

The Effect of Technical Default Cost on Discretionary Accounting Decisions

Hassan R. HassabElnaby
University of Toledo

Janet Mosebach*
University of Toledo

Michael Mosebach
University of Toledo

Scott Whisenant
University of Kansas

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*Please direct all comments and suggestions to Janet Mosebach, Department of Accounting, College of Business and Innovation, University of Toledo, 2801 W. Bancroft Street, Mail Stop 103, Toledo, OH 43606-3390; Email janet.mosebach@utoledo.edu; Phone (419) 530-2440, Fax (419) 530-2873.

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ABSTRACT

This study investigates whether the variation in the expected costs of technical default leads managers to manipulate earnings in periods prior to, as well as in, the year in which avoidance of technical default becomes unlikely. We argue that managers have private information about the expected costs and consequences of default and, prior to default, condition their decisions about accounting choice and discretion on these expectations. We provide evidence on the endogeneity of two forms of discretion in accounting choices in the context of testing the debt covenant hypothesis. We document that both forms of earnings management are associated with a lower cost of technical default. Our findings also suggest earnings management is less likely when the expected cost of technical default is low, and such decisions are associated with a lower default cost for firms that actually enter technical default.

Keywords: Accounting choice, discretionary accounting, earnings management, accounting, debt, technical default, positive accounting

JEL Classifications: G21, G30, G39, M41, M43

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I. Introduction

Contracting theory views corporations as institutions engaged in mobilizing resources to create wealth and benefits for their stakeholders. In other words, corporations grow in size and complexity partly because of their ability to mobilize productive resources and create wealth. Contracting theory further suggests that firms are governed by efficient technologies that include a connected series of contracts (e.g., employment, compensation, and debt). However, firms are also governed by efficient technologies like the monitoring activities of internal and external auditors, debt holders, government regulators, the board of directors, audit committees, and compensation committees. Such stakeholders use accounting numbers in most aspects of these contracting and monitoring technologies, such as determining compensation, testing debt covenants, and monitoring managerial performance. Whereas flexibility in Generally Accepted Accounting Principles (GAAP) requires the use of managerial discretion, a large body of research suggests that in some instances this discretion results in accounting earnings that are biased toward a specific result (see Healy and Wahlen (1999) for a review of this literature).

In this study we investigate not only the degree to which corporate managers employ specific, allowed discretion in generating accounting earnings but also their reasons for doing so. We explore the first issue in the context of debt contract monitoring; i.e., in terms of the financial covenants in lending agreements that constitute efficient contracting technologies for controlling the conflict of interest between shareholders and creditors (Jensen and Meckling (1976); Smith and Warner (1979)).² We address the second issue by investigating the relative levels of one

¹ If borrowers neglect to make timely debt service payments, they are in actual default of their debt contracts. However, if borrowers are compliant with debt service payments but have violated some other debt covenant, they are in what is commonly (and here) referred to as technical default.

² Recent contributions to the financial contracting literature emphasize the important role of debt contracting in efficient accounting choices (Watts, 1993, 2003a,b; Holthausen and Watts, 2001; Ball et al., 2005).

incentive, the cost of technical default, and its association with the use of discretion in reporting accounting earnings.

We use disclosures found in the notes accompanying a firm's financial statements and management's discussion and analysis (MD&A) to identify 221 firms in technical default from 1994 to 2000. We then use that data and principal component analysis to calculate the cost of technical default. Because lenders are primarily concerned with the downside region of a borrower's earnings distribution, we investigate whether discretionary managerial accounting decisions to increase earnings are related to the expected costs of technical default in periods prior to and the period of the technical default by means of a system of three structural equations using a two-stage least squares procedure.

We find that managers use both discretion in accounting method changes *and* accounting accruals to make income-increasing accounting choices surrounding covenant violations that lead to technical default. One motivation for such actions is evident from the reported results: both types of discretionary accounting decisions to manage earnings upward lead to lower technical default costs in the periods surrounding covenant violations. We also find that our incentive variable, the expected cost of technical default, is positively associated with income-increasing choices in both accounting methods and accounting accruals. Lastly, our findings suggest that managers view discretionary accounting choices to manage earnings upward using accounting methods and accounting accruals as substitutes. Specifically, we document a negative relation between the two forms of earnings management, which suggests managers use discretion in the choice of accounting methods to increase income. In turn, such decisions tend to be associated with a reduction in the use of accounting discretion in income-increasing accruals and vice versa. These findings are consistent with the covenant-based hypothesis in the periods surrounding covenant violations. Most particularly, our findings support the claims in Smith and

Warner (1979) and Holthausen and Leftwich (1983) that the strength of incentives to use accounting discretion depends on the costs of violating debt covenants. Thus, we interpret our findings as being consistent with the assumption implicit in the covenant-based hypothesis that income-increasing incentives are greater for firms experiencing higher technical default costs surrounding periods of covenant violations.

We contribute to the financial contracting literature in two ways. First, by investigating whether managerial discretionary decisions on income-increasing accounting choices are associated with variations in the expected cost of technical default. Specifically, we address whether failure to control for the strength of the incentives, generated by these costs, to make income-increasing accounting choices is a plausible explanation for the inconsistencies in the literature in periods prior to and of covenant violations. Second, by investigating whether the strength of one incentive to act opportunistically affects discretion in both accounting method changes *and* accounting accruals, failure to incorporate both forms of discretionary accounting choices could also help explain inconsistencies in prior research. However, unlike prior covenant-based literature, which typically investigates both forms of discretion as independent managerial choices to avoid covenant violations, our research design considers the endogenous nature of managerial expectations about default costs. That is, we expect managers to consider the costs and benefits of changing accounting methods to manage earnings upward while simultaneously considering the costs and benefits of income-increasing accrual management in response to an increase in the expected probability of technical default.

The remainder of the paper proceeds as follows. Section II discusses the motivation of this study and summarizes relevant prior literature. Section III discusses our data and variable measurement, and Section IV outlines our research design and model specifications. Section V reports the results of the empirical tests, and Section VI concludes the paper.

II. Motivation and Prior Literature

a. Motivation

By investigating one incentive for avoidance of covenant violations—the expected costs of technical default—this paper aims to determine whether these costs are associated with managerial accounting choices. Such technical default costs can include, but are not limited to, reduced borrowing limits, increased collateral requirements, increased restrictive covenants, increased interest rates, and in the extreme, demands for immediate payment of all outstanding balances.

