Research design issues in earnings management studies

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Abstract

This paper discusses trade-offs associated with three research designs commonly used in the earnings management literature: those based on aggregate accruals, those based on specific accruals and those based on the distribution of earnings after management. A key theme of the paper is that empirical procedures for aggregate accruals studies lag both our theories of incentives to manage accruals and our institutional knowledge of how accruals behave. Empirical findings suggest that aggregate accruals models that do not consider long-term earnings growth are potentially misspecified and can result in misleading inferences about earnings management behavior. It is suggested that future progress in the earnings management literature is more likely to come from application of specific accrual and distribution-based tests than from aggregate accruals tests. © 2000 Elsevier Science Ltd. All rights reserved.

1. Introduction

The earnings management literature attempts to understand why managers manipulate earnings, how they do so and the consequences of this behavior. These questions are the focus of a significant area of inquiry within financial reporting research. There is broad interest in the findings of this literature, as the reviews by Schipper (1989), Dechow and Skinner (2000) and Healy and Wahlen (1999) indicate. However, as these papers note, interpretations of the
evidence are controversial. My paper overviews research designs applied in the recent literature and discusses factors that cause it to be difficult to interpret the evidence.

My paper discusses trade-offs associated with three research designs commonly used in the earnings management literature: those based on aggregate accruals, those based on specific accruals and those based on the distribution of earnings after management. A key theme of my review is that much of the controversy over interpretation of the literature’s findings is due to the extensive use of aggregate accruals models to characterize discretionary behavior. The model of aggregate accruals proposed by Jones (1991), hereafter referred to as the Jones model, is the most commonly used in the literature. Given the limited theory we have of how accruals behave in the absence of discretion, the task of identifying and controlling for potentially correlated omitted variables is daunting indeed. Although aggregate accruals models made an important contribution to the literature at the time they were introduced and have had substantial impact, I suggest that further progress in the literature will require a departure from extensive reliance on aggregate accruals approaches.

An alternative to studying aggregate accruals is to model the behavior of specific accruals. Studies adopting this approach typically focus on a specific industry, such as banking (e.g., Scholes et al., 1990) or property and casualty insurance (e.g., Petroni, 1992), and use knowledge of institutional arrangements to characterize the likely nondiscretionary and discretionary behavior of accruals. A second alternative to studying aggregate accruals is the methodology for identifying earnings management developed by Burgstahler and Dichev (1997) and Degeorge et al. (1999) based on the distribution of earnings after management. The latter two studies make strong predictions about the behavior of earnings in narrow intervals around a target earnings number and find compelling evidence that earnings are managed to achieve earnings targets, particularly positive earnings.

In this review, I discuss the characteristics of and trade-offs associated with the three most commonly applied designs in the earnings management literature. I first focus on research design issues in aggregate accruals designs, discussing a number of issues associated with modeling aggregate accruals. Next I discuss these issues from the perspective of what we know about one component of aggregate accruals, the change in accounts receivable. An important theme of this discussion is that empirical procedures for aggregate accruals studies lag both our theories of incentives to manage accruals and our institutional knowledge of how accruals behave. The discussion highlights a

1 This paper focuses on research design issues related to tests of earnings management primarily through accruals. As such, it does not address issues related to the literature on choice of accounting principles. See Fields et al. (2000) for a recent discussion of this literature.
number of issues related to drawing inferences about earnings management from the behavior of aggregate accruals given the behavior of its components.

I then provide evidence concerning the specification of aggregate accruals models. Specifically, I conjecture that firms with greater expected earnings growth are likely to have greater than expected accruals than firms with less expected earnings growth. The Jones model controls for growth in current year sales, but firms with different expectations for long-term earnings growth likely make different working capital investment decisions. The empirical findings are consistent with this conjecture in that estimated discretionary accruals using the Jones model or the Dechow et al. (1995) modified Jones model, hereafter referred to as the modified Jones model, are significantly associated with analysts’ projections of long-term earnings growth. This finding holds after controlling for return on assets, which Dechow et al. (1995) and Kasznik (1999) have shown to be significantly associated with estimated discretionary accruals.\(^2\) My findings indicate that it is also important to control expected earnings growth in earnings management studies using an aggregate accruals approach.

I then overview research design trade-offs associated with both specific accruals and distribution approaches. An important advantage of the specific accrual approach is that an understanding of the nondiscretionary component is more readily developed, as the researcher can rely on generally accepted accounting principles to understand what fundamentals should be reflected in the account in the absence of earnings management. A prime advantage of the distribution approach is that it allows the researcher to make a strong prediction about the frequency of earnings realizations which is unlikely to be due to the nondiscretionary component of earnings. I suggest that future contributions to the literature may result from greater use of these approaches, either individually or in combination.

The layout of the paper is as follows. Section 2 overviews earnings management research designs and provides descriptive evidence on their use in the recent literature. Section 3 discusses research design issues associated with aggregate accruals proxies for earnings management. Section 4 develops this discussion further using the context of a specific accrual, accounts receivable. Section 5 presents empirical evidence on the relation between discretionary accrual estimates based on aggregate accruals, and earnings performance and earnings growth. Section 6 discusses design issues associated with specific accruals studies, Section 7 discusses design issues associated with earnings distribution tests, and Section 8 concludes.

2. Earnings management research designs

A fundamental element of any test for earnings management is a measure of management’s discretion over earnings. The literature has followed several approaches, with varying characteristics. First, there is a large literature that attempts to identify discretionary accruals based on the relation between total accruals and hypothesized explanatory factors. This literature began with Healy (1985) and DeAngelo (1986), who used total accruals and change in total accruals, respectively, as measures of management’s discretion over earnings. Jones (1991) introduced a regression approach to control for nondiscretionary factors influencing accruals, specifying a linear relation between total accruals and change in sales and property, plant and equipment. I refer to these approaches as aggregate accruals studies. Panel A of Table 1 describes the most typical of the aggregate accruals estimation approaches and indicates the authors introducing these approaches.

A second approach in the literature is to model a specific accrual, as in McNichols and Wilson (1988), Moyer (1990), Petroni (1992), Beaver and McNichols (1998), Penalva (1998), Nelson (2000) and Petroni et al. (2000). These studies often focus on industry settings in which a single accrual is sizable and requires substantial judgment. Based on these characteristics, as well as anecdotal evidence, the researchers have priors that management’s discretion is likely to be reflected in a specific accrual or set of accruals. As with aggregate accruals studies, a key aspect of the research design task is modeling the behavior of each specific accrual to identify its discretionary and nondiscretionary components. Panel B of Table 1 provides several examples of measures of specific discretionary accruals and indicates the authors introducing these approaches.

A third approach is to examine the statistical properties of earnings to identify behavior that influences earnings, as developed by Burgstahler and Dichev (1997) and Degeorge et al. (1999). These studies focus on the behavior of earnings around a specified benchmark, such as zero or a prior quarter’s earnings, to test whether the incidence of amounts above and below the benchmark are distributed smoothly, or reflect discontinuities due to the exercise of discretion. Panel C of Table 1 describes this approach to testing for earnings management and indicates the authors introducing these approaches.

