

THE EFFECT OF EARNINGS MANAGEMENT CONSTRAINTS ON FINANCIAL
REPORTING DECISIONS: AN EMPIRICAL EXAMINATION OF
ACCOUNTING WRITE-OFFS

by

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(Under the Direction of KENNETH GAVER)

ABSTRACT

This study extends recent research by Barton and Simko (2002) by examining whether earnings management constraints embedded within generally accepted accounting principles (GAAP) affect financial reporting outcomes beyond whether firms meet or beat earnings benchmarks. Specifically, this study tests whether earnings management constraints increase the likelihood that management will record an accounting write-off and whether this association depends on the amount by which earnings fall short of the benchmark. Using a sample of 51,581 firm-year observations for 5,739 firms during the years 1976-2000, this study regresses the likelihood of accounting write-offs on the extent to which managers face earnings management constraints relative to meeting an earnings benchmark, the amount by which earnings fall short of this benchmark, the interaction between these measures, and control variables. Consistent with expectations, this study finds a positive association between the extent of earnings management constraints in the current period and managers' accounting write-off decisions. The results also show that the marginal effect of earnings management constraints on the write-off is inversely related to the amount of the benchmark shortfall. This evidence suggests that managers are more likely to record a write-off when earnings management constraints limit their ability to avoid reporting earnings that just slightly miss the benchmark, thus providing a second possible explanation for the disproportionately low observed frequencies of firms

reporting small losses reported by Burgstahler and Dichev (1997).

INDEX WORDS: Earnings Management, Earnings Management Constraints, Accounting Discretion, Financial Reporting Strategies, Asset Write-offs, Restructuring Charges, Earnings Benchmarks

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CHAPTER 1

INTRODUCTION

1.1. Statement of Issues

1.1.1. Background

In light of recent claims that generally accepted accounting principles (GAAP) grant managers too much discretion (e.g., Levitt 1998), Barton and Simko (2002) provide recent evidence suggesting that this discretion is limited by constraints embedded within GAAP. Specifically, they argue that the fundamentals of accrual accounting ensure that biased measurement and recognition practices used to overstate net income also accumulate on the balance sheet leading to overstated net asset values. Given prior evidence that overstated earnings and net asset values result in costly regulatory enforcement actions (e.g., Dechow et al 1996), the authors further argue that managerial discretion to manage earnings upward is subject to an upper bound and that managers have disincentives to extend the limits of this upper bound. Consistent with these arguments, Barton and Simko (2002) find an inverse relation between the extent to which net asset values

exceed those based on a neutral application of GAAP and managers' ability to report earnings that meet or exceed analysts' forecasts – a particularly strong earnings management incentive (e.g., Matsumoto 2002).

Although Barton and Simko's results provide evidence suggesting that the earnings management constraints embedded within GAAP explain why some firms with particularly strong incentives to overstate earnings fail to achieve the desired outcomes, an empirical question arises about how these constraints affect other accounting decisions over which managers have considerable discretion within GAAP. That is, do earnings management constraints explain differences in managers' financial reporting strategies? The purpose of this dissertation is to address this question by examining the association between earnings management constraints and the timing and magnitude of large asset write-offs and restructuring charges (hereafter, accounting write-offs), while controlling for other factors associated with these items.

Managerial incentives with respect to the timing and measurement of accounting write-offs have been of particular interest to regulators, standard setters and accounting researchers because these items represent significant negative charges to income statement and

balance sheet accounts, and managers have considerable discretion with respect to their timing and measurement (Alciatore et al 1998). Given the negative impact of accounting write-offs on reported earnings, managers with sufficient earnings management discretion may have incentives to delay reporting these items in the current period if they have strong incentives to manage earnings upward (Heflin and Warfield 1997). On the other hand, managers with limited earnings management discretion may have incentives to record large accounting write-offs given the inverse relation between net asset values and the ability to manage earnings (Barton and Simko 2002; DeFond 2002), as well as the opportunity to create hidden reserves available to boost future earnings (Levitt 1998; Moehrle 2002).

1.1.2. Earnings Management Incentives and Constraints

A powerful test of whether earnings management constraints affect managers' accounting decisions requires 1) an empirical proxy for managers' *ability* to manage earnings upward and 2) identification of empirical contexts in which managers have *incentives* to manage earnings upward. With respect to the first issue, this study uses the ratio of net operating assets at the beginning of the reporting period to sales during the prior period,

consistent with the measure developed by Barton and Simko (2002). With respect to the second issue, recent studies employing the distributional approach to assess earnings management behavior find that managers have particularly strong incentives to avoid reporting losses (e.g., Hayn 1995; Burgstahler and Dichev 1997; Degeorge et al 1999). Thus, this study examines whether managers' decisions regarding the timing and magnitude of asset write-offs are associated with their ability to manage earnings upward to avoid reporting year-end losses. In addition, this study examines whether this association is a function of the amount by which earnings fall short of the reporting objectives.

1.2. Summary of Results

Based on a sample of 51,581 firm-year observations pertaining to 5,749 firms during the years 1976 to 2000, this study finds that earnings management constraints are positively associated with the timing of accounting write-offs, even after controlling for other incentives and economic factors associated with these reporting items. This evidence suggests that earnings management constraints have financial statement implications beyond determining whether managers are able to meet earnings benchmarks. In addition, the results suggest that the marginal effect of

earnings management constraints on the likelihood of a write-off varies with the proximity of earnings to the benchmark. Specifically, this evidence suggests that the relative impact of earnings management constraints on managerial reporting decisions declines as the amount by which earnings fall short of the benchmark increases.

1.3. Contributions of This Study

This dissertation contributes to the accounting literature in three ways. First, this study extends recent research by Barton and Simko (2002), who find that the ability to manage earnings upward is limited by constraints embedded within GAAP. While their study shows that these constraints explain why some firms fail to meet earnings objectives, this study shows that the ability to manage earnings affects how managers implement GAAP to report financial statement information.

Second, this study adds to the debate about whether firms strategically record accounting write-offs with the intent to manage earnings in the future. Prior studies investigating this issue rely on tests of earnings management behavior in the periods subsequent to the write-off, finding mixed results (e.g., Rees et al 1996; Moerhle 2002; Bens and Johnston 2002). While this study does not directly observe managerial intent with respect to future

reporting incentives, the results suggest that firms with limited earnings management discretion in the current period are more likely to record accounting write-offs.

Finally, this study is particularly relevant for researchers using the distributional approach to assess earnings management around benchmarks. Recent studies employing this approach argue that the disproportionately low observed frequencies of small losses, small earnings decreases and small negative earnings surprises result from income-increasing earnings management (e.g., Hayn 1995; Burgstahler and Dichev 1997; Degeorge et al 1999). The results in this study suggest that a second possible interpretation of the low observed frequencies of small losses and small earnings decreases is that managers facing small losses, but lacking sufficient discretion to avoid these outcomes, use the opportunity to record income-decreasing accounting write-offs.

1.4. Organization of the Dissertation

The remainder of this dissertation is organized as follows. Chapter 2 reviews the relevant literature on managerial incentives to manage earnings upward, earnings management constraints, and managerial incentives with respect to the timing and measurement of accounting write-offs. Chapter 3 develops empirical predictions about how

earnings management constraints affect the timing of accounting write-offs. Chapter 4 discusses the sample selection process, data sources, variable measurement and the empirical model used to test the hypotheses. Chapter 5 provides descriptive statistics for the full sample, and it reports and discusses the results of the empirical tests. Finally, chapter 6 concludes the dissertation with a discussion of the study's implications and limitations. In addition, provides suggestions for future research regarding the effect of earnings management constraints on managers' reporting decisions.

CHAPTER 2

LITERATURE REVIEW

This chapter reviews the streams of accounting research pertaining to this study's predictions and empirical tests. In addition, it discusses this study's contributions to the accounting literature. Section 2.1 overviews the empirical definitions of earnings management and discusses empirical techniques used to identify this behavior. Section 2.2 discusses evidence regarding earnings management to meet or beat earnings benchmarks. Section 2.3 discusses empirical evidence regarding earnings management constraints embedded within GAAP. Section 2.4 reviews the literature on managerial incentives to record accounting write-offs. Finally, section 2.5 discusses this study's contributions to these streams of literature.

2.1. Background

2.1.1. Defining Earnings Management

The primary objective of financial reporting by business enterprises is to communicate information "that is useful to present and potential investors and creditors and other users in making rational investment, credit, and similar decisions (FASB, SFAC 1 paragraph 34)." To achieve

this objective, generally accepted accounting principles (GAAP) require publicly traded entities to report financial performance under the accrual method of accounting. The accrual method requires (allows) managers to make judgments about expected future cash realizations. These judgments can enhance the quality of reported earnings by allowing managers to select accounting methods and make estimates that reveal their private information about current and future firm performance. Alternatively, opportunistic managers may also have incentives to abuse their reporting discretion to engage in earnings management.

While there is no all-inclusive list of behaviors that constitute earnings management, several broad definitions appear in the accounting literature. For example, Schipper (1989) defines earnings management as follows:

... [A] purposeful intervention in the external financial reporting process, with the intent of obtaining some private gain (as opposed to, say, merely facilitating the neutral operation of the process (p. 92)).

In addition, Healy and Wahlen (1999) suggest the following:

Earnings management occurs when managers use judgment in financial reporting and in structuring transactions to alter financial reports either to mislead some stakeholders about the underlying economic performance of the company, or to influence contractual outcomes that depend on reported accounting numbers (p. 6).

Although both of the above definitions imply that earnings management occurs when managers use their reporting discretion with some form of intent, accounting researchers interested in assessing this behavior face empirical challenges, primarily because managerial intent is unobservable (Dechow and Skinner 2000). Thus, earnings management researchers have employed a variety of research design techniques that jointly attempt to (1) identify settings in which managers have ex ante incentives to manage earnings, and (2) measure the ex post effects of managerial discretion on reported earnings (Healy and Wahlen 1999).

2.1.2. Summary of Earnings Management Incentives

The preponderance of earnings management research investigates managerial incentives with respect to three managerial incentives studied in accounting research fall into three distinct, but non-mutually exclusive classifications. First, the use of accounting numbers in contracts between managers and stakeholders (e.g., compensation or debt contracts) gives rise to potential managerial opportunism, given managers' reporting discretion within GAAP (Watts and Zimmerman 1986; Healy and Wahlen 1999; Fields et al 2001). For example, prior research had documented evidence suggesting that managers

have (and act on) incentives to manage reported earnings to increase their compensation (e.g., Healy 1985; Gaver et al 1995; Guidry et al 1999) and to avoid costs associated with violating the terms of lending agreements (DeFond and Jimbalvo 1994; Beneish and Press 1993).

Second, the use of accounting numbers in the political process to advocate or administer government regulation creates incentives for managers to manage earnings (Watts and Zimmerman 1986; Fields et al 2001). For example, politicians often criticize firms reporting high abnormal profits during political crises such as inflation or oil shortages. In addition, industry regulators establish rate restrictions and solvency requirements based on reported accounting numbers. Empirical tests of regulatory incentives find evidence consistent with earnings management to affect import relief decisions (Jones 1991), to avoid anti-trust regulation (Cahan 1992), to avoid political scrutiny (Key 1997), and to meet industry solvency requirements (Petroni 1992).

Finally, the use of accounting information by capital market participants (e.g., investors and financial analysts) in an effort to assess firm value may create incentives for earnings management to influence stock price (Healy and Wahlen 1999). Empirical studies of earnings

management for capital market reasons report evidence consistent with earnings management prior to capital market transactions such as management buyouts (Perry and Williams 1994), initial public offerings (Teoh et al 1998a), and seasoned equity offerings (Teoh et al 1998b). Researchers have reported earnings management to avoid falling short of accounting benchmarks – e.g., positive and increasing earnings (Burgstahler and Dichev 1997; Degeorge et al 1999) and analysts' earnings forecasts (Burgstahler and Eames 1999). Myers and Skinner (2000) also find evidence consistent with earnings management to sustain strings of successive earnings increases.

2.1.2. Research Design Techniques

Over the past decade, the most common approach to measure the ex post use of accounting discretion in the reporting process has been the estimation of unexpected or “discretionary” accruals based on the model developed by Jones (1991, hereafter, the Jones model). The Jones model allows researchers to partition total accruals into non-discretionary and discretionary components by regressing total accruals on proxies for expected accruals related to working capital (e.g., the change in revenues) and depreciation (e.g., fixed assets). The difference between total accruals and expected accruals reflects the

unexpected or discretionary component of accruals. Studies employing the Jones model hypothesize whether managers have incentives to increase or decrease earnings, and then examine the extent which discretionary accruals follow patterns consistent with managerial incentives.

Researchers using this approach report evidence that managers manage earnings to increase compensation (Gaver et al 1995), avoid political scrutiny (Key 1997), and avoid violation of debt covenants (DeFond and Jiambalvo 1994).

Although this approach has been widely accepted by accounting researchers, the Jones model has been subject to criticism. For example, McNichols (2000) argues that the Jones model approach lacks sufficient power and reliability to detect earnings management because abnormal accruals are correlated with expected earnings growth, and many applications of the Jones model do not appropriately control for this effect. In addition, Thomas and Zhang (2000) also find that the Jones model does not predict total accruals as well a naïve model, which predicts that total accruals equal -5% of the total assets for all firms and years.

An alternative approach has emerged in the earnings management literature. Several studies assess earnings management by examining the distribution of reported

earnings around observable benchmarks. For example, Burhstahler and Dichev (1997) hypothesize that managers have strong incentives to avoid reporting losses and earnings declines. These authors test for earnings management by observing whether abnormal discontinuities appear in the distribution around the earnings benchmark. McNichols (2000) notes that this approach contributes to the literature by allowing researchers to predict which group of firms will manage earnings without requiring the estimation of discretionary accruals. The disadvantage of this approach, however, is that it does not provide evidence on the method of earnings management (Healy and Wahlen 1999; McNichols 2000).