The empirical evidence on the covenant-based hypothesis for periods prior to technical default is mixed. For instance, DeFond and Jiambalvo (1994), Demerjian (2009), and Sweeney (1994) find that, consistent with the debt covenant hypothesis, managers of firms in technical default make income-increasing accounting changes in the periods before the violation. Franz et al. (2014) find that post Sarbanes-Oxley (SOX), firms with stronger incentives to avoid violating debt covenants had a smaller reduction in earnings management than firms with weaker incentives; also consistent with the debt covenant literature. However, Healy and Palepu (1990) and DeAngelo et al. (1994) find no support for the hypothesis. Similarly, Sweeney (1994), in an investigation of income-increasing accounting method changes, extends the covenant-based hypothesis to the fiscal period of default and finds evidence consistent with such extension to the fiscal period of covenant violation. However, DeFond and Jiambalvo (1994), using income-increasing accounting accruals that are arguably a less costly form of manipulation, find inconsistent results for the fiscal year of covenant violation.

b. The Effect of Technical Default Cost on Earnings Management Decisions

Debt contracting technologies in private lending agreements appear to have evolved differently from those in public lending agreements. Leftwich (1983) was the first to document

that the customization of private (versus public) lending agreements leads to differences in contracting costs. For example, lower renegotiation costs in private lending agreements, relative to public lending agreements, generally result in more restrictive debt covenants (Smith and Warner (1979); Leftwich (1983)). In response to such tighter debt covenants, the covenant-based hypothesis posits that managers have incentives to make accounting method and accrual decisions that reduce the likelihood of the financial covenants in their firms' debt agreements being violated. Smith and Warner (1979) and Holthausen and Leftwich (1983) argue that the strength of these incentives depends on the costs of violating debt covenants.³

Dichev and Skinner (2002) compare two recalculated financial covenants to reported covenant levels obtained from the DealScan database and find technical violations, not necessarily associated with financial distress, in approximately 30 percent of their sample. Based on their results, they conclude that private lenders use debt covenants as trip wires for borrowers. Thus, the Dichev and Skinner (2002) findings offer support for the debt covenant hypothesis but shed little light on either the process by which managers use discretion in accounting or the types of incentives that affect discretionary accounting decisions. Naturally extending the Dichev and Skinner (2002) findings raises the following question: Why do only some, but not all, corporate managers affect accounting earnings and thus report earnings just above their covenant thresholds? Two plausible reasons are (1) variations in accounting choice slack, and (2) variations in the cost of making accounting choices that manage earnings upward.

c. Cost of Technical Default

³ The conditions that constitute default are listed in the loan agreement and frequently include failure to pay sums due on principal and interest; failure to comply with specified provisions of the loan agreement; breach of warranty or representation; and, often, a cross-default clause. This cross-default clause, the principal clause in loan agreements, examines all covenants and gives the lender the right to terminate the agreement and accelerate the loan based on breach of covenant as defined in the default clause.

As Beneish and Press (1993) show, technical default is costly. The default costs reported in the financial contracting literature include increased interest rates, tightened restrictions in existing covenants, additional restrictive covenants, reduced capital expenditure, and reduced availability of future lending (Beneish and Press (1993, 1995); Chen and Wei (1993); Sweeney (1994); Nini et al. (2007); Sudheer and Roberts (2008); Amir (2009)). This study sample includes only firms that do not enter bankruptcy, therefore, the only costs we expect managers to avoid are refinancing and restructuring costs. Beneish and Press (1993) document the former at between 1% and 2% of a firm's market value of equity. They also suggest any additional financing and investing covenants imposed following technical default indicate increased monitoring.

Sweeney (1994) finds the costs of technical default vary across firms, ranging from so relatively small as to be insignificant to quite material with regard to the debt contract. The lowest cost of technical default occurs when a firm receives a permanent waiver with no renegotiation, implying no change in the terms of the loan. Dichev and Skinner (2002) argue for a further result of technical violation with effectively zero cost; namely, that only violations not "cured" need be reported. Thus, when a firm enters technical default and obtains a waiver prior to the release of financial statements, the default does not become public knowledge. On the other hand, the highest cost results when a firm's debt contracts include cross-default provisions, which state that if any loan defaults, all other loans are also in default, and all lenders accelerate their loans by requiring immediate and full payment. As shown in Dichev and Skinner (2002), this latter result is so rare as to be almost not a consideration. The calling in of loans is reserved for the most seriously distressed firms, therefore, firms that have either defaulted on their debt service or have filed for bankruptcy protection are not included in our sample.

Because lenders are primarily concerned with the downside region of a borrower's earnings distribution, we investigate whether discretionary managerial accounting decisions to increase earnings are related to the expected costs of default in periods prior to and the year of technical default. Admittedly, our sample selection method requires an ex-post financial covenant violation in a private lending agreement that could produce a selection bias toward firms whose managers perceive covenant violations as inevitable or toward firms without sufficient accounting choice slack to upwardly manage earnings. However, in either case, the sample selection process biases against rejection of the null hypothesis of income-increasing accounting choices in the years prior to and in the year of the covenant violation.

We argue that managers have private information about the expected costs and consequences of technical default and, prior to default, condition their accounting choices on these expectations. That is, we assume managers can, on average, reliably predict the outcome of technical default and, thus, accurately measure its cost. This assumption is plausible in that managers not only have past experience with most of their lenders but informal discussions with their lenders as they approach technical default. Additionally, managers have asymmetric information about their firm's financial position that is a significant factor in determining technical default costs.

III. Data and Variable Measurement

a. Primary Sample Selection Procedures

Securities and Exchange Commission (SEC) Regulation S-X requires disclosure of the circumstances surrounding any breach of a debt covenant existing on the balance sheet date in the notes accompanying a firm's financial statements.⁴ As a result, corporate managers must

⁴ Rule 4-08 of Regulation S-X of the United States Securities and Exchange Commission rules (17 CFR §210.4-08; i.e., Rule 4-08, General Notes to Financial Statements). Additionally, pronouncements of the accounting profession discuss disclosure requirements related to uncured debt covenant violations. ASC 470-10-45 requires disclosure of

disclose in a note to financial statements whether or not the lender has asserted any rights resulting from the technical default. Even though the lender can waive rights for a stated period of time, disclosures called for by Regulation S-X must still be made. The SEC also mandates further discussion of events having a potential impact on a firm's financial condition in cases where a brief description in the notes accompanying the financial statements may be insufficient for investors to fully understand the event.⁵ This management discussion and analysis (MD&A) offers another potential source of information about technical default on credit agreements.

To identify firms in technical default, we search three databases—LexisNexis, the Dow Jones News Service, and Compact Disclosure—that disclose public companies' annual reports for the fiscal years 1994 to 2000. Our purpose in using three sources is to extract as comprehensive a sample as possible of first-time violators of accounting-based debt covenants. As a data source for technical default and its costs for our sample, we use the notes accompanying financial statements and the MD&A disclosed in annual and (when available) quarterly reports. As in prior studies (Beneish and Press (1993); Chen and Wei (1993); DeFond and Jiambalvo (1994)), we search for keywords likely to identify technical default such as “default,” “violation,” and “waiver”. We stopped hand collecting data as of 2000 out of concerns that the 9/11 attacks and the economic events during the following years, such as the failure of Lehman Brothers, the housing crisis, and the recession, would cause banks to be more risk averse. We assumed these events would lead banks to modify their behavior through tighter covenants, stricter negotiating, and, as we saw, a near halt to new lending or refinancing. This

the circumstances of a default when long-term debt is reclassified as a current liability (under accelerated repayment terms). The Statement on Auditing Standards No. 59 also notes that technical default of debt contracts can be a basis for auditors disclosing going-concern problems. More recently, in 2004, the SEC adopted a fourth rule (Release No. 33-8400), which requires a firm to file a Form 8-K report if a triggering event causing the increase or acceleration of a direct financial obligation of the firm occurs and the consequences of the event are material to the company. One example of such an event is technical default on a credit agreement. However, the effective date of this new disclosure rule occurs subsequent to our sample period.

