue as a going concern.

Naturally, our results alone are insufficient to conclude that mandatory disclosure is unnecessary, as that will require a careful cost benefit analysis by standard setters. Our analysis offers the following additional insights to inform this cost benefit discussion. Among our treatment sample firms that cease to continue as a going concern, in only 38% of the cases managers discuss the possibility of the firm subsequently going bankrupt. This seemingly low percentage is potentially consistent with the view that managers could do more to inform markets

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<sup>1</sup> This in-sample result of 85% is virtually identical using out of sample estimation procedures.

about a firm's uncertainty related to continuing as a going concern. However, the current voluntary disclosure frequencies by management regarding the ability to continue as a going concern are slightly below what auditors currently provide and already outpace what we observe under the mandatory disclosure regime in Canada. In particular, auditors of our sample firms issued a going concern opinion only in 43.5% of cases. In a sample of firms recently studied by the Staff on the Ontario Securities Commission that ceased operations in Canada (OSC STAFF NOTICE 52-719 Going Concern Disclosure Review), where going concern disclosures are currently *mandatory*, only 27% had specific going concern disclosure in their MD&A prior to bankruptcy.

It is worth noting that while managers may not provide information regarding going concern when it is warranted, we also find that in 8% of the control sample (where firms continue to remain a going concern), managers discuss going concern problems. This suggests that even managers face inherent difficulties in predicting bankruptcy. Despite the inherent difficulty that always surrounds the prediction of uncertain future events we find that the relative ability of voluntary MD&A disclosures over financial variables to predict bankruptcy improves as the prediction horizon increases. That is, the predictive accuracy of a model including only voluntary MD&A disclosure (financial statement ratios) is 85% (90%) in the year prior to bankruptcy. Three years prior to bankruptcy, not surprisingly the predictive ability of voluntary MD&A disclosure (financial statement ratios) decreases to 73% (66%), respectively, but the MD&A disclosure becomes more predictive relative to financial ratios. These patterns are also present when evaluating the incremental predictive ability of these variables after controlling for other variables. Although our evidence does not speak to whether mandating going concern disclosures by management would improve the predictive power of MD&A disclosure, at a

minimum our findings suggest that the voluntary MD&A disclosures in firms' financial statements provide important insights over mandatory accounting numbers in assessing a firm's ability to continue as a going concern.

In addition to providing important insights into the current regulatory debate, this study more generally adds to the literature on the informativeness of the MD&A (Brown and Tucker, 2011; Feldman et al. 2010; Cole and Jones 2005), to the bankruptcy prediction literature (Altman 1968; Ohlson 1980; Zmijewski 1984; Shumway 2001; Beaver et al. 2005; Beaver et al. 2012), and to the literature studying the boundaries of the auditor with respect to going concerns (Carson et al. 2012). The study also adds to the growing literature on the importance of qualitative disclosure using automated linguistic techniques (Tetlock 2007; Tetlock et al. 2008; Li 2010) and in particular fills the void noted by Li (2011) that linguistic analysis may be useful for bankruptcy prediction.

## **2. Going Concern Disclosure Debate and Related Literature**

### *2.1 The Controversy*

In May 2007, the Financial Accounting Standards Board decided to add a project to its agenda to address an entity's assessment of its ability to continue as a going concern and the adoption of a liquidation basis of accounting with a view to converge the reporting requirements under International Accounting Standards 1 (IAS 1). Although the responsibility of providing a going concern judgment currently resides with the auditor, several members of the FASB board view that management is in the best position to provide a formal view on the going concern issue (Bloomberg BNA, October 2012). In October 2008, the FASB issued an exposure draft titled "Going concern" that mandated disclosures when there is substantial doubt about an entity's ability to continue as a going concern. The Board believes that this requirement is particularly

useful to investors in better evaluating the financial statements when they are prepared on a going concern basis in the presence of serious concerns about the entity's ability to continue as a going concern. In January 2012, the FASB board decided on a narrow vote (4-3) that it will not continue the development of a requirement for management to perform a going concern assessment (Whitehouse, 2012a). The primary concern of the board members is that the threshold to identify going concern is difficult to define and enforce such that it is relevant for investors. The board felt that disclosures about risks and uncertainties would be more valuable to users of financial statements (Tysiac, 2012).

Opponents of the going concern requirements cite that the current disclosure requirements under SOP 94-6 already provide necessary and valuable information about risk and uncertainties that could affect a firm's current or near term functioning of the reporting entity. In particular, they claim that existing disclosures in the MD&A should speak to the going concern question (Whitehouse, 2012b; Bloomberg BNA, October 2012). Notwithstanding existing MD&A disclosures, the FASB acknowledged that there may be more for management to say, and in a May 2012 board meeting, decided to revisit the going concern requirements. At the same time, the PCAOB is planning on expanding the going concern evaluation requirements for auditors who are required to provide a going concern audit opinion "when there is a substantial doubt about the company's ability to continue as a going concern for a reasonable period of time" (PCAOB standard AU 341). The fluctuating nature of FASB's decision to consider mandating going concern requirement over the last five years serves to underscore the controversial nature of this topic.

The renewed interest from regulators about providing early warning signals to investors through management disclosures raises two important research questions. First, do existing

going concern disclosures voluntarily provided by management assist in the prediction that a firm will cease as a going concern? Second, even in the absence of explicit disclosures of going concern problems, do the existing textual disclosures in the firm's financial reports provide useful information about the likelihood that a firm will cease as a going concern? Answering these questions would help inform the debate on the usefulness of expanding the going concern disclosures.

## *2.2 Related Literature*

Whether a firm has ceased as a going concern is typically assessed by examining the incidence of bankruptcy. Since the seminal work of Altman (1968) that documented the role of financial statement variables for predicting bankruptcy, there has been a large literature in both accounting and finance on bankruptcy prediction (See Beaver et al. 2012 for a summary). Shumway (2001) expanded the financial statement predictors by including market variables. Using a hazard rate model, he shows that market variables are relevant beyond financial variables in assessing the likelihood of bankruptcy. Other variables such as industry affiliation (Chava and Jarrow 2004) and R&D intensity (Franzen et al. 2007) have been shown to add to the explanatory power of bankruptcy prediction models, but commercial metrics such as Moody's KMV measure of default add very little to improve bankruptcy prediction.

Recent research by Beaver et al. (2005) and Beaver et al. (2012) document a time-series decline in the explanatory power of financial ratios to predict bankruptcy. Beaver et al. (2012) show that this trend is attributable in part due to the trends in quality of financial numbers either due to intervention by managers (managerial discretion) or due to the inability of financial numbers to reflect information (unrecognized intangible assets). Given this trend it is useful to



explore whether information beyond financial variables, in particular, textual disclosures in the MD&A of the annual report, assist in the bankruptcy prediction task.

### **3. Sample Selection, Research Design and Variable Measurement**

#### *3.1. Sample*

Following prior research, we use the occurrence of bankruptcy as our measure of a firm's cessation as a going concern. To identify our treatment sample of bankrupt firms we begin with the universe of firm observations in the Compustat Annual database during the period 1995-2011<sup>2</sup>. From this large time-series data, we identify 354 firms that are headquartered in the US and have filed for bankruptcy (either filed as Chapter 11 or Chapter 7) using the Compustat delisting reason code (DLRSN=02). We then identify the exact date of bankruptcy filing by examining the SEC Form 8K filed by the bankrupt firms. We eliminate 92 firms with missing data for the fiscal year prior to bankruptcy filing – i.e., data necessary to compute financial ratios and textual MD&A disclosures. This results in a final treatment sample of 262 firms.