To characterize the research designs applied in the recent literature, a search for the 1993–1999 period was conducted in The Accounting Review, Contemporary Accounting Research, Journal of Accounting and Economics, Journal of Accounting, Auditing and Finance, Journal of Accounting and Public Policy, Journal of Accounting Research, Journal of Business Finance and Accounting, and Review of Accounting Studies. This search identified 55 articles testing for earnings management using proxies for discretionary behavior. Appendix A provides a reference for each of these articles.
Table 1
Discretionary accrual proxies

<p>| Panel A: Aggregate accruals models |</p>
<table>
<thead>
<tr>
<th>Authors</th>
<th>Discretionary accrual proxy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healy (1985)</td>
<td>Total accruals</td>
</tr>
<tr>
<td>DeAngelo (1986)</td>
<td>Change in total accruals</td>
</tr>
<tr>
<td>Jones (1991)</td>
<td>Residual from regression of total accruals on change in sales and property, plant and equipment</td>
</tr>
<tr>
<td>Modified Jones Model from Dechow et al. (1995)</td>
<td>Residual from regression of total accruals on change in sales and on property, plant and equipment, where revenue is adjusted for change in receivables in the event period</td>
</tr>
<tr>
<td>Kang and Sivaramakrishnan (1995)</td>
<td>Residual from a regression of noncash current assets less liabilities on lagged levels of these balances, adjusted for increases in revenues, expenses and plant and equipment</td>
</tr>
</tbody>
</table>

<p>| Panel B: Specific accrual models |</p>
<table>
<thead>
<tr>
<th>Authors</th>
<th>Discretionary accrual proxy</th>
</tr>
</thead>
<tbody>
<tr>
<td>McNichols and Wilson (1988)</td>
<td>Residual provision for bad debt, estimated as the residual from a regression of the provision for bad debts on the allowance beginning balance, and current and future write-offs</td>
</tr>
<tr>
<td>Petroni (1992)</td>
<td>Claim loss reserve estimation error, measured as the five year development of loss reserves of property casualty insurers.</td>
</tr>
<tr>
<td>Beaver and Engel (1996)</td>
<td>Residual allowance for loan losses, estimated as the residual from a regression of the allowance for loan losses on net charge-offs, loan outstanding, nonperforming assets and one year ahead change in nonperforming assets</td>
</tr>
<tr>
<td>Beneish (1997)</td>
<td>Days in receivables index, gross margin index, asset quality index, depreciation index, selling general and administrative expense index, total accruals to total assets index</td>
</tr>
<tr>
<td>Beaver and McNichols (1998)</td>
<td>Serial correlation of one year development of loss reserves of property casualty insurers</td>
</tr>
</tbody>
</table>

<p>| Panel C: Frequency distribution approach |</p>
<table>
<thead>
<tr>
<th>Authors</th>
<th>Test for earnings management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Burgstahler and Dichev (1997)</td>
<td>Test whether the frequency of annual earnings realizations in the region above (below) zero earnings and last year’s earnings is greater (less) than expected</td>
</tr>
<tr>
<td>DeGeorge et al. (1999)</td>
<td>Test whether the frequency of quarterly earnings realizations in the region above (below) zero earnings, last quarter’s earnings and analysts’ forecasts is greater (less) than expected</td>
</tr>
<tr>
<td>Myers and Skinner (1999)</td>
<td>Test whether the number of consecutive earnings increase is greater than expected absent earnings management</td>
</tr>
</tbody>
</table>

Table 2 presents summary statistics on the publications by year, by journal and by methodology. The data in Panel A document that the earnings management literature is active, with a substantial number of papers published in
recent years. Panel B indicates that papers on earnings management have been published in all the leading accounting journals. Panel C indicates that total accruals, specific accruals and distribution approaches are being applied and

Table 2
Descriptive data on journal articles on earnings management

<table>
<thead>
<tr>
<th>Panel A: Frequency distribution of articles published, by publication year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year of journal issue</td>
</tr>
<tr>
<td>-----------------------</td>
</tr>
<tr>
<td>1993</td>
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<tr>
<td>1994</td>
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<td>1995</td>
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<td>1996</td>
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<td>1997</td>
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<tr>
<td>1998</td>
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<tr>
<td>1999b</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Panel B: Frequency distribution of articles published, by journal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Journal</td>
</tr>
<tr>
<td>The Accounting Review</td>
</tr>
<tr>
<td>Contemporary Accounting Research</td>
</tr>
<tr>
<td>Journal of Accounting and Economics</td>
</tr>
<tr>
<td>Journal of Accounting Research</td>
</tr>
<tr>
<td>Journal of Accounting and Public Policy</td>
</tr>
<tr>
<td>Journal of Accounting Auditing and Finance</td>
</tr>
<tr>
<td>Journal of Business Finance and Accounting</td>
</tr>
<tr>
<td>Review of Accounting Studies</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Panel C: Frequency distribution of articles published, by primary methodology applied</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measure of manipulation</td>
</tr>
<tr>
<td>Total accruals</td>
</tr>
<tr>
<td>Residual from aggregate accruals model</td>
</tr>
<tr>
<td>Specific accruals</td>
</tr>
<tr>
<td>Asset sales and asset write-off</td>
</tr>
<tr>
<td>Accounting changes</td>
</tr>
<tr>
<td>Unusual gains and losses</td>
</tr>
<tr>
<td>Subject of accounting enforcement by SEC</td>
</tr>
<tr>
<td>Distribution of earnings</td>
</tr>
<tr>
<td>Change in R&amp;D expenditure from prior year</td>
</tr>
<tr>
<td>Other</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

a Percentages do not add to 100.0% due to rounding.
b Articles were included through September 1999, so 1999 does not include a full year of data.
c The total number of approaches exceeds the number of articles because one study applied two approaches.
accepted. However, as Panel C indicates, the greatest number of studies use an aggregate accruals approach based on the Jones model. Although some academics question the validity of this discretionary accruals proxy (e.g., McNichols and Wilson, 1988, p. 12; Wilson, 1996, pp. 172, 177; Bernard and Skinner, 1996, pp. 315–320), the large number of studies published that use this approach suggests that it is widely accepted as a proper proxy for earnings management.

3. Research design issues associated with discretionary accrual proxies based on aggregate accruals

There are several issues that affect inferences from aggregate accruals studies. As noted by McNichols and Wilson (1988), accruals-based tests of earnings management require a proxy for management’s discretion over accruals. McNichols and Wilson (1988, p. 5) characterize this proxy, DAP, as measuring discretionary accruals, DA, with error, \( \eta \)

\[
DAP = DA + \eta.
\]

The error, \( \eta \), reflects the effects of omitted variables in the estimation of DA, as well as idiosyncratic variation. Jones (1991, pp. 210–212) measures DAP as \( A \), aggregate accruals, less estimated nondiscretionary accruals, NAEST

\[
DAP = A - NAEST,
\]

where NAEST is characterized as the prediction error from an equation regressing total accruals on the change in revenues and level of property, plant and equipment.

McNichols and Wilson (1988, pp. 5–6) characterize a test for earnings management where DA is observed in terms of the following regression:

\[
DA = \alpha + \beta \text{PART} + \varepsilon,
\]

where PART is an indicator variable partitioning the sample into two groups, for which differences in earnings management behavior are predicted, \( \alpha \) is the mean discretionary accrual of observations in the first group and \( \alpha + \beta \) is the mean discretionary accrual of observations in the second group. However, the researcher does not observe DA but rather an estimate, DAP. Tests of earnings management are therefore characterized by the following regression:

\[
DAP = \phi + \gamma \text{PART} + \upsilon,
\]

Panel C notes 56 articles because one study applied two methodological approaches.
where

\[ \gamma = \beta + \rho(\text{PART}, \eta) * \frac{\sigma_\eta}{\sigma_{\text{PART}}}, \]

which can be written as

\[ \gamma = \beta + \text{bias}. \]

The error term \( \eta \) reflects the effects of omitted variables in the estimation of DA as well as idiosyncratic variation in DAP conditional on DA. As McNichols and Wilson (1988, p. 6) show, \( \gamma \) is a biased estimate of \( \beta \) if the partitioning variable is correlated with \( \eta \), the measurement error in the estimate of discretionary accruals.