⁵ Item 303 of Regulation S-K (17 CFR §229.303: Management's Discussion and Analysis of Financial Condition and Results of Operations).

behavior modification would bias our sample in an unknowable way. But, as risk or perceived risk increases, the costs of technical default will also increase and that would bias our results towards our null hypothesis.

For inclusion in our sample, we require not only that firms be in technical default but that they have disclosed accounting-based covenant(s), identified violation(s), and reported lenders' responses to those violations. Table 1 presents the overall search results. The initial sample includes 334 observations of technical default violators. Because we expect differences in both incentives to manage earnings and the cost of technical default for first-time violations, we eliminate 45 observations that are not first-time covenant violators of the lending agreements. To eliminate the most financially distressed observations, we delete 27 firms in actual default of debt service payments or that subsequently filed for bankruptcy protection in the two fiscal years after the technical default fiscal year. We also eliminate 11 observations due to lack of COMPUSTAT financial information over our sample period. In addition, we are unable to find copies of the actual debt contract for 27 firms. Finally, as McNichols (2000) cautions that merger and acquisition activities can bias estimates in earnings management studies, we eliminate 3 observations due to merger and acquisition activities. The resulting final sample includes 221 observations.

(Insert Table 1 here)

Sweeney (1994) argues that managers may find technical default inevitable and delay making income-increasing accounting choices until the period of technical default in an attempt to lower post-technical default penalties by reporting higher earnings. She also suggests that managers may face unexpectedly high default costs that create a stronger incentive subsequent to default. We incorporate her recommendations by investigating managerial actions in the

covenant violation year (0 in event time), and both the year prior to covenant violation (-1 in event time) and two years prior to covenant violation (-2 in event time).

b. Sample Statistics

In our sample, all firms are aligned in event time relative to the fiscal year of the initial covenant violation of a lending agreement. As shown in Panel A of Table 2, firms in our sample report most frequently violating debt covenants for reasons related to minimum net worth, minimum working capital, minimum current ratio, and maximum debt-to-equity ratio. The descriptive statistics for our sample on the magnitudes of violated covenants are consistent with prior research (Beneish and Press (1993); Sweeney (1994); Jaggi and Lee (2002)). In our sample of 221 firms, we are able to document 335 violations of accounting-based debt covenants. As shown in Panel B of Table 2, slightly more than half of our sample firms ($n = 114$; 52%) have violated only one covenant while the remaining observations ($n = 107$; 48%) have violated two or more covenants.⁶

(Insert Table 2 here)

c. Measuring Technical Default Cost

To measure the expected costs of technical default, we use realized default costs reported when covenant violations are reported, which we obtain from the firm's annual and quarterly reports. Consistent with Beneish and Press (1993), our sample evidence indicates the following most frequently reported new costs: reduced borrowing limits, measured as the percentage reduction in borrowable amount; increased restrictive covenants, measured as the percentage change in accounting, investing, and financing constraints; and higher interest rates, measured as

⁶ Dichev and Skinner (2002) examine a large sample of private debt agreements and measure firms' closeness to current ratio and tangible net worth constraints. They find a significantly greater proportion of firms slightly above covenant violation thresholds than below, and they interpret the evidence to mean that managers take actions to avoid covenant default. Since Dichev and Skinner's (2002) sample period (1986 to 1999) is reasonably similar to ours, we compare our descriptive statistics to theirs and find our results very similar to those reported in the DealScan–Compustat intersection sample of their Table 2.

the change in interest rate percentage. Our descriptive statistics on the magnitudes of violated covenants are also consistent with prior research (Beneish and Press (1993); Sweeney (1994); Jaggi and Lee (2002)). The most frequently cited reasons for violating debt covenants in our sample relate to minimum net worth, minimum working capital, minimum current ratio, and maximum debt-to-equity.⁷

Smith (1993) argues that costs imposed subsequent to debt renegotiation are not homogeneous and vary across firms depending on their capital structures and investment opportunity sets. To address this concern, we calculate the cost of technical default using principal component analysis, which has the advantage of estimating cost by identifying the most important gradients, to develop a continuous construct variable specific to each observation. The factors generated are thought to be representative of the underlying processes that have created the correlations among the included variables (Greene, 2003). In addition, we do not believe the hindsight bias generated by proxying expected cost with the actual results of technical default is systematic. Rather, we assume that because managers can, on average, accurately estimate the cost of technical default, our measure is a reliable proxy for managerial information prior to technical default.

Our principal component analysis combines the attributes found in prior research with the eight actual consequences of technical default found in our sample:

- (1) permanent waiver with no renegotiation;
- (2) permanent waiver after renegotiation with no additional restrictions;
- (3) permanent waiver after renegotiation with additional restrictions;
- (4) temporary waiver with no renegotiation;
- (5) temporary waiver after renegotiation with no additional restrictions;
- (6) temporary waiver after renegotiation with additional restrictions;
- (7) no waiver with no renegotiation and the lender not calling the loan; and
- (8) no waiver after renegotiation and the loan being called.

⁷ Because accounting-based covenants are of interest in our study, it is reasonable to include cash-flow constraint covenants that are likely to be EBITDA based.

We identify the results using dichotomous variables.

We also use the new costs associated with additional restrictions, identified in the text of annual and quarterly reports, to obtain a more precise measure of the actual cost of technical default. As outlined above, the most frequently reported new costs are reduced borrowing limits (RB: the percentage reduction in the available borrowable amount), additional restrictive covenants (AC: the percentage change in the financial covenants), and higher interest rates (IR: the percentage change in the interest rate).

Asquith et al. (2004), and Beatty and Weber (2003) argue that the cost of technical default is lower when there is a single lender. In contrast, debt agreements with multiple lenders usually require a supermajority or unanimous consent to modify the contract or grant a waiver. Requiring at least a supermajority reduces the likelihood of either a modification of contract terms or a waiver as the number of lenders increases. We capture this cost increase using the number of lenders in the loan syndication for private debt (LND).

d. Control Variables for Modeling Technical Default Cost

Beneish et al. (2004) suggest that the cost of technical default is greater for high growth opportunity firms, therefore, we use Tobin's Q (the market value of equity plus book value of debt divided by the book value of assets) to estimate a proxy for growth opportunities in our sample. This variable is measured two fiscal years prior to the fiscal year of debt covenant violation using financial statement data obtained at the beginning of that fiscal year. To proxy for the effect of covenant changes on growth, we interact this growth opportunities proxy with the effect of the reduced borrowing (RBG), additional covenants (ACG), and interest rate change (IRG) on the technical default cost.

