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Evidence that the zero-earnings discontinuity has disappeared ☆

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ABSTRACT

Discontinuities in earnings distributions at zero have been widely cited as evidence of earnings management but not without controversy. Recent research suggests discontinuities may be mere artifacts of certain research design choices. We find that the well-known zero-earnings discontinuity disappears soon after passage of the Sarbanes–Oxley Act (SOX) and has not returned. We also find that neither the discontinuity nor its disappearance require the effects of widely cited alternative (non-earnings management) explanations for the zero-earnings discontinuity.

1. Introduction

Burgstahler and Dichev (1997) document a discontinuity in the distribution of earnings at zero which they interpret as evidence that "losses are managed away." Their interpretation is relatively widespread.[1] However, the earnings management interpretation is not without controversy. Evidence in Durtschi and Easton (2005, 2009) and Dechow et al. (2003) suggests alternative (i.e., non-earnings management) explanations for the discontinuity, including the effects of scaling and sample selection. Beaver et al. (2007) conclude that the asymmetric nature of income taxes and special items contribute to the discontinuity.[2]

Significant economic change has occurred since the publication of Burgstahler and Dichev (1997). The late 1990s experienced significant economic expansion, the bursting of the dot.com bubble and economic contraction of 2000–2001, the implementation of Regulation FD in 2000, the collapse of Enron in 2001, and the passage of Sarbanes–Oxley (SOX) in 2002. In this paper, we examine the zero-earnings discontinuity over time from 1976 through 2012. Because of the importance of SOX, and because some prior research both (1) suggests a change in earnings management behavior following SOX (e.g. Cohen et al., 2008; Lobo and Zhou, 2010, 2006) and (2) interprets the zero-earnings discontinuity as evidence of earnings management (e.g., Hansen 2010; Roychowdhury 2006), we begin our investigation by examining distributions of

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[1] The importance of Burgstahler and Dichev (1997) to accounting research is difficult to overstate. It is cited in nearly 2,000 papers in Google Scholar and has been cited over 400 times in peer-reviewed journals (via a search of Business Source Complete). In 2002, the American Accounting Association acknowledged the influence of Burgstahler and Dichev's (1997) research with its Notable Contribution to Accounting Literature Award.

[2] Beaver et al. (2007) note that their results "do not imply that the discretionary component of either income taxes or special items is zero or that firms do not exercise discretion to avoid losses."

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earnings before and after 2002 (corresponding to SOX's implementation). We also construct earnings distributions in every year from 1976 through 2012. We find that the zero-earnings discontinuity disappears soon after the passage of the SOX and has not returned. Specifically, we find evidence of a zero-earnings discontinuity in every year from 1976 through 2002 but one (1980) and no evidence of a discontinuity in any year from 2003 through 2012.

Given the controversy surrounding the interpretation of the zero-earnings discontinuity, and the non-earnings management explanations offered by prior research, we conduct tests to assess whether scaling, sample selection, taxes, or special items drive the disappearance of the discontinuity. Specifically, we examine pre- and post-2002 earnings distributions after (1) eliminating the earnings scalar, (2) using a constant sample to control for selection bias, (3) replacing earnings with earnings before taxes, and (4) examining firms' earnings before special items. In each case, we find clear evidence of a zero-earnings discontinuity before 2002 and no evidence after. An implication is that neither the zero-earnings discontinuity nor its disappearance require the effects of these non-earnings management factors.[3]

We then turn our attention to whether variation in the incentive to avoid losses influences the discontinuity. Proving earnings management causes the discontinuity is difficult, if not impossible. However, prior research suggests firms with longer strings of profits have greater incentives to manage earnings to avoid losses (Barth et al., 1999; Burgstahler and Dichev, 1997; DeAngelo et al., 1996). Consistent with this, the only evidence of a post-2002 discontinuity we find is among firms with the strongest incentives to avoid losses. In other words, while on average, we cannot detect a discontinuity after 2002, we find some post-2002 evidence of a discontinuity among firms with potentially stronger incentives to manage earnings. In contrast, we find that a pre-2002 discontinuity exists regardless of the string of positive earnings. This evidence supports, albeit weakly, an earnings management interpretation of the discontinuity and a general reduction in earnings management to avoid losses after 2002.