2.1.3. Focus of This Review

Dechow and Skinner (2000) argue that the different perceptions of earnings management between the academic and practitioner communities are due, in part, to “a prolonged (academic) focus on incentives that may be less important than capital market incentives for earnings management (p. 16).” Furthermore, McNichols (2000) states that future contributions to the earnings management literature are likely to come from studies using the distributional approach rather than models of unexpected accruals. Thus, the discussion in section 2.2 focuses on the body of

evidence using the distributional approach to test for earnings management around benchmarks. The review also discusses the rewards and costs associated with meeting or missing these targets, respectively. Section 2.3 provides a detailed discussion of evidence reported by Barton and Simko (2002) suggesting that earnings management constraints embedded within GAAP explain why firms with incentives to manage earnings fall short of the earnings target, even when doing so is costly.

2.2. Earnings Management to Meet or Beat Benchmarks

2.2.1. Distributional Evidence

Hayn (1995) provides the first empirical evidence of unusual discontinuities in earnings distributions around earnings benchmarks. Specifically, she examines the frequency distribution of annual earnings from 1963-1990 and observes fewer than expected observations (assuming a normal distribution) in the region of small negative earnings and greater than expected observations in the region of small positive earnings. Hayn argues that these results are consistent with firms engaging in earnings management to avoid losses; however, her study does not develop a hypothesis for this observed behavior.

Burgstahler and Dichev (1997), hereafter BD, extend Hayn (1995) by presenting two theories about managers'

incentives to avoid reporting losses and earnings decreases. First, transactions cost theory suggests that firms reporting losses or earnings decreases bear higher transaction costs because stakeholders use heuristic cutoffs at zero earnings or zero changes in earnings to determine the terms of transactions. Second, prospect theory assumes that investors rely on wealth reference points (e.g., zero earnings or zero earnings changes), rather than absolute wealth, to derive value. Consistent with Hayn (1995), BD document abnormal discontinuities in the distributions of annual earnings around zero earnings levels and zero earnings changes. The authors conclude that earnings management to avoid losses and earnings decreases is pervasive, documenting that 8-12% (30-44%) of firms with small pre-managed earnings decreases (losses) exercise discretion to report earnings increases (profits). Burgstahler and Eames (1999) report similar evidence using analysts' forecasts as the earnings benchmark.

Degeorge, Patel and Zeckhauser (1999), hereafter DPZ, also hypothesize that managers have incentives to exceed thresholds because of investors' reliance on heuristic cutoffs. They provide evidence of earnings management to exceed three earnings thresholds—report positive profits, sustain recent performance, and meet analysts'

expectations. DPZ contribute to the earnings management literature in two ways. First, they report evidence that managers have incentives to exceed quarterly earnings thresholds, consistent with the annual results reported by BD. Second, DPZ assess the relative importance of each threshold to managers and find that managers have strongest incentives to report profits, followed by reporting earnings increases and meeting analysts' expectations, respectively.

A limitation of the BD and DPZ studies is that neither provides a direct examination of how or why managers meet or exceed earnings benchmarks. Dechow, Richardson and Tuna (2000), hereafter DRT, address the first issue by examining the characteristics of "benchmark beaters"—i.e., firms reporting small positive earnings and zero forecast errors—relative to other firms. Specifically, DRT examine the magnitude of total working capital accruals, Jones model discretionary accruals, special items and extraordinary items for their sample firms. They find that firms reporting small profits have higher working capital accruals, discretionary accruals and positive special items, relative to other firms. They also find that firms just meeting analysts' expectations have higher accruals than other firms.

DRT also further explore the issue of why managers have incentives to meet earnings benchmarks. They find that firms reporting small profits show a decline in earnings or stock performance in the following year. This result is consistent with managers' incentives to delay bad news. Conversely, DRT find that firms reporting zero forecast errors show improved performance in the future. The authors argue that these are high-growth (i.e., high market-to-book ratio) firms wishing to avoid the 'torpedo effect' associated with disappointing analysts (see discussion of Skinner and Sloan 1999 below).

Matsumoto (2002) also examines managers' incentives and mechanisms to avoid negative earnings surprises (i.e., falling short of analysts' earnings forecasts). Her initial tests focus on firm characteristics associated with strong incentives to avoid negative earnings surprises. First, Matsumoto argues that firms with a high level of institutional ownership have incentives to avoid negative earnings surprises because institutional investors place heavy emphasis on short-term performance. Next, she argues that firms with greater reliance on implicit claims with other stakeholders (e.g., customers, suppliers and employees) have incentives to avoid negative earnings surprises because a strong financial image improves firms'

trade terms with these stakeholders. Finally, the author suggests that firms with high value-relevance of earnings (i.e., high correlation between unexpected earnings and abnormal returns) have greater incentives to avoid negative earnings surprises because market participants are more likely respond strongly to negative earnings surprises. Matsumoto documents evidence consistent with these hypotheses.

Matsumoto (2002) also investigates two competing explanations about how managers avoid negative earnings surprises—managing earnings or managing analysts' expectations. She tests the probability of positive abnormal accruals (earnings management) and lower-than-expected analysts' earnings forecasts (expectations management), both conditioned on firms meeting analysts' forecasts. The author documents support for both mechanisms. This evidence suggests that managers engage in both earnings management and in managing the expectations of analysts to avoid negative earnings surprises.

Two studies adopt the distribution of earnings approach to test earnings management in industries with regulated accounting and reporting requirements. Beaver, McNichols and Nelson (2000) report evidence of earnings management and income smoothing among a sample of property-

casualty insurers. Specifically, they find that managers understate loss reserves to avoid reporting small losses, but overstate reserves when earnings are relatively high. Beatty, Ke and Petroni (2002) report similar evidence for a sample of public and private banks. They find that public banks have greater incentives than private banks to avoid earnings declines and public banks are more likely to report longer strings of earnings increases.

The general conclusion of these studies is that the consistent evidence of a gap or lacuna in the earnings distribution around earnings benchmarks is consistent with predictions of earnings management.¹ Table 1 summarizes the results of empirical earnings management research using the distributional methodology.

2.2.2. Evidence of Rewards and Consequences

Burgstahler and Dichev (1997) and Degeorge et al (1999) present theories about the importance of benchmarks to market participants; however, neither study provides empirical evidence of why earnings benchmarks are important to market participants (Dechow and Skinner 2000). Three studies—Barth, Elliott, and Finn (1999); Skinner and Sloan

¹ A recent working paper by Beaver et al (2003) document that asymmetry in the treatment of taxes and special items between profit and loss firms provides a partial explanation for the lacuna in the distribution of earnings around zero. Their results, however, do not preclude the use of managerial discretion around this benchmark.

TABLE 1
Summary of Earnings Management Studies Using the
Distributional Approach

Authors	Main Finding
Burgstahler and Dichev (1997)	Discontinuity in earnings distribution between small losses (earnings decreases) and small profits (earnings increases) consistent with earnings management to avoid losses and earnings decreases
Burgstahler and Eames (1999)	Similar finding as BD, using analyst forecasts as the earnings benchmark
Degeorge, Patel and Zeckhauser (1999)	Hierarchy among earnings benchmarks, whereby managers' first incentive is to report profits, followed by positive changes in earnings and to meet analysts' forecasts
Dechow, Richardson and Tuna (2000)	Small profit firms have high working capital accruals, discretionary accruals and positive special items, relative to other firms; firms just meeting analysts' expectations have high accruals relative to other firms
Matsumoto (2002)	Institutional ownership, implicit claims with stakeholders and value-relevance of earnings associated with incentives to avoid negative earnings surprises; evidence suggests firms manage earnings and analysts
Beaver, McNichols and Nelson (2000)	Evidence of earnings management and income smoothing for a sample of Property-Casualty insurers
Beatty, Ke and Petroni (2002)	Public banks have greater incentives than private banks to avoid earnings declines and public banks are more likely to report longer strings of earnings increases

(2001); and Bartov, Givoly and Hayn (2002)—document evidence consistent with market participants rewarding managers who consistently meet or exceed earnings benchmarks, but severely punish managers who fall short of

a benchmark. The findings of these studies are discussed below.

Barth et al (1999) investigate the importance of maintained earnings increases to managers and investors. They find that firms with patterns of increasing earnings enjoy higher price-earnings multiples than other firms, controlling for growth and risk factors. The authors also find that price-earnings multiples suffer a significant decline when the string of consecutive earnings increases is broken. Barth et al base their inferences on two theoretical valuation models: Modigliani and Miller's (1966) permanent earnings model and the accounting-based valuation model developed by Ohlson (1995). Both models show that earnings persistence affects the price earnings multiples.

Next, Skinner and Sloan (2001) investigate the difference in stock return performance between growth (i.e., high market-to-book ratio) stocks and value stocks. The authors posit that this difference results from asymmetric responses to negative earnings surprises exhibited by growth stocks. Measuring earnings surprises as the difference between actual reported earnings and consensus analysts' earnings forecasts, Skinner and Sloan find that growth stocks and value stocks respond similarly

to positive earnings surprises; however, they find that the stock price response to adverse earnings surprises is disproportionately large for growth stocks. The authors term this consequence the 'torpedo effect.' The authors' findings are consistent with prior evidence of market participants overpricing growth stocks, leading to price declines when earnings expectations are not met (Lakonishok, Shleifer and Vishny 1994). The evidence reported by Skinner and Sloan (2001) suggests that managers of growth firms have particularly strong incentives to avoid disappointing analysts, even by small amount.

Finally, Bartov, Givoly and Hayn (2002), hereafter BGH, provide additional evidence on the importance of meeting or beating earnings benchmarks, particularly analysts' earnings forecasts. BGH show that firms meeting or beating analysts' quarterly expectations enjoy greater premiums than firms that report negative earnings surprises, controlling for absolute performance. This study also finds that the market appears to discount earnings management or expectations management to meet or beat analysts' forecasts, but the amount of the discount is not economically significant. While their evidence suggests irrational investor behavior, the authors find that market premiums associated with meeting or beating

analysts' expectations are predictive of firms' future performance.

In sum, the three studies above provide compelling empirical evidence that managers have strong incentives to manage earnings to meet earnings benchmarks, because market participants use these benchmarks to assess firm value.

Table 2 provides a summary of these findings.

TABLE 2
Summary of Studies Examining the Costs and Rewards to Meet or Beat Earnings Benchmarks

Authors	Main Finding
Barth, Elliott and Finn (1999)	Firms reporting consecutive strings of increasing earnings enjoy higher price-earnings multiples, but suffer significant declines when the string is broken
Skinner and Sloan (2001)	Stock price response to adverse earnings surprises is disproportionately large for growth stocks
Bartov, Givoly and Hayn (2002)	Firms meeting or beating analysts' quarterly expectations enjoy greater premiums than firms that report negative earnings surprises

2.3. Earnings Management Constraints within GAAP

The studies reviewed above document evidence that managers have particularly strong earnings management incentives to meet earnings benchmarks. Thus, an empirical question arises about why some firms with similar incentives miss earnings expectations, even by a small

amount. Barton and Simko (2002) provide evidence that firms miss earnings benchmarks, particularly earnings expectations, because they have limited discretion to manage earnings. Specifically, Barton and Simko argue that firms' earnings management flexibility is limited by constraints embedded within generally accepted accounting principles (GAAP). Their argument relies on the fundamental relation between the income statement and balance sheet, where optimistic earnings management overstates both net income and net assets. GAAP implementation guidelines place upper boundaries on optimistic measurement and recognition assumptions, thus managers' ability to manage earnings decreases in the extent which net assets are overstated on the balance sheet, measured as net operating assets relative to sales (NOA).

Prior to their main analysis, Barton and Simko report descriptive evidence supporting the validity of their empirical measure (NOA) and evidence consistent with managers' incentives to avoid disappointing analysts. First, the authors find that NOA adequately captures the extent of managers' prior optimism by showing that firms ranking in the upper quintile of NOA report higher cumulative abnormal accruals in the past relative to firms

in the bottom quintile. Second, Barton and Simko report descriptive evidence consistent the findings reported by Skinner and Sloan (2001). Specifically, they show that firms missing earnings expectations by 1 penny per share suffer a disproportionate market penalty relative to firms missing expectations by a larger amount.

In their main analysis, Barton and Simko model the level of earnings surprise as a function of NOA. They predict that the level of earnings surprise decreases in the extent which net assets are overstated on the balance sheet. The authors employ a generalized ordered logit regression model to concentrate on the sample of firms that miss earnings expectations by 1 penny per share (i.e., where the incentive to manage earnings is likely to be the strongest). Consistent with their prediction, Barton and Simko report a significant negative coefficient on NOA across all levels of earnings surprise, controlling for other incentives and constraints on earnings management. The authors interpret these results as indicating that adherence to GAAP and its implementation guidelines constrain managers from repeated earnings management. Their findings are robust to alternate empirical models and industry controls.

Barton and Simko (2002) contribute to the earnings management literature in the following ways. First, Healy and Wahlen (1999) describe extant earnings management literature as providing “only modest insights to standard setters (pg. 380).” They suggest that future contributions to this literature will come (in part) from examining conditions that constrain earnings management. Barton and Simko document evidence that constraints embedded in GAAP limit repeated earnings management. Second, Barton and Simko’s report evidence explaining why some firms miss earnings expectations by a small amount, given the disproportionate market penalty associated with small negative earnings surprises. Third, while they do not directly measure earnings management flexibility, their proxy for earnings management constraints provides a basis for examining how these constraints affect reporting decisions over which managers have reporting discretion.

