Discussion of Detecting Earnings Management: A New Approach

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1. Introduction

Despite the large number of papers purporting to identify earnings management, the current techniques used to identify it are sorely lacking. In general, they are based on the assumption that accruals unexplained by a linear projection on firm-level observables (i.e., discretionary accruals) represent either explicit earnings management or poor quality earnings. Namely, these techniques assume that the residual from a linear regression represents earnings management. They suffer from measurement error and correlated omitted variables, which lead to Type 1 errors (i.e., rejection of a true null hypothesis of no earnings management) and Type 2 errors (i.e., failure to reject a false null hypothesis of no earnings management). Furthermore, they are typically estimated in the cross section and therefore do not take into account the fact that earnings (and its components) are best described by dynamic processes. These techniques have not

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1 Such models include Jones [1991], Dechow and Dichev [2002], and their myriad progeny. To a certain extent, all of these models can be classified as “deterministic” models of accruals because they specify nondiscretionary accruals as a linear function of observables.
significantly changed in over 20 years. Nevertheless, they are the “state of the art” in accounting research.

Dechow, Hutton, Kim, and Sloan [2012] (henceforth “DHKS”) propose a novel method to identify accruals-based earnings management. Their approach is based on the concept that “any accruals-based earnings management in one period must reverse in another period.” The concept that accruals-based earnings management eventually reverses appears to be relatively uncontroversial—eventually there should be ex post settling up of accruals-based manipulation. By taking into account accrual reversals, their method could potentially increase statistical power, better control for correlated omitted variables, and actually model the dynamics of earnings and accruals. DHKS therefore motivate their technique as a much needed innovation to accounting research that can be used by both academics and practitioners to establish “the existence of earnings management in historical data.”

The study’s goal is ambitious. Moreover, the specification and empirical tests are a much needed step in the right direction. DHKS therefore provide a significant contribution to the literature on earnings management that may spur much needed progress in this important area. This progress is likely to be driven by research that addresses several fundamental questions about identifying accruals-based earnings management that neither DHKS nor prior research adequately address. I discuss these questions in what follows.

Earnings are best described by a firm-level dynamic process, and accruals, as a component of earnings, are also likely to be generated by a firm-level dynamic process. The first question is therefore what is the stochastic process that best describes unmanaged accruals. Namely, absent manipulation what are the statistical properties of accruals? This question is fundamental because its answer represents the null hypothesis (i.e., the statistical properties of nondiscretionary accruals) in any accruals-based earnings management study. Although hundreds of accounting studies purport to identify accruals-based earnings management, the literature is basically silent on what we should expect to see for unmanaged accruals. The literature assumes that nondiscretionary accruals are a linear (nonstochastic) function of several firm characteristics. Using this assumption, the literature then tests the level of discretionary accruals against a null hypothesis of zero. The DHKS method does not address the issue of what the statistical properties of unmanaged accruals are and instead relies on the prior deterministic models to decompose accruals into discretionary and nondiscretionary components.

The second question is what are the dynamic properties of manipulated accruals. DHKS acknowledge that their technique relies on the traditional deterministic models to estimate discretionary accruals. But, they posit that, by capturing the dynamics of accrual reversals, their technique addresses many of the problems associated with the traditional methods (e.g.,
measurement error and correlated omitted variables). Their approach, however, does not test whether firm-specific accrual reversals are greater for firms suspected of earnings management. Instead, it only captures whether there are group-level differences in the levels of discretionary accruals in the periods that accruals-based earnings management occurs and reverses. This group-level specification therefore does not necessarily remove firm-level correlated omitted variables. It is important to note that nothing in their technique relies on or identifies firm-specific reversals in discretionary accruals.

The final question is how can a researcher identify or specify priors for the periods in which accruals-based earnings management occurs and reverses. DHKS provide no guidance on this question. Instead, their approach assumes that the researcher knows the periods in which earnings management occurs and reverses. Knowing these periods, a researcher can use the DHKS method to confirm earnings management. Their approach is therefore useful when working with samples of firms with “known” manipulation, such as firms subject to SEC Accounting and Auditing Enforcement Releases (AAERs).