To interpret accruals-based tests as evidence that earnings management did not occur, one must be confident that the discretionary accrual proxy is sufficiently sensitive to reflect it. To interpret accruals-based tests as evidence that earnings management occurred, one must be confident that measurement error in the discretionary accrual proxy is not correlated with the partitioning variable in the study’s research design.4

3.1. The behavior of accruals absent earnings management

Given the potential for measurement error in discretionary accrual proxies to induce bias in earnings management studies, a fundamental question is how accruals behave in the absence of earnings management.5 To date, the aggregate accruals literature has largely taken a black box approach to the factors that explain accruals. This causes it to be extremely difficult to be confident that estimates of discretionary accruals capture discretion by management and poses several difficulties in evaluating research design choices.6 Accounting researchers need to understand the factors that cause accruals to fluctuate in a world without incentive problems. Whether accruals are linear in the change in sales in the absence of earnings management, as the Jones model specifies, is an open question. The existing literature specifies some parsimonious linear

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4 For further discussion of this point, see McNichols and Wilson (1988, pp. 7–13) and Bernard and Skinner (1996, pp. 315–320).

5 This question is fundamental because most studies proceed by modeling nondiscretionary accruals and inferring discretionary accruals. An alternative approach, followed by Petroni et al. (2000) is to directly model the discretionary component of accruals based on management’s incentives to exercise discretion. This latter approach allows the researcher to separate the estimation error in the discretionary accrual proxy from that in the estimate of nondiscretionary accruals.

6 This concern parallels Leamer’s (1983) discussion of misspecification in econometric models, more generally. He quotes Guy Orcutt: “Doing econometrics is like trying to learn the laws of electricity by playing the radio” (see Leamer, 1983, p. 31).
models to explain aggregate accrual behavior, but has presented little theory or evidence for how these accruals behave with or without earnings management.\(^7\)

Several empirical studies have examined the validity of alternative earnings management tests. Dechow et al. (1995), hereafter DSS, examine the accrual behavior of firms that are subject to Securities and Exchange Commission (SEC) enforcement actions. Their findings indicate that the accrual proxies they examine capture this extreme behavior.\(^8\) Bradshaw et al. (1999) extend the DSS sample of firms subject to SEC enforcement actions and use accrual measures based on the statement of cash from operations rather than the balance sheet. Their evidence is consistent with DSS, establishing that extreme cases of earnings manipulation are reflected in aggregate accruals.

Beneish (1997) examines the ability of DSS’s modified Jones model to identify earnings management by firms identified as generally accepted accounting principles (GAAP) violators, either by the financial press or the SEC Enforcement Division. He finds that the modified Jones model does not perform well in detecting GAAP violators, and that a model incorporating financial statement ratios and other explanatory factors has significantly fewer classification errors (1997, pp. 292–296). His study suggests that by exploiting information about specific accruals, potentially more powerful methods for detecting earnings management can be developed. Kang and Sivaramakrishnan’s (1995) study suggests a similar inference. They develop a model of aggregate accruals based on levels of working capital accounts rather than changes to test for earnings management and document that their method has greater power to identify simulated earnings management.\(^9\)

The ability to develop more powerful earnings management tests is important because the DSS simulation results suggest that earnings management amounts less than 5% of total assets are likely to go undetected by aggregate accruals tests.\(^10\) The median net income before extraordinary items for COMPUStat firms for the 1988–1998 period is 3.8% of beginning total assets, so average earnings management of even one percent of total assets would be very material to most firms’ earnings.\(^11\) If researchers are to be able to characterize the nature and magnitude of more subtle earnings management activity, then more powerful methods will be required.

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\(^7\) A notable exception is Dechow et al. (1998).

\(^8\) See DSS, pp. 219–223.

\(^9\) See pp. 356–358 for discussion of their model and pp. 361–365 for their findings.

\(^10\) The DSS (1995, pp. 204–223) simulation results focus on the frequency of rejection at the 5% level for specific firm-year observations, rather than the frequency of rejecting that a sample mean differs from zero. However, the low rates of rejection at low levels of earnings management (pp. 215–218) suggest power can be an issue, even for large sample studies.

\(^11\) This statistic is presented in Table 3, which will be discussed in Section 5.
This inference is reinforced by the results of Thomas and Zhang (1999). They compare the predictive ability of six models of total accruals and find that only the Kang and Sivaramakrishnan (1995) model performs moderately well. Surprisingly, they find that a naïve model that predicts total accruals equal to $-5\%$ of total assets outperforms the other five models. They also find that in predicting current accruals, only the Jones model has predictive ability. Their findings indicate that overfitting in estimation periods results in greater perceived explanatory power for these models than is warranted.

Finally, DSS (pp. 205–209) and Kasznik (1999, pp. 67–69) show that discretionary accrual estimates are correlated with earnings performance. Firms with higher (lower) earnings exhibit significantly positive (negative) discretionary accruals. Presumably this arises because firms with abnormally high (low) earnings have positive (negative) shocks to earnings that include an accrual component. A consequence of this is that one is more likely to detect earnings management that increases earnings for the most profitable firms and earnings management that reduces earnings for the least profitable firms.12

One question this raises is whether the findings of some of the studies that document significant discretionary accrual estimates are enhanced by measurement error in discretionary accrual proxies that is correlated with the partitioning variable in the research design. Of the 55 papers reviewed for this paper, 23 test for hypothesized earnings management behavior using an aggregate accruals regression approach and 22 of these conclude that they find evidence of earnings management.13 Even if earnings management is pervasive, these findings are interesting given the DSS conclusion that most of the accruals models in their study would not reject the null hypothesis of no earnings management unless the magnitude of the manipulation were approximately 5\% of total assets. One would expect studies testing for earnings management to be likely to find null results except in contexts with incentives to manage earnings by sizable magnitudes. The strength of the findings across studies may indicate aggressive earnings management across the studied contexts, or bias in the tests of earnings management due to measurement error in the discretionary accrual proxy. The strength of the findings across studies may also reflect selection in the editorial process, where papers finding no evidence of earnings management

12 Although this finding is well documented in the literature, I am aware of only a few studies, such as Kasznik (1999) that directly control for this effect.

13 Panel C shows 25 studies using an aggregate accruals regression approach, though two of these studies, Dechow et al. (1995) and Kang and Sivaramakrishnan (1995) are methodological in orientation and are therefore excluded from this calculation. The one study of the 23 using the residuals approach which does not find earnings management as hypothesized is Rees et al. (1996). Rees et al. find evidence of discretionary accruals, as predicted, but argues that the fact they do not reverse in subsequent periods suggests they are nondiscretionary rather than discretionary (1996, pp. 165–168).
are less likely to be published. To the extent this occurs, it is difficult to assess the strength of the evidence of earnings management from published studies alone.