2.4. Prior Research on Accounting Write-offs

2.4.1. Background

In a recent review, Alciatore et al (1998) suggest that accounting write-offs provide a rich setting for accounting research because accounting write-offs generally represent significant negative charges to earnings on the income statement and assets on the balance sheet. In

addition, managers have considerable discretion under generally accepted accounting principles (GAAP) to estimate the timing and magnitude of accounting write-off charges. The combination of these two factors creates incentives for managers to record accounting write-offs to manage earnings, a behavior receiving considerable attention from standard setters, regulators and academics. For example, the FASB issued SFAS No. 121 (1995), *Accounting for the Impairment of Long-Lived Assets and for Long-Lived Assets to Be Disposed Of*, to address the varying practices with respect to the timing and magnitude of accounting write-offs. Former SEC Chairman Arthur Levitt (1998) also expressed concerns about the widespread use of 'big bath' restructuring charges. Levitt argues that companies overstate these charges, creating hidden reserves that can be "miraculously reborn as income when estimates change or future earnings fall short." Academic researchers have provided mixed evidence about whether and to what extent managers use discretion to affect the timing and magnitude of accounting write-offs. The section below discusses empirical and theoretical research about the timing of accounting write-offs and incentives affecting the decision to record these charges.

2.4.2. Managerial Discretion and Accounting Write-offs

Strong and Meyer (1987) suggest that flexible (GAAP) accounting standards induce managerial opportunism in the recording of asset impairment charges, creating reserves that will likely be reversed into future earnings. Consequently, they argue, managers may have incentives to initiate the write-off decision rather than doing so at the behest of the auditors. In their empirical analysis, Strong and Meyer examine a sample of 120 firms announcing accounting write-offs between 1981 and 1985. They compare the financial performance and other characteristics of each sample firm with a control group of firms, matched by industry and size, which did not announce a write-off during the same period. The authors conjecture that asset valuation declines are likely associated with prior performance declines. However, they find that firms announcing write-offs appear in neither the upper nor lower performance quintiles within their respective industries. Strong and Meyer interpret these results as suggesting that top performing firms may have adopted an ongoing asset revaluation policy recognizing immaterial write-offs, while poor performers have incentives to avoid further diluting their equity base.

The authors also conjecture that firms have incentives to record accounting write-offs during a change

in senior management. Specifically, they argue, “the incentive for senior management, particularly during executive transition, is to take a large reserve now against many eventualities as possible, believing that the later reserve reversal and higher reported earnings will strengthen the perception of management effectiveness (p. 644).” Consistent with this argument, Strong and Meyer find that a change in senior management, especially from outside the firm, is the most important determinant of a write-off decision.

Elliott and Shaw (1988) also examine the characteristics of firms reporting accounting write-offs. The authors motivate their study by noting the considerable discretion embedded in these charges relative to other financial statement information. They also cite concerns expressed by practitioners and regulators about the timing, frequency, and excessive nature of accounting write-offs. Elliott and Shaw select a sample of 240 firms reporting accounting write-offs—defined as negative special items (*Compustat* data item #17) representing at least 1% of total assets—during the years 1982-1985. The authors then analyze the relations among discretionary accounting write-offs, managerial incentives and underlying economic events for their sample firms. Specifically, they examine long-

term and short-term stock returns surrounding the write-off and other firm characteristics such as management turnover and performance relative to industry peers.

Consistent with the findings reported by Strong and Meyer (1987), Elliott and Shaw (1988) find that 39% of their write-off firms experience a change in senior management during the year of the write-off. In addition, the authors report evidence that the majority of write-offs occur during the fourth fiscal quarter. They conjecture that this result occurs because financial statement audits are performed on an annual rather than interim basis.² Next, the authors find that write-off firms perform poorly relative to industry peers during the three years preceding the write-off and that analysts reduce their forecasts of one-year ahead earnings for these firms. These results jointly suggest that firms recording accounting write-offs generally occur during difficult times, and that market participants do not reward firms engaging in big bath behavior.

Zucca and Campbell (1992) conjecture that managers have incentives to record write-offs both during periods when earnings are particularly low (bath takers) and when

² However, others argue that the preponderance write-offs during the fourth quarter occur as a result of managers determining whether year-end earnings objectives are attainable before deciding whether or not to record the write-off (e.g., Alciatore et al 1998).

earnings are particularly high (income smoothers). To test their assertion, Zucca and Campbell use a random walk model to estimate expected earnings for a sample of 67 firms recording 77 accounting write-offs from 1978-1982. They find that 45 of the write-offs occur when earnings fell below expected earnings, consistent with firms taking a big bath. They also find that 22 of the write-offs occur when earnings exceeded expected earnings, consistent with income smoothing. The authors conclude that this evidence is consistent with earnings management.

Zucca and Campbell also address the notion that taking a big bath to clean up the balance sheet enhances future firm performance. They compare performance for three years subsequent to the write-off for their write-off firms to those from a control sample, matched on size and industry. Contrary to the received notion, the authors find no evidence that write-off firms outperform their industry peers in subsequent periods.

Francis, Hanna and Vincent (1996), hereafter FHV, develop an empirical model that discriminates between incentive-driven or impairment-driven determinants of the accounting write-off decision. Their study uses three proxies for managerial incentives—a change in senior management around the write-off, pre-write-off performance

relative to prior year performance, and the number of times the firm recorded a write-off in the preceding five years. The authors use historical firm performance and industry trends to proxy for asset impairment. FHV conduct their test using a weighted tobit model, on a matched sample of firms recording write-offs—negative special items representing at least 1% of total assets—and non-write-off firms. FHV find that the impairment variables are significant in explaining the timing and magnitude of the accounting write-off. They also find that, after controlling for impairment, the frequency and size of accounting write-off increase when firms change upper management and when firms have a history of recording accounting write-offs. Contrary to Zucca and Campbell's finding of big bath and income smoothing behavior, FHV find that write-offs are decreasing in abnormally poor or good performance relative to prior year.

Rees, Gill and Gore (1996), hereafter RGG, investigate whether accounting write-offs reflect opportunistic behavior or provide value-relevant information to investors. They first provide descriptive evidence that firms reporting write-offs experience increasingly poor performance in the three years preceding the write-off, consistent with prior studies. Next, RGG examine the

pattern of abnormal accruals surrounding the accounting write-off. The authors argue that if managers have incentives to record discretionary accounting write-offs, it is also likely managers will exercise discretion over accruals. The authors document a significant pattern of negative abnormal accruals concurrent with the write-off. RGG interpret this evidence as consistent with earnings management to improve future earnings. However, the authors find no evidence that these accruals reverse in subsequent years. Thus, the authors conclude that the negative abnormal accruals "are a credible signal to the market regarding firm value (p. 158)."

Heflin and Warfield (1997) extend prior research on accounting write-offs by investigating the timeliness of accounting write-offs and whether managers overstate these charges to improve future earnings. The authors first test whether managers record accounting write-offs on a timely basis by comparing the financial performance of write-off firms to that of a matched sample of industry peers. Their results show that, relative to their industry peers, write-off firms experience lower stock returns in the year of and the three years preceding the write-off. Conversely, the authors find that write-off firms report earnings equal to or greater than do their industry peers for the three years

preceding the write-off, but report significantly lower pre-write-off earnings in the write-off year. Heflin and Warfield interpret these results as suggesting that managers have incentives to delay write-off recognition in order to achieve earnings management objectives.

Second, the authors test whether firms overstate accounting write-offs to improve future earnings. They note that excessive write-offs depress current period earnings by accelerating expenses from future periods, thus overstating future earnings. Further, they also motivate this analysis based on prior research suggesting that managers have incentives to record write-offs when earnings are particularly low (take a bath) or particularly high (income smoothing). The authors find no support for managers incentives to take a bath, however they do find evidence consistent with income smoothing.

Kirschenheiter and Melumad (2002), hereafter KM, contribute to this area of research by offering theoretical support for empirical findings of big bath and income smoothing behavior. Specifically, the authors develop an analytical model in which big baths and income smoothing are part of a value-maximizing reporting strategy. Unlike the other articles reviewed in this section, KM do not explicitly discuss accounting write-offs; rather, they

consider managerial incentives to significantly under-report earnings when news is sufficiently bad (big bath) or when news is sufficiently good (income smoothing). Their model assumes that firm value increases in the level of reported earnings, but decreases in the magnitude of the earnings surprise. Thus, when earnings are sufficiently high, managers have incentives to under-report (smooth) earnings to increase the inferred precision. Conversely, when earnings are sufficiently low, managers will under-report earnings to 1) further distort the inferred precision of earnings and 2) shift income into future reporting periods. KM relate their analytical results to empirical studies by showing that firms avoid reporting negative earnings surprises and attempt to report small positive earnings surprises.

Moehrle (2002) contributes to both the earnings management and big bath literatures by examining whether managers use restructuring charge reversals to manage post-charge earnings. The author notes that while regulators (e.g., Levitt) and members of the financial press suggest a widespread abuse restructuring charges to manage earnings, academic research has provided little evidence supporting these arguments (e.g., Bens 2002; Bens and Johnston 2002). This study provides a more direct test of earnings

management by examining the timing and magnitude of restructuring charge reversals in settings where managers have strong incentives to manage earnings—report positive earnings, increasing earnings and meet earnings expectations (see discussion above). He selects a sample of restructuring charge reversals and hypothesizes that reversals will occur when firms' pre-reversal earnings fall short of the earnings benchmark (i.e., positive earnings, increasing earnings and analysts' earnings forecasts). Consistent with concerns expressed by former SEC Chairman Arthur Levitt, Moeherle finds evidence supporting his hypotheses.

A working paper by Bens and Johnston (2002) documents evidence in contrast to concerns about widespread earnings management surrounding corporate restructurings. Analogous to the Jones (1991) model, this study decomposes restructuring charges into non-discretionary and discretionary components. The authors then regress the discretionary charge on a number of proxies for earnings management incentives (e.g., big bath, income smoothing, and poor corporate governance). Their empirical results show no statistical evidence that the discretionary component of restructuring charges is associated with earnings management incentives. This study also finds that

less than 8% of firms reverse part of the restructuring charge in subsequent periods. The authors conclude that their results do not support the view that restructuring charges are used to systematically manage earnings.

In sum, the evidence reported above suggests that the extant research on the extent of managerial opportunism in the timing and measurement of accounting write-offs has yielded relatively mixed and inconclusive results. In addition, while some studies argue that managers record accounting write-offs to create future accounting flexibility, no study has directly examined how the ability to manage earnings in the current period affects the write-off decision. Table 3 provides a summary of the evidence on managerial discretion and incentives to record accounting write-offs.

2.5. Contribution of This Study to the Literature

This dissertation contributes to the earnings management literature in the following ways. First, it extends the findings reported by Barton and Simko (2002) by examining whether earnings management constraints have other financial statement implications beyond explaining whether firms' ability to meet earnings targets. Specifically, this dissertation examines whether managers' ability to manage earnings affects other measurement and

TABLE 3
Summary of Research on Managerial Discretion and Incentives
to Record Accounting Write-offs

Authors	Main Findings
Strong and Meyer (1987)	Flexible accounting standards induce managerial opportunism with respect to accounting write-offs.
Elliott and Shaw (1988)	Write-offs are associated with poor performance and typically occur during the fourth fiscal quarter.
Zucca and Campbell (1992)	Evidence suggests that managers record write-offs to take a big bath or to smooth income.
Francis, Hanna and Vincent (1996)	Timing and magnitude of accounting write-offs associated with both impairment- and incentive-related proxies; however, findings contrary to big bath or income smoothing behavior.
Rees, Gill and Gore (1996)	Write-offs reflect underlying economic performance; no evidence of subsequent earnings management.
Heflin and Warfield (1997)	Managers have incentives to delay the timing of accounting write-offs to achieve earnings objectives.
Kirschenheiter and Melumad (2002)	Develop analytical model in which big bath and income smoothing are optimal reporting strategies
Moehrle (2002)	Managers strategically time restructuring charge reversals to meet or beat earnings benchmarks.
Bens and Johnston (2002)	No evidence that restructuring charges are associated with earnings management incentives.

judgment decisions available to managers within GAAP – particularly, the reporting of large asset impairment write-downs and restructuring charges (i.e., accounting write-offs). In addition, the research design used in this study provides future researchers a mechanism to examine how earnings management constraints affect other reporting decisions or voluntary disclosure strategies.

Second, this study contributes to the body of accounting research that examines whether managers record large accounting write-offs as part of a big bath strategy to create (or recover) the ability to manage earnings (e.g., Rees et al 1996; Moehrle 2002). While this study does not directly examine managerial incentives to manage future earnings, the findings suggest that firms with insufficient earnings management discretion are more likely to record accounting write-offs, consistent with the incentive to recover earnings management flexibility.

Finally, this study contributes to the emerging body of research using the earnings distribution approach to assess earnings management around benchmarks. While prior studies interpret the discontinuity in the earnings distribution around earnings benchmarks as evidence of income-increasing earnings management, this study offers a second (but not necessarily competing) explanation for this

observed phenomenon. That is, the evidence in this study suggests that managers faced with reporting earnings that fall slightly short of the benchmark, but lacking sufficient discretion to avoid this outcome, use the opportunity to record income-decreasing accounting write-offs. This behavior would also dilute the observed frequencies of small losses and earnings decreases.

CHAPTER 3

HYPOTHESIS DEVELOPMENT

Barton and Simko (2002) report evidence that earnings management constraints embedded within GAAP limit managers' ability to opportunistically manage earnings upward. However, their findings also give rise to questions about whether these constraints are associated with other strategic reporting decisions. The purpose of this chapter is to develop two predictions about the association between earnings management constraints embedded within GAAP and managers' decisions to record accounting write-offs.