For each of the treatment firms, we identify a distinct “healthy” control firm (i.e., a firm that did not file for bankruptcy during the sample period) matched based on industry and total assets for the fiscal year prior to the bankruptcy filing by the treatment firm. To ensure that the control firms are proximate in size with that of treatment firms, we impose the requirement that total assets of a matched firm is within 20% of total assets for the treatment firm. For industry matching, we follow Frankel et al (2002) SIC-based industry classification scheme (see also Feng et al. 2010). Our final sample for empirical analysis is therefore comprised of 524 firm year observations, corresponding to 262 matched pairs.

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<sup>2</sup> Note that our sample period is much smaller than other studies that consider over 40 years of data. This is because to compute linguistic variables we require availability of 10K filings in a machine readable format which is not readily available prior to 1995.

We obtain market variables such as stock returns, variance of stock returns, and market capitalization from CRSP. However, market variables are not available for all firms. Therefore, when we estimate regressions involving market predictors our sample size is reduced to 211 matched pairs, i.e., 422 firm year observations.

### 3.2. Research Design and Variable Measurement

We begin with a research design that enables us to evaluate the ability of textual MD&A disclosures in predicting that a firm will cease as a going concern in the following year. Specifically, we estimate the following model step-wise to determine the predictive ability of textual content in a firm's MD&A:

$$Pr(BRUPT_{t+1}) = \beta_0 + \beta_1 GC\_MGMT_t + \beta_2 POSMDA_t + \beta_3 NEGMDA_t + \beta_4 GC\_AUD_t + \beta_5 WCTA_t + \beta_6 RETA_t + \beta_7 EBITTA_t + \beta_8 MVETL_t + \beta_9 SALETA_t + v_t \quad (1)$$

where BRUPT equals one if the firm ceased to exist as a going concern by filing a Chapter 11 or Chapter 7, and zero otherwise; t and t+1 are time subscripts. Since our dependent variable is dichotomous and our sample comprises of matched pairs, we estimate all models using conditional logistic regressions (McFadden 1973; Ohlson 1980).

The first three independent variables in equation (1) represent qualitative textual disclosures within the MD&A section of each firm's annual 10-K filing. The first measure, GC\_MGMT, is an indicator variable that takes the value of one if the firm made a statement in the MD&A suggesting the possibility the firm may be unable to continue as a going concern, and zero otherwise. To identify such statements, we read each firm's MD&A and locate sentences explicitly referencing the term "going concern" or discussing the firms' ongoing operations. Examples of such statements are provided in Appendix A. We manually identify such references because there is no established automated tool for this purpose. If the textual references about

the firm's inability to continue as a going concern are useful in predicting bankruptcy, we expect  $\beta_1 > 0$ .

The second and third measures capture the linguistic tone of entire MD&A using the established dictionary based technique (Tetlock, 2007; Pennebaker 2010) modified by Loughran and McDonald (2011) for business settings. Specifically, we use the Linguistic Inquiry and Word Count (LIWC) software to measure the fraction of positive and negative words in the entire MD&A using the dictionary developed by Loughran and McDonald (2011).<sup>3</sup> The resulting frequency of positive (POSMDA) and negative (NEGMDA) words capture the linguistic tone of the MD&A. If these linguistic tone metrics derived from textual MD&A disclosures are indicative of a potential going concern problem, we expect the likelihood of subsequent bankruptcy to be decreasing (increasing) in the proportion of positive (negative) words. This implies  $\beta_2 < 0$  and  $\beta_3 > 0$ .

We next consider whether auditor going concern opinion substitutes for managerial going concern statements or management tone in the MD&A disclosures. We measure auditor going concern opinion using an indicator variable (GC\_AUD) that takes the value of one if the auditor expressed substantial doubt about the firm continuing as a going concern, and zero otherwise. We manually obtain the audit opinion data from reviewing the auditor report in each 10-K filing. We expect GC\_AUD to positively predict the likelihood of bankruptcy. In addition to the audit opinion variable, we include several other control variables, particularly financial variables that have been shown to predict bankruptcy. For financial ratios we follow prior research (Altman 1968; Ohlson 1980; Shumway 2001) and consider ratio of working capital to total assets (WCTA), ratio of retained earnings to total assets (RETA), ratio of earnings before interest and taxes to total assets (EBITTA), ratio of market value of equity to total liabilities (MVETL), and

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<sup>3</sup> Appendix B lists sample positive and negative words from the Loughran and McDonald (2011) dictionary.

ratio of sales to total assets (SALETA). Specific details on the computation of these variables are provided in Table 1. Consistent with prior research we predict the coefficients on WCTA, RETA, EBITTA, MVETL and SALETA to be negative.

We assess whether textual disclosures are informative for predicting bankruptcy via reference to statistical significance on the coefficients of interest ( $\beta_1$ ,  $\beta_2$ , and  $\beta_3$ ). To facilitate assessment of the extent to which textual disclosures are informative we measure predictive accuracy via the area under the receiver operating characteristic (ROC) curve or AUC<sup>4</sup> (Hosmer and Lemeshow, 2000; Kim and Skinner, 2012; Hobson, Mayew and Venkatachalam, 2012), and goodness of fit via the Pseudo-R<sup>2</sup> statistic.

### *3.3. Descriptive Statistics*

Table 2 provides the descriptive statistics and correlation matrix for the variables used in the regression analyses. Panel A of Table 2 presents the descriptive statistics for the treatment and control samples separately. All continuous variables are winsorized at the 1% and 99% level to prevent undue influence of outliers. Relative to treatment firms, control firms on average have a lower incidence of management disclosure about going concern, and have a higher (lower) proportion of positive (negative) words in the MD&A. Control firms also have a lower incidence of going concern opinion of auditors.

With respect to financial variables, the average (median) of total assets (AT) for the treatment sample is \$437 (\$48) million whereas for the control sample it is \$479 (\$47) million. By construction, the mean (median) of total assets is not statistically different across the two

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<sup>4</sup> A better measure of model fit for LOGIT regressions is the Receiver Operating Characteristic (ROC) curve (See Figure 1). Sensitivity refers to the probability of correctly predicting a 1 (i.e. bankruptcy) and specificity refers to the probability of correctly predicting a 0 (i.e. no bankruptcy). ROC curve for each of the models specify how the probability of correctly predicting a 1 is traded off against the probability of correctly predicting a 0 for all possible cut-off points. The further the ROC curve is from the 45 degree reference line, the better the model predicts both 1s and 0s. The area under the ROC curve (AUC) summarizes this information.

samples, suggesting the matching procedure was effective. The two samples are different on other dimensions, however. The median return on assets (EBITTA) is much lower (-14.6% versus 6%) for the bankrupt firms relative to the control firms. This is consistent with the expectation that bankrupt firms are more likely to be loss firms relative to control firms. Moreover, bankrupt firms have relatively lower retained earnings as a percentage of total assets (median RETA is 21.5% versus 56.3%), relatively greater leverage (median MVETL is 0.489 versus 3.025), and greater return volatility (median LSIGMA is 21.3% versus 14.6%). The means and medians for other market variables (LERET and LRSIZE) are also statistically different between the treatment and control samples. Taken together, the univariate evidence is consistent with the prediction that smaller firms that have poor accounting performance, higher return volatility, higher leverage, and lower retained earnings are more likely to cease as a going concern.