This confirmation aspect of DHKS may, however, be detrimental to the literature because it risks providing researchers with many degrees of freedom to identify earnings management. Namely, there are an infinite number of reversal periods and patterns that can be tested until statistical significance is achieved. These degrees of freedom are likely to spur lengthy and potentially unresolvable debates among authors, reviewers, editors, and workshop participants about the “correct” periods and patterns for manipulation and its reversal.

Overall, it is clear that accruals-based earnings management occurs. The AAER sample used in DHKS provides ample examples of such activity. Moreover, accruals-based earnings management likely imposes significant costs on society. DHKS contribute to the accounting literature by presenting a method that improves academic methods to identify accruals-based earnings management. But, their method is incomplete and suffers from many of the same issues that plague the traditional methods used to identify accruals-based earnings management. Most importantly, their method relies on researchers knowing exactly the periods in which accruals are managed and reversed. Nevertheless, DHKS is an important step in treating accruals-based earnings management as a dynamic process.

In what follows, I briefly review the DHKS method. I next discuss several fundamental unanswered questions and how they relate to DHKS. I follow by examining the two points about accruals raised in DHKS: the source of errors in the estimation of discretionary accruals and the serial correlations of discretionary and nondiscretionary accruals. I then discuss several points raised by Conference participants and conclude by suggesting areas for future research.
2. The DHKS Method

DHKS motivate their technique by reviewing the well-known problems arising from the traditional methods used to estimate discretionary accruals. Namely, these methods measure discretionary accruals with error. These errors can arise from nondiscretionary accruals that are unintentionally included in estimates of discretionary accruals and from discretionary accruals that are unintentionally removed from estimates of discretionary accruals. These errors can attenuate and/or bias estimates of earnings management. Whether they induce Type 1 or Type 2 errors depends on whether they are correlated with the variable used to identify firms suspected of managing earnings (the “partitioning variable”).

2.1 SPECIFICATION

To address these problems with traditional discretionary accruals estimates, DHKS propose a parsimonious and easy-to-implement method. It involves regressing discretionary accruals \( DA_{i,t} \) on two partitioning variables: the first partitioning variable \( PART_{i,t} \) is coded as 1 for firm-years in which accruals-based earnings management is posited to occur, and 0 otherwise; the second partitioning variable \( PARTP_{1,i,t} \) is coded as 1 for firm-years in which accruals-based earnings management is posited to reverse, and 0 otherwise. The following regression is to be estimated as a pooled cross section

\[
DA_{i,t} = a + bPART_{i,t} + cPARTP_{1,i,t} + \varepsilon_{i,t}.
\]  

(1)

The researcher then identifies earnings management by rejecting the null hypothesis that \( b - c = 0 \). In essence, DHKS update the McNichols and Wilson [1988] specification of

\[
DA_{i,t} = a + bPART_{i,t} + \varepsilon_{i,t}.
\]

by adding an additional partitioning variable.

To estimate discretionary accruals, DHKS propose that researchers use the standard traditional methods: the Healy [1985] model, the Jones model, the modified Jones model, the Dechow–Dichev model, and the McNichols [2002] model. DHKS attempt to address the well-known problems with these methods by specifying a null hypothesis of the equality of the estimated coefficients, \( b - c = 0 \). This specification controls for correlated omitted variables that are constant across the manipulation and reversal periods. Such “constant” correlated omitted variables should lead to an equality of the coefficients. Moreover, DHKS specify the test statistic so that it allows researchers to classify accruals reversals as either income increasing or income decreasing. To do so, they propose that researchers check, conditional on the difference being statistically significant, the sign of the difference between the coefficients: \( b - c > 0 \) indicating upward earnings management; \( b - c < 0 \) indicating downward earnings management.
2.2 EMPIRICAL VALIDATION

To validate their method the authors replicate Dechow, Sloan, and Sweeney [1995] and compare their approach with the performance-matched discretionary accruals method of Kothari, Leone, and Wasley [2005].

After specifying the various methods to estimate discretionary accruals, the authors carry out a battery of tests to estimate their method’s Type 1 and Type 2 error rates. To start, they randomly assign firm-years as years in which accruals-based earnings management is hypothesized to occur. Doing so, they carry out a large number of simulations to estimate their method’s Type 1 error rate. In general, they convincingly show that, when applied to the broad sample of Compustat firms, their method produces a Type 1 error rate within typically acceptable ranges. On average, the rate is around 5% and not above 10% in any of their specifications.