Given the findings discussed in the earnings management studies reviewed in chapter 2, this study posits that managers with strong incentives to manage earnings upward (e.g., settings in which management faces the prospect of missing an earnings benchmark) are less likely to record income-decreasing accounting write-offs when sufficient earnings management flexibility is available. However, when their ability to manage earnings upward is limited by constraints embedded within GAAP, managers have incentives to record an accounting write-off for two

reasons. First, recent analytical evidence suggests that taking a big bath is part of an optimal reporting strategy in which managers can distort the precision of the bad news and shift income into future periods (Kirschenheiter and Melumad 2002). Second, Barton and Simko (2002) find that the ability to manage earnings upward varies inversely with the extent to which net asset values exceed those based on a neutral application of GAAP. Given that accounting write-offs significantly reduce net asset values on the balance sheet, managers faced with earnings management constraints in the current period have incentives to record an accounting write-off to avoid facing similar constraints in the future (DeFond 2002). Based on these arguments, this study tests the following hypothesis about the effect of earnings management constraints on accounting write-off decisions:

H_{1A}: The extent to which managers face earnings management constraints relative to meeting their earnings benchmarks is positively associated with the likelihood that the manager will choose to record an accounting write-off, *ceteris paribus*.

This study also posits that the marginal effect of the level of earnings management constraints on the likelihood of a write-off is inversely related to the amount by which

earnings (before the write-off decision) fall short of the benchmark.¹ Specifically, when the benchmark shortfall is extreme, earnings management constraints are not likely to factor into managers' write-off decisions because the benchmark is sufficiently out of reach. Under this condition, accounting write-offs are likely reflecting the underlying economic condition of the firm rather than managerial opportunism (e.g., Rees et al 1996).

Conversely, managers lacking sufficient earnings management flexibility to manage earnings upward by a relatively small amount may have no recourse but to take a big bath rather than report earnings that just slightly miss the benchmark. Therefore, this study tests the following hypothesis:

H_{2A}: The marginal effect of earnings management constraints on managers' write-off decisions varies inversely with the amount by which earnings fall short of the benchmark, *ceteris paribus*.

¹ Barton and Simko (2002) find an inverse relation between firms ability to avoid a negative earnings surprise (based on cents per share) varies inversely with the number of shares outstanding, since 1 penny per share of additional earnings is likely easier to achieve via earnings management for firms with fewer shares outstanding.

CHAPTER 4

SAMPLE SELECTION, DATA, AND VARIABLE SPECIFICATIONS

This chapter develops empirical tests of the study's hypotheses. The first section explains the sample selection process and provides selected characteristics of the sample period. The second section operationalizes the empirical proxy for earnings management constraints discussed in chapter 3. The third section develops a set of variables to control for other factors associated with write-off decisions. Finally, the fourth section defines the empirical model used to test the study's basic hypothesis that the likelihood of an accounting write-off is positively related to the extent to which managers face earnings management constraints embedded within GAAP.

4.1. Sample Selection and Data Sources

4.1.1. Description of Sample Firms

The sample in this study includes annual data for all firms on the Compustat Full Coverage, Primary, Secondary and Tertiary databases during 1976 – 2000. This sample period is comparable to those in prior studies utilizing the distributional approach to assess earnings management

around earnings benchmarks (e.g., Burgstahler and Dichev 1997). Utilities and financial services firms (2-digit SIC codes 49 and 60-67) are excluded from the sample because these firms are subject to regulatory accounting requirements and thus, may have different reporting incentives (Barton and Simko 2002). The elimination of observations with missing data for the main test variables yields a final sample of 51,581 annual observations pertaining to 5,749 firms within 64 industries (based on 2-digit SIC code).

Table 4 presents general characteristics of the sample during 1976-2000. First, the number of observations increased from 822 firms in 1976 to 5,154 firms in 2000, consistent with a growth in the number of new firms and wider firm coverage by *Compustat* over time. Second, the average firm size, measured as the market value of common equity, increased from \$574 million in 1976 to \$1.5 billion in 2000. The sample also exhibits a declining trend in reported earnings per share. Specifically, the average EPS decreased from \$2.16 in 1976 to \$0.04 in 2000, consistent with findings reported by Givoly and Hayn (2002), who argue that accounting conservatism has increased over time.

TABLE 4
General Characteristics for the Sample of 51,581 Firm-Year
Observations From the Compustat Full Coverage, Primary,
Secondary and Tertiary Databases During 1976-2000

Year	Number of Firms	Average Market Value of Common Equity (\$ Million)	Average Earnings Per Share ¹ (\$)
1976	822	573.9	2.16
1977	848	512.6	2.13
1978	866	522.7	2.47
1979	904	556.6	2.55
1980	947	661.4	2.22
1981	987	595.2	1.99
1982	1,120	579.9	1.33
1983	1,158	684.3	1.24
1984	1,240	622.2	1.27
1985	1,305	736.5	1.01
1986	1,362	830.1	0.76
1987	1,477	861.2	0.86
1988	1,608	800.5	0.90
1989	1,669	921.5	0.84
1990	1,700	860.4	0.63
1991	1,817	1013.9	0.45
1992	2,014	1027.0	0.38
1993	2,229	1150.6	0.45
1994	2,633	1077.9	0.59
1995	2,948	1182.8	0.56
1996	3,480	1225.3	0.52
1997	4,040	1298.8	0.42
1998	4,470	1285.3	0.22
1999	4,783	1525.1	0.22
2000	5,154	1468.4	0.04
Total	51,581	1083.0	0.69

¹The amounts reported are based on earnings before extraordinary items.

Table 5 presents the industry representation of the sample based on 2-digit SIC codes. The modal industry represented in the sample is Business Services (SIC code 73), with 941 firms accounting for 5,438 observations. The

industry with the second highest representation of firms is Chemicals and Allied Products (SIC code 28), with 481 firms accounting for 4,191 observations.¹ The twenty industries with the highest sample representation account for 78% of the entire sample.

TABLE 5
Industry Representation Based on 2-Digit SIC Code for the
Sample of 5,749 Firms From the Compustat Full Coverage,
Primary, Secondary and Tertiary Databases During 1976-2000

SIC Code	Industry Description	Number of Firms	Number of Firm-Year Observations
73	Business Services	941	5,438
28	Chemicals & Allied Products	481	4,191
36	Electr, Other Electric Equip, Ex Cmp	479	5,009
35	Indl, Comml Machy, Computer Eq	420	4,246
38	Meas. Instr, Photo Gds, Watches	380	3,702
48	Communications	267	1,383
13	Oil & Gas Extraction	201	2,122
50	Durable Goods - Wholesale	166	1,668
87	Engr, Acc, Resh, Mgmt, Rel Svcs	138	918
20	Food and Kindred Products	133	1,487
59	Miscellaneous Retail	128	972
37	Transportation Equipment	113	1,332
80	Health Services	110	840
33	Primary Metal Industries	106	1,191
58	Eating & Drinking Places	105	945
51	Nondurable Goods - Wholesale	90	862
34	Fabr Metal, Ex Machy, Trans Eq	87	1,165
27	Printing, Publishing & Allied	83	996
30	Rubber & Misc. Plastics Prods	75	838
26	Paper and Allied Products	65	721
All			
Other		1,181	11,555
Total		5,749	51,581

¹ The large disparity between these two industries in terms of the number of representative firms is likely due to a significant growth in Business Services firms during the latter part of the sample. For example, Business Services firms average only 5.8 years in the sample (5,438/941), while firms in SIC code 28 average 8.7 years.

4.2. Variable Specifications

4.2.1. Dependent Variable

As discussed in Chapters 1 and 3, the term 'accounting write-offs' describes both asset impairment write-offs and corporate restructuring charges. *Compustat* includes these charges in its data item #17 (special items), which also includes other non-recurring gains and losses. Given the data collection costs required to examine the financial statements for each observation, this study follows prior research (e.g., Elliott and Shaw 1988; Francis et al 1996) by classifying firm-year observations with negative special items (Compustat item #17) that exceed 1% of beginning total assets as write-off firms.² Given this study's focus on accounting write-offs as discrete financial reporting choices, the dependent variable (*WRITE_OFF*) is defined as follows:

WRITE_OFF = One (1) for firm-years with
negative special items that exceed
1% of beginning total assets, and
zero (0) otherwise.

Table 6 reports that sample firms recorded a total 10,343 accounting write-offs during 1976-2000,

² Elliott and Shaw (1988) observe that Compustat often codes firm-years with no special items with missing value indicators ('.'). Consistent with their approach, this study codes special items as 0 for firm-years in which special items are 'missing,' but total assets (data item #6) are not.

TABLE 6
Frequency and Magnitude of Accounting Write-offs for the
Sample of 51,581 Firm-Year Observations
During 1976-2000

Year	Number of Firms (A)	Number of Write-off Firms ¹ (B)	Relative Frequency (B/A)	Average Magnitude Relative to Total Assets ²
1976	822	30	3.6%	5.5%
1977	848	43	5.1	5.5
1978	866	37	4.3	4.0
1979	904	33	3.7	4.9
1980	947	38	4.0	4.5
1981	987	53	5.4	5.0
1982	1,120	79	7.1	5.5
1983	1,158	85	7.3	5.7
1984	1,240	119	9.6	5.7
1985	1,305	162	12.4	6.5
1986	1,362	194	14.2	8.0
1987	1,477	179	12.1	6.5
1988	1,608	235	14.6	6.7
1989	1,669	274	16.4	6.2
1990	1,700	347	20.4	6.6
1991	1,817	374	20.6	7.8
1992	2,014	445	22.1	8.0
1993	2,229	467	21.0	8.7
1994	2,633	485	18.4	8.7
1995	2,948	708	24.0	9.1
1996	3,480	809	23.2	9.8
1997	4,040	1,041	25.8	9.9
1998	4,470	1,306	29.2	9.4
1999	4,783	1,255	26.2	8.5
2000	5,154	1,545	30.0	11.0
Total	51,581	10,343	20.1%	8.9%

¹Observations are coded as write-off firms when the reported value of negative special items (Compustat item #17) exceeds 1% of beginning total assets.

²The values in this column reflect the average write-off magnitude, in absolute terms, relative to total beginning assets for write-off firms.

representing approximately 20% of the population. The relative frequency of firms recording write-offs in the sample population increased from 3.6% (30 out of 822 firms)

in 1976 to 30% (1,545 out of 5,154 firms) in 2000.³ Table 6 also reveals a steady, but less striking, increase in the magnitude of accounting write-offs relative to total assets. Specifically, the average write-off magnitude increased from 5.5% of total assets in 1976 to 11% of total assets in 2000.

4.2.2. Earnings Management Incentive to Avoid Losses

As discussed in chapter 1, a test of whether managers' ability to manage earnings upward affects reporting decisions requires the definition of a context in which managers have strong earnings management incentives. This main analysis in this study focuses on managerial incentives to achieve the zero-earnings benchmark because prior research suggests widespread earnings management to avoid losses (Burgstahler and Dichev 1997; Degeorge et al 1999). Given that accounting write-offs reflect line items used in the calculation of bottom-line net income, this study measures the level of earnings before special items relative to the zero-earnings benchmark to proxy for managerial incentives to manage earnings upward. Consistent with Elliott and Hanna (1996), the level of earnings before special items (EBSI) is measured as

³ Elliott and Hanna (1996) report similar findings regarding the over time trend in the frequency of write-offs.

earnings before extraordinary items (EBEI) plus income tax expense (TAXES) minus special items (SPECIAL):

$$EBSI = (EBEI + TAXES - SPECIAL).$$

Thus, this study assumes that incentives to manage earnings upward are strong when the level of earnings before special items is below the zero-earnings benchmark (i.e., $EBSI < 0$).

4.2.3. *Measuring Earnings Management Constraints*

This study develops a proxy for earnings management constraints relative to meeting or exceeding the zero-earnings benchmark based on evidence reported by Barton and Simko (2002) suggesting that managers' ability to manage earnings upward varies inversely with the extent to which net asset values exceed those based on a neutral application of GAAP. To capture this effect, this study follows the approach used by Barton and Simko (2002), which measures the level of net operating assets (NOA) at the beginning of year t scaled by sales during year $t-1$ ⁴:

$$NOA = \text{Net operating assets at the beginning of year } t \text{ scaled by sales during year } t-1,$$

⁴ Barton and Simko (2002) use a measure of net operating assets at the beginning of quarter t divided by sales during quarter $t-1$ because their study focuses on managerial incentives to avoid negative quarterly earnings surprises.

where: Net operating assets are measured as shareholder's equity minus cash and marketable securities plus total debt.

Consistent with the findings reported by Barton and Simko (2002), this study assumes that the greater the value of NOA, the greater the constraints faced by managers who wish to manage earnings upward. To proxy for earnings management constraints pertaining to managers' incentives to meet or exceed the zero-earnings benchmark, this study measures NOA_CONS_0 as follows:

NOA_CONS_0 = NOA for firm-years in which earnings before special items are below the zero-earnings benchmark (i.e., $EBSI < 0$), and zero otherwise,

where: The subscript 0 indicates the zero-earnings benchmark.

Observations coded with values of zero for NOA_CONS indicate the absence of earnings management constraints relative to the zero-earnings benchmark because these firm-years report $EBSI \geq 0$.

Hypothesis 1 predicts a positive association between NOA_CONS_0 and the dependent variable, $WRITE_OFF$. That is, the greater the earnings management constraints relative to

meeting or exceeding the zero-earnings benchmark, the greater the likelihood of an accounting write-off.

4.2.4. *Measuring the Benchmark Shortfall*

To proxy for the earnings shortfall relative to the zero-earnings benchmark ($SHORTFLL_0$), this study measures the absolute value of EBSI scaled by the weighted number of shares outstanding during the year for firm-years in which $EBSI < 0$, and zero for all other observations⁵:

$SHORTFLL_0$ = The absolute value of EBSI scaled by weighted shares outstanding during the year for firm-years in which $EBSI < 0$, and zero otherwise,

where: The subscript 0 indicates the zero-earnings benchmark.