Regarding voluntary going concern disclosures by management in the MD&A (GC\_MGMT) we find that 38% of the bankrupt firms discuss uncertainties about going concern whereas only 8% of the control firms discuss uncertainties about going concern (this difference is statistically significant at the 1% level). This suggests that i) a significant number of firms do voluntarily disclose uncertainties about going concern and ii) some managers (albeit a small number) are conservative enough to disclose uncertainties even when the firm does not subsequently file for bankruptcy. Our examination of the auditor opinion about going concern indicates that 44% of the bankrupt firms provide a qualified audit opinion where as only 12% the control firms receive a qualified audit opinion. Taken together, the proportion of voluntary disclosures by management relative to the mandated disclosures by the auditors is open to two interpretations. First, in comparison with the proportion of voluntary going concern disclosure

by the management it appears that auditors are more likely to report going concern issues relative to the management. That is, managers make more Type I errors relative to auditors. But, opponents of the going concern mandate would argue that the proportion of going concern discussion in the MD&A is sufficiently high enough that the current disclosure either on its own or in combination with other disclosures in the MD&A is sufficient to assist investors in assessing likelihood of bankruptcy. Second, auditors make more Type II errors relative to management in that auditors are more likely to raise going concern problems when in fact, ex post, the firm continues as a going concern. This suggests that auditors are more conservative relative to management in providing a going concern opinion in the firms' financial statements.

Regardless of the differential proportion of the Type I and Type II errors one might argue that the proportion of going concern disclosure by both the management and auditor is similar and hence, disclosure by either party would subsume the information contained in the other. That is, when auditors issue a going concern opinion it is more likely that the managers follow suit and provide a discussion of going concern uncertainties in the MD&A. In other words, auditors' going concern opinion is a substitute for management voluntary disclosure, or vice versa. Furthermore, given the disclosure by the auditor and management of going concern problems, the value added by the linguistic tone measures based on management discussion in MD&A may be questionable.

To provide more evidence on these two issues, we compare the descriptive statistics of the linguistic tone variables and the audit opinion variable across firms that did and did not voluntarily disclose going concern uncertainty (see Table 2, Panel B). If management discussion of going concern uncertainties merely mirrored the auditor going concern opinion we would expect the proportion of going concern audit opinion to be 100% (0%) when the management

reports (does not report) going concern uncertainties in the MD&A. However, the results in Panel B suggest this is not the case. When management reports a going concern uncertainty, only in 85% of the cases the auditor also issues a disclaimer. Furthermore, when management does not report a going concern uncertainty about 6% to 19% of the time auditor issues a going concern opinion. This provides an initial indication that audit opinion and management opinion are not substitutes. Next, we explore whether the linguistic measures are likely to add to the predictive power for bankruptcy beyond management opinion about going concern uncertainty. We find that regardless of whether management provides a going concern disclosure the proportion of positive words (negative words) are consistently lower (higher) for control firms relative to treatment firms. This gives us an early indication that management opinions need not necessarily subsume the management tone of the overall disclosure in the MD&A. Overall, the results in Panel B suggest that management opinion, audit opinion and the linguistic variables may individually contain incrementally useful information to predict bankruptcy.

In Panel C of Table 1, we report Pearson and Spearman correlations. All of the main predictor variables with the exception of SALETA are significantly correlated with the variable of interest, BRUPT. Moreover, the signs on all these correlations are as expected. Despite the strong univariate correlations of the various predictors with the bankruptcy variable, we find many of the financial variables are associated with both BRUPT and the textual disclosures of interest (GC\_MGMT, POSMDA, and NEGMDA). To assess whether textual disclosures of the MD&A are incremental to financial variables and to assess the extent to which textual MD&A disclosures predict bankruptcy in the subsequent year, we turn to multivariate analysis.

## 4. Results

### 4.1. Multivariate Results

Table 3 reports the results of estimating equation (1) in a step-wise manner to facilitate comparison of the predictive ability of textual measures against standard metrics used for bankruptcy prediction. In column (1), we focus only on the management disclosure variable (GC\_MGMT) and find that the coefficient is statistically significant (at the 1% level) and that area under the ROC curve (AUC) is a healthy 0.75.<sup>5</sup> Thus, we infer that management going concern disclosure in MD&A section exhibits reasonable predictive ability (75%) that is well above a chance threshold of 50%. The goodness of fit, as measured by Pseudo- $R^2$  is also reasonable at 21%.

Next, we test the predictive ability of the linguistic variables POSMDA and NEGMDA and report the results in column (2). The coefficient on POSMDA is negative (-1.019) as expected and significant (p-value <0.01). The coefficient on NEGMDA is positive (1.380) and statistically significant (p-value <0.01). The linguistic variables taken together register an AUC of 80%. In column (3), we include all 3 variables corresponding to MD&A content. The coefficients on GC\_MGMT, POSMDA, and NEGMDA are all of the predicted sign and statistically significant with an associated AUC of 85% and Pseudo  $R^2$  of approximately 32%. As stated earlier, AUC between 80 and 90% indicates excellent discriminatory ability. Thus, we can conclude that management going concern disclosure and linguistic tone of the MD&A disclosure together possess remarkable predictive accuracy for bankruptcy. However, it is

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<sup>5</sup> Hosmer-Lemeshow (2000, p.162) indicate that AUC of 0.5 indicates no discrimination, AUC of between 0.7 and 0.8 indicates acceptable discrimination, AUC of between 0.8 and 0.9 indicates excellent discrimination, and AUC greater than 0.9 is considered outstanding discrimination (See also Kim and Skinner 2012).



unclear whether the discriminatory ability of these variables would continue to hold after controlling for other quantitative predictors or potential correlated omitted variables.

In column 4, we control for all the standard financial statement predictors in prior literature by adding financial ratios and auditor going concern opinion. As a collection, the explanatory variables in column (4) represent what a reader could extract from a 10-K filing. The inclusion of these variables increases AUC substantially to 91% making the model reach excellent discriminative ability. The predictive ability of the text variables POSMDA and NEGMDA continues to be strong and statistically significant. However, the coefficient on GC\_MGMT is no longer significant. The coefficient on auditor opinion variable (GC\_AUD) is insignificant as well, despite the strong positive univariate association with bankruptcy noted in Table 2. Thus, the opinions of both the management and the auditor about going concern do not contain unique incremental information for bankruptcy prediction. Rather they merely reflect the informational content in underlying fundamentals. With respect to the financial ratios only two of the five financial ratios (RETA and EBITTA) are statistically significant, consistent with the findings in Shumway (2001) who uses a hazard model instead of logistic regressions.

In terms of predictive accuracy, each of the models examined in columns (1) to (4) show sizeable and significant increases in AUC as we add linguistic variables and financial variables to management opinion about going concern. We also note that, in tandem with AUC, the goodness of fit as measured by Pseudo- $R^2$  steadily increases from 20% in column (1) to 43% in column (4). To provide a pictorial comparison of the predictive ability we plot the AUC for each of the four model specifications reported in columns (1)-(4) of Table 3 (see Figure 1).

## *4.2 Robustness Checks and Additional Analyses*

### *4.2.1 Control for Market Variables*

Recent bankruptcy research (Shumway 2001; Chava and Jarrow 2004; Beaver et al. 2005; Beaver et al. 2012) establish the significance of market based variables in predicting bankruptcy. The market based variables commonly used in prior research are: logarithm of market capitalization (LRSIZE), lagged cumulative abnormal stock return (LERET), and lagged standard deviation of abnormal stock returns (LSIGMA). Market capitalization is computed as ratio of market capitalization of the firm at the end of the fiscal year divided by the market cap of the market index. Abnormal stock returns are computed as the excess of cumulative raw returns over the cumulative market returns for the fiscal year. Standard deviation of abnormal returns is computed as the standard deviation of the error terms in a regression of the firm's monthly stock return on the market monthly returns for the fiscal year. To control for these market variables we augment the specification in Table 3, column (4) by including these variables and report our findings in column (5) of Table 3.