They next randomly seed earnings management by adding and reversing a constant to discretionary accruals and then running their pooled cross-sectional regression with the partitioning variables. They show that their method appears to have reasonable power to detect accruals-based earnings management when the researcher knows exactly the periods in which earnings management occurs and reverses. In their third set of tests, the authors apply their technique to firms subject to AAERs. Once again, they show that their method has reasonable power to detect accruals-based earnings management.

Finally, the authors examine whether their approach is robust to correlated omitted variables by testing error rates on observations from the highest and lowest decile of portfolios of firm-years based on extreme events and firm characteristics such as earnings, sales growth, size, cash flows, and earnings growth.

Overall, these tests are well executed and are consistent with the DHKS method, having reasonable power and low rates of false positives compared to other commonly used methods.

3. Fundamental Questions

The DHKS method provides a much needed improvement to the traditional methods used to identify accruals-based earnings management. Nevertheless, there are several fundamental questions related to both the nature of earnings and accruals and to detecting accruals-based earnings management that neither DHKS nor prior literature adequately address. In this section I discuss these questions and how they relate to the DHKS method.

3.1 PROPERTIES OF NONDISCRETIONARY ACCRUALS

Since Dechow and Dichev [2002] there has been virtually no improvement in the techniques used to partition accruals into discretionary and nondiscretionary components. As I mentioned in the previous section,
DHKS provide no progress on this dimension. Instead, DHKS rely on the deterministic methods of prior research that assume that any accruals unexplained by a linear projection on firm characteristics represent earnings management. Such linear projections do not capture the fact that earnings are generated by a stochastic process. Moreover, even in the absence of manipulation, accruals are likely stochastic.\(^2\) This point raises several important questions. What are the properties of shocks to the accrual process? How and why do these shocks translate into nondiscretionary accruals? These questions are fundamental because the stochastic properties of nondiscretionary accruals represent the null hypothesis of any accruals-based earnings management test.

3.2 DYNAMICS OF DISCRETIONARY ACCRUALS

The second question is what are the stochastic properties of discretionary accruals. Namely, what are the dynamic properties of accruals-based manipulation and its reversal? What should we expect to see if accruals are manipulated? How should they reverse? What would be the stochastic properties of reversals?

Although DHKS rely on the traditional deterministic methods to partition accruals into nondiscretionary and discretionary components, the authors claim that, because their method specifies and estimates accrual reversals, it addresses many of the criticisms of these traditional methods. Namely, they posit that their additional partitioning variable captures correlated omitted variables that are constant over the manipulation and reversal periods. By capturing these correlated omitted variables, their method should increase statistical power and decrease Type 1 and Type 2 errors.

The underlying and motivating assumption of DHKS is that accruals-based earnings management is a firm-level dynamic process that involves reversals. This assumption is probably uncontroversial for most accounting researchers. However, their method neither specifies nor captures a firm-level dynamic process of accrual reversals. Instead, it tests restrictions on the coefficients on \(PART_{i,t}\) and \(PARTP1_{i,t}\): whether the equality of their estimated coefficients, \(b - c = 0\), can be rejected. Specifically, it tests whether the mean discretionary accrual of firms for which \(PART_{i,t} = 1\) is significantly different from the mean discretionary accrual for those same firms when \(PARTP1_{i,t} = 1\).

This group-level specification is problematic. It does not capture firm-level reversals, which is the construct used to motivate DHKS, and is therefore subject to misspecification. For example, if \(PART_{i,t}\) includes a firm with an extreme positive realization and \(PARTP1_{i,t}\) includes another firm that has an extreme negative realization, then the DHKS method will identify earnings management even though there was no abnormal firm-specific

\(^2\) If accruals were deterministic, then it would be straightforward to map cash flows into unmanipulated earnings.
reversal of discretionary accruals. Similarly, the method only captures correlated omitted variables if they are at the group level. Unlike a firm-level fixed-effect specification, it does not remove firm-level correlated omitted variables that are invariant over the sample period.