Consistent with the measurement of NOA_CONS_0 , observations coded with values of zero for $SHORTFLL_0$ indicate firm years in which earnings before special items meet or exceed the zero-earnings benchmark. Consistent recent analytical evidence that managers have incentives to take a big bath when earnings are below reporting targets (Kirschenheiter and Melumad 2002), this study predicts that the greater the

⁵ This study measures the earnings shortfall in absolute terms to facilitate the interpretation of this variable and the interaction term below.

earnings shortfall relative to the zero-earnings benchmark, the greater the likelihood of an accounting write-off.

4.2.5. Interaction Between NOA_CONS and SHORTFALL

Next, this study uses the interaction between NOA_CONS and SHORTFLL to test whether the association between the extent of earnings management constraints relative to meeting or exceeding the zero-earnings benchmark and the likelihood of an accounting write-off varies with the earnings shortfall:

$$NOA_CONS_{\theta} * SHORTFLL_{\theta}.$$

Hypothesis 2 predicts an inverse association between the interaction term and the dependent variable. That is, the association between NOA_CONS and WRITE_OFF becomes weaker as the values of SHORTFLL become larger.

4.2.6. Control Variables

4.2.6.1. Controls for History of Past Write-offs

Prior research investigating the timing and nature of accounting write-offs find that firms with a recent history of recording write-offs are likely to do so in the future (Elliott and Hanna 1996; Francis et al 1996). Therefore, this study controls for the number of accounting write-offs

recorded during the three years preceding year t for each firm-year observation:

$$HIST_{it} = \text{Total number of accounting write-offs recorded by firm } i \text{ during the three fiscal years preceding year } t.$$

Consistent with prior research, this study predicts a positive association between HIST and the dependent variable.

In addition, firms in industries that tend to record frequent write-offs have a greater likelihood of recording a write-off in the current period (Francis et al 1996). Thus this study also includes a variable to control for the industry's propensity to record write-offs:

$$IND_HIST_{it} = \text{Average number of write-offs recorded by all firms (excluding firm } i) \text{ in the same 3-digit industry classification as firm } i \text{ during the three years preceding year } t.$$

Consistent with the firm-specific measure, this study predicts a positive association between IND_HIST and the likelihood of an accounting write-off.

4.2.6.2. Controls for Recent Performance

Prior research also suggests that firms experiencing recent poor performance are likely to record accounting

write-offs to reflect the costs associated with changing the firm's strategic direction or to write-down the values of assets whose costs are impaired or unrecoverable (e.g., Francis et al 1996). First, this study controls for recent firm performance by measuring the change in the firm i 's return-on-assets ratio during the year preceding year t :

$$\Delta ROA_{it} = \text{Change in ROA for firm } i \text{ during the year preceding year } t, \text{ where ROA is measured as earnings before extraordinary items (EBEI) divided by beginning total assets.}$$

Consistent with prior research, this study predicts a negative association between ΔROA and the dependent variable.

Second, this study includes a control for the likelihood of asset impairment based the ratio of a firm's book value of equity to its market value of equity (i.e., book-to-market ratio). Francis et al (1996) argue that firms with recent increases in their book-to-market ratios are more likely to have impaired assets. Thus, this study measures the change in firm i 's book-to-market ratio during the year preceding year t :

$$\Delta BTM_{it} = \text{Change in firm } i \text{'s book-to-market ratio during the fiscal year preceding year } t.$$

This study predicts a positive association between ΔBTM_{it} and the dependent variable.

Finally, this study includes variables to control for industry-specific performance:

$IND_ARO A_{it}$ = Median change in return-on-assets ratio for all firms in the same 3-digit industry classification as firm i during the year preceding year t ,

IND_ABTM_{it} = Median change in book-to-market ratio for all firms the same 3-digit industry classification as firm i during the year preceding year t , and

IND_GROWTH_{it} = Median percentage sales growth of all firms in same industry as firm i during the year preceding year t .

Predictions for the variables $IND_ARO A$ and IND_ABTM are consistent with those for the firm-specific measures. That is, this study predicts a negative association between $IND_ARO A$ and $WRITE_OFF$, and a positive association between IND_ABTM and $WRITE_OFF$. In addition, this study predicts that firms in industries with declining sales growth (IND_GROWTH) are more likely to record a write-off.

4.2.6.3. Controlling for Time Effects

In addition to the control variables described above, this study also includes a vector of dummy variables for each fiscal year (YEAR) to control for any changes in economic conditions over time as well as any changes in the existence of authoritative guidance with respect to asset impairment write-downs and corporate restructuring charges (e.g., SFAS No. 121 and EITF 94-3).

This concludes the description of the variables used in testing the study's hypotheses. Table 7 provides a summary of the empirical variables.

4.3. Model Used in Testing the Hypotheses

H₁ posits that the extent to which overstatement in net asset values constrains managers' ability to manage earnings upward is positively associated with the likelihood that firms will record an accounting write-off in the current year, after controlling for write-off history, firm performance, impending asset impairments, industry-specific factors and fiscal year. Furthermore, H₂ posits that this association varies inversely with the amount of additional earnings management necessary to meet the earnings target. These hypotheses are operationalized as follows:

TABLE 7
Summary of Empirical Proxies

Empirical Variable	Description
• Dependent Variable	
WRITE_OFF	Indicator variable equal to 1 for firm-years in which the reported amount of negative special items exceeds 1% of total assets, and zero otherwise.
• Main Test Variables	
NOA_CONS ₀	Extent of earnings management constraints, measured as the level of net operating assets scaled by past sales, when the level of earnings before special items falls short of the zero-earnings benchmark.
SHORTFLL ₀	Amount by which earnings fall short of the zero-earnings benchmark
• Control Variables	
HIST	Number of write-offs recorded by a firm during the past three years
ΔROA	Change in return-on-assets ratio during the year preceding year t
ΔBTM	Change in book-to-market ratio during the year preceding year t
IND_HIST	Average number of write-offs recorded by all firm's in firm i's 3-digit SIC classification (excluding firm i)
IND_ΔROA	Median change in return-on-assets ratio for firm i's industry (3-digit SIC)
IND_ΔBTM	Median change in book-to-market ratio for firm i's industry (3-digit SIC)
IND_GROWTH	Median percentage sales growth for all firms in the same industry as firm i
YEAR	Vector of dummy variables for T-1 fiscal years

$$Prob(WRITE_OFF_{it} = 1) =$$

$$\begin{aligned} & \Phi(b_0 + b_1NOA_CONS_{0,it} + b_2SHORTFLL_{0,it} \\ & + b_3NOA_CONS_{0,it} * SHORTFLL_{0,it} + b_4HIST_{it} + b_5DROA_{it} \\ & + b_6DBTM_{it} + b_7IND_HIST_{it} + b_8IND_DROA_{it} \\ & + b_9IND_DBTM_{it} + b_{10}IND_GROWTH_{it} + b'YEAR_t + u_{it})(1) \end{aligned}$$

where: $\Phi(b'x) = \int_{-\infty}^{b'x} f(t)dt$

WRITE_OFF_{it} = 1 if firm i records a write-off during year t, zero otherwise,

NOA_CONS_{0,it} = Earnings management constraints relative to meeting or exceeding the zero-earnings benchmark, measured as NOA for firm years in which EBSI < 0, and zero otherwise,

SHORTFLL_{0,it} = Amount of additional earnings necessary to meet the zero-earnings benchmark, measured as the absolute value of EBSI scaled by weighted number of shares outstanding for firm-years in which EBSI < 0, and zero otherwise,

HIST_{it} = Number of write-offs recorded by firm i during the three years preceding year t,

ΔROA_{it}	=	Change in return-on-assets ratio for firm i during the year preceding year t ,
ΔBTM_{it}	=	Change in book-to-market ratio for firm i during the year preceding year t ,
IND_HIST_{it}	=	Average number of write-offs recorded by all firm in the same industry firm i (excluding firm i) during the three years preceding year t ,
$IND_ΔROA_{it}$	=	Median change in return-on-assets ratio for all firms in the same industry as firm i during the year preceding year t ,
$IND_ΔBTM_{it}$	=	Median change in book-to-market ratio all firms in the same industry as firm i during the year preceding year t ,
IND_GROWTH_{it}	=	Median percentage sales growth for all firms in the same industry as firm i during the year preceding year t , and
$YEAR_t$	=	Vector of dummy variables for $T-1$ fiscal years, where $T = 25$.

Consistent with H_1 , the model predicts that the NOA_CONS_0 coefficient (β_1) will be significantly positive. The model predicts that the $SHORTFLL_0$ coefficient (β_2) will be positive. Next, H_2 predicts that coefficient on the

interaction between NOA_CONS_0 and SHORTFLL_0 (β_3) will be significantly negative. Predictions for the control variables are as discussed in the previous section. Finally, no predictions are made with respect to the vector of variables to control for time-effects (YEAR).

CHAPTER 5

EMPIRICAL RESULTS

This chapter reports results of empirical tests regarding the effects of earnings management constraints on managers' decisions to record accounting write-offs on a sample of 51,581 firm-year observations. Section 5.1 discusses descriptive statistics and correlations among variables. Section 5.2 reports and interprets pooled probit regressions for both hypotheses, while section 5.3 reports results using a random effects probit regression. Section 5.4 presents additional evidence regarding whether alternate specifications of the empirical proxy for managers' ability to manage earning upward affect the study's inferences. Section 5.5 presents additional evidence regarding whether alternate specification of the earnings benchmark affects the study's inferences. Finally, section 5.6 summarizes the study's results.

5.1. Descriptive Statistics and Correlations

5.1.1. Descriptive Statistics

Panel A of table 8 reveals that this sample varies widely in terms of general firm characteristics. For

example, the median market value of common equity (MKTVAL) is \$78 million, while the mean is \$1.1 billion (which is more than twice the third quartile, \$452 million).¹ The mean total assets (ASSETS) for the sample, \$1.5 billion, is over fifteen times the median, \$93 million, and over three times the third quartile, \$468 million. Similarly, the mean value of net sales (SALES) for the sample is \$1.4 billion, while the median and third quartile are \$105 million and \$578 million, respectively. The mean net income during the sample period is \$49 million, which is more than twice the amount of the third quartile, \$21 million. Finally, the frequency of reported losses (LOSSES) during the sample period is 32%.

Panel B reports descriptive statistics for the main test variables in the empirical model. By construction, the proxy for the extent of earnings management constraints relative to meeting the zero-earnings benchmark, NOA_CONS₀, and the corresponding measure of the earnings shortfall relative to this benchmark, SHORTFLL₀, are coded as zero for firm-years in which management does not face the prospect of reporting a loss. Thus, the mean value of NOA_CONS₀ is 0.573, while the median and third quartile are 0.000 and

¹ Here, and in the remaining analyses, all variables are Winsorized at the 1st and 99th percentiles of their distributions.

TABLE 8
Descriptive Statistics for the Sample of 51,581
Firm-Year Observations During 1976-2000

Panel A: Variables of General Interest:					
Variables	Mean	Standard Deviation	First Quartile	Median	Third Quartile
MKTVAL (\$)	1083.0	3494.1	17.0	77.8	452.5
ASSETS (\$)	1495.0	8420.1	20.5	93.4	468.3
SALES (\$)	1436.6	6559.0	19.7	105.5	527.8
NI (\$)	49.0	188.0	-1.0	2.4	20.8
LOSSES (%)	31.6	46.5	0.0	0.0	1.0
Panel B: Main Test Variables:					
Variables	Mean	Standard Deviation	First Quartile	Median	Third Quartile
NOA_CONS ₀	0.573	2.384	0.000	0.000	0.235
SHORTFLL ₀	0.240	0.693	0.000	0.000	0.080
Panel C: Control Variables:					
Variables	Mean	Standard Deviation	First Quartile	Median	Third Quartile
HIST	0.475	0.724	0.000	0.000	1.000
ΔROA	0.008	0.283	-0.044	-0.001	0.032
ΔBTM	-0.013	0.587	-0.144	0.002	0.152
IND_HIST	0.317	0.229	0.143	0.286	0.464
IND_ΔROA	-0.002	0.032	-0.011	-0.001	0.008
IND_ΔBTM	0.000	0.162	-0.050	0.003	0.057
IND_GROWTH	-0.296	0.459	-0.927	-0.047	0.064

¹Dollar (\$) amounts in millions.

MKTVAL = Market value of common equity.

ASSETS = Total assets.

SALES = Net sales.

NI = Net income.

LOSSES = Frequency of firms reporting net losses.

WRITE_OFF = Variable indicating whether or not firm recorded a write-off during the year.

NOA_CONS₀ = Net operating assets at beginning of year t scaled by sales during year t-1 for firm-years in which earnings before special items fall short of the zero-earnings benchmark, and zero otherwise.

SHORTFLL₀ = Absolute value of earnings before special items scaled by the number of shares outstanding for firm-years in which earnings before special items fall short of the zero-earnings benchmark, and zero otherwise.

HIST = Number of write-offs recorded in the past three years.

ΔROA = Prior year change in return-on-assets ratio.

ΔBTM = Prior year change in book-to-market ratio.

IND_HIST = Average number of write-offs recorded by industry.

IND_ΔROA = Median industry change in return-on-assets ratio.

IND_ΔBTM = Median industry change in book-to-market ratio.

IND_GROWTH = Median industry percentage sales growth.

0.235, respectively. The mean for SHORTFLL_0 is 0.240, while the median and third quartile are 0.000 and 0.080, respectively.