Similar to the results in Beaver et al. (2005) and Beaver et al. (2012), coefficients on all market variables are of the predicted sign and significant at the 1% level. That is, the coefficients on LERET and LRSIZE are negative whereas the coefficient on LRSIGMA is positive. Notwithstanding, the coefficients on POSMDA, NEGMDA continue to remain significant and so do the coefficients on financial variables RETA and EBITTA. The coefficient on MVETL is now weakly significant (at the 10% level) but of the opposite sign. There are two possible explanations for obtaining the opposite sign for MVETL despite the negative univariate correlation ( $\rho = -0.158$ ) between MVETL and BRUPT observed in Table 2, Panel C. First, MVETL is significantly correlated with the market variables. Second, MVETL is similar to

LRSIZE in that both are proxies for firm size that causes the coefficient of MVETL to deviate from the predicted sign. The predictive ability of the model after the inclusion of market variables as measured by pseudo  $R^2$  increases from 43% to 57%. The AUC, after adding market variables, also increases to 95% exhibiting outstanding discriminatory power.<sup>6</sup> As stated in prior research (Beaver et al. 2005), market based variables reflect a rich and comprehensive mix of information which includes financial statement data as a subset. Hence, it is no surprise that the predictive ability of a model specification with market variables is superior to all other models. Regardless, it is striking that textual content continues to exhibit incremental information not captured by any of the other variables.

#### *4.2.2 Hold-out Sample Analysis*

An inherent drawback of the cross-sectional analysis reported in Table 3 is that it suffers from possible over-fitting and optimistic prediction errors (see Kim and Skinner, 2012; Larcker and Zakolyukina, 2012). One way to address this limitation is to perform a “K-fold” cross validation procedure described by Efron and Tibshirani (1993).<sup>7</sup> Consistent with common practice, we use a 10-fold cross-validation repeated 10 times (Witten and Frank, 2005). The procedure involves the following steps. First, we randomly choose 10% of the full sample, which forms the first fold. Next, we randomly choose a second group (of 10%) from the remaining sample (i.e., another 10% from the 90% remainder sample), which forms the second fold. We then continue this procedure until we get ten such “folds” of data. We use the newly created data and estimate the various models in Table 3 using nine of the ten folds, and apply the estimated coefficients to the fold that was held out of the estimation. This yields an “out of sample” estimate of AUC. We repeat this process ten times and report the average of the ten

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<sup>6</sup> Note that the models estimated in columns (4) and (5) of Table 3 are not comparable in that the estimation of column (5) uses a smaller sample because of lack of availability of market variables for the full sample.

<sup>7</sup> We thank Irene Kim for providing us the SAS code to perform this procedure.

estimates in Table 3, just below the in-sample AUC estimate. As observed in Table 3, the AUC estimates using the hold-out sample procedure described above are virtually identical to the in-sample estimates in all specifications. Hence, our reported AUC estimates are quite robust.

#### *4.2.3 Other Tests*

In Table 3, the inclusion of market based variables caused data attrition in Column 5 of Table 3 relative to the other columns presented. To assess whether this data attrition is associated in some way with a confounding factor, we re-estimate columns (1) to (4) using the sample from column (5). Untabulated results reveal that our inferences are unchanged and the AUCs for the models estimated in columns (1) – (4) of Table 3 using the reduced sample are almost identical if not slightly better.

Lastly, we compare the incremental explanatory power of the linguistics variables relative to a model with only financial variables. In untabulated results we find that a model consisting of only the financial statement variables yields an AUC of 89% and a Pseudo- $R^2$  of 32%. As with the results reported in column (4) of Table 3, the coefficients on RETA (-0.945) and EBITTA (-2.267) are negative and significant at the 1% level, while coefficients of all other financial variables are insignificant. Thus, comparing these results with those reported in column (4) results, we can conclude that adding the linguistic variables to a financial variables only specification improves the predictive ability by 2%, an increase that is statistically significant at the 5% level.

### **5. Relative Timeliness of Linguistic Variables**

Having established that textual MD&A disclosures have incremental and substantial explanatory power in predicting whether a firm will cease as a going concern, in this section we investigate when, relative to other predictors MD&A disclosures become more or less useful.

That is, we explore the relative timeliness of the predictors both two and three years prior to the year of the bankruptcy. Prior research (Altman 1968; Beaver et al. 2005) shows that the ability of financial ratios to predict bankruptcy improves as the year of bankruptcy approaches.

Although one might expect a similar trend in predictive ability of linguistic variables as more information is available for a better going concern assessment, it is unclear *ex ante* which of the predictors are relatively more timely. For example, if textual MD&A disclosures provide a better venue to describe the future state of the firm relative to financial numbers which are arguably more backward looking, it is conceivable that MD&A disclosures may become a more important predictor of future bankruptcy much earlier than the financial variables.

To investigate the relative timeliness, we isolate a sub sample of 242 firms (121 matched pairs) for which we have all required data (i.e. text variables, management opinion in MD&A, auditor opinion, and financial ratios) for three years prior to the bankruptcy filing by treatment firms. For this limited subsample, we first re-estimate the full model containing all 10-K information (i.e., column 4 of Table 3), and report the results in Column (1) of Table 4, Panel A. Except for the weak negative association for POSMDA and RETA, the results are broadly consistent with those reported in column (4) of Table 3 and the predictive accuracy of the model (91.7%) is similar to the 91.2% estimated on the full sample in Table 3.

To assess the time trend, we estimate the full model in column (1) of Table 4 both 2 years prior (column 2) and three years prior (column 3) to bankruptcy. The AUC of these full models declines from 91.7% to 85.8% to 76.5% for each year prior to bankruptcy, consistent with the information in 10-K losing predictive ability as the horizon to bankruptcy increases. However, in terms of individual coefficients, NEGMDA is positive and significant at all horizons, and

POSMDA (GC\_MGMT) is significantly negative (positive) at both two and three year horizons.<sup>8</sup> Of the financial variables, only EBITTA is reliably negative in each of the three years. These results suggest that textual MD&A disclosures have incremental explanatory power at horizons greater than one year.

To assess how the potential for differential predictive ability of each class of variables are, we begin in Figure 2 by graphing the AUCs listed in Table 4 Panel A for the full model at all horizons as the benchmark case (see the thick line in Figure 2). We then estimate subsets of the full model based on different classes of explanatory variables. In particular, we estimate a management going concern only model, a linguistic tone only model, a management going concern and linguistic tone model, and a financial variables only model. We plot the AUCs of these models at all horizons in Figure 2 and report them in Panel B of Table 4.

As expected, the full model (thick line) has the highest explanatory power relative to all other models at each horizon. Also, across all models the predictive ability declines as horizon to bankruptcy increases. In terms of ranking the explanatory power of the models, at one year prior to bankruptcy, the financial variables (short dashed line) outperform the full textual variable model (long dashed line), which in turn outperforms the linguistic tone model only (thin line), which outperforms the management going concern only model (dotted line). This rank ordering holds at the two year horizon as well. However, at 3 years prior to bankruptcy, the financial variable model only (short dashed line) is outperformed by both the full textual variable model (long dashed line) and the linguistic tone only model (thin line). Obviously the overall

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<sup>8</sup> Notice that the coefficient on GC\_AUD in column (3) of Table 4 is negative, inconsistent with the predictions. Further analysis reveals that this negative coefficient is a manifestation of high correlation between GC\_AUD and GC\_MGMT. When we consider the predictive ability of GC\_AUD separately, we find the coefficient to be positive and statistically significant, as predicted.

effect of the full textual variable model (long dashed line) is driven by linguistic tone, as the management going concern only model always underperforms all models.