Following Beatty and Weber (2003), we include two other debt-related aspects of the debt contract that can potentially affect the cost of technical default: the remaining duration of

the debt agreement, and the relative size of the debt in default. If time to maturity (TM) is shorter, lenders have less risk and are likely to impose lower costs. Conversely, as the size (SIZ) of the debt increases, the lender is more at risk and likely to impose higher costs. In addition, we include a variable that proxies for the probability of future default (PAY), which we obtain using Chesser's (1974) model for estimating the probability that a firm will default on future debt service. If the probability of actual debt service default is high, the technical default cost will increase.⁸ Finally, we include a variable to indicate whether the debt is secured (SEC) which we posit lowers risk to the lender and should reduce the cost of technical default.

e. Discretionary Accounting Choice: Accounting Method Changes

Managers use discretion in accounting procedures through either early adoption of mandatory accounting changes or by switching from one acceptable accounting method to another (e.g., LIFO to FIFO). Nonetheless, changing accounting methods is a costly activity even when technical default is not a factor. Healy and Palepu (1990) interpret their findings to mean that, to avoid covenant-mandated dividend restrictions, managers cut dividends rather than changing accounting procedures, arguably a costly action in terms of its expected effect on stock price. This finding implies that the expected costs (benefits) of making accounting changes are higher (lower) for some firms than the cost of voluntarily cutting dividends.

To increase earnings through accounting method changes, a firm must have the flexibility to make accounting choices and change accounting methods. We measure accounting method changes (identified using notes to financial statements and COMPUSTAT footnote codes that supplement database items) as the magnitude of income increases resulting from voluntary

⁸ It should be noted that many of these control variables can proxy for risk. We investigate the consequences of this ability by removing the variables that we believe proxy for risk and inserting the firm's beta. The main results of our paper remain unchanged.

accounting changes or early adoption of mandatory accounting changes.⁹ As show in Table 3, we observe the following rates of accounting method changes in the two years prior to and in the fiscal year of technical default: two years prior, 35.8 percent; one year prior, 40.6 percent; and in the year of default, 23.6 percent.

(Insert Table 3 here)

We also note that approximately 49 percent of our sample of first-time violators of debt covenants made decisions to change accounting methods that increased income. 47 sample firms using an accelerated depreciation method and 75 using the LIFO inventory method voluntarily changed to straight-line depreciation or FIFO inventory, respectively. These changes generally result in increased earnings. Interestingly, the most frequent accounting changes are extending FIFO or changing from LIFO to FIFO inventory, options that lead to higher earnings but a reduction in cash flow due to higher income taxes. Dyreng (2009) also finds that as firms approach covenant violation they engage in income-increasing earnings management, increasing their income tax liability by an amount equivalent to increasing the cost of debt financing by between 12.92 and 22.72 basis points. Such willingness to accept an actual reduction in cash flows to avoid technical default further emphasizes its costly nature.

f. Discretionary Accounting Choice: Accounting Accruals

A second form of accounting choice is the discretion allowed in accounting accruals. However, compared to accounting procedure changes, discretionary accruals are both less obvious and less restricted (DeFond and Jiambalvo (1994); Healy (1985)). Because the expected

⁹ Because the promulgation of new accounting standards frequently allows a transition period for early adoption, we make no distinction in our main tests between early adoption of an accounting standard and an accounting method change. However, in supplemental tests, we consider only one voluntary accounting choice decision by deleting early adoption of a new standard. Although not displayed in Table 3, only one new accounting standard affects our sample period: SFAS 133, issued in June 1998 to address derivatives and hedging activities, allowed early adoption between 1998 and 2000. In our sample, managerial decisions to adopt this accounting standard early result in 50 early adoptions that increase income and 14 that have no effect on income.

costs and benefits of decisions to change accounting methods or use discretion in accounting accruals are likely to be both firm- and time-specific surrounding technical default, managers must assess whether they expect the benefits of either (both) method(s) to outweigh the costs.

We measure the second form of discretionary accounting choice using discretionary accrual techniques previously documented in the literature as capable of identifying earnings management (Dechow et al. (1995)). Specifically, we obtain a discretionary accrual proxy (EM_{DA}) for each firm-year estimate using a modified Jones (1991) discretionary accrual model. In this model, we define operating accruals (ACC) as the change in current noncash assets minus the change in current liabilities exclusive of the current portion of long-term debt, minus depreciation and amortization, and scaled by lagged total assets. With reference to the annual COMPUSTAT data, we define operating accruals (ACC) as follows:

$$ACC = (ACT - CHE - LCT + DLC - DP)/\text{lagged AT.}$$

As in DeFond and Jiambalvo (1994), we estimate the discretionary accrual model cross-sectionally each year using all firm-year observations from available COMPUSTAT data in the same two-digit SIC code industry:¹⁰

$$ACC_{i,t} = \beta_0 + \beta_1 ASSETS_{i,t-1} + \beta_2 (\Delta SALES_{i,t} - \Delta AR_{i,t}) + \beta_3 PPE_{i,t} + \epsilon_{i,t}, \quad (1)$$

where:

$(\Delta SALES_{i,t} - \Delta AR_{i,t})$ = change in sales minus change in accounts receivable scaled by lagged total assets ($ASSETS_{i,t-1}$)

$PPE_{i,t}$ = net property, plant and equipment scaled by $ASSETS_{i,t-1}$.

The use of total assets as the deflator is intended to mitigate heteroskedasticity in residuals.

g. Control Variables for Other Incentives to Manage Earnings

¹⁰ Our approach to estimating the modified Jones model differs from that used by Dechow et al. (1995), who first estimate the Jones model parameters for each firm in their sample during the estimation period and then apply those parameters to a modified sales change variable to estimate discretionary accruals during the event period. Such an approach is likely to generate a large estimated discretionary accrual when a firm experiences extreme growth in the test period rather than the estimation period. Rather, to obtain a modified Jones model of discretionary accruals, we follow prior studies that estimate the model cross-sectionally and then subtract the change in accounts receivable from the change in sales (e.g., Subramanyam (1996); DeFond and Park (1997)).

Other factors identified in prior literature as being associated with earnings management include political costs, bonus plans, thresholds other than technical default, tax considerations, and decreases in liquidity. Because most, or some form, of these variables are used either as control variables or variables of interest in Beatty and Weber (2003), we include them to reduce potential omitted correlated variable problems.

Both Watts and Zimmerman (1978) and Zimmerman (1983) discuss political costs, which, together with the associated additional scrutiny of the firm's actions, increase the cost of earnings management. As a result, firms with higher political costs tend to manage earnings less. Thus, we proxy for political costs (PC) using the natural log of the book value of total assets.

Managers also have incentives to manage earnings when their bonus plans (BP) are tied to earnings (Healy (1985); Holthausen et al. (1995)). Therefore, we expect a positive association between earnings management and the existence of a bonus plan as proxied by cash salary plus bonus (Lambert and Larcker (1987); Sloan (1993)).