Panel C reports descriptive statistics for the control variables. The mean value of HIST, measured as the number of write-offs recorded in the past three years, is 0.473, while the median is 0.000. The mean change in return-on-assets, ΔROA , is 0.008; however, the median is -0.001, suggesting that most firm-years in the sample experience recent performance declines. Similarly, the mean value of ΔBTM , the proxy for the likelihood that management will be required to report an asset impairment under GAAP in the future, is -0.013, while the median is 0.002. The mean and median measures for the industry's write-off propensity, IND_HIST , are 0.387 and 0.216, respectively. The mean industry performance measure, $\text{IND_}\Delta\text{ROA}$, is -0.002, while the median is -0.001. The mean $\text{IND_}\Delta\text{BTM}$ is 0.000 and the median is 0.003. Finally, the average industry sales growth, IND_GROWTH , is -0.296, while the median is -0.047.

5.1.2. Correlations

Table 9 reports both Pearson and Spearman correlations between the independent variables and the dependent variable (WRITE_OFF). Given that both sets of coefficients

TABLE 9
Correlations Between Independent Variables and Dependent
Variable for the Sample of 51,581 Firm-Year Observations
During 1976-2000

Variables	Pearson Correlation with WRITE_OFF (two-tailed probabilities)	Spearman Correlation with WRITE_OFF (two-tailed probabilities)
NOA_CONS ₀	0.052 (0.000)	0.189 (0.000)
SHORTFLL ₀	0.217 (0.000)	0.219 (0.000)
HIST	0.205 (0.000)	0.208 (0.000)
ΔROA	-0.005 (0.263)	-0.046 (0.000)
ΔBTM	0.025 (0.000)	0.045 (0.000)
IND_HIST	0.131 (0.000)	0.135 (0.000)
IND_ΔROA	-0.019 (0.000)	-0.028 (0.000)
IND_ΔBTM	0.040 (0.000)	0.033 (0.000)
IND_GROWTH	0.036 (0.000)	0.020 (0.000)
WRITE_OFF = Variable indicating whether or not firm recorded a write-off during the year. NOA_CONS ₀ = Net operating assets at beginning of year t scaled by sales during year t-1 for firm-years in which earnings before special items fall short of the zero-earnings benchmark, and zero otherwise. SHORTFLL ₀ = Absolute value of earnings before special items scaled by the number of shares outstanding for firm-years in which earnings before special items fall short of the zero-earnings benchmark, and zero otherwise. HIST = Number of write-offs recorded in the past three years. ΔROA = Prior year change in return-on-assets ratio. ΔBTM = Prior year change in book-to-market ratio. IND_HIST = Average number of write-offs recorded by industry. IND_ΔROA = Median industry change in return-on-assets ratio. IND_ΔBTM = Median industry change in book-to-market ratio. IND_GROWTH = Median industry percentage sales growth.		

yield similar results, and that the non-parametric Spearman coefficients are less sensitive to skewness in the data, the discussion below focuses on the Spearman coefficients (second column of table 9).

This study's main hypothesis predicts that managers with limited ability to manage earnings upward are more likely to record accounting write-offs. Consistent with this prediction, table 9 shows a significantly positive correlation between NOA_CONS_0 and $WRITE_OFF$ ($p < 0.001$). This suggests that the greater the earnings management constraints relative to meeting the zero-earnings benchmark, the greater the likelihood the manager will choose to record an accounting write-off.

Next, the empirical model predicts that the greater the magnitude of the earnings shortfall relative to the zero-earnings benchmark, the greater the likelihood of an accounting write-off. Consistent with this prediction, table 9 shows a correlation coefficient of 0.217 ($p < 0.001$) between $SHORTFLL_0$ and $WRITE_OFF$. This suggests that the greater the amount by which earnings fall short of the earnings target, the greater the likelihood of an accounting write-off.²

² This is also consistent with 'big bath' arguments (e.g., Zucca and Campbell 1992; Kirschenheiter and Melumad 2002).

With respect to the firm-specific control variables, the model predicts that firms with a recent history of recording accounting write-offs are more likely to record write-offs in the future. Consistent with this prediction, the correlation between HIST and WRITE_OFF is positive and statistically significant ($p < 0.001$). Next, table 9 also shows a significantly negative correlation between the proxy for recent firm performance, ΔROA , and the dependent variable ($p < 0.001$).³ This result is consistent with the model's prediction that firms with recent performance declines are more likely to record accounting write-offs. Finally, the model predicts that firms with recent increases in the book-to-market ratio, this study's proxy for the likelihood of asset impairment, are more likely to record accounting write-offs. Consistent with this prediction, table 9 reports a correlation coefficient of 0.045 ($p < 0.001$) between ΔBTM and WRITE_OFF.

The correlation coefficients for the industry-specific control variables yield similar results to the firm-specific control variables. Specifically, table 9 shows that IND_HIST is significantly positively correlated with the dependent variable ($p < 0.001$), consistent with the

³ However, the Pearson coefficient (first column) is negative, but not statistically significant.

prediction that firms in industries that write-off frequently are more likely to record future write-offs. In addition, the model predicts that firms in industries with recent performance declines or industries suffering asset impairments are more likely to record accounting write-offs. Consistent with these predictions, table 9 reports a significantly negative correlation ($p < 0.001$) between `IND_ΔROA` and `WRITE_OFF`, and a significantly positive correlation ($p < 0.001$) between `IND_ΔBTM` and `WRITE_OFF`. Finally, table 9 reports a significantly positive correlation between `IND_GROWTH` and `WRITE_OFF`; however, this result is opposite to the model's prediction that firms in industries with declining sales growth are more likely to record write-offs.

5.2. Pooled Probit Regression Results

Table 10 reports pooled probit regression results for hypothesis 1 and hypothesis 2. The first hypothesis posits that the level of earnings management constraints is positively associated with the likelihood of an accounting write-off, while hypothesis 2 posits that the association between earnings management constraints and the likelihood of accounting write-offs is inversely related to the benchmark shortfall. Results reported in table 10 are based on the sample of 51,581 firm-year observations

pertaining to 5,769 firms during 1976-2000. The standard errors are heteroscedastically consistent and adjusted for repeated observations of the same firm.

Consistent with the predictions of hypothesis 1, the NOA_CONS_0 coefficient, β_1 , is positive and significant at the 0.01 level. The extent of earnings management constraints relative to managers' ability to meet the zero-earnings benchmark significantly increases the likelihood of an accounting write-off, even after controlling for the amount by which earnings fall short of the benchmark and other factors associated with the timing of write-offs. The coefficient on $SHORTFLL_0$, β_2 , is also significantly positive ($p < 0.01$), consistent with the prediction that the greater the amount by which earnings fall short of the zero-earnings benchmark, the greater the likelihood of an accounting write-off. Hypothesis 2 posits that the strength of the association between earnings management constraints and the likelihood of an accounting write-off varies inversely with the magnitude of the earnings shortfall relative to the benchmark. Consistent with this prediction, the coefficient on the interaction between NOA_CONS_0 and $SHORTFLL_0$, β_3 , is negative and significant

TABLE 10
Pooled Probit Regression Results Showing the Relation
Between Firm Write-Off Behavior and Earnings Management
Constraints Relative to Meeting the Zero-Earnings Benchmark
for a Sample of 51,581 Firm-Year Observations
During 1976-2000

$$\begin{aligned} \text{Prob}(\text{WRITE_OFF}_{it} = 1) = & \Phi(b_0 + b_1\text{NOA_CONS}_{0,it} + b_2\text{SHORTFLL}_{0,it} \\ & + b_3\text{NOA_CONS}_{0,it} * \text{SHORTFLL}_{0,it} + b_4\text{HIST}_{it} + b_5\Delta\text{ROA}_{it} + b_6\Delta\text{BTM}_{it} \\ & + b_7\text{IND_HIST}_{it} + b_8\text{IND_DROA}_{it} + b_9\text{IND_DBTM}_{it} + b_{10}\text{IND_GROWTH}_{it} \\ & + b' \text{YEAR}_t + u_{it}) \end{aligned}$$

Variable Name ¹	Parameter (Predicted Sign)	Coefficient (z-statistic ²)
Intercept	β_0	-1.653*** (-30.36)
NOA_CONS _{0,it}	β_1 (+)	0.208*** (7.63)
SHORTFLL _{0,it}	β_2 (+)	0.257*** (24.78)
NOA_CONS _{0,it} * SHORTFLL _{0,it}	β_3 (-)	-0.019*** (-7.51)
HIST _{it}	β_4 (+)	0.274*** (34.63)
ΔROA_{it}	β_5 (-)	-0.042** (-2.31)
ΔBTM_{it}	β_6 (+)	0.046*** (4.54)
IND_HIST _{it}	β_7 (+)	0.275*** (5.51)
IND_ΔROA _{it}	β_8 (-)	-0.261 (-1.12)
IND_ΔBTM _{it}	β_9 (+)	0.046 (0.83)
IND_GROWTH _{it}	β_{10} (-)	-0.187*** (-7.91)
Wald χ^2_{34df}		4452.52***

¹Coefficients for YEAR dummies are suppressed.

²z-statistics are calculated using the Huber/White/Sandwich estimate of variance (Rogers 1993; Williams 2000).

*, **, and *** designate statistical significance at the 0.10, 0.05 and 0.01 levels, respectively, one-sided if sign is predicted, two-sided otherwise.

WRITE_OFF = Variable indicating whether or not firm recorded a write-off during the year.

NOA_CONS₀ = Net operating assets at beginning of year t scaled by sales during year t-1 for firm-years in which earnings before special items fall short of the zero-earnings benchmark, and zero otherwise.

SHORTFLL₀ = Absolute value of earnings before special items scaled by the number of shares outstanding for firm-years in which earnings before special items fall short of the zero-earnings benchmark, and zero otherwise.

HIST = Number of write-offs recorded in the past three years.

ΔROA = Prior year change in return-on-assets ratio.

ΔBTM = Prior year change in book-to-market ratio.

IND_HIST = Average number of write-offs recorded by industry.

IND_ΔROA = Median industry change in return-on-assets ratio.

IND_ΔBTM = Median industry change in book-to-market ratio.

IND_GROWTH = Median industry percentage sales growth.

at the 0.01 level. The effect of earnings management constraints on the write-off decision is stronger when the benchmark shortfall is relatively small, and weaker when the benchmark shortfall is relatively large.⁴

With respect to the control variables, the coefficient on HIST, β_4 , is positive and statistically significant ($p < 0.01$), consistent with the prediction that the number of recent write-offs is positively associated with the likelihood of a write-off in the current period. The ΔROA coefficient, β_5 , is negative and significant at the 0.05 level, consistent with the prediction that firms experiencing recent performance declines are more likely to record an accounting write-off. The coefficient on ΔBTM , β_6 , is significantly positive ($p < 0.01$), consistent with the prediction that increases in the book-to-market ratio indicate the likelihood of asset impairments. The coefficient on IND_HIST, β_7 , is positive and significant at

⁴ This effect can be further illustrated by taking the derivative of Equation 1 with respect to NOA_CONS_0 :

$$\frac{\partial WRITE_OFF}{\partial NOA_CONS_0} = 0.208 - 0.019 * SHORTFLL_0$$

Given that the values of $SHORTFLL_0$ are measured in absolute terms (zero otherwise), a unit increase in this measure represents an increase in the amount by which earnings fall below the benchmark. Thus, as the shortfall increases, the marginal effect of NOA_CONS_0 on $WRITE_OFF$ weakens.

the 0.01 level. The likelihood that a firm will record a write-off is positively associated with the frequency of write-offs recorded by industry peers. Neither of the coefficients on the variables $IND_ΔROA$ and $IND_ΔBTM$ ($β_8$ and $β_9$, respectively) is statistically significant. Finally, the IND_GROWTH coefficient, $β_{10}$, is significantly negative at the 0.01 level, consistent with the prediction that firms in industries with recent declines in sales growth are more likely to record accounting write-offs.

5.3. Random Effects Probit Regression Results

This section estimates the following random effects probit regression model to test hypotheses 1 and 2, given that the panel data used in the sample:

$$\begin{aligned}
 Prob(WRITE_OFF_{it} = 1) = & \Phi(b_0 + b_1NOA_CONS_{0,it} + b_2SHORTFLL_{0,it} \\
 & + b_3NOA_CONS_{0,it} * SHORTFLL_{0,it} + b_4HIST_{it} + b_5DROA_{it} \\
 & + b_6DBTM_{it} + b_7IND_HIST_{it} + b_8IND_DROA_{it} + b_9IND_DBTM_{it} \\
 & + b_{10}IND_GROWTH_{it} + b'YEAR_t + n_i + h_{it}), \quad (2)
 \end{aligned}$$

where model imposes the restriction that the correlation between successive error terms for observations of the same firm is constant.⁵

The results reported in table 11 support both hypotheses and yield similar inferences regarding the control variables as the results reported in the pooled probit regression (table 10). Given the similarity of the results, the remaining probit regression analyses will report coefficients using the pooled probit regression approach.

5.4. *Alternate Specifications of the Empirical Proxy*

DeFond (2002) argues that using the level of net operating assets scaled by past sales (NOA) to proxy for the extent to which net asset values exceed neutrality may be problematic because this measure does not control for systematic differences in the ratio of net operating assets to sales that may be unrelated to overstatement. To ensure that the above results do not simply reflect inter-industry differences in NOA, rather than adequately capturing the extent of earnings management constraints, this study re-estimates the empirical model in which the proxy for the

⁵ Specifically, the random effects model assumes that the error term takes the following form:

$$u_{it} = v_i + \eta_{it},$$

where v_i is a random disturbance characterizing the i th firm and is constant through time (Greene 2000).