As a collection, the results in Figure 2 suggest that as the time horizon increases, when considered separately, the importance of textual MD&A disclosures, relative to financial statement ratios, increases for assessing a firm's ability to continue as a going concern. In addition, the incremental predictive ability of textual MD&A disclosures in comparison to financial ratios display a similar pattern. Panel B of Table 4 reveals that the incremental AUC of MD&A disclosures is 11% whereas that of financial variables is a mere 1%. However, as the horizon gets closer to bankruptcy, the incremental predictive ability reverses. That is, financial variables have more incremental predictive ability relative to textual variables. These trends may be due to the forward looking nature of the MD&A in addition to the flexibility afforded to management in describing the state of the firm.

Overall, our findings have the following implications. Voluntary disclosures currently provided by management in the MD&A provide both incremental and relative predictive power at longer horizons whereas financial ratios provide predictive power at shorter horizons. This suggests that standard setters should perhaps consider broadening the discussion of going concern assessments beyond the 12 month period that is being currently contemplated.

## **6. Conclusions**

The primary objective of this study is to inform the debate on mandating additional management disclosure regarding going concern assessment. We construct and compare several predictive models using explanatory variables in the form of management going concern disclosure in the MD&A, linguistic tone in MD&A disclosures, auditor going concern opinions, standard financial ratios, and market based variables. We adopt a matched pair research design

and utilize conditional logistic regressions for estimating all our models. Our findings indicate that current management disclosure in MD&A in the form of voluntary going concern assessments and linguistic tone has significant incremental information content over and above what can be discerned from financial ratios and market based variables. The predictive content of MD&A disclosures on a standalone basis is significant as measured by Area under the Curve of 85%. Moreover, the textual MD&A disclosures convey incremental and relative predictive power as early as three years prior to bankruptcy.

We find evidence of a significant number of situations where management has voluntarily expressed uncertainty about going concern despite the auditor not providing a disclaimer due to a going concern opinion. Further, we find that any explicit disclosure by management regarding going concern assessment is incrementally uninformative once we control for fundamentals in the form of quantitative and qualitative content in financial statements. Hence our study provides some evidence consistent with the claims made by those opposing the proposed requirement for additional mandatory management disclosures on going concern assessment. Opponents contend, among other reasons, that managers already disclose sufficient information in their MD&A voluntarily, suggesting additional regulation is unnecessary. At the same time, if one were to consider the management opinion in isolation, several (over 60%) of the sample firms did not provide a going concern opinion despite filing for bankruptcy the year following the 10K filing.

We believe our paper directly informs this debate by assessing whether, and to what extent, and when existing disclosures in a firm's MD&A inform about a firm's ability to continue as a going concern. However, our results alone are not sufficient to conclude that mandatory disclosure is unnecessary, because our analysis does not take into account the costs of



Type I and Type II errors inherent in management opinions. The fact that textual information content in MD&A has incremental predictive power for bankruptcy prediction even after controlling for auditor opinion and financial ratios offers, and outperforms financial ratio only models at longer horizons, offers support for the claims made by those opposing the proposed requirement for additional mandatory management disclosures on going concern assessment. Even if such additional disclosure is mandated, it is unclear how much incremental information can such a disclosure provide given that current information set comprising of textual, financial, and auditor variables exhibits very high predictive power (91%) regarding a firm's ability to continue as a going concern.

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## Appendix A

### Sample statements in MD&A section for determining whether management expressed going concern issues

#### For coding GC\_MGMT = 1 (i.e., management expressed a going concern)

*“However, due to continuing losses and immediate need for additional financing, it is possible that the Company may not be able to continue as a going concern.”*

*“The uncertainties involved in the receipt of additional licensing fees or receipt of additional financing, many of which are outside the control of the Company raise substantial doubt as to the Company's ability to continue as a going concern.”*

*“These losses raise doubt about the Company's ability to continue as a going concern.”*

*“Management believes that it is unlikely that the Company will be able to meet its obligations as they become due and to continue as a going concern.”*

*“Our liquidity and working capital constraints have caused us to receive a going concern opinion from our independent auditors, negatively affect our business and results of operation, and could result in bankruptcy.”*

*“The items discussed above raise substantial doubts about our ability to continue as a going concern.”*

*“There can be no assurance that the Company will be successful in its defense of this litigation or that as a result of the institution of this litigation that the Company will not be compelled to commence a proceeding under Chapter XI of the Federal Bankruptcy laws. These factors create uncertainty whether the Company can continue as a going concern.”*

*“In the event that the Company is unsuccessful, it is possible that the Company will cease operations or seek bankruptcy protection.”*

*“In the event that the Company is unable to locate other sources of funding to meet its current cash needs, it will then be unable to continue to operate as a going concern and will seek protection under the Federal bankruptcy laws.”*

*“Absent any waiver, forbearance or modification to our current credit agreement, we believe our recurring losses from operations, interest and debt burden amid declining sales and potential inability to generate sufficient cash flow to meet our obligations and sustain our operations raise substantial doubt about our ability to continue near-term as a going concern.”*

## Appendix A (continued)

**For coding GC\_MGMT = 0 (i.e., management did not express a going concern)**

*“The accompanying consolidated financial statements have been prepared assuming that the Company will continue as a going concern.”*

*“By utilizing cash which had been received pursuant to the settlement of the Company’s litigation with ....., management believes it has sufficient capital resources and liquidity to operate the Company for the foreseeable future. However.....the Company’s independent registered public accounting firm has expressed substantial doubt about the Company’s ability to continue as a going concern.”*

*“The Company has performed an evaluation of its ability to continue as a going concern and believes it has sufficient financial resources to fund its operations through at least ....., Accordingly, the consolidated financial statements have been prepared assuming the Company will continue as a going concern, which contemplates the realization of the assets and the satisfaction of liabilities in the normal course of business.”*

## Appendix B

### Sample Positive and Negative words from L&M Dictionary

<u>Positive Words</u>	<u>Negative Words</u>
ACCOMPLISH	AGGRAVATE
ADEQUATELY	ANTITRUST
BENEFIT	BANKRUPTCY
COLLABORATE	BARRIER
CONFIDENT	BREACH
CREATIVE	CAUTION
FAVORABLY	CATASTROPHIC
GAIN	CHALLENGING
IMPRESSIVE	CONCERNS
INNOVATE	CUTBACK
INVENT	DEFICIT
LEADERSHIP	DELAY
OPPORTUNITY	DEplete
OPTIMISTIC	FAIL
OUTPERFORM	FORECLOSE
PROACTIVE	HINDER
PROFITABLE	LIQUIDATE
REBOUND	LITIGATION
REVOLUTIONIZE	PERVASIVE
SATISFACTORY	REASSESS
STABILITY	RENEGOTIATE
SUCCESSFULLY	RESTATEMENT
SURPASS	SCRUTINY
TREMENDOUS	UNABLE
UNPARALLELED	UNFORESEEN
WIN	WEAKEN