Besides technical default, two other earnings management thresholds are identified in the literature: reporting a loss and reporting a decrease in earnings from the previous fiscal year (Burgstahler and Dichev (1997); Degeorge et al. (1999)). We define both situations as losses (LS) represented by a dichotomous variable equal to one if the observation would have reported a loss without the effects of the two forms of income-increasing earnings management, and zero otherwise. We also expect incentives to avoid losses and decreased earnings (relative to the previous fiscal year) will be greater in those observations whose common equity trades on a major exchange (i.e., the New York Stock Exchange, American Stock Exchange, or NASDAQ, including the National Market System). Therefore, to take into account the greater incentives to report above these benchmarks, we multiply the loss variable (LS) by one for firms listed on a

major stock exchange (LSX) and by zero otherwise. We expect a positive association between the proxies for incentive to avoid and the two forms of earnings management.

Management can also avoid higher taxes that decrease cash flows by managing earnings through tax loss carryforwards. Thus, we include a dichotomous variable (TAX) equal to one if an observation has tax loss carryforwards *and* makes accounting changes with tax effects. Because having tax loss carryforwards can make technical default less costly, we expect it to be positively associated with earnings management.

Decreased liquidity produces an incentive for cash-increasing accounting changes, thus changes in accounting methods that result in higher cash flows may stem from a need for liquidity rather than avoidance of technical default. Therefore, following Sweeney (1994), we multiply the change in operating cash flows, normalized by total assets at the beginning of the fiscal period, by a dichotomous value equal to one if the accounting change has a positive cash flow effect. Because discretionary accruals tend to have little or no cash flow affect, this liquidity proxy (LQ) is included only in the accounting choice model.

An additional incentive for managers to manipulate earnings upwards is a performance pricing provision in debt contracts, which, besides affecting technical default cost, can affect earnings management decisions. Specifically, improvements in a borrower's financial performance lead to a lower interest rate and vice versa, a dynamic that suggests a positive association between earnings management and performance pricing in debt contracts. Thus, our model includes a dichotomous value (PER) equal to one (zero otherwise) if the debt contract contains a performance pricing provision.

Extant findings on whether earnings are managed to avoid reducing dividends are inconclusive. Sweeney (1994), Beatty and Weber (2003), Daniel et al. (2008), and Li et al. (2013), find that earnings management is so used, while Healy and Palepu (1990), and DeAngelo

et al. (1994) find no such evidence. Nonetheless, for completeness and to control for potentially omitted correlated variables, we include a dichotomous value (DIV) equal to one if the debt contract contains a dividend constraint and zero otherwise.

To make discretionary accrual choices, just as for accounting method changes, managers must have flexibility. Therefore, we include two flexibility proxy variables as follows:

- for accounting choice flexibility (FLX_{AC}) - measured as the number of income-increasing accounting procedures available for each observation at the beginning of the fiscal year, and
- for discretionary accrual flexibility (FLX_{DA}) – measured using the root mean squared error of the estimation of discretionary accruals (Barton, 2001).¹¹

We expect a positive association between the flexibility proxies and the use of both accounting method changes and discretionary accruals.

Mohrman (1996) and Beatty et al. (2002) find that a significant number of debt contracts, mostly private, dictate the use of specific accounting methods in the assessment of compliance with debt covenants (the so-called frozen GAAP). However, Beatty et al. (2002) also find that managers are willing to absorb higher costs to retain accounting flexibility so that accounting method changes can be used to calculate the limits defined in the debt covenant (flexible GAAP). In addition, Ghosh and Moon (2010) find firms that rely heavily on debt financing might be willing to bear higher borrowing costs because the benefits of avoiding potential debt covenant violations exceed the higher borrowing costs.

In our sample, approximately 59 percent of observations exclude *either* voluntary *or* mandatory accounting changes in computations determining compliance with debt contract provisions, while 32 percent exclude *both* voluntary and mandatory accounting changes by requiring use of the GAAP in effect on the start date of the debt contract (frozen GAAP). The dichotomous variable (INC) is equal to one if a firm's debt contracts allow either voluntary or

¹¹ This measure, by construction, assesses flexibility in accounting accruals by industry.

mandatory accounting changes to be used in the computations determining compliance with debt contract provisions. As documented in Beatty and Weber (2003), firms pay for the ability to include accounting changes in their calculations for contract monitoring, therefore, we anticipate a positive association between INC and accounting changes. We also predict a negative association between INC and the discretionary accruals model. That is, firms able to use the results of an accounting change in their calculations will tend to rely more on accounting changes and less on discretionary accruals to increase earnings.

IV. Research Design and Model Specifications

We implement a system of three structural models, each a function of the other two plus exogenous variables:

$$\begin{aligned} EM_{DA} &= EM_{AC} + CST + O_1 \\ EM_{AC} &= EM_{DA} + CST + O_2 \\ CST &= EM_{DA} + EM_{AC} + O_3 \end{aligned}$$

where:

EM_{DA} = decisions to manage accounting accruals: for income-increasing discretion in accounting accruals (DA), we use the value of income-increasing discretionary accruals as evidenced by estimating the modified Jones (1991) model to obtain a discretionary accrual proxy,

EM_{AC} = decisions to manage accounting procedures: for income-increasing accounting choice (AC) decisions, we use the value of upward earnings changes resulting from changes in accounting methods (scaled by total assets measured at the beginning of the fiscal period),

CST = estimated cost of technical default, and

O_i = vector of included control variables.¹²

The default cost of the two earnings management models is likely to be endogenous, as is simultaneity between the two earnings management models, therefore, we first test the structural models for an endogeneity/simultaneity bias. We use an omitted variables variant of the Hausman (1978) test and find evidence of potential endogeneity/simultaneity bias in each model.

¹² In our sample, and as documented previously in this area of the literature, most covenant violations occur or are disclosed toward the end of the fiscal year. Accordingly, the financial statement data are obtained from the end of the fiscal year in the year of technical default (i.e., t_0), and at the end of fiscal years t_{-1} and t_{-2} for the two periods prior to the technical default fiscal year.

To control for such bias in the estimated coefficients of interest, we estimate the following system of three structural equations using a two-stage least squares procedure:

$$EM_{DA} = \alpha_0 + \alpha_1 \textit{Predicted-EM}_{AC} + \alpha_2 \textit{Predicted-CST} + \alpha_3 \textit{INC} + \alpha_4 \textit{PC} + \alpha_5 \textit{BP} + \alpha_6 \textit{LS} + \alpha_7 \textit{LSX} + \alpha_8 \textit{TAX} + \alpha_9 \textit{DIV} + \alpha_{10} \textit{FLX}_{AC} + \alpha_{11} \textit{PER} + \xi \quad (2)$$

$$EM_{AC} = \beta_0 + \beta_1 \textit{Predicted-EM}_{DA} + \beta_2 \textit{Predicted-CST} + \beta_3 \textit{INC} + \beta_4 \textit{PC} + \beta_5 \textit{BP} + \beta_6 \textit{LS} + \beta_7 \textit{LSX} + \beta_8 \textit{TAX} + \beta_9 \textit{LQ} + \beta_{10} \textit{DIV} + \beta_{11} \textit{FLX}_{DA} + \beta_{12} \textit{PER} + \omega \quad (3)$$

$$\textit{CST} = \Phi_0 + \Phi_1 \textit{Predicted-EM}_{DA} + \Phi_2 \textit{Predicted-EM}_{AC} + \Phi_3 \textit{GO} + \Phi_4 \textit{LND} + \Phi_5 \textit{IRG} + \Phi_6 \textit{ACG} + \Phi_7 \textit{RBG} + \Phi_8 \textit{PER} + \Phi_9 \textit{SIZ} + \Phi_{10} \textit{PAY} + \Phi_{11} \textit{SEC} + \Phi_{12} \textit{TM} + \epsilon \quad (4)$$