3.2. The relation between discretionary and nondiscretionary accruals

Assuming one has a model of how accruals behave absent earnings management, two additional questions must be addressed: What factors cause management to exercise discretion? What relation does this imply between discretionary accruals and nondiscretionary accruals? Most of the aggregate accruals models assume that discretionary accruals are orthogonal to nondiscretionary accruals. 14

The assumption of orthogonality may be plausible in some research design contexts, but there are plausible scenarios in which nondiscretionary accruals are correlated with discretionary accruals. Recent papers by Demski and Frimor (1999), McCulloch and Black (1999) and Bagnoli and Watts (2000) focus on understanding management’s incentives to manage earnings and suggest the assumed orthogonality is too restrictive.

Demski and Frimor (1999) develop a model in which manipulation of performance measures is the equilibrium response to nonlinearities in the relation between compensation and performance. The intuition is that discreteness in the pay-offs induces the agent to smoothe the report of initial output to increase the expected pay-off in the second period. A key feature of their setting is the nonlinearity of incentives, which causes the magnitude of manipulation to be nonlinear in what might be called premanaged earnings.

McCulloch and Black (1999) show that if management alters accruals in response to fluctuations in nondiscretionary accruals to achieve a smoother income series, there will be a negative correlation between nondiscretionary and discretionary accruals. A bonus story as in Healy (1985) suggests no correlation between discretionary and nondiscretionary accruals when earnings before management are below target and management cannot manipulate upward sufficiently to achieve positive results, but negative correlation between discretionary and nondiscretionary accruals when earnings are above target. Similarly, for firms that manage earnings to avoid losses, I expect discretionary accruals are more positive when nondiscretionary accruals are more negative.

Bagnoli and Watts (2000) examine how the existence of relative performance evaluation affects earnings management incentives. They find that the tendency to manage earnings and the amount are increasing in the firm’s reliance on relative performance evaluation. Furthermore, firms are more likely to manage

14 Note this concern would not apply when discretionary accruals are estimated directly, rather than being inferred as the residual accrual from a regression of total accruals on factors explaining nondiscretionary accruals.
earnings if they expect competitor firms to manage earnings. As I discuss further below, this poses a challenge for empirical researchers interested in estimating discretionary accruals. Researchers estimating nondiscretionary accruals by industry, as the cross-sectional Jones model is often applied, may well overstate the magnitude of nondiscretionary accruals and understate the magnitude of discretionary accruals, because industry-level controls include the average level of discretion exercised by the industry.

3.3. Estimation issues

Estimation of discretionary accruals requires specification of an estimation and test period, and specification of firm-year observations in which earnings were not actively managed. The maintained assumption is that earnings management occurs in the test period but not in the estimation period. Given the rich set of contexts in which management has been hypothesized to manage earnings, this can be a difficult assumption to maintain in many studies. At best, the estimation period includes the effects of hypothesized earnings management and the estimate of nondiscretionary accruals in the test period includes a normal level of earnings management, lowering the power of the test. Furthermore, the accruals in the test period will include the reversal of estimation period earnings management activities in addition to earnings management induced by current period incentives. To the extent the incentives differ across periods, the benchmark may understate or overstate the nondiscretionary accruals, leading to an inference of positive or negative discretionary accruals in the test period when there were none. Furthermore, these estimation issues cause it to be very difficult to draw conclusions about the frequency or magnitude of earnings management activity.

A second estimation issue is the estimation approach to use. Jones (1991, pp. 210–212) used a firm-specific model to estimate the relation between total accruals and explanatory factors. However, to estimate firm-specific parameter estimates requires a reasonable time series. Most studies impose the requirement that sample firms have at least 10 years of data, which poses two problems. First, one must exclude firms that do not have a sufficient data series in

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15 Bagnoli and Watts (2000) focus on relative performance evaluation of managers for compensation purposes. Although explicit relative performance evaluation is perhaps not very common, one could envision capital market incentives that might operate in a similar way. Investors compare performance across similar firms, thereby providing similar incentives to those modeled by Bagnoli and Watts for relative performance evaluation.

16 This research design issue is not unique to studies using discretionary accrual proxies based on an aggregation of accruals. However, our general lack of understanding of incentives to manage accruals in estimation periods can cause this issue to be more problematic for these designs than for those based on a specific accrual.
COMPUSTAT or other data sources. This leads to potentially smaller samples, and their representativeness is an open question. Second, it is not clear that sample firms have no incentive to manage earnings in the estimation period, or that data are stationary over such a long period. An alternative is to use a cross-sectional estimation approach, which does not require a time-series for each firm. However, then the benchmark for each firm’s accruals is the behavior of the other firms in the sample. For the reason Bagnoli and Watts (2000) indicate, and for reasons I discuss below, this can result in positive or negative discretionary accruals that may not reflect earnings management.

A third estimation issue is the measure of accruals to use. Many studies define accruals as the change in current asset and liability accounts less depreciation. This approach has the advantage of allowing a larger sample size and longer time series than studies that require Statement of Financial Accounting Standard (SFAS) 95 (FASB, 1987) data, which was not available before 1988. However, as discussed below, the balance sheet approach raises other concerns. More recent studies, e.g., Collins and Hribar (2000) and Bradshaw et al. (1999), measure accruals using the changes in the current accounts disclosed on the SFAS 95 (FASB, 1987) statement of cash from operations.

There seem to be two critical issues in choosing a measure of accruals. First, one wants a measure that is sensitive to the hypothesized manipulation. Second, one wants a measure whose nondiscretionary component is most readily controlled. Jones (1999) argues that current accruals provide a more accurate basis for estimating discretionary behavior than aggregate accruals, because the estimated discretionary portion of noncurrent accruals is less likely to reflect year-specific discretion. Consistent with this, he finds that discretionary current accruals are significantly negatively correlated, consistent with reversal of discretion, whereas discretionary noncurrent accruals are significantly positively correlated.¹⁷

4. What we know versus what we do

An important theme of this review is that there is a gap between the empirical procedures that are used in the earnings management literature and our institutional knowledge of how accounting accruals behave. Recent papers by Collins and Hribar (2000) and Hansen (1999) provide an example of the gap between our empirical procedures and knowledge of the behavior of financial statement numbers. These papers document that the approach commonly taken to estimate accruals as the difference in succeeding balance sheet

¹⁷ See also Beneish (1998) for further discussion on the choice between current and total accruals.
amounts induces substantial measurement error due to the failure to adjust for merger/acquisition and divestiture activity. Further, both papers note that if partitioning variables are correlated with variables related to merger/acquisition or divestiture activity, the measurement error in discretionary accrual estimates can lead the researcher to conclude that earnings management exists when it does not.

To provide additional examples of the gap between our institutional knowledge of accruals and aggregate accruals models, I consider the research design issues posed by a firm whose only accrual is receivables. It is argued that unusually high receivables relative to sales reflect aggressive revenue recognition. The basic rationale for this is that firms may exercise judgment regarding when revenue is earned but that customers are not likely to pay for the more discretionary sales, and therefore receivables increase. However, a number of factors influence the relation between receivables and the change in sales, absent earnings management, which one must control to properly identify discretionary revenues.

First, one should consider how receivables are affected by credit policy. If a firm grants more generous credit terms in the test period then, all else equal, days sales outstanding grows and one would observe a greater change in receivables relative to the change in sales, as estimated using the firm-specific Jones model. One could argue that credit policy is a mechanism that managers use to accelerate revenue. However, credit policy is also a mechanism that management uses in the absence of earnings management motivations, and therefore the extent to which its effects are discretionary or nondiscretionary is not readily identifiable.\(^\text{18}\) For example, consider a firm that relaxes its credit terms from net 30 days in the estimation period to net 60 days in the test period. The estimated relation between change in receivables and change in sales would be based on the 30 days collection period, resulting in a positive discretionary accrual in the test period.\(^\text{19}\) The underlying question is whether and to what extent this reflects discretion.