We make the following contributions. First, we provide evidence regarding the changing nature of an important earnings benchmark in the post-2002 period. By studying each year individually, we are able to identify a critical turning point when the zero-earnings discontinuity becomes imperceptible. We document that the zero-earnings discontinuity persists for at least 25 years, but disappears after 2002, and has, as of yet, not returned. The disappearance of the zero-earnings discontinuity is likely of considerable interest to researchers and educators. Earnings distributions have been used by researchers to investigate earnings management in a variety of settings.[4] Educators use the discontinuity as an intuitive means of communicating earnings management consequences to students (e.g. Revsine et al., 2012). Researchers and educators who want to use earnings distributions or refer to the zero-earnings discontinuity in the future will likely want to be cognizant of the fact there is little or no zero-earnings discontinuity after 2002.

Second, we provide evidence relevant to the ongoing debate about the cause of the zero-earnings discontinuity. Recent studies challenge whether the discontinuity is the result of earnings management by suggesting it may be due to scaling and sample selection (e.g., Dechow et al., 2003; Durtschi and Easton, 2009, 2005). Reconciling our results (the disappearance of the zero-earnings discontinuity) with scaling and sample selection as causes of the discontinuity requires that the effects of scaling and sample selection changed in such a way that while they once created a discontinuity, they no longer do. Results from our pre/post-2002 analyses of unscaled earnings distributions and constant-samples are inconsistent with the notion that discontinuities are merely artifacts of the research design choices advanced by prior research.[5]

Third, to the extent the zero-earnings discontinuity reflects earnings management to avoid losses (e.g. Burgstahler and Dichev, 1997; Degeorge et al., 1999), our analyses provide new evidence about changes in earnings management over time. Prior research suggests a decline in accrual earnings management (Bartov and Cohen, 2009; Cohen et al., 2008; Lobo and Zhou, 2010, 2006) but an increase in real earnings management after SOX. Our evidence that the zero earnings discontinuity disappears is consistent with the notion that, with respect to loss avoidance, any increases in real earnings management to avoid losses that might have occurred were insufficient to offset any declines in accrual earnings management to avoid losses. We caution, though, that we do not provide direct evidence of a decline in earnings management.

In this study, we focus on the zero-earnings discontinuity but recognize that prior research also examines discontinuities in distributions of earnings changes (Burgstahler and Dichev, 1997) and analyst forecast errors (e.g. Degeorge et al., 1999). We focus on the zero-earnings discontinuity for several reasons. First, the controversy regarding the extent to which earnings management/non-earnings management factors contribute to discontinuities focuses on the zero-earnings discontinuity (e.g. Beaver et al., 2007; Dechow et al., 2003; Durtschi and Easton, 2009; Jacob and Jorgensen, 2007). Second, prior research suggests the discontinuity in earnings changes is not as pronounced as the zero-earnings discontinuity (Burgstahler and Dichev, 1997). Third, analyst forecast errors are influenced by *both* managers and analysts (Durtschi and Easton, 2005) with managers playing a role in the forecasts set by analysts (Burgstahler and Eames, 2006; Graham et al., 2005; Matsumoto, 2002). Fourth, the analyst forecast error distribution peaks at zero (Degeorge et al., 1999), making distributional evidence more difficult to interpret (Burgstahler and Chuk, 2013). Regardless, we analyze distributions of

[3] As an additional assessment of the sensitivity of our results to the choice of scalar, we repeated our main tests after scaling by total assets, instead of market value of equity. Total assets as a scalar produces clear evidence of a discontinuity before 2002 and no discontinuity after 2002.

[4] Examples include real earnings management, stock option compensation, and analysts' forecasts (Brown and Caylor, 2005; Burgstahler and Eames, 2006; Degeorge et al., 1999; Eldenburg et al., 2011; Gunny, 2010; McAnally et al., 2008; Roychowdhury, 2006).

[5] Our tests do not rule out that non-earnings management factors, especially the asymmetric nature of income taxes and special items (Beaver et al., 2007) contribute to the discontinuity's size. In fact, some of our analyses suggest that taxes and special items contribute to the discontinuity. Further, we cannot rule out the possibility that other, as-of-yet un-specified research design choices contribute to the discontinuity.

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