Given these issues, one Conference participant suggested that a better specification would be to show that the firm-specific changes (i.e., reversals) in discretionary accruals for firms posited to have engaged in accruals-based earnings management are significantly greater than the changes for firms posited to not have managed earnings. Such a specification would presumably have greater power to identify earnings management and would be closer to modeling the dynamics of both the earnings and accruals processes. Modeling and estimating such firm-level accrual reversals provides significant opportunities for future research.

3.3 SPECIFYING A PRIOR

The third fundamental question is how can researchers identify periods of accruals-based earnings management and its reversal. DHKS provide no guidance for this question. It instead provides researchers with the flexibility to match reversals with their “priors.” The authors state their method can significantly improve the specification and power of earnings management tests if “the researcher has reasonable priors concerning the period(s) in which the hypothesized earnings management is expected to reverse.” The term “prior” implies uncertainty. Although the authors use the term “prior” many times in the manuscript, nowhere do they specify or allow for a prior distribution over the periods in which accruals-based earnings management reverses. What if researchers have an actual prior about when earnings management occurred and reversed? Namely, what if the researcher is uncertain on a firm-specific basis about the periods in which earnings management occurs and reverses? Such uncertainty is probably more descriptive of most earnings management studies than exact knowledge of the patterns and reversals of manipulation.

One Conference participant raised the question of whether the DHKS method could provide unscrupulous researchers with a carte blanche to keep trying different combinations of reversal periods and patterns until they reject the null hypothesis of no accruals-based earnings management. Namely, does the method provide researchers with the flexibility to keep testing different reversal periods and patterns until statistical significance is achieved? Or, in other words, does statistical significance determine the reversal periods and patterns? This is a legitimate concern, given that the study provides no direction on how to specify the periods and patterns in which accruals-based earnings management occurs and reverses. Given these issues, the DHKS method may lead to endless and potentially irresolvable debates both in workshops and in communications between authors, reviewers, and editors about the correct specification of reversal periods and patterns. Just as the method could allow authors to “data mine”
until they find statistical significance, it can just as likely provide reviewers with the ability to require authors to “data mine” until statistical significance disappears.

To illustrate this point, I replicated the analysis presented in table 2 of DHKS that randomly assigns suspected firm-years to evaluate the false positive rate of their method. Specifically, I randomly assigned years in which earnings management is hypothesized to occur and then, for each random draw, I estimated seven partitioning regressions that capture the possible reversals over three years. I next calculated the frequency at which I could reject the null hypothesis for at least one of the seven regressions. I did so for each method used by DHKS to estimate discretionary accruals. For this analysis, I find that I can reject the null hypothesis between 36% and 38% of the time (Healy, 36.3%; Jones, 37.4%; Modified Jones, 36.2%; Dechow-Dichev, 38.2%; McNichols, 38.4%). Effectively, the false-positive rate scales linearly with the number of regressions that are run, illustrating the potential to use statistical significance to determine the reversal periods and patterns.

4. Properties of Discretionary Accruals

Related to the questions discussed in the previous section, the DHKS method raises two important issues about the nature of discretionary accruals.

4.1 ERROR TERMS

The first issue is the source and characteristics of error terms. This issue arises from the fact that DHKS and prior methods specify nondiscretionary accruals as a deterministic process of firm-level observables and do not model the firm-level dynamics of discretionary accruals and their reversals. This point is relevant given that discretionary accruals capture most of the variance in total accruals.

To illustrate this point, in this section I discuss how the DHKS specification models these error terms and raise several questions about what generates the errors and what the statistical properties of the errors are.

DHKS and the prior methods begin with the following partitioning equation

\[ DA_{i,t} = a + bPART_{i,t} + \varepsilon_{i,t}. \]

In this equation, \( DA_{i,t} \) represents the discretionary accruals for firm \( i \) in period \( t \); \( PART_{i,t} \) is an indicator set to 1 in periods during which earnings management is hypothesized, and 0 otherwise; and \( \varepsilon_{i,t} \) is an error term.