Second, one can consider the consequences of credit policy on the Jones model estimates conducted at the industry or cross-sectional level. Variation across firms in credit policy will influence the relation between the change in receivables and change in sales. Consider estimating the Jones model parameters for a sample of firms, half of which have credit terms of net 30 days and

\(^{18}\) Dechow and Skinner (2000) make a similar argument. Also note that although one cannot determine whether the change in credit policy is intended to manage earnings in either scenario, the change accelerates revenues and could be said to reduce earnings quality. In other words, to forecast the likely level of permanent earnings, one would adjust for such a change regardless of management’s intent.

\(^{19}\) This occurs because for a given change in sales, there is a greater increase in receivables, resulting in a positive discretionary accrual estimate.
half of which have credit terms of net 60 days. The coefficient from the regression of change in receivables on change in revenues is too low for the firms with more generous credit terms and too high for the firms with less generous credit terms. Consequently, in the test period, firms with more generous credit terms are considered to have positive discretionary accruals even though their credit policy has not changed between the estimation and test period.

Next, consider the implications of increases in revenues over time, assuming that credit policy remains constant. As DSS note, the Jones model provides an estimate of nondiscretionary accruals that is too large (and consequently an estimate of discretionary accruals that is too small) when some revenue is manipulated because all revenues are treated as nondiscretionary. DSS propose a correction for this, which is to subtract the change in receivables from the change in revenues. This, however, results in estimates of nondiscretionary accruals that are too small for firms with growing revenues, because not all of the change in receivables is discretionary. This adjustment therefore overstates discretionary accruals for firms with growing revenues.

A number of other factors influence the relation between a firm’s sales and receivables in the absence of earnings management. Clearly revenue recognition policy is one of these factors. Additional factors include working capital management. For example, some firms sell off some of their receivables through factoring or securitization transactions. These transactions result in a lower reported level of receivables, and would lead to a lower estimate of discretionary accruals for firms engaging in such transactions.

Pressuring distributors to make early purchases, also known as channel stuffing, is a widely discussed form of manipulation of revenues. Depending on the nature of the firm’s relation with its customers, such behavior may or may not result in a positive estimate of discretionary accruals. If the customers agree to purchase additional merchandise for resale, then they may well hold the inventory and pay the producer, causing no additional receivables beyond those predicted by the sales increase. In such cases, the measure of discretionary accruals will underestimate the extent of earning manipulation, reducing the power of such tests.

An alternative scenario is one where customers anticipate a forthcoming price increase (decrease) and therefore accelerate (postpone) their purchasing behavior in the current period. Although it may result in a temporary change in estimated discretionary accruals, and subsequent period’s sales, one might not typically consider a product price change as an earnings management

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20 This is not an issue for firms with unchanged revenues because holding their credit policy constant, all of the change in receivables is discretionary.

21 Beneish (1998) shows that the amount of the overstatement is as high as one-third of the change in receivables, and suggests using the change in cash sales as a potential control variable.
technique. Nevertheless, in this scenario, the behavior of accruals would be interpreted as consistent with management’s manipulation of earnings.

Although a price change can be exogenous to management’s reporting concerns, it can also be endogenous. Firms vary in the timing of their sales across the fiscal quarter and across the year, resulting in varying levels of receivables at the end of a fiscal period. For example, Crook (1999) indicates that 70% of Oracle Corporation’s sales are typically concluded in the last month of the quarter due to that company’s customers historically waiting until then in an effort to obtain concessions. More generally, the extent to which customers seek concessions may well be due to the bargaining power between customers and suppliers when suppliers are attempting to meet sales growth targets. Differences across firms in the timing of sales within fiscal periods will influence estimates of their discretionary accruals under cross-sectional estimation, even if they have similar credit terms to other firms in their comparison set.  

One could also examine other components of accruals and the factors that influence their behavior. For example, inventory levels have changed substantially over time due to just-in-time policies, and accounts payable varies considerably across firms as a result of differences in the nature of their purchasing decisions and their bargaining power with suppliers.

5. Correlated omitted variables in aggregate accruals tests

As discussed in Section 3, an unbiased test of earnings management requires that measurement error in the discretionary accrual proxy is uncorrelated with the partitioning variable in the research design. Evidence in DSS and Kasznik (1999) indicates that the Jones model estimates of discretionary accruals are correlated with earnings performance. Specifically, these studies document that estimated discretionary accruals are negative for firms with low earnings and positive for firms with high earnings. Both studies caution that if profitability is correlated with the partitioning variable in an earnings management study, the findings are biased.

One test of the specification of a model is to include other potential explanatory variables. If a model is well-specified, then one would not expect to find additional variables with explanatory power. To assess the potential for omitted variables that can potentially be correlated with partitioning variables in earnings management studies, I examine the relation between accruals and growth in earnings, controlling for the change in sales. Because accruals are the

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22 To see this, consider the extreme example of a firm that conducts all of its sales in the last week of each quarter and has credit terms of 30 days. The firm would recognize 90 days of sales outstanding, when in fact, its receivables are outstanding for 30 days.
changes in working capital accounts, one would expect rapidly growing firms to experience larger accruals. An open question is whether the change in current period sales (in the Jones model variants) sufficiently captures the factors causing growth in accruals.

To test for a relation between discretionary accrual estimates and growth, I estimate Jones and modified Jones models of accruals from 1988 to 1998, using cross-sectional estimation at the two-digit industry level, as captured by COMPUSTAT SIC codes. This sample period allows me to use SFAS 95 (FASB, 1987) statement of cash from operations data to estimate accruals, rather than changes in balance sheet accounts. I also exclude companies with merger and acquisition transactions, following Collins and Hribar (2000) and Hansen (1999). Growth in earnings, GROWTH, is measured as the median of analysts’ long-term earnings growth forecasts reported by IBES for the last month of the respective fiscal year.

To test whether higher growth firms have greater estimates of discretionary accruals, I estimate the following equation:

$$DA_i = a_0 + a_1 \text{ROA} + a_2 \text{GROWTH} + \varepsilon_i,$$

where $DA_i$ is the discretionary accrual estimate from model $i$, where $i = J$ indicates the Jones model and $i = MJ$ indicates the modified Jones model. The model tests for an association between discretionary accrual estimates and GROWTH after controlling for return on assets, ROA.

Descriptive statistics and data on the correlations among the dependent and explanatory variables are in Table 3. The data indicate that the mean accrual is 1.53% of start-of year total assets. The mean Jones model nondiscretionary accrual estimate, $\text{NDA}_J$, is 1.34% of beginning total assets, and the mean Jones model discretionary accrual estimate, $\text{DA}_J$, is 0.19%. The mean modified Jones model nondiscretionary accrual estimate, $\text{NDA}_{MJ}$, is 1.13% of beginning total assets, and the mean modified Jones model discretionary accrual estimate, $\text{DA}_{MJ}$, is 0.40%. The mean analysts’ earnings growth estimate, GROWTH, is 17.04% with a median of 15.0%. Average return on assets, ROA, for sample firms is 1.59% with a median of 3.8%. The average change in sales, $\Delta \text{SALES}$, is 10.22% of beginning total assets, and the median is 6.85%.