In the first stage, we estimate equations (2), (3), and (4) using single-equation estimations with only the vector of control variables. The fitted values from these regressions, which by construction are independent of their respective error terms, are used as instrumental variables in the second-stage regressions.¹³

We then investigate our prediction that managers form expectations about technical default costs prior to periods of covenant violations and, weighing the costs and benefits of the two discretionary accounting decisions, have greater incentives to make income-increasing accounting choices as expected default costs increase. We also predict that the two forms of earnings management are not independent discretionary choices.

V. Results

a. Empirical Evidence

Tables 4, 5, and 6 report the results of estimating the system of equations two fiscal years prior to technical default, one fiscal year prior to technical default, and in the fiscal year of technical default, respectively. This analysis provides several insights into managerial attempts to delay technical default *and* lower its costs through accounting choice and accrual discretion in periods prior to and coincident with technical default.

¹³ Evidence from a Basman (1960) test suggests that the system of equations is well specified.

In periods surrounding technical default, the expected costs of technical default (CST) are reliably positive in both earnings management models. This suggests, as predicted, that the higher the cost, the more managers will use earnings management to increase net income. The predicted values of EM_{DA} are reliably negative, indicating that the two forms of upward earnings management can be viewed as substitute accounting choices made by managers in response to expected default costs in periods surrounding covenant violations.

As expected, the evidence suggests that managers' expectations of the costs of technical default are positively associated with their decisions to use income-increasing accounting choice in periods prior to *and* inclusive of the technical default period. The latter is important in that evidence suggests managers continue to act opportunistically by using income-increasing accounting choices even though technical default has occurred. Our findings are also consistent with managers expecting the cost of technical default to be a function of the magnitude of deviation in the calculated variable determining compliance from the required levels in debt contracts. Managers appear to use increased accounting discretion to report higher earnings when faced with higher expected technical default cost.¹⁴ This can be seen in Tables 4 through 6 which consistently show that the higher cost of technical default is positively associated with a higher level of earnings management.

In addition, the evidence reported in Tables 4, 5, and 6 indicates an important factor in the decision to change accounting methods is whether the company has the flexibility to make an accounting change that will increase earnings (FLX_{AC}). Managers are also apparently influenced by their desire to retain dividend payment flexibility in that the dividend variable (DIV) is reliably positive.

¹⁴ Dichev and Skinner (2002) provide evidence that private lenders constrain their debt covenant levels more tightly than public lenders. This tightness leads to a higher incidence of technical default with lower cost. In our sample, each observation is a private loan, which biases the cost of technical default downwards, and in our tests favors the null for an association between technical default cost and our two forms of accounting discretion.

(Insert Tables 4, 5, and 6 here)

Two other determinants warrant discussion. First, the incentives for managers to use either form of earnings management seem greater when the firm is listed on a major exchange (LSX). Second, we also find evidence associating bonus plans (BP) with decisions to use income-increasing earnings management in the two fiscal years prior to and coincident with the fiscal year of technical default.

b. Technical Default Cost

As reported in Tables 4 through 6, we also estimate a model for the cost of technical default, which we find to be negatively associated with both forms of earnings management activities. The evidence suggests that managers use earnings management decisions rationally to lower technical default costs. Particularly important for understanding managerial incentives to achieve a certain financial result using accounting discretion are the findings reported for the fiscal year of technical default (see Table 6). Even though technical default is unavoidable, managers employ both forms of earnings discretion and are rewarded with lower technical default costs. This strongly suggests lenders either do not understand the earnings management activity or the covenants are so tight that technical default is not a serious concern.

c. Robustness Test 1: Exclusion of Early Adopters of Mandatory Accounting Method Changes

For the main tests, we do not differentiate between the inclusion of voluntary and mandatory accounting method changes. However, it can be argued that these two forms of accounting choice have varying levels of rewards and costs to both managers and lenders. We test the robustness of our findings by eliminating the earnings effect of early adopters.¹⁵ The results of these robustness tests are similar to our main findings.

¹⁵ For example, if a firm has both voluntary (e.g., \$2,000) and mandatory (e.g., \$500) income-increasing effects, the earnings effect included in the test is only \$2,000. Conversely, if a firm has no voluntary changes and \$2,000 mandatory changes, then EM_{AC} equals \$0.

Although it might be argued that less justification can be made testing the robustness of our main findings when accounting choice is allowed only for mandatory accounting changes, we nevertheless perform such a test. The outcomes are again no different than our main test results; however, the allowed inclusion variable (INC, which is now 1) is not reliably different from zero (p -value $<.20$). Thus, the evidence suggests that managerial decisions tend to make greater use of accounting method choices to increase income surrounding technical default when voluntary choices are allowed. On the other hand, this evidence cannot be reliably interpreted to mean that allowing mandatory accounting choices tends to result in early adoption of income-increasing accounting choice decisions surrounding technical default.

d. Robustness Test 2: Accounting Changes Allowable in the Debt Agreement

The evidence thus far suggests that accounting method changes and discretionary accruals are two alternative mechanisms available to managers to both avoid covenant violations and reduce the resulting costs of technical default. However, the evidence on the simultaneity of decisions to use the two forms of earnings management is less likely to hold when accounting changes are excluded in computations determining compliance with debt contract provisions.

To investigate this issue, we repeat the endogeneity tests on two subsamples. First, we delete observations whose debt contract does not allow the inclusion of either voluntary or mandatory accounting changes in computations determining debt contract compliance. This subsample allows for either (but not both) voluntary or mandatory changes in accounting procedures (i.e., flexible GAAP). The evidence again supports simultaneity between the two forms of earnings management activities. Second, we delete observations in which the debt contracts clearly disallow the consideration of accounting changes in the calculation of ratios monitored as debt covenants. This subsample uses accounting procedures in effect on the start

date of the debt contract (i.e., frozen GAAP). Under this frozen GAAP constraint, the test of endogeneity between the two forms of earnings management activities is not supported.

VI. Conclusion

Our findings indicate that accounting choice matters when a borrower is either approaching or *in* technical default. Specifically, we find evidence that, in contrast to their behavior when accounting changes are perhaps unimportant for debt covenants that restrict dividend payments (Healy and Palepu, 1990), managers use both accounting choice and discretion in accounting accruals to lower the costs of technical default. Our results further suggest that managers have private information about the expected costs and consequences of technical default and that, both prior to default *and* in the period of default, they condition their decisions about accounting choice and accounting discretion on these expectations. A reasonable inference is that managers drawing upon these two forms of earnings management expect their decisions to directly influence the costs of technical default.