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3 For example, over the period 1988 through 2009, the variance of total accruals is 0.009. If total accruals over this period are decomposed into discretionary and nondiscretionary accruals using the Jones model estimated in the cross-section at the industry-level the variance of discretionary accruals is five times larger than the variance of nondiscretionary accruals (0.0075 versus 0.0015).
In contrast with prior literature, DHKS actually specify the source and properties of the error term in a partitioning equation that uses perfectly measured discretionary accruals. They assume that $\varepsilon_{i,t}$ is independently and identically distributed, implying that it has no serial correlation. They also assume that the source of $\varepsilon_{i,t}$ is accruals-based earnings management not captured by $\text{PART}_{i,t}$. This assumption implies that the other forms of accruals-based earnings management are orthogonal to the type posited by the researcher, otherwise the specification will suffer from endogeneity

$$\text{cov}(\text{PART}_{i,t}, \varepsilon_{i,t}) \neq 0.$$  

I find this assumption confusing given that the authors posit that only a small percentage of firm-years involve accruals-based earnings management. What are these other forms of accruals-based earnings management that are orthogonal to $\text{PART}_{i,t}$? It is important to note that DHKS do not assume that these error terms arise from performance shocks, because if they did it is unlikely that $\text{cov}(\text{PART}_{i,t}, \varepsilon_{i,t}) = 0$.

In their specification, the authors also allow for imperfect decompositions of accruals into discretionary and nondiscretionary components. They specify a discretionary accruals proxy, $\text{DAP}_{i,t}$, that measures $\text{DA}_{i,t}$ with error

$$\text{DAP}_{i,t} = (\text{DA}_{i,t} - \mu_{i,t}) + \eta_{i,t}$$

in which $\mu_{i,t}$ represents discretionary accruals that are unintentionally removed from $\text{DAP}_{i,t}$, and $\eta_{i,t}$ represents nondiscretionary accruals that are unintentionally left in $\text{DAP}_{i,t}$. Once again, the authors (and prior research) provide limited information about the distributions of these error terms. Are $\mu_{i,t}$ and $\eta_{i,t}$ each independently and identically distributed? Are $\mu_{i,t}$ and $\eta_{i,t}$ uncorrelated? Are they both orthogonal to $\varepsilon_{i,t}$? Are they both orthogonal to the partitioning variables? Are they both serially uncorrelated?

These questions are important given that they shed light on the extent of attenuation versus bias in estimates of accruals-based earnings management and provide guidance on how to calculate standard errors when applying the DHKS method. Moreover, covariances between these error terms can increase or decrease the power of the DHKS method compared to the performance-matched discretionary accruals method that potentially removes such errors through differencing.

Given that discretionary accruals capture most of the variance of total accruals, it would greatly improve the manuscript and contribute to the literature on earnings management if the sources and characteristics of these error terms were formally explored and modeled. This is especially important given the possibility that errors are correlated with the partitioning variables commonly used in the literature.
4.2 SERIAL CORRELATIONS IN DISCRETIONARY AND NONDISCRETIONARY ACCRUALS

The DHKS method is based on two fundamental assumptions about the firm-level serial correlations of discretionary and nondiscretionary accruals. The first assumption is that unmanaged discretionary accruals are serially uncorrelated at the firm level. The second assumption is that nondiscretionary accruals are positively serially correlated at the firm level because of growth. These assumptions led to many questions and comments from Conference participants. To address these questions and comments, the authors present in the published version of the manuscript mean firm-level first-order serial correlations of discretionary and nondiscretionary accruals in table 2, panel C. As I discuss further, these results present further opportunities for future research.

When reviewing these results it is important to keep in mind that DHKS assume that the percentage of firm-years in which accruals-based earnings management is posited to occur is less than 5%. Table 2, panel C, shows that the mean firm-level first-order serial correlations for discretionary accruals are negative for four of five methods used to estimate discretionary accruals and range from $-0.08$ to $-0.206$. These results raise doubt about the assumption that, absent manipulation, the reversal of discretionary accruals should be, on average, zero. For basically the entire population of Compustat, firm-level discretionary accruals are, on average, negatively serially correlated for four of the five methods used to estimate discretionary accruals (Healy, Jones, Modified Jones, and McNichols). These results show that, for a large percentage of the Compustat population, discretionary accruals reverse, implying that testing whether $b - c = 0$ may not capture the null hypothesis of no accruals-based earnings management. They provide further support for the idea that the benchmark for an abnormal reversal should be at the firm level.