Panel B of Table 3 presents correlations between accruals variables and explanatory variables, with Pearson correlations on the upper diagonal and Spearman correlations on the lower diagonal. The panel indicates that ACCRUALS is significantly positively correlated with GROWTH, ROA and $\Delta \text{SALES}$. Furthermore, the estimated nondiscretionary and discretionary components of ACCRUALS are also significantly correlated with GROWTH and ROA. Furthermore, $\text{DA}_{MJ}$, the modified Jones model discretionary

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23 Both discretionary accrual estimates are scaled by beginning total assets.
Table 3  
Descriptive statistics and correlations between accruals measures and performance variables

Panel A: Descriptive statistics for selected variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>n</th>
<th>Mean</th>
<th>S.D.</th>
<th>Median</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCRUALS</td>
<td>27,158</td>
<td>0.0153</td>
<td>0.1210</td>
<td>0.0094</td>
</tr>
<tr>
<td>NDAJ</td>
<td>27,158</td>
<td>0.0134</td>
<td>0.0577</td>
<td>0.0065</td>
</tr>
<tr>
<td>DAJ</td>
<td>27,158</td>
<td>0.0019</td>
<td>0.1065</td>
<td>0.0008</td>
</tr>
<tr>
<td>NDAMJ</td>
<td>27,158</td>
<td>0.0113</td>
<td>0.0537</td>
<td>0.0054</td>
</tr>
<tr>
<td>DAMJ</td>
<td>27,158</td>
<td>0.0040</td>
<td>0.1121</td>
<td>0.0018</td>
</tr>
<tr>
<td>GROWTH</td>
<td>27,258</td>
<td>0.1704</td>
<td>0.1047</td>
<td>0.1500</td>
</tr>
<tr>
<td>ROA</td>
<td>50,449</td>
<td>0.0159</td>
<td>0.1385</td>
<td>0.0380</td>
</tr>
<tr>
<td>ΔSALES</td>
<td>78,982</td>
<td>0.1022</td>
<td>0.2754</td>
<td>0.0685</td>
</tr>
</tbody>
</table>

Panel B: Correlations between accruals and performance variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>ACCRUALS</th>
<th>NDAJ</th>
<th>DAJ</th>
<th>NDAMJ</th>
<th>DAMJ</th>
<th>GROWTH</th>
<th>ROA</th>
<th>ΔSALES</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCRUALS</td>
<td>1.0000</td>
<td>0.4741</td>
<td>0.8789</td>
<td>0.3806</td>
<td>0.8965</td>
<td>0.1923</td>
<td>0.2962</td>
<td>0.3216</td>
</tr>
<tr>
<td>NDAJ</td>
<td>0.3896</td>
<td>1.0000</td>
<td>-0.0032</td>
<td>0.9473</td>
<td>0.0577</td>
<td>0.2671</td>
<td>0.3229</td>
<td>0.6851</td>
</tr>
<tr>
<td>DAJ</td>
<td>0.8335</td>
<td>-0.0547</td>
<td>1.0000</td>
<td>-0.0809</td>
<td>0.9870</td>
<td>0.0742</td>
<td>0.1533</td>
<td>-0.0058</td>
</tr>
<tr>
<td>NDAMJ</td>
<td>0.2994</td>
<td>0.9463</td>
<td>-0.1358</td>
<td>1.0000</td>
<td>-0.0684</td>
<td>0.2375</td>
<td>0.2806</td>
<td>0.6179</td>
</tr>
<tr>
<td>DAMJ</td>
<td>0.8610</td>
<td>0.0043</td>
<td>0.9856</td>
<td>-0.1019</td>
<td>1.0000</td>
<td>0.1038</td>
<td>0.1783</td>
<td>0.0510</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Variable</th>
<th>Value</th>
<th>Value</th>
<th>Value</th>
<th>Value</th>
<th>Value</th>
<th>Value</th>
<th>Value</th>
<th>Value</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>GROWTH</td>
<td>0.2199</td>
<td>0.3533</td>
<td>0.0699</td>
<td>0.3315</td>
<td>0.0963</td>
<td>1.0000</td>
<td>0.0420</td>
<td>0.3240</td>
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</tr>
<tr>
<td>ROA</td>
<td>0.2989</td>
<td>0.3926</td>
<td>0.1237</td>
<td>0.3544</td>
<td>0.1520</td>
<td>0.1931</td>
<td>1.0000</td>
<td>0.3560</td>
<td></td>
</tr>
<tr>
<td>ΔSALES</td>
<td>0.3245</td>
<td>0.7794</td>
<td>-0.0187</td>
<td>0.7297</td>
<td>0.0348</td>
<td>0.4053</td>
<td>0.4420</td>
<td>1.0000</td>
<td></td>
</tr>
</tbody>
</table>

Variable definitions:

ACCRUALS: the changes in working capital accounts as disclosed on the statement of cash from operations, measured as the increase in accounts receivable (COMPUTAT data item #302) plus the increase in inventory (#303) plus the decrease in accounts payable and accrued liabilities (#304) plus decrease in taxes accrued (#305) plus the increase (decrease) in other assets (liabilities) (#307), deflated by beginning total assets.

NDAJ: predicted value of accruals from the Jones model estimated by two-digit industry and year.

DAJ: residual from cross-sectional estimation by two-digit industry and year of the Jones model.

NDAMJ: predicted value of accruals from the modified Jones model estimated by two-digit industry and year.

DAMJ: residual from cross-sectional estimation by two-digit industry and year of the modified Jones model.

GROWTH: the median of analysts’ long-term growth forecast as reported by I/B/E/S for the last month of the fiscal year.

ROA: return on assets, measured as income before extraordinary items (data item #123) scaled by beginning total assets (COMPUSTAT data item #6).

ΔSALES: change in sales (data item #12) deflated by beginning total assets (data item #6).

Panel B shows the Pearson (Spearman) correlation between the respective variables on the upper (lower) diagonal. The second line indicates the two-tailed probability value that the correlation is equal to zero and the third line indicates the number of observations available for calculating the correlation.
accrual estimate is significantly positively correlated with ΔSALES. This arises because the estimation approach assumes all increases in receivables are discretionary, so firms with the greatest increase in sales have larger discretionary accrual estimates.

The estimation results for Eq. (1) are in Table 4. Panel A presents the findings for discretionary accrual estimates from the Jones model and Panel B presents the findings for the modified Jones model. The findings indicate, consistent with DSS and Kasznik (1999), that discretionary accrual estimates are significantly positively associated with return on assets, ROA. The coefficient estimate is 0.0817, with a t-statistic of 26.342. The findings also indicate that discretionary accrual estimates are significantly positively associated with GROWTH, analysts’ long-term earnings growth forecasts, with a coefficient of 0.0426 and a t-statistic of 7.942. After controlling for ROA, GROWTH continues to have incremental explanatory power, as evidenced by its coefficient of 0.0473 and t-statistic of 7.837. These findings indicate that growth firms are likely to exhibit positive discretionary accrual estimates, and that a comparison of their estimated discretionary accruals to those of firms with lower growth can lead to a conclusion of greater earnings management by these firms. It is possible that growth firms are more likely to manipulate their earnings.