**Figure 1**  
**Plot of ROC curves for Conditional LOGIT regressions**

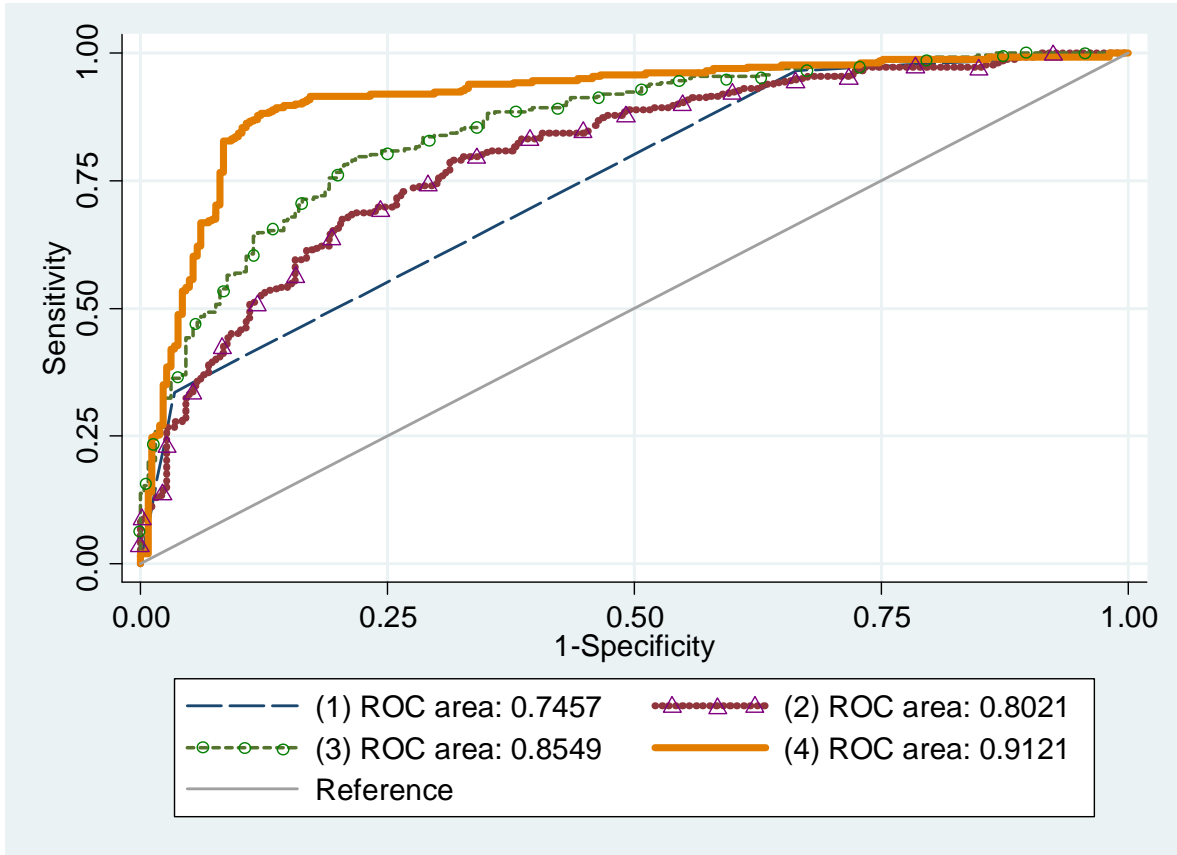
This figure shows a plot of “sensitivity” (probability of correctly predicting 1) versus “1-specificity” for all possible cut-off points. Specificity is the probability of correctly predicting 0. The estimating equations for the various models plotted are given below.

*Model (1):*  $Pr(BRUPT_{t+1}) = \beta_0 + \beta_1 GC\_MGMT_t + v_t$

*Model (2):*  $Pr(BRUPT_{t+1}) = \beta_0 + \beta_2 POSMDA_t + \beta_3 NEGMDA_t + v_t$

*Model (3):*  $Pr(BRUPT_{t+1}) = \beta_0 + \beta_1 GC\_MGMT_t + \beta_2 POSMDA_t + \beta_3 NEGMDA_t + v_t$

*Model (4):*  $Pr(BRUPT_{t+1}) = \beta_0 + \beta_1 GC\_MGMT_t + \beta_2 POSMDA_t + \beta_3 NEGMDA_t + \beta_4 GC\_AUD_t + \beta_5 WCTA_t + \beta_6 RETA_t + \beta_7 EBITTA_t + \beta_8 MVETL_t + \beta_9 SALETA_t + v_t$





**Figure 2**  
**Time Series Analysis**

This figure shows a plot of Area under the ROC Curve (AUC) for predicting bankruptcy using predictor variables in prior periods. Separate plots are shown for each of the regression models (1)-(4) and (FIN) described below.

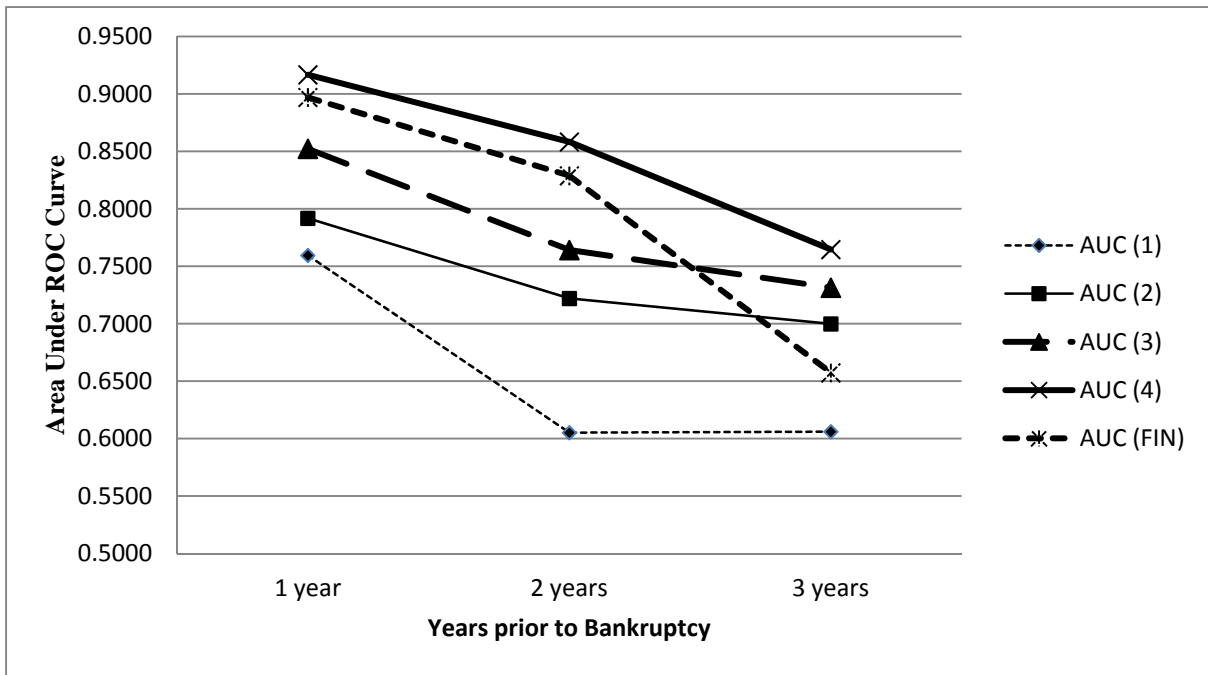
*Model (1):*  $Pr(BRUPT_{t+1}) = \beta_0 + \beta_1 GC\_MGMT_t + v_t$

*Model (2):*  $Pr(BRUPT_{t+1}) = \beta_0 + \beta_2 POSMDA_t + \beta_3 NEGMDA_t + v_t$

*Model (3):*  $Pr(BRUPT_{t+1}) = \beta_0 + \beta_1 GC\_MGMT_t + \beta_2 POSMDA_t + \beta_3 NEGMDA_t + v_t$

*Model (4):*  $Pr(BRUPT_{t+1}) = \beta_0 + \beta_1 GC\_MGMT_t + \beta_2 POSMDA_t + \beta_3 NEGMDA_t + \beta_4 GC\_AUD_t + \beta_5 WCTA_t + \beta_6 RETA_t + \beta_7 EBITTA_t + \beta_8 MVETL_t + \beta_9 SALETA_t + v_t$

*Model (FIN):*  $Pr(BRUPT_{t+1}) = \beta_0 + \beta_5 WCTA_t + \beta_6 RETA_t + \beta_7 EBITTA_t + \beta_8 MVETL_t + \beta_9 SALETA_t + v_t$