Regarding the assumption that nondiscretionary accruals are positively serially correlated, the results are mixed. They are positively correlated for the Jones and Modified Jones models but negatively serially correlated for the Dechow-Dichev and McNichols models. DHKS follow Wysocki [2009] and conjecture that the negative serial correlations in the Dechow-Dichev

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4 In table 2, panel C, the authors present two additional columns of correlations. The first presents mean firm-level serial correlations for firms subject to AAERs. The second column presents for the AAER sample the cross-sectional correlations between accruals in the last year in which earnings management is alleged to occur and the first reversal year. In general, the firm-level serial correlations for the AAER sample are less negative than for the general population. The cross-sectional correlations are more negative than for the general population, but this is not a direct comparison with the distribution of firm-level serial correlations for the Compustat sample. A direct comparison would be to randomly assign years for manipulation and reversal to the general population and then test whether the correlation between these years for the random sample is less negative than the correlation for the AAER reversal sample.
and McNichols models arise because these models classify some discretionary accruals as nondiscretionary accruals, implying that the firm-level serial correlations for discretionary accruals should be even more negative for the Dechow-Dichev and McNichols models.

Finally, these serial correlations raise an important question about the statistical significance of the AAER results. Namely, the standard errors for these tests are likely understated given that they are not adjusted for serial correlation.

5. Additional Comments

In addition to the issues discussed above, Conference participants raised many questions and issues with the DHKS method. In what follows, I discuss several of these points and questions.

First, several participants questioned the conclusion that the DHKS method dominates the performance-matched discretionary accruals approach. For example, DHKS state that the performance-matched discretionary accruals method is inferior to their method when growth is a correlated omitted variable. This may not be a fair comparison given that the performance-matched discretionary accrual method is designed to control for performance as opposed to growth.

Several Conference participants also questioned whether the estimated magnitude of discretionary accrual reversals for the AAER sample are plausible. Specifically, some participants felt that general performance could be driving the results. For example, the drops in the reversal years could be driven by negative performance shocks as opposed to the reversal of manipulation. Furthermore, the authors do not address the question of whether the reversal for the AAER sample represents the costs (e.g., legal costs) of being targeted by the SEC. Moreover, the magnitudes of the $b$ and $c$ coefficients for the AAER sample are perplexing. The tests show that the reversals are larger than the original manipulation. This could be due to reversals capturing multiple years of manipulation, firms receiving negative performance shocks, or firms incurring significant costs arising from an AAER investigation. The sources of these reversals are worthy of future inquiry.

Finally, there was an extended discussion at the Conference about the merits of firm-specific time-series estimation of discretionary accruals compared to the pooled cross-sectional approach used in the manuscript. Several participants stated that the time-series approach better controls for correlated omitted variables than does the cross-sectional approach used by the authors. Namely, the time-series approach may better control for firm-level heterogeneity in variables such as size and growth than the cross-sectional approach. The authors state that their time-series estimation reduces sample size and therefore potentially reduces the power of tests. However, it could just as easily increase power if it removes noise and omitted variables. It would be helpful to readers if the authors
provided more information about how the method works in the time series.

6. Moving Forward

DHKS contribute to the literature on identifying earnings management by making an important step in introducing dynamics to the estimation of discretionary accruals. In addition, the DHKS method raises several fundamental questions that provide opportunities for future research. For example, what stochastic process generates unmanaged earnings? To a certain extent, this question was actively researched in the 1970s before the advent of machine-readable analyst forecasts, but there has been minimal research on this topic since then. Furthermore, DHKS raise important questions about what are the statistical properties of discretionary and nondiscretionary accruals. Although there is some evidence on these questions (e.g., Hribar and Collins [2002] and Hribar and Nichols [2007]), the evidence is with respect to the cross-sectional distributions of accruals and does not examine their time-series properties. Finally, a significant opportunity for future research involves extending DHKS by specifying and estimating a structural model of the stochastic process that generates unmanaged accruals. Doing so will allow researchers to specify credible null hypotheses of no accruals-based earnings management.

REFERENCES


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5 Some notable attempts to move in this direction are by White [2009], Baber, Kang, and Li [2011], and Zakolyukina [2011].