Table 4
Estimation results from regression of discretionary accrual proxies on return on assets, analysts’ consensus long-term earnings growth forecasts

\[ \text{DA}_i = a_0 + a_1 \text{ROA} + a_2 \text{GROWTH} + \epsilon_i. \]  

### Panel A: Estimation results for cross-sectional Jones model discretionary accrual proxy

<table>
<thead>
<tr>
<th>Estimation</th>
<th>Intercept</th>
<th>ROA</th>
<th>GROWTH</th>
<th>Adjusted ( R^2 )</th>
<th>( F )-value(^b)</th>
<th>( n )</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.0013</td>
<td>0.0817</td>
<td>0.0327</td>
<td>693.894</td>
<td>20,517</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(2.998)</td>
<td>(26.342)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>-0.0022</td>
<td>0.0426</td>
<td>0.0065</td>
<td>63.070</td>
<td>9482</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(-2.028)</td>
<td>(7.942)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>-0.0059</td>
<td>0.0473</td>
<td>0.0146</td>
<td>62.718</td>
<td>8335</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(-5.052)</td>
<td>(7.837)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Panel B: Estimation results for cross-sectional modified Jones model discretionary accrual proxy

<table>
<thead>
<tr>
<th>Estimation</th>
<th>Intercept</th>
<th>ROA</th>
<th>GROWTH</th>
<th>Adjusted ( R^2 )</th>
<th>( F )-value(^b)</th>
<th>( n )</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>0.0026</td>
<td>0.0980</td>
<td>0.0447</td>
<td>791.550</td>
<td>20,517</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(5.229)</td>
<td>(28.135)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>-0.0022</td>
<td>0.0577</td>
<td>0.0109</td>
<td>105.764</td>
<td>9475</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(-1.911)</td>
<td>(10.284)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>-0.0078</td>
<td>0.0668</td>
<td>0.0280</td>
<td>97.097</td>
<td>8347</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(-6.372)</td>
<td>(10.151)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\(^a\)See variable definitions in Table 3.

\(^b\)The \( F \)-values for models 1–6 are significant with probability values less than 0.0001.
However, my findings indicate that without explicitly partitioning on any incentive variable, firms with higher growth in earnings have higher discretionary accruals.

The estimation results for the modified Jones model are consistent with and slightly stronger than those for the Jones model. Specifically, after controlling for earnings performance, the coefficient on GROWTH is 0.0668 with a $t$-statistic of 10.151. These findings indicate that researchers comparing firms that differ in earnings performance or growth characteristics may well observe (or not observe) differences in estimated discretionary accruals that relate to the performance characteristics of these firms rather than their incentives to manage earnings. Some of the contexts examined in the prior literature that might be correlated with performance, growth or both include asset impairments, lawsuits, rising oil prices for oil and gas firms, management buyouts, mergers and acquisitions, and initial public and seasoned equity offerings.

6. Research design issues of specific accruals tests for earnings management

An alternative to taking an aggregate accruals approach is to model a specific accrual or a set of specific accruals on an individual basis. There are advantages and disadvantages to this approach relative to the aggregate accruals approach. First, the researcher can develop intuition for the key factors that influence the behavior of the accrual, exploiting his or her knowledge of generally accepted accounting principles. Second, a specific accrual approach can be applied in industries whose business practices cause the accrual in question to be a material and a likely object of judgment and discretion. A specific industry setting can also provide insight on variables to control to better identify the discretionary component of a given accrual. Third, one can estimate the relation between the single accrual and explanatory factors directly. If different components of aggregate accruals relate differently to change in sales, for example, aggregation can induce estimation error in parameter estimates.

There are three potential disadvantages to using a specific accruals approach. First, it is crucial that the specific accrual reliably reflect the exercise of discretion. If it is not clear which accrual management might use to manipulate earnings, then the power of a specific accrual test for earnings management is reduced. Furthermore, if the aim of the research is to identify the magnitude of manipulation on earnings, rather than to test whether it is associated with hypothesized factors, then one would require a model for each specific accrual likely to be manipulated by management. Second, specific accruals approaches generally require more institutional knowledge and data than aggregate accruals approaches. This raises the cost of applying such approaches. Third, the number of firms for which a specific accrual is managed may be small relative to the number of firms with aggregate accruals. This may limit the
generalizability of the findings of specific accruals studies, and may preclude identification of earnings management behavior if specific accruals are not sufficiently sensitive.

Given the above trade-offs, the researcher’s goal is to identify contexts where the incentives to manage earnings are of interest and reliable and powerful measures of earnings management can be identified. Several studies taking a specific accruals approach have attempted to do so by focusing on a specific industry or set of industries. For example, McNichols and Wilson (1988) choose industries with the highest ratios of receivables to total assets and the largest number of firms in the industry: publishers, business services and nondurable wholesalers. The first criterion serves to identify firms for which the allowance for uncollectibles is likely a material account and the second serves to identify industries with a sufficiently large number of firms to permit reliable model estimation. A number of studies focus on discretion in loan loss provisions in the banking industry. These studies include Beaver et al. (1989), Moyer (1990), Scholes et al. (1990), Wahlen (1994), Beatty et al. (1995), Collins et al. (1995), and Beaver and Engel (1996). A distinctive feature of each of the above studies is the use of generally accepted accounting principles to specify what the nondiscretionary component of an accrual should be.

Petroni (1992) identified the loss reserves of property and casualty insurers as an ideal context for application of a specific accruals approach. Two factors contribute to this: First, the claim loss reserve is a very material accrual for this industry. Second, unique disclosures required by the SEC allow the researcher to identify how reserve estimates initially reported correspond to ex post outcomes. Petroni’s (1992) study, and subsequent studies by Beaver and McNichols (1998), Penalva (1998), Nelson (2000), Petroni et al. (2000) and Beaver et al. (1999), exploit these unique disclosures to test hypotheses about earnings management. Specifically, the disclosures allow the researcher to identify firms that ex post under- or over-reserved, and to test hypotheses about the factors motivating this behavior. Access to this measure greatly mitigates concern about measurement error in the discretionary accrual proxy being correlated with the partitioning variable because of the transparency of the measure.

For example, Petroni (1992, pp. 498–499) documents that financially weak insurers tend to underestimate loss reserves relative to companies exhibiting greater financial strength. Gaver and Paterson (2000) build on these findings to examine the influence of regulation of insurance company financial reporting on financial statement manipulation. Specifically, Gaver and Paterson hypothesize and find that accreditation of states’ financial reporting require-

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24 For example, the provision for losses is 72% of premiums earned by firms in Beaver and McNichols’ (1998) sample.
ments, which requires an annual audit and establishes minimum standards for loss reserves, is associated with significantly less under-reserving by financially weak insurers. Beaver and McNichols (1998, pp. 78–79) propose serial correlation in year-by-year loss reserve errors as an indication of loss reserve manipulation, because unbiased reserve estimates by management should result in serially uncorrelated reserve errors. They find strong evidence of manipulation in loss reserves, with the median firm exhibiting serial correlation in reserve errors of 0.59. Petroni et al. (2000) model both the nondiscretionary and discretionary components of loss reserve revisions. They draw on data on the nature and amount of insurance coverage written each year to identify non-discretionary revisions, and incentive variables to identify discretionary revisions.

In my view, the studies in the banking and property and casualty insurance industries provide strong evidence of earnings management. While the institutional contexts may limit generalizability to other industries, and the issue of classifying discretionary and nondiscretionary behavior remains, grounding the research in a more focused institutional setting can provide greater insight and structure regarding the nature of likely correlated omitted variables. The strength of these findings suggests that the specific accruals approach may be profitably applied to study other industries for which discretion is likely to be concentrated in a single or small number of accruals.