TABLE 11
Random Effects Probit Regression Results Showing the
Relation Between Firm Write-Off Behavior and Earnings
Management Constraints Relative to Meeting the Zero-
Earnings Benchmark for a Sample of 51,581 Firm-Year
Observations During 1976-2000

$$\begin{aligned} \text{Prob}(\text{WRITE_OFF}_{it} = 1) = & \Phi(b_0 + b_1\text{NOA_CONS}_{0,it} + b_2\text{SHORTFLL}_{0,it} \\ & + b_3\text{NOA_CONS}_{0,it} * \text{SHORTFLL}_{0,it} + b_4\text{HIST}_{it} + b_5\Delta\text{ROA}_{it} + b_6\Delta\text{BTM}_{it} \\ & + b_7\text{IND_HIST}_{it} + b_8\text{IND_}\Delta\text{ROA}_{it} + b_9\text{IND_}\Delta\text{BTM}_{it} + b_{10}\text{IND_GROWTH}_{it} \\ & + b' \text{YEAR}_t + n_i + h_{it}) \end{aligned}$$

Variable Name ¹	Parameter (Predicted Sign)	Coefficient (z-statistic)
Intercept	β_0	-1.639*** (-26.41)
NOA_CONS _{0,it}	β_1 (+)	0.019*** (4.88)
SHORTFLL _{0,it}	β_2 (+)	0.261*** (23.94)
NOA_CONS _{0,it} * SHORTFLL _{0,it}	β_3 (-)	-0.021*** (-7.13)
HIST _{it}	β_4 (+)	0.276*** (27.67)
ΔROA_{it}	β_5 (-)	-0.047** (-1.69)
ΔBTM_{it}	β_6 (+)	0.045*** (3.32)
IND_HIST _{it}	β_7 (+)	0.236*** (4.89)
IND_ ΔROA_{it}	β_8 (-)	-0.393 (-1.61)
IND_ ΔBTM_{it}	β_9 (+)	0.085 (1.50)
IND_GROWTH _{it}	β_{10} (-)	-0.174*** (-6.79)
Wald χ^2_{34df}		3115.97***

¹Coefficients for YEAR dummies are suppressed.
*, ** and *** designate statistical significance at the 0.10, 0.05 and 0.01 levels, respectively, one-sided if sign is predicted, two-sided otherwise.
WRITE_OFF = Variable indicating whether or not firm recorded a write-off during the year.
NOA_CONS₀ = Net operating assets at beginning of year t scaled by sales during year t-1 for firm-years in which earnings before special items fall short of the zero-earnings benchmark, and zero otherwise.
SHORTFLL₀ = Absolute value of earnings before special items scaled by the number of shares outstanding for firm-years in which earnings before special items fall short of the zero-earnings benchmark, and zero otherwise.
HIST = Number of write-offs recorded in the past three years.
 ΔROA = Prior year change in return-on-assets ratio.
 ΔBTM = Prior year change in book-to-market ratio.
IND_HIST = Average number of write-offs recorded by industry.
IND_ ΔROA = Median industry change in return-on-assets ratio.
IND_ ΔBTM = Median industry change in book-to-market ratio.
IND_GROWTH = Median industry percentage sales growth.

extent of earnings management constraints relative to the zero-earnings benchmark is based on an industry-adjusted measure of NOA:

ADJ_NOA = NOA for firm i during year t minus the industry median NOA (based on 3-digit SIC classification) during year t , and

ADJ_NOA_CONS₀ = ADJ_NOA for firm years in which EBSI < 0, and zero otherwise.

Table 12 shows that the results based on the following model using the adjusted empirical proxy support both hypotheses:

$$\begin{aligned}
 Prob(WRITE_OFF_{it} = 1) = & \Phi(b_0 + b_1 ADJ_NOA_CONS_{0,it} \\
 & + b_2 SHORTFLL_{0,it} + b_3 ADJ_NOA_CONS_{0,it} * SHORTFLL_{0,it} \\
 & + b_4 HIST_{it} + b_5 DROA_{it} + b_6 DBTM_{it} + b_7 IND_HIST_{it} \\
 & + b_8 IND_DROA_{it} + b_9 IND_DBTM_{it} + b_{10} IND_GROWTH_{it} + b'YEAR_t \\
 & + u_{it}).
 \end{aligned} \tag{3}$$

Specifically, the coefficients on ADJ_NOA_CONS₀ and the ADJ_NOA_CONS₀- SHORTFLL₀ interaction, β_1 and β_3 , respectively, are significant at the 0.01 level. Thus, the main empirical results do not appear to be driven solely by

TABLE 12
Pooled Probit Regression Results Showing the Relation
Between Firm Write-Off Behavior and an Industry-Adjusted
Proxy for Earnings Management Constraints Relative to
Meeting the Zero-Earnings Benchmark for a Sample of 51,581
Firm-Year Observations
During 1976-2000

$$\begin{aligned}
 Prob(WRITE_OFF_{it} = 1) = & \Phi(b_0 + b_1ADJ_NOA_CONS_{0,it} + b_2SHORTFLL_{0,it} \\
 & + b_3ADJ_NOA_CONS_{0,it} * SHORTFLL_{0,it} + b_4HIST_{it} + b_5DROA_{it} + b_6DBTM_{it} \\
 & + b_7IND_HIST_{it} + b_8IND_DROA_{it} + b_9IND_DBTM_{it} + b_{10}IND_GROWTH_{it} \\
 & + b'YEAR_t + u_{it})
 \end{aligned}$$

Variable Name ¹	Parameter (Predicted Sign)	Coefficient (z-statistic ²)
Intercept	β_0	-1.652*** (-30.39)
ADJ_NOA_CONS _{0,it}	β_1 (+)	0.015*** (4.34)
SHORTFLL _{0,it}	β_2 (+)	0.240*** (24.44)
ADJ_NOA_CONS _{0,it} * SHORTFLL _{0,it}	β_3 (-)	-0.013*** (-6.23)
HIST _{it}	β_4 (+)	0.275*** (34.74)
ΔROA_{it}	β_5 (-)	-0.042** (-2.31)
ΔBTM_{it}	β_6 (+)	0.047*** (4.60)
IND_HIST _{it}	β_7 (+)	0.280*** (5.63)
IND_ΔROA _{it}	β_8 (-)	-0.269 (-1.15)
IND_ΔBTM _{it}	β_9 (+)	0.049 (0.83)
IND_GROWTH _{it}	β_{10} (-)	-0.191*** (-7.91)
Wald χ^2_{34df}		4367.39***

¹Coefficients for YEAR dummies are suppressed.

²z-statistics are calculated using the Huber/White/Sandwich estimate of variance (Rogers 1993; Williams 2000).

*, **, and *** designate statistical significance at the 0.10, 0.05 and 0.01 levels, respectively, one-sided if sign is predicted, two-sided otherwise.

WRITE_OFF = Indicator of whether firm recorded a write-off.

ADJ_NOA_CONS₀ = Industry-adjusted NOA (Net operating assets at beginning of year t scaled by sales during year t-1) for firm-years in which earnings before special items fall short of the zero-earnings benchmark, and zero otherwise.

SHORTFLL₀ = Absolute value of earnings before special items scaled by the number of shares outstanding for firm-years in which earnings before special items fall short of the zero-earnings benchmark, and zero otherwise.

HIST = Number of write-offs recorded in the past three years.

ΔROA = Prior year change in return-on-assets ratio.

ΔBTM = Prior year change in book-to-market ratio.

IND_HIST = Average number of write-offs recorded by industry.

IND_ΔROA = Median industry change in return-on-assets ratio.

IND_ΔBTM = Median industry change in book-to-market ratio.

IND_GROWTH = Average industry percentage sales growth.

differences in the ratio of net operating assets to sales across industries.

5.3.2. Composition of Net Operating Assets

In their subsequent analyses, Barton and Simko (2002) decompose net operating assets into short-term and long-term components based on the argument managers' ability to manipulate earnings varies across different components of the balance sheet. Particularly, prior research suggests that earnings management via working capital accruals are less transparent than using a change in depreciation policy to boost income (Beneish 1998; Teoh et al 1998). To examine whether earnings management constraints pertaining to these components provide additional insight into the write-off decision, this study follows Barton and Simko (2002) and decomposes NOA into the following three components:

1. Working Capital (WC), defined as current assets less cash, marketable securities and current liabilities, plus short-term debt, all at the beginning of year t and divided by sales during year $t-1$.
2. Net Fixed Assets (NFA), defined as property, plant and equipment, net of accumulated depreciation, at the beginning of year t and divided by sales during year $t-1$.
3. Other Net Long-Term Assets (ONLTA), defined as NOA less WC and NFA.

Next, these measures are used to construct decomposed measures of NOA_CONS_0 for each firm-year observation:

$$\begin{aligned}
 WC_CONS_{0,it} &= WC \text{ if } EBSI < 0 \text{ for firm } i \text{ during year } t, \text{ and zero otherwise,} \\
 NFA_CONS_{0,it} &= NFA \text{ if } EBSI < 0 \text{ for firm } i \text{ during year } t, \text{ and zero otherwise,} \\
 ONLTA_CONS_{0,it} &= ONLTA \text{ if } EBSI < 0 \text{ for firm } i \text{ during year } t, \text{ and zero otherwise.}
 \end{aligned}$$

Table 13 reports results for hypotheses 1 and 2 based on the following model using the decomposed proxies for earnings management constraints:

$$\begin{aligned}
 Prob(WRITE_OFF_{it} = 1) = & \Phi(b_0 + b_1 WC_CONS_{0,it} + b_2 NFA_CONS_{0,it} \\
 & + b_3 ONLTA_CONS_{0,it} + b_4 SHORTFLL_{0,it} \\
 & + b_5 WC_CONS_{0,it} * SHORTFLL_{0,it} + b_6 NFA_CONS_{0,it} * SHORTFLL_{0,it} \\
 & + b_7 ONLTA_CONS_{0,it} * SHORTFLL_{0,it} + b_8 HIST_{it} + b_9 DROA_{it} \\
 & + b_{10} DBTM_{it} + b_{11} IND_HIST_{it} + b_{12} IND_DROA_{it} + b_{13} IND_DBTM_{it} \\
 & + b_{14} IND_GROWTH_{it} + b'YEAR_t + u_{it}). \tag{4}
 \end{aligned}$$

Consistent with hypothesis 1, the coefficients on WC_CONS_0 , NFA_CONS_0 and $ONLTA_CONS_0$ (β_1 , β_2 and β_3 , respectively) are

TABLE 13
Pooled Probit Regression Results Showing the Relation
Between Firm Write-Off Behavior and Proxies for Earnings
Management Constraints Relative to Meeting the Zero-
Earnings Benchmark Based on Components of Net Operating
Assets for a Sample of 51,581 Firm-Year Observations
During 1976-2000

$$\text{Prob}(\text{WRITE_OFF}_{it} = 1) = \Phi(b_0 + b_1\text{WC_CONS}_{0,it} + b_2\text{NFA_CONS}_{0,it} + b_3\text{ONLTA_CONS}_{0,it} + b_4\text{SHORTFLL}_{0,it} + b_5\text{WC_CONS}_{0,it} * \text{SHORTFLL}_{0,it} + b_6\text{NFA_CONS}_{0,it} * \text{SHORTFLL}_{0,it} + b_7\text{ONLTA_CONS}_{0,it} * \text{SHORTFLL}_{0,it} + b_8\text{HIST}_{it} + b_9\Delta\text{ROA}_{it} + b_{10}\Delta\text{BTM}_{it} + b_{11}\text{IND_HIST}_{it} + b_{12}\text{IND_}\Delta\text{ROA}_{it} + b_{13}\text{IND_}\Delta\text{BTM}_{it} + b_{14}\text{IND_GROWTH}_{it} + b' \text{YEAR}_t + u_{it})$$

Variable Name ¹	Parameter (Predicted Sign)	Coefficient (z-statistic ²)
Intercept	β_0	-1.848*** (-22.20)
WC_CONS _{0,it}	β_1 (+)	0.141*** (5.81)
NFA_CONS _{0,it}	β_2 (+)	0.023*** (2.63)
ONLTA_CONS _{0,it}	β_3 (+)	0.058*** (6.12)
SHORTFLL _{0,it}	β_4 (+)	0.282*** (25.41)
WC_CONS _{0,it} *SHORTFLL _{0,it}	β_5 (-)	-0.044*** (-2.63)
NFA_CONS _{0,it} *SHORTFLL _{0,it}	β_6 (-)	-0.048*** (-6.56)
ONLTA_CONS _{0,it} *SHORTFLL _{0,it}	β_7 (-)	-0.009 (-1.54)
HIST _{it}	β_8 (+)	0.271*** (33.52)
ΔROA_{it}	β_9 (-)	-0.042** (-2.31)
ΔBTM_{it}	β_{10} (+)	0.042*** (4.02)
IND_HIST _{it}	β_{11} (+)	0.257*** (5.19)
IND_ ΔROA_{it}	β_{12} (-)	-0.273 (-1.17)
IND_ ΔBTM_{it}	β_{13} (+)	0.037 (0.68)
IND_GROWTH _{it}	β_{14} (-)	-0.191*** (-7.84)
Wald χ^2_{38df}		4631.24***

¹Coefficients for YEAR dummies are suppressed.

²z-statistics are calculated using the Huber/White/Sandwich estimate of variance (Rogers 1993; Williams 2000).

*, ** and *** designate statistical significance at the 0.10, 0.05 and 0.01 levels, respectively, one-sided if sign is predicted, two-sided otherwise.

WRITE_OFF = Variable indicating whether firm recorded a write-off.

WC_CONS₀ = Working capital at the beginning of year t divided by sales during year t-1 for firm-years in which earnings before special items fall below the zero-earnings benchmark, and zero otherwise.

NFA_CONS₀ = Net fixed assets at the beginning of year t divided by sales during year t-1 for firms-years in which earnings before special items fall below the zero-earnings benchmark, and zero otherwise.

ONLTA_CONS₀ = Other net long-term assets at the beginning of year t divided by sales during year t-1 for firm-years in which earnings before special items fall below the zero-earnings benchmark, and zero otherwise.

