

More on estimating conditional conservatism

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ABSTRACT

Basu (1997) proposes a measure of financial reporting conservatism based on asymmetry in the conditional earnings/returns relation, or differences between the separate relations observed for good and bad news subgroups. To explain the bias noted by Patatoukas and Thomas (2011), or PT, in the Basu measure, Ball, Kothari, and Nikolaev (2012), or BKN, propose a framework which decomposes returns and earnings into expected and unexpected components. Whereas BKN believe that bias arises because of the conditional relation between (a) expected earnings and expected returns, we extend their analysis to also consider relations suggested by their framework between (b) expected earnings and unexpected returns, (c) unexpected earnings and expected returns, and (d) unexpected earnings and unexpected returns. We find that the first relation, between the expected components of earnings and returns, does not create bias in the Basu measure, contrary to BKN’s claim. But we find biases, both positive and negative, in the remaining three relations. The bias we document for the second relation is equivalent to the PT explanation for their bias. The bias we document for the fourth relation suggests that the revised Basu measures proposed by BKN are unreliable.

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1. INTRODUCTION

Research investigating conservatism that is conditional on news has seesawed between optimism and pessimism regarding a popular measure proposed in Basu (1997). Dietrich et al. (2007) and Givoly et al. (2007) provide evidence and arguments which suggest that the measure is unreliable. Ball et al. (2013) dismiss or ignore these concerns. Patatoukas and Thomas (2011), referred to hereafter as PT, identify bias in the Basu measure by showing that lagged earnings, which could not reflect conservatism that is conditional on news disclosed this year, also exhibits evidence of conditional conservatism. Ball et al. (2012), referred to hereafter as BKN, propose a framework that decomposes returns and earnings into expected and unexpected components and generates (a) an alternative explanation for the PT results, based on a non-linear relation between expected returns and earnings, and (b) revised measures of conditional conservatism, based on unexpected returns and earnings. We extend the BKN analysis by investigating the other relations among expected and unexpected components of returns and earnings.

Some background first. Before BKN, research using the Basu method compares slopes from regressions of observed earnings on returns, estimated separately for good and bad news subgroups, where good (bad) news is indicated by positive (negative) returns. The separate relations estimated for good and bad news subgroups are labeled conditional relations, and estimated slopes describe the timeliness with which earnings reflects news. The Basu measure of conditional conservatism, which is the excess of the bad news slope over the good news slope, describes differential timeliness or asymmetry in those conditional relations. Whereas prior

1 While debates about the Basu measure tend to appear in the empirical literature, there has also been some discussion as to whether conditional conservatism is optimal at a theoretical level (e.g., Gigler and Hemmer, 2001).

2 PT and BKN can refer either to the studies or the authors of those studies, depending on the context.
research has blurred the distinction between observed and unexpected earnings/returns, BKN make the important point that relations between expected earnings and returns cannot be ignored. They also claim that PT’s lagged earnings result, which we refer to as the PT bias, is explained by asymmetry in the conditional relation between expected earnings (for which lagged earnings is a proxy) and expected returns. BKN’s revised measures of conditional conservatism seek to eliminate the PT bias by eliminating the expected components of earnings and returns and focusing on asymmetry in the conditional relation between the unexpected components.

Our objective is to consider biases in the Basu measure due to all four combinations of the expected and unexpected components of earnings and returns. We first examine the conditional relation between the expected components of earnings and returns to investigate BKN’s explanation for the PT bias. Next, we examine the two conditional relations between the expected component of one variable and the unexpected component of the other. Finally, we examine the conditional relation between the unexpected components of earnings and returns. We focus more attention on this fourth relation because BKN claim that asymmetry in this relation is a bias-free measure of conditional conservatism.