Fields et al. (2001) express concern that accounting research often fails to control for endogeneity in research design. Our methodology specifically addresses this endogeneity problem in an accounting decision context in which multiple decisions are likely to influence managerial behavior. Moreover, our findings suggest that the decision to use either form of earnings management is not independent of the decision to use the other form and, perhaps as important, the two forms are both used to intervene in the financial reporting process surrounding periods of technical default on debt contracts.

However, several caveats are worth noting. First, income-increasing earnings management, in either form, can be motivated by attempts to value maximize the firm by signaling the asymmetry of managerial information or attempting to lower transaction costs for all parties. Although we attempt to filter out the more financially distressed firms, our sample of

default firms can be expected to exhibit relatively more financial distress than a sample of firms that has not violated covenants. Thus, our findings could also be explained by the managers of these default firms switching to the most efficient set of accounting choices given their financial condition.

Overall, we contribute to the technical default cost variation literature by documenting that the level of cost of technical default is a direct determinant of whether managers make decisions to use income-increasing accounting choices and discretion in accounting accruals. Further, we document that the two forms of earnings management, in the case of technical default, act as substitutes for one another.

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TABLE 1
Sample Selection Process^a

Firm Type	# of Firms
Firms in technical default on an account-based covenant that identify the violation and its results	334
Minus the following observations:	
Non-first time violators during the sample period	45
Defaulted on debt services or filed bankruptcy	27
Financial information not available	11
Firms with material bank debt contracts not filed with SEC ^b	27
Firms with significant mergers and acquisitions	3
<i>Firms in our sample</i>	221

^a To identify firms in technical default of debt contracts, we searched the LexisNexis, Dow Jones News Service, and Compact Disclosure databases, which disclose the annual reports of public companies for fiscal years 1994 to 2000. The text searched included the notes to accompanying financial statements and discussion by managers in SEC filings (e.g., the Management Discussion and Analysis). Our online search also included Forms 10-K, 10-Q, and 8-K and, when complete SEC filings could not be obtained from our data sources, registration statements or annual and quarterly reports.

^b Neither our online search of Forms 10-Q and 8-K nor that of all the registration statements resulted in any copy of the debt contract for these firms.

TABLE 2

Distribution of debt covenant violations for firms entering first-time technical default in 1994–2000 ^a

Panel A: Distribution of Technical Default by Covenant Type

Covenant Type	# of covenants violated	% of covenants violated
Net worth, tangible net worth	141	42.09%
Working capital	59	17.61%
Current ratio	52	15.52%
Debt-equity ratio	39	11.64%
Interest coverage	22	6.57%
Dividends paid in excess of earnings restrictions	10	2.99%
Cash flow from operation or cash flow to total debt	8	2.39%
Minimum earnings level	4	1.19%
<i>Total</i>	335	100.0%

Panel B: Number of Covenants Violated

	# of firms	% of firms
Firms that violated one covenant	114	52%
Firms that violated two or more covenants	107	48%
<i>Total firms in violation</i>	221	100%

^aTo identify firms in technical default of debt contracts, we searched the LexisNexis, Dow Jones News Service, and Compact Disclosure databases, which disclose the annual reports of public companies for fiscal years 1994 to 2000. The text searched included the notes to accompanying financial statements and discussion by managers in SEC filings (e.g., the Management Discussion and Analysis). Our online search also included Forms 10–K, 10–Q, and 8–K and, when complete SEC filings could not be obtained from our data sources, registration statements or annual and quarterly reports.

TABLE 3

Descriptive statistics for earnings management decisions for 221 U.S. firms entering first-time technical default in 1994–2000

Income-increasing accounting changes in the two years prior to and in the fiscal year of technical default (t_0)

	t₂	t₁	t₀	Total Changes
FIFO adopted or extended	26	31	18	75
Depreciation methods	17	19	11	47
Depreciable lives	21	23	13	57
Pension assumptions	10	11	7	28
Other	8	9	5	22
Number of accounting changes	82	93	54	229
Total firms				108
<i>Percentage of total changes</i>	<i>35.8%</i>	<i>40.6%</i>	<i>23.6%</i>	<i>100%</i>

TABLE 4

Estimation results for the three structural models (controlled for endogeneity)^a
 Fiscal year two years prior to technical default^b

	EM _{AC}		EM _{DA}		CST	
Intercept	0.156	(2.180)**	0.315	(3.558)***	-0.287	(-2.585)***
<i>Predicted</i> -EM _{AC}			-0.183	(-2.333)***	-1.069	(-2.810)***
<i>Predicted</i> -EM _{DA}	-1.128	(-3.508)***			-2.345	(-2.277)***
<i>Predicted</i> -CST	0.648	(2.497)***	0.276	(3.189)***		
INC	0.398	(2.372)***	-0.182	(-2.188)***		
PC	-0.017	(-0.074)	-0.044	(-1.269)*		
BP	0.144	(1.901)**	0.152	(1.918)**		
LS	0.167	(2.184)**	0.133	(2.088)**		
LSX	0.265	(2.591)***	0.240	(2.496)***		
TAX	0.065	(1.815)**	0.036	(1.157)		
LQ _i	-0.204	(-1.189)				
DIV	0.445	(2.332)***	0.314	(2.255)***		
FLX _i	0.504	(2.876)***	0.334	(2.995)***		
PER	0.202	(2.226)***	0.185	(2.355)***	-0.203	(-2.036)**
GO					0.124	(1.982)**
LND					-0.147	(-2.273)***
IRG					0.259	(2.783)***
ACG					0.196	(1.992)**
RBG					0.378	(3.098)***
SIZ					0.194	(2.091)**
PAY					0.276	(3.086)***
SEC					-0.162	(-1.081)
TM					-0.064	(-1.187)
Adjusted R ²	0.241		0.310		0.411	

^aEM_{AC}: Model 1: Determinants of decisions to manage accounting accruals

EM_{DA}: Model 2: Determinants of decisions to manage accounting procedures

CST: Model 3: Determinants of estimated cost of technical defaults

^bThe table reports *t*-statistics for the estimated coefficients in parentheses. The sample consists of 192 of the 221 observations of first time violators in technical default of debt covenants with evidence of loans two years before technical default. Variables, measured two fiscal years prior to technical default unless specifically noted, are defined below.

***, **, and * indicate significance at the 1%, 5%, and 10% levels using either a one or two-tailed test as appropriate.

Variable Definitions for Tables 4, 5, and 6:

EM_i = Effect of earnings management. For income-increasing accounting choice (AC) decisions, we use the value of earnings changes when accounting method changes (scaled by beginning of the period total assets). For income-increasing discretion in accounting accruals, we use the value of income-increasing discretionary accruals as evidenced by estimating the modified Jones (1991) model to obtain a discretionary accrual proxy.