**Table 1**  
**Description of Regression Variables**

<b>Variable</b>	<b>Description</b>
BRUPT	<i>Indicator variable set to 1 if a firm goes bankrupt in year <math>t+1</math> and 0 otherwise.</i>
WCTA	<i>Working Capital divided by Total Assets computed as: <math>(act_t - lct_t) / at_t</math></i>
RETA	<i>Retained Earnings divided by Total Assets computed as: <math>(at_t - lt_t) / at_t</math></i>
EBITTA	<i>Earnings Before Interest and Taxes divided by Total Assets computed as: <math>(ebit_t / at_t)</math></i>
MVETL	<i>Market Value of Equity divided by Total Liabilities computed as: <math>(csho_t * prcc_{f_t}) / lt_t</math></i>
SALETA	<i>Sales divided by Total Assets computed as: <math>sale_t / at_t</math></i>
GC_MGMT	<i>Indicator variable set to 1 if management has expressed uncertainty about the firm being a going concern in the MD&amp;A section of the 10K and 0 otherwise</i>
GC_AUD	<i>Indicator variable set to 1 if auditors expressed substantial doubt about the firm being a going concern in the independent auditor report section of the 10K and 0 otherwise</i>
POSMDA	<i>Percentage of words in “MD&amp;A” belonging to the POSITIVE category as defined in LM dictionary</i>
NEGMDA	<i>Percentage of words in “MD&amp;A” belonging to the NEGATIVE category as defined in LM dictionary</i>
LERET	<i>Cumulative security residual return for the fiscal year <math>t</math></i>
LRSIZE	<i>Logarithm of market capitalization at the end of fiscal year <math>t</math> (market capitalization of the firm divided by the market capitalization of the market index)</i>
LSIGMA	<i>Standard deviation of security residual returns for the fiscal year <math>t</math></i>
AT	<i>Total Assets (compustat item “at”)</i>
LT	<i>Total Liabilities (compustat item “lt”)</i>

**Table 2**  
**Descriptive Statistics**

**Panel A:** Descriptive statistics for the regression variables are reported for Treatment and Control samples separately. All the variables are measured in the year prior to bankruptcy for the treatment firm and their control counterparts. All variables are described in Table 1. \*\*\*, \*\*, \* denote statistical significance at the 1%, 5%, and 10% levels, respectively. N=262 for all the variables with the exception of market variables LERET and LESIGMA where N= 211.

Variables	Treatment sample			Control sample			Tstat of Diff. in Means	Z-stat of Diff. in Medians
	Mean	Median	Std. Dev.	Mean	Median	Std. Dev.		
GC_MGMT	0.378	0.000	0.486	0.076	0.000	0.266	-8.81***	-8.24***
POSMDA	0.749	0.720	0.280	0.801	0.760	0.356	1.85*	1.05
NEGMDA	1.703	1.670	0.654	1.219	1.150	0.623	-0.87***	-8.18***
GC_AUD	0.435	0.000	0.497	0.122	0.000	0.328	-8.51***	-7.99***
WCTA	-0.093	0.032	0.704	0.202	0.257	0.517	5.45***	7.16***
RETA	0.009	0.215	0.905	0.439	0.563	0.589	6.44***	10.13***
EBITTA	-0.400	-0.146	0.670	-0.108	0.060	0.525	5.56***	8.56***
MVETL	3.021	0.489	11.103	7.330	3.025	15.476	3.66***	9.96***
SALETA	1.403	1.258	1.116	1.339	1.148	1.013	-0.68	-0.87
LERET	-0.507	-0.712	0.775	-0.058	-0.223	0.886	5.87***	9.32***
LSIGMA	0.288	0.213	0.252	0.198	0.146	0.194	-4.33***	-5.14***
LRSIZE	-13.296	-13.320	1.711	-12.354	-12.392	1.924	5.92***	4.54***
AT	437.250	47.925	4062.200	479.086	47.331	4839.414	0.11	0.18
LT	350.285	35.894	3147.686	274.961	16.420	2832.101	-0.29	-2.97***

**Panel B:** Two-by-Two Analysis of Treatment versus Control firms, by Management Going Concern opinion. Mean values of the tone variables and audit opinion variables are shown in each cell. All variables are described in Table 1.

	No Going Concern Uncertainty (GC_MGMT = 0)				Going Concern Uncertainty (GC_MGMT = 1)			
	N	GC_AUD	POSMDA	NEGMDA	N	GC_AUD	POSMDA	NEGMDA
Control firms (BRUPT=0)	242	0.062	0.792	1.165	20	0.850	0.909	1.882
Treatment firms (BRUPT=1)	163	0.190	0.749	1.531	99	0.838	0.751	1.985

**Table 2 (continued)**

**Panel C:** Correlation matrix for regression variables. Spearman correlation is shown above diagonal and Pearson below. p-values are shown in brackets. All variables described in Table 1. (N= 524 for all variables except for market variables *LERET*, *LSIGMA*, and *LRSIZE* where N= 422)

Variables	<i>BRUPT</i>	<i>GC_MGMT</i>	<i>GC_AUD</i>	<i>POSMDA</i>	<i>NEGMDA</i>	<i>WCTA</i>	<i>RETA</i>	<i>EBITTA</i>	<i>MVETL</i>	<i>SALETA</i>	<i>LERET</i>	<i>LSIGMA</i>	<i>LRSIZE</i>
<i>BRUPT</i>	1	0.360 [<0.01]	0.349 [<0.01]	-0.058 0.188	0.375 [<0.01]	-0.340 [<0.01]	-0.452 [<0.01]	-0.428 [<0.01]	-0.455 [<0.01]	0.015 0.731	-0.407 [<0.01]	0.322 [<0.01]	-0.244 [<0.01]
<i>GC_MGMT</i>	0.360 [<0.01]	1	0.679 [<0.01]	-0.004 0.919	0.412 [<0.01]	-0.398 [<0.01]	-0.410 [<0.01]	-0.397 [<0.01]	-0.314 [<0.01]	-0.031 0.474	-0.313 [<0.01]	0.336 [<0.01]	-0.344 [<0.01]
<i>GC_AUD</i>	0.364 [<0.01]	0.672 [<0.01]	1	0.071 0.107	0.347 [<0.01]	-0.391 [<0.01]	-0.400 [<0.01]	-0.478 [<0.01]	-0.260 [<0.01]	-0.050 0.253	-0.283 [<0.01]	0.351 [<0.01]	-0.401 [<0.01]
<i>POSMDA</i>	-0.081 0.065	0.003 0.937	0.058 0.183	1	0.099 0.024	0.039 0.373	-0.096 0.028	0.050 0.252	0.005 0.913	0.095 0.030	0.156 [<0.01]	-0.059 0.204	0.043 0.350
<i>NEGMDA</i>	0.355 [<0.01]	0.403 [<0.01]	0.353 [<0.01]	0.085 0.053	1	-0.361 [<0.01]	-0.397 [<0.01]	-0.364 [<0.01]	-0.431 [<0.01]	0.101 0.021	-0.340 [<0.01]	0.287 [<0.01]	-0.344 [<0.01]
<i>WCTA</i>	-0.232 [<0.01]	-0.401 [<0.01]	-0.406 [<0.01]	0.013 0.762	-0.282 [<0.01]	1	0.648 [<0.01]	0.331 [<0.01]	0.456 [<0.01]	0.017 0.699	0.292 [<0.01]	-0.315 [<0.01]	0.253 [<0.01]
<i>RETA</i>	-0.271 [<0.01]	-0.385 [<0.01]	-0.402 [<0.01]	-0.067 0.125	-0.290 [<0.01]	0.808 [<0.01]	1	0.307 [<0.01]	0.723 [<0.01]	-0.202 [<0.01]	0.302 [<0.01]	-0.299 [<0.01]	0.302 [<0.01]
<i>EBITTA</i>	-0.236 [<0.01]	-0.334 [<0.01]	-0.399 [<0.01]	-0.013 0.764	-0.139 [<0.01]	0.457 [<0.01]	0.423 [<0.01]	1	0.079 0.017	0.284 [<0.01]	0.381 [<0.01]	-0.470 [<0.01]	0.416 [<0.01]
<i>MVETL</i>	-0.158 [<0.01]	-0.111 0.011	-0.090 0.040	-0.067 0.125	-0.207 [<0.01]	0.200 [<0.01]	0.217 [<0.01]	-0.074 0.089	1	-0.297 [<0.01]	0.426 [<0.01]	-0.172 [<0.01]	0.418 [<0.01]
<i>SALETA</i>	0.030 0.497	0.001 0.985	-0.003 0.953	0.070 0.108	0.106 0.015	-0.061 0.164	-0.175 [<0.01]	0.196 [<0.01]	-0.201 [<0.01]	1	0.008 0.872	-0.082 0.076	-0.066 0.155
<i>LERET</i>	-0.281 [<0.01]	-0.203 [<0.01]	-0.182 [<0.01]	0.132 [<0.01]	-0.210 [<0.01]	0.081 0.080	0.070 0.131	0.154 [<0.01]	0.182 [<0.01]	0.005 0.917	1	-0.114 0.014	0.399 [<0.01]
<i>LSIGMA</i>	0.197 [<0.01]	0.234 [<0.01]	0.260 [<0.01]	-0.009 0.853	0.192 [<0.01]	-0.326 [<0.01]	-0.296 [<0.01]	-0.222 [<0.01]	-0.045 0.337	0.036 0.437	0.295 [<0.01]	1	-0.413 [<0.01]
<i>LRSIZE</i>	-0.256 [<0.01]	-0.351 [<0.01]	-0.409 [<0.01]	0.057 0.222	-0.332 [<0.01]	0.283 [<0.01]	0.308 [<0.01]	0.290 [<0.01]	0.195 [<0.01]	-0.089 0.054	0.275 [<0.01]	-0.266 [<0.01]	1