SHORTFLL₀ = Absolute value of earnings before special items scaled by the number of shares outstanding for firm-years in which earnings before special items fall below the zero-earnings benchmark, and zero otherwise.

HIST = Number of write-offs recorded in the past three years.

ΔROA = Prior year change in return-on-assets ratio.

ΔBTM = Prior year change in book-to-market ratio.

IND_HIST = Average number of write-offs recorded by industry.

IND_ ΔROA = Median industry change in return-on-assets ratio.

IND_ ΔBTM = Median industry change in book-to-market ratio.

IND_GROWTH = Median industry percentage sales growth.

significantly positive at the 0.01 level. In addition, the WC_CONS_0 coefficient is over six times the magnitude of the NFA_CONS_0 (0.141 versus 0.023), and more than twice as large as the $ONLTA_CONS_0$ coefficient (0.141 versus 0.058).⁶ This suggests that managers are more likely to record an accounting write-off when they face earnings management constraints in working capital accounts than in long-term net asset accounts. With respect to the interaction terms, the coefficients on the WC_CONS_0 - $SHORTFLL_0$ and the NFA_CONS_0 - $SHORTFLL_0$ interactions, β_5 and β_6 , are negative and significant at the 0.01 level, consistent with hypothesis 2. However, the coefficient on the $ONLTA_CONS_0$ - $SHORTFLL_0$ interaction is negative, but not statistically significant. In sum, the results reported in table 13 suggest that earnings management constraints across different components of net operation assets are positively associated with the likelihood of an accounting write-off.

5.4. Alternate Specification of Earnings Benchmark

The main analysis in this dissertation focuses on managers' incentives to avoid reporting losses because prior research suggests that reporting positive earnings is managers' first objective (Degeorge et al 1999). However,

⁶ Wald χ^2 tests reject the null hypotheses that $\beta_1 = \beta_2$ and $\beta_1 = \beta_3$ at the 0.01 significance level.

another important earnings objective is to avoid reporting earnings decreases (Burgstahler and Dichev 1997; Degeorge et al 1999). This section examines whether the empirical results are robust to alternate specification of the empirical proxies based on managers' incentives to avoid earnings decreases. The new variables measuring the extent of earnings management constraints and the earnings shortfall relative to meeting the zero-earnings change benchmark are based on the level of earnings before special items relative to earnings from the prior year:

$$\begin{aligned} \Delta EBSI_{it} &= \text{Earnings before special items (EBSI) for firm } i \text{ during year } t, \\ &\quad \text{minus earnings before extraordinary items (EBEI) during year } t-1, \\ NOA_CONS_{0\Delta, it} &= \text{NOA for firm-years in which } \Delta EBSI < 0, \text{ and zero otherwise,} \\ SHORTFLL_{0\Delta, it} &= \text{The absolute value of } \Delta EBSI \text{ for firm-years in which } \Delta EBSI < 0, \text{ and zero otherwise,} \\ \text{where:} &\quad \text{The } 0\Delta \text{ subscript indicates the zero-earnings change benchmark.} \end{aligned}$$

Table 14 reports results supporting hypotheses 1 and 2 using the following model which operationalizes the empirical proxies based on managers' incentives to avoid earnings decreases:

TABLE 14
Pooled Probit Regression Results Showing the Relation
Between Firm Write-Off Behavior and Earnings Management
Constraints Relative to Meeting the Zero-Earnings Change
Benchmark for a Sample of 51,581 Firm-Year Observations
During 1976-2000

$$\begin{aligned} \text{Prob}(\text{WRITE_OFF}_{it} = 1) = & \Phi(b_0 + b_1\text{NOA_CONS}_{0\Delta,it} + b_2\text{SHORTFLL}_{0\Delta,it} \\ & + b_3\text{NOA_CONS}_{0\Delta,it} * \text{SHORTFLL}_{0\Delta,it} + b_4\text{HIST}_{it} + b_5\Delta\text{ROA}_{it} + b_6\Delta\text{BTM}_{it} \\ & + b_7\text{IND_HIST}_{it} + b_8\text{IND_}\Delta\text{ROA}_{it} + b_9\text{IND_}\Delta\text{BTM}_{it} + b_{10}\text{IND_GROWTH}_{it} \\ & + b' \text{YEAR}_t + u_{it}) \end{aligned}$$

Variable Name ¹	Parameter (Predicted Sign)	Coefficient (z-statistic ²)
Intercept	β_0	-1.657*** (-27.60)
NOA_CONS _{0Δ,it}	β_1 (+)	0.026*** (5.61)
SHORTFLL _{0Δ,it}	β_2 (+)	0.230*** (18.97)
NOA_CONS _{0Δ,it} * SHORTFLL _{0Δ,it}	β_3 (-)	-0.028*** (-4.83)
HIST _{it}	β_4 (+)	0.276*** (33.34)
ΔROA _{it}	β_5 (-)	-0.084*** (-3.20)
ΔBTM _{it}	β_6 (+)	0.035*** (2.75)
IND_HIST _{it}	β_7 (+)	0.247*** (5.46)
IND_ΔROA _{it}	β_8 (-)	-0.348 (-1.30)
IND_ΔBTM _{it}	β_9 (+)	0.040 (0.70)
IND_GROWTH _{it}	β_{10} (-)	-0.215*** (-8.70)
Wald χ^2_{34df}		3265.86***

¹Coefficients for YEAR dummies are suppressed.

²z-statistics are calculated using the Huber/White/Sandwich estimate of variance (Rogers 1993; Williams 2000).

*, **, and *** designate statistical significance at the 0.10, 0.05 and 0.01 levels, respectively, one-sided if sign is predicted, two-sided otherwise.

WRITE_OFF = Variable indicating whether firm recorded a write-off.

NOA_CONS_{0Δ} = Net operating assets at beginning of year t scaled by sales during year t-1 for firm-years in which earnings before special items are below the zero-earnings change benchmark, and zero otherwise.

SHORTFLL_{0Δ} = Absolute value of the change in earnings before special items scaled by the number of shares outstanding for firm-years in which the change in earnings before special items is negative, and zero otherwise.

HIST = Number of write-offs recorded in the past three years.

ΔROA = Prior year change in return-on-assets ratio.

ΔBTM = Prior year change in book-to-market ratio.

IND_HIST = Average number of write-offs recorded by industry.

IND_ΔROA = Median industry change in return-on-assets ratio.

IND_ΔBTM = Median industry change in book-to-market ratio.

IND_GROWTH = Median industry percentage sales growth.

$$\begin{aligned}
Prob(WRITE_OFF_{it} = 1) = & \Phi(b_0 + b_1NOA_CONS_{\theta D, it} \\
& + b_2SHORTFLL_{\theta D, it} + b_3NOA_CONS_{\theta D, it} * SHORTFLL_{\theta D, it} + b_4HIST_{it} \\
& + b_5DROA_{it} + b_6DBTM_{it} + b_7IND_HIST_{it} + b_8IND_DROA_{it} \\
& + b_9IND_DBTM_{it} + b_{10}IND_GROWTH_{it} + b'YEAR_t + u_{it}). \quad (5)
\end{aligned}$$

Specifically, the $NOA_CONS_{\theta\Delta}$ coefficient, β_1 , is positive and statistically significant ($p < 0.01$), consistent with hypothesis 1. Next, the coefficient on $SHORTFLL_{\theta\Delta}$, β_2 , is positive and statistically significant consistent with managers' incentives to record a write-off when earnings fall below the benchmark (i.e., take a 'big bath'). Finally, the coefficient on the interaction between $NOA_CONS_{\theta\Delta}$ and $SHORTFLL_{\theta\Delta}$ is negative and statistically significant ($p < 0.01$), consistent with hypothesis 2.

5.5. Summary of Empirical Results

Based on the arguments presented in chapter 3 that managers' ability to manage earnings upward is likely to affect reporting decisions, hypothesis 1 predicts that the greater the extent to which managers face earnings management constraints, the greater the likelihood the manager will choose to record an accounting write-off, even after controlling for the amount of additional earnings necessary to achieve the earnings target, write-off history

and performance. Hypothesis 2 posits that the association between earnings management constraints and the write-off decision varies inversely with the amount by which earnings fall short of the earnings benchmark.

This study tests hypotheses 1 and 2 using a pooled probit regression and computes test statistics based on the Huber/White/Sandwich estimation of variance (Rogers 1993; Williams 2000). The probit regression results strongly support hypothesis 1's prediction that earnings management constraints are positively associated with the likelihood of an accounting write-off. The results also support hypothesis 2's prediction that the association between earnings management constraints and write-off decisions varies inversely with the amount of additional earnings necessary to meet the earnings target. Stated differently, the greater the benchmark shortfall, the weaker the relation between earnings management constraints and the likelihood of an accounting write-off. The study also observes statistically significant relations between variables controlling for the firm's write-off history and recent performance. In addition, this study finds partial support for the industry-specific variables.

To test the robustness of the results, this study uses alternate specifications of the probit regression model,

the empirical proxy for earnings management constraints and the earnings benchmark. The inferences remain unchanged for each alternate specification.

In summary, this study finds convincing evidence that the ability to manage earnings upward affects managerial reporting decisions. Specifically, this study finds a positive association between earning management constraints and the likelihood of an accounting write-off. In addition, this association varies inversely with the amount by which earnings fall short of the earnings target.

CHAPTER 6

CONCLUSION

6.1. Summary

To date, most earnings management studies focus on identifying contexts in which managers have incentives to manage earnings and developing tests of whether managers behave opportunistically within these contexts (Healy and Wahlen 1999). Barton and Simko (2002) contribute to this body of research by showing that earnings management constraints embedded within GAAP limit managers' ability to manage earnings upward, thus providing an explanation about why some firms fail to achieve earnings management incentives. Chapter 1 of this dissertation suggests that earnings management constraints are also likely to affect other reporting decisions, such as whether to record an accounting write-off.

Chapter 2 summarizes the relevant streams of literature that lead most directly to the current study. Specifically, it focuses on managerial incentives to meet observable earnings benchmarks and how earnings management constraints affect managers' ability to meet these

benchmarks. In addition, chapter 2 reviews research on whether managers behave opportunistically with respect to accounting write-off decisions. This dissertation links these bodies of research by examining whether earnings management constraints are associated with managers' decisions to record accounting write-offs.

Chapter 3 develops the study's two testable hypotheses. Hypothesis 1 predicts that the extent to which managers face earnings management constraints is positively associated with the likelihood that managers will choose to record an accounting write-off, even after controlling for other factors associated with the timing of write-offs and fiscal year. Hypothesis 2 predicts that the association between earnings management constraints and accounting write-off decisions varies inversely with the amount by which earnings fall short of the earnings benchmark.

Chapter 4 describes the sample, which consists of 51,581 firm-year observations pertaining to 5,749 firms during 1976 to 2000. In addition it develops the research methodology employed in the study, and explains how the model used to examine the two hypotheses empirically operationalizes each of the empirical proxies.

Finally, chapter 5 presents empirical results that strongly support both hypotheses. Consistent with

hypothesis 1, this study finds a significantly positive association between the extent to which managers face earnings management constraints and the likelihood of an accounting write-off. This study also finds that the association between earnings management constraints and accounting write-off decisions is significantly inversely related to the amount by which earnings fall short of the earnings benchmark, consistent with hypothesis 2. Evidence regarding the control variables suggests that performance declines and past write-off activity at both the firm and industry levels increase the likelihood of an accounting write-off in the current period. Results based on alternate specifications of the empirical model, the empirical proxy for earnings management constraints, and the earnings management context remain unchanged.

6.2. Contributions and Implications of the Study

This study contributes to the accounting literature in several ways. First, it extends Barton and Simko's (2002) evidence regarding earnings management constraints embedded within GAAP by testing whether these constraints have financial reporting implications beyond whether or not firms are able to meet earnings benchmarks. Second, this study extends research investigating whether managers record accounting write-offs to create or recover earnings

management flexibility. While this study does not directly observe managerial intent with respect to future earnings management incentives, it does find that earnings management constraints in the current period are positively associated with managers' write-off decisions. Thus, the evidence suggests that managers lacking sufficient earnings management flexibility have incentives to record accounting write-offs to avoid facing the similar condition in the future. Finally, this study is of interest to researchers using the distributional approach to assess earnings management behavior around observable benchmarks. Specifically, this study's finding that the association between earnings management constraints and write-off decisions varies inversely with the amount by which earnings (before the write-off decision) fall short of the benchmark suggests that managers lacking sufficient discretion to manage earnings upward by a small amount are more likely to record an accounting write-off rather than report earnings that fall just short of the benchmark.

6.3. Limitations

One potential limitation of this study is that the analysis does not control for recent executive turnover. Prior research suggests a strong association between executive turnover and accounting write-offs (e.g., Strong

and Meyer 1987; Francis et al 1996). Given the large sample used in this study, executive turnover data is not included due to the considerable data collection costs. However, exclusion of this data is not likely to affect this study's inferences because it is not obvious why incumbent management teams would behave differently when faced with earnings management constraints than new management teams.

Another limitation of this study is the use of weighted shares outstanding as a deflator for the benchmark shortfall measures. Scaling by weighted shares allows for interpretation of the shortfall measures on an earnings per share basis; however, the number of shares outstanding may be arbitrarily determined or manipulated by management and may not properly achieve comparability across firms and over time. Nonetheless, the use of this deflator is not likely to affect this study's main inferences.

6.4. Suggestions for Further Research

Future researchers can explore several extensions that relate to the current study. First, future research could further refine the methodology employed by this study by focusing on quarterly data, given that write-offs can occur throughout the fiscal year. In addition, future research could explore whether earnings management constraints are

associated with other reporting decisions such as changes in disclosure policies.

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