CST_i = Cost of technical default measured either as a construct variable or the probability of waiver.
 TD = Dichotomous variable assigned a value of 1 if the firm avoided technical default, zero otherwise.
 INC = Dichotomous variable assigned a value of 1 if the debt contract allows the effects of accounting changes to be included in contract calculations, zero otherwise.
 PC = Political cost measured as the natural log of the book value of total assets at the beginning of the fiscal year (COMPUSTAT data item 6).
 BP = Dichotomous variable assigned a value of 1 if a bonus plan exists, zero otherwise. We use Forbes annual compensation survey and search available proxy statements filed with the SEC available in LexisNexis and EDGAR.
 LS = Dichotomous variable assigned a value of 1 if the firm would have reported a loss without earnings management, zero otherwise. The variable is measured using earnings (COMPUSTAT data item 172) for the fiscal year of interest after removing the income-increasing effects of earnings management.
 LSX = LS * 1 if the firm is listed on a major stock exchange (the New York Stock Exchange, American Stock Exchange, or NASDAQ, including National Market System).
 TAX = Dichotomous variable assigned a value of 1 if the firm has net operating loss carry-forwards (COMPUSTAT data item 52) and makes accounting changes that have tax effects.
 LQ = Changes in operating cash flows (first-differenced COMPUSTAT data item 308) normalized by total assets and multiplied by a dichotomous variable with a value of one if the accounting change has a positive cash flow effect. In fiscal years prior to data from statement of cash flows being available, we use the balance sheet (i.e., indirect) method to estimate operating cash flows.
 PER = Dichotomous variable assigned a value of 1 if the debt contract includes accounting-based performance-pricing constraints obtained from DealScan or from managerial discussions in the data sources.
 DIV = Dichotomous variable assigned a value of 1 if the debt contract includes accounting-based dividend constraints
 FLX_i = Either AC, the number of income-increasing accounting procedures available for each firm, or DA, the root mean squared error of the regression used to estimate discretionary accruals.
 LND = Number of lenders providing loans to the borrower, either the number of lenders in the loan syndication for private debt or the log of the number of bonds issued for public debt.
 GO = Proxy for growth opportunities measured as the market value of equity plus the book value of debt (COMPUSTAT data items 199 and 25, respectively) divided by the book value of assets. The variable is measured two years prior to the fiscal year of violation.
 IRG = GO * the percentage change in interest rate following the renegotiation process.
 ACG = GO * the percentage change in the number of new constraints following the renegotiation process.
 RBG = GO * the percentage reduction in the amount of available borrowing credit.
 SIZ = Natural log of the total amount of debt in default.
 PAY = Probability of default in future debt payment from the model in Chesser (1974)
 SEC = Dichotomous variable assigned a value of 1 if the debt is secure, zero otherwise.
 TM = Debt issue's time to maturity (in months).

TABLE 5

Estimation results for the three structural models (controlled for endogeneity)^a
 Fiscal year one year prior to technical default^b

	EM_{AC}		EM_{DA}		CST	
Intercept	0.145	(2.019)**	0.297	(3.357)***	-0.259	(-2.329)***
<i>Predicted</i> -EM _{AC}			-0.179	(-2.287)***	-1.028	(-2.702)***
<i>Predicted</i> -EM _{DA}	-1.106	(-3.040)***			-0.292	(-2.277)**
<i>Predicted</i> -CST	0.629	(2.425)***	0.268	(3.096)***		
INC	0.379	(2.303)***	-0.176	(-1.124)**		
PC	-0.016	(-0.072)	-0.043	(-1.193)		
BP	0.142	(1.868)**	0.150	(1.892)**		
LS	0.159	(2.120)**	0.130	(2.024)**		
LSX	0.257	(2.516)***	0.233	(2.414)***		
TAX	0.062	(1.762)**	0.035	(1.123)		
LQ _i	-0.198	(-1.155)				
DIV	0.436	(2.264)***	0.305	(2.189)***		
FLX _i	0.499	(2.792)***	0.324	(2.907)***		
PER	0.198	(2.162)**	0.180	(2.287)***	-0.201	(-2.016)**
GO					0.204	(2.893)***
LND					-0.138	(-2.124)**
IRG					0.244	(2.625)***
ACG					0.241	(2.921)***
RBG					0.367	(3.008)***
SIZ					0.187	(2.011)**
PAY					0.271	(3.025)***
SEC					-0.161	(-1.583)*
TM					-0.062	(-1.141)
Adjusted R ²	0.226		0.290		0.381	

^aEM_{AC}: Model 1: Determinants of decisions to manage accounting accruals

EM_{DA}: Model 2: Determinants of decisions to manage accounting procedures

CST: Model 3: Determinants of estimated cost of technical defaults

^b The table reports *t*-statistics for the estimated coefficients in parentheses. The sample consists of 209 of the 221 observations of first-time violators in technical default of debt covenants with evidence of loans one year before technical default. Variable definitions are reported in Table 4. Variables are measured one fiscal year prior to technical default unless specifically noted.

***, **, and * indicate significance at the 1%, 5%, and 10% levels using either a one or two-tailed test as appropriate.

TABLE 6

Estimation results for the three structural models (controlled for endogeneity)^a
 Fiscal year of technical default^b

	EM_{AC}		EM_{DA}		CST	
Intercept	0.131	(1.827)**	0.272	(3.071)***	-0.240	(-2.159)**
<i>Predicted-EM_{AC}</i>			-0.159	(-2.031)**	-0.921	(-2.420)***
<i>Predicted-EM_{DA}</i>	-0.962	(-2.991)***			-0.254	(-1.980)**
<i>Predicted-CST</i>	0.543	(2.092)**	0.231	(2.671)***		
INC	0.327	(1.985)**	-0.152	(-1.831)**		
PC	-0.014	(-0.062)	-0.037	(-1.026)		
BP	0.136	(1.817)**	0.143	(1.821)**		
LS	0.136	(1.527)*	0.111	(1.734)*		
LSX	0.225	(2.201)***	0.204	(2.112)**		
TAX	0.056	(1.602)*	0.032	(1.021)		
LQ _i	-0.177	(-1.031)				
DIV	0.395	(2.051)**	0.276	(1.983)**		
FLX _i	0.442	(2.471)***	0.287	(2.573)***		
PER	0.201	(2.190)***	0.182	(2.317)**	-0.201	(-2.016)**
GO					0.187	(2.654)***
LND					-0.125	(-1.931)*
IRG					0.226	(2.431)***
ACG					0.215	(2.608)***
RBG					0.314	(2.571)***
SIZ					0.176	(1.897)**
PAY					0.242	(2.701)***
SEC					-0.153	(-1.698)**
TM					-0.054	(-1.001)
Adjusted R ²	0.213		0.274		0.351	

^aEM_{AC}: Model 1: Determinants of decisions to manage accounting accruals

EM_{DA}: Model 2: Determinants of decisions to manage accounting procedures

CST: Model 3: Determinants of estimated cost of technical defaults

^b The table reports *t*-statistics for the estimated coefficients in parentheses. The sample consists of 221 observations of first time violators in technical default on debt covenants. Variable definitions are reported in Table 4. Variables are measured in the year of technical default unless specifically noted.

***, **, and * indicate significance at the 1%, 5%, and 10% levels using either a one or two-tailed test as appropriate.