In contrast to the above studies, Beneish (1997) develops a model based on several specific accruals, focusing on firms from a number of industries. He uses a sample of firms identified by the SEC as generally accepted accounting principle violators to calibrate alternative measures of earnings management. Beneish (1997, pp. 282–288) develops a model to identify earnings management which is based on a number of financial statement ratios, several of which relate to specific accruals such as receivables, inventory and accounts payable. What is distinctive about his approach is that a richer information set is utilized to identify variation in the levels of these specific accruals. Although he focuses on several accruals, the modeling of each accrual’s behavior is done separately, rather than for the aggregate. In addition, the ability of the various accruals to identify GAAP violations is assessed account by account, allowing for variation in the exercise of discretion across accruals. There seems to be great potential to apply this approach further, with more extensive modeling of the behavior of specific accruals. One could also focus on a specific accrual or set of accruals by focusing on industry settings where those accruals are most material.

7. Research design issues in distributional tests for earnings management

Recent studies by Burgstahler and Dichev (1997), hereafter BD, and De-george et al. (1999), hereafter DPZ, contribute an innovative approach to
testing for earnings management, by focusing on the density of the distribution of earnings after management. They both suggest that if firms have greater incentives to achieve earnings above a benchmark, then the distribution of earnings after management will have fewer observations than expected for earnings amounts just below the threshold, and more observations than expected for earnings just above the threshold. Their empirical evidence bears this out, in that both studies find significantly more observations than expected in the range above zero earnings, and in the range above the prior period’s earnings.²⁵ The visual representations of the earnings distributions in BD and DPZ suggest earnings are managed to meet earnings targets, particularly to achieve positive earnings.

A noteworthy feature of the BD and DPZ designs is that the power of their approach comes from the specificity of their predictions regarding which group of firms will manage earnings, rather than from a better measure of discretion over earnings. These studies measure discretion over earnings as the behavior of earnings after management, which no doubt includes discretionary and nondiscretionary components. However, it seems implausible that the behavior of the nondiscretionary component of earnings could explain such large differences in the narrow intervals around their hypothesized earnings targets. Stated differently, measurement error in their proxy for discretionary behavior seems unlikely to be correlated with their partitioning variable.

BD and DPZ parallel DSS and Bradshaw et al. (1999), which focus on firms subject to SEC enforcement actions, by identifying firms manipulating earnings and then examining hypotheses about management’s incentives and methods of managing earnings. In contrast, the designs of many prior studies rest on the joint hypotheses that firms manage earnings in response to specified factors and that the proxy for discretion over earnings is sufficiently sensitive to detect it. BD and DPZ provide a powerful tool to the earnings management arsenal in that they identify contexts in which large number of firms appear to manage earnings. The approach also provides an indication of the frequency of manipulation, though this rests on an assumption about the distribution of earnings absent manipulation. As BD indicate, the assumption that the expected frequency in a given region is the average of the observed frequencies in the adjacent regions of the earnings distribution is not valid for the distribution of earnings after manipulation. This occurs because manipulation may have affected the adjacent regions around the hypothesized benchmark, and because manipulation may be reflected in other regions of the distribution.

The distribution approach per se is silent on the approach applied to manipulate earnings. However, hypotheses about the form of manipulation can be tested for sample firms identified as earnings manipulators using the distribution approach. Myers and Skinner (1999), in the spirit of the earnings distribution approach, test whether the frequency of consecutive quarterly earnings increases is greater than would be expected by chance, and find that it is. Furthermore, they examine the correlation between cash flows and accruals for these firms and their use of special items, to provide evidence on the ways these firms manage earnings. Beatty et al. (1999) examine differences in the incentives of private and public banks to manage earnings around zero and find evidence supporting their hypothesis that public banks have greater incentives to manage earnings. Beaver et al. (2000) examine the earnings management incentives of public and private property and casualty insurance firms, and find that they both avoid losses. Furthermore, Beaver et al. (2000) document that loss reserves are understated for firms just achieving positive profits, and overstated for firms with greater profitability.

The distribution approach is also silent on the incentives for management to achieve specific benchmarks. How these incentives vary across firms, and what targets might be appropriate in different contexts are important questions for future research. A better understanding of why managers manipulate earnings will allow researchers to assess the power of alternative earnings management tests, and ultimately strengthen our understanding of the implications of earnings management for investors and other contracting parties.

8. Where to go from here

Although the trade-offs an earnings management researcher faces depend on the question addressed, the objective of the research often focuses on understanding whether earnings are being managed in a given context, how they are managed and the incentives that shape the environment for discretionary behavior. As such, the researcher aims to identify contexts where the incentives to manage earnings are of interest and reliable and powerful measures of earnings management can be applied.

This review argues that earnings management measures based on the Jones and modified Jones model approach are not sufficiently powerful or reliable to assess earnings management behavior in many contexts likely to be of interest to accounting researchers, standard letters and analysts. I provide evidence of possible misspecification of these models, which have been used extensively in the literature to identify discretionary behavior. Specifically, I conjecture that firms with greater expected earnings growth are likely to have greater accruals.
than firms with less expected earnings growth. Furthermore, this effect is not controlled by the current year change in sales and therefore estimated discretionary accruals using the Jones and modified Jones models are significantly associated with analysts’ projections of long-term earnings growth. This finding holds after controlling for return on assets, which has been shown by Dechow et al. (1995) and Kasznik (1999) to be significantly associated with estimated discretionary accruals. My findings raise questions about the findings of prior studies whose partitioning variables are correlated with earnings growth.

Further progress in this literature depends on our ability to understand the set of actions managers take to achieve a given earnings objective. The practical relevance of such an understanding is important both to regulators and securities analysts. In this vein, I believe that future contributions to the earnings management literature will come from papers that model the behavior of specific accruals with and without manipulation. I think this approach has greater potential to develop measures of earnings management that are both responsive to earnings management and whose measurement error is uncorrelated with partitioning variables of interest. This approach also allows the development of tests that are well grounded in the institutional specifics of those accruals and can provide greater insight into how accruals are managed. This may ultimately lead to alternative reporting standards and analysis techniques that better permit investors to evaluate firm performance. It seems more likely that such measures can be developed in industry-specific contexts or for specific accruals. However, given the strong interest in aggregate accruals, there is certainly a high pay-off to more meaningful characterization of the behavior of aggregate accruals as well. At either the aggregate or specific accrual level, our comparative advantage as accounting academics is to understand how accounting numbers reflect underlying transactions and to interpret financial statement relationships.

I believe that future contributions to the earnings management literature will also come from papers that exploit the distributional properties of earnings and other components to identify behavior consistent with earnings management. A significant element of these designs is a strong prediction about the behavior of earnings around the target which is not plausibly due to nondiscretionary forces. This approach also has the potential of allowing the researcher to study how earnings are managed for samples of firms identified as likely to increase or decrease earnings based on their ex post earnings after management.

There is also a need for further research on the factors that motivate managers to manipulate earnings, and for this understanding to be better reflected in our empirical methods. Although the literature generally assumes that discretion is orthogonal to nondiscretionary accruals, this is
counter to many models of management incentives to exercise discretion. Estimation techniques that estimate discretion relative to a firm’s past behavior or in comparison to other firms may also be problematic if the earnings management behavior in the comparison group is not well understood.

Finally, there is a gap between our institutional knowledge and our empirical procedures. Even with a general characterization of the behavior of accruals absent discretion, there is far more richness in the behavior of accruals than simple models allow. My paper overviewed several issues in the context of accounts receivable that can affect the identification of discretionary behavior from a regression of the change in receivables on change in sales. There is the potential to reduce this gap through the use of richer research designs and measures of discretionary behavior which condition on more information than the prior literature has attempted.

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Appendix A. Papers published on earnings management from 1993 to 1998


References