**Table 3**  
**Estimation of Conditional Logistic Regression Models**

This table reports estimation of regression equation (1) using conditional logit model for all firms. We estimate equation (1) sequentially as presented in columns (1) – (5). z-statistics included in brackets \*\*\* p<0.01, \*\* p<0.05, \* p<0.10.

<i>VARIABLES</i>	<i>Predicted Sign</i>	<i>(1)</i>	<i>(2)</i>	<i>(3)</i>	<i>(4)</i>	<i>(5)</i>
<i>GC_MGMT</i>	+	<b>2.280***</b> [6.515]		<b>1.828***</b> [4.960]	0.545 [1.149]	0.314 [0.562]
<i>POSMDA</i>	-		<b>-1.019***</b> [-2.865]	<b>-0.964**</b> [-2.509]	<b>-1.401***</b> [-3.064]	<b>-1.658***</b> [-2.750]
<i>NEGMDA</i>	+		<b>1.380***</b> [7.130]	<b>1.108***</b> [5.393]	<b>1.032***</b> [4.240]	<b>0.741**</b> [2.412]
<i>GC_AUD</i>	+				0.481 [1.215]	0.549 [1.120]
<i>WCTA</i>	-				0.168 [0.383]	0.667 [1.103]
<i>RETA</i>	-				<b>-0.770**</b> [-2.301]	<b>-1.092**</b> [-2.179]
<i>EBITTA</i>	-				<b>-1.716***</b> [-3.821]	<b>-1.887***</b> [-3.392]
<i>MVETL</i>	-				-0.013 [-0.880]	<b>0.0197*</b> [1.804]
<i>SALETA</i>	-				-0.095 [-0.662]	-0.132 [-0.704]
<i>LERET</i>	-					<b>-0.840**</b> [-2.548]
<i>LSIGMA</i>	+					<b>3.712**</b> [2.534]
<i>LRSIZE</i>	-					<b>-0.531***</b> [-2.974]
<i>Observations</i>		524	524	524	524	422
<i>Pseudo R<sup>2</sup></i>		0.2052	0.2211	0.3158	0.4339	0.5718
<i>Receiver Operating Characteristics</i>						
<i>AUC</i>		0.7457	0.8021	0.8549	0.9121	0.9485
<i>STD ERR</i>		0.0166	0.019	0.0162	0.0136	0.0110
<i>Mean AUC (Out of sample)</i>		0.7474	0.7958	0.8525	0.9009	0.9272

**Table 4**  
**Estimation of Conditional Logistic Regression Models for Examining Relative Timeliness**

**Panel A:** This table reports estimation of regression equation (1) using conditional logit model for a reduced sample of firms using predictor variables in prior periods. z-statistics included in brackets \*\*\* p<0.01, \*\* p<0.05, \* p<0.10.

<i>VARIABLES</i>	<i>Predicted Sign</i>	<i>Years prior to Bankruptcy</i>		
		<i>1 year</i> (1)	<i>2 years</i> (2)	<i>3 years</i> (3)
<i>GC_MGMT</i>	+	0.450 [0.760]	<b>1.701**</b> [2.040]	<b>2.909**</b> [2.520]
<i>POSMDA</i>	-	-1.122 [-1.510]	<b>-1.752**</b> [-2.530]	<b>-0.974**</b> [-2.020]
<i>NEGMDA</i>	+	<b>0.909***</b> [2.580]	<b>0.547*</b> [1.620]	<b>0.810***</b> [2.770]
<i>GC_AUD</i>	+	0.809 [1.490]	-0.607 [-0.920]	<b>-1.623*</b> [-1.890]
<i>WCTA</i>	-	0.192 [0.340]	<b>1.729**</b> [1.960]	0.409 [0.730]
<i>RETA</i>	-	-0.508 [-1.210]	<b>-1.973***</b> [-2.680]	0.032 [0.070]
<i>EBITTA</i>	-	<b>-1.485**</b> [-2.410]	<b>-1.666**</b> [-2.170]	<b>-1.233*</b> [-1.940]
<i>MVETL</i>	-	<b>-0.124**</b> [-2.250]	-0.013 [-1.220]	-0.007 [-0.810]
<i>SALETA</i>	-	-0.011 [-0.060]	-0.136 [-0.690]	-0.140 [-0.720]
<i>Observations</i>		242	242	242
<i>Pseudo R<sup>2</sup></i>		0.4703	0.3099	0.1797
<i>Receiver Operating Characteristics</i>				
<i>AUC</i>		0.9167	0.8583	0.7646
<i>STD ERR</i>		0.0190	0.0250	0.0299

**Panel B:** AUC for various models with independent variables listed in parenthesis

<i>AUC (GC_MGMT)</i>	0.7595	0.6052	0.6061
<i>AUC (POSMDA, NEGMDA)</i>	0.7918	0.7220	0.6999
<i>AUC (Financial Variables)</i>	0.8970	0.8299	0.6573
<i>AUC (GC_MGMT, POSMDA, NEGMDA)</i>	0.8523	0.7642	0.7314
<i>Incremental AUC (GC_MGMT, POSMDA, NEGMDA)</i>	0.0198	0.0293	0.1112
<i>Incremental AUC (Financial Variables)</i>	0.0405	0.0953	0.0136

Note: Incremental AUC is determined as the difference between the AUC of the full model and AUC of the model excluding the variables of interest listed in parenthesis.