We find no significant asymmetry in the first conditional relation—between expected earnings and returns, which contradicts BKN’s explanation for the PT bias. Note that BKN do not investigate this relation, even though they propose it as an explanation in their equations (4) and (5). Instead, they support their position by pointing to nonlinearity in the unconditional expected earnings/returns relation (Figure 2C in BKN). Unconditional relations, observed when good and bad news subgroups are combined, should provide no insight regarding differences between the separate conditional relations observed for the two subgroups. This conflation of conditional and unconditional relations distorts BKN’s analyses of the PT bias.
We find significant asymmetry, however, in the second conditional relation—between expected earnings and unexpected returns. This asymmetry is consistent with PT’s explanation for the upward bias they document. Much to our surprise, not only does BKN’s framework reject the competing explanation that they generate from it, the framework actually supports PT’s explanation! Recall that PT’s explanation is based on two empirical regularities: unconditionally, share price is (a) positively related to lagged price-deflated earnings (the loss effect), and (b) negatively related to return variances (the return variance effect). As shown in PT’s Figure 1, Panel B, the negative unconditional relation between scale and return variance—the second moment of the return distribution—translates into a negative (positive) conditional relation between scale and mean returns—the first moment of the return distribution—for the good (bad) news subgroup. As a result, share price which is negatively related to lagged price-deflated earnings is also negatively (positively) related to returns for the good (bad) news subgroup. Given that lagged earnings proxies for expected earnings and variances of observed returns resemble variances of unexpected returns, the asymmetry documented by PT between lagged earnings and returns is reflected as asymmetry in the second conditional relation between expected earnings and unexpected returns.

We also find asymmetry in the third conditional relation, between unexpected earnings and expected returns, but in this case it biases the Basu measure downward. This asymmetry in the conditional relation is caused by unconditional relations between scale and (a) levels of expected returns and (b) the variance of unexpected earnings. It is similar to the relations between scale and expected earnings and the variance of unexpected returns that describes the second conditional relation above. In this case, scale is negatively related to both expected returns and the variance of unexpected earnings. Again, the unconditional relation between scale
and the second moment of unexpected earnings creates opposite conditional relations between scale and the first moment of unexpected earnings, when the sample is split into good and bad news subgroups.

Our results suggest substantial biases in BKN’s revised measures of conditional conservatism, which are based on the fourth conditional relation—between the unexpected components of earnings and returns.\(^3\) We conduct a direct test of bias in the BKN measures by adapting the methodology in Dietrich et al. (2007), hereafter referred to as DMR. We find clear evidence of conditional conservatism associated with BKN’s revised measures in data that should not exhibit such evidence. Second, we find the BKN measures exhibit cross-sectional and time-series variation that is related to PT’s return variance effect. Such co-variation suggests bias in BKN’s measures because accounting conservatism should not affect the unconditional relation between scale and return variance.

More generally, while Basu, Ball et al. (2013), and BKN attribute all observed asymmetry—in the respective conditional earnings/returns relations they investigate—to conditional conservatism, evidence suggests that asymmetry arises for other reasons. For example, Banker et al. (2012) consider operational reasons (cost stickiness) and Beaver and Ryan (2008) consider financial reasons (equity resembles a put option as financial distress increases) why the earnings/returns relation differs between good and bad news. Similarly, recent research (e.g., Collins et al., 2012, and Hsu et al., 2012) documents differential timeliness in cash flows, which should also be unrelated to conditional conservatism (because accruals determine conditional conservatism).

\(^3\) While the two asymmetries noted for the second and third conditional relations illustrate how biases affecting the Basu measure can arise for reasons that are hard to anticipate, they should not bias BKN’s revised measures of conditional conservatism because the expected components of both earnings and returns have been extracted.
Our study offers the following main takeaways. First, there is no support for BKN’s alternative explanation of the bias in the Basu measure documented by PT. Second, all our evidence is consistent with PT’s explanation for this bias. Third, researchers should tread cautiously when using BKN’s revised measures. We do not claim that these measures are so biased that they have zero correlation with true conditional conservatism, because we do not investigate that hypothesis. However, our evidence suggests that the measures are unreliable. And it appears likely that other concerns expressed in prior studies about the Basu measure (e.g., Givoly et al., 2007) also apply to the BKN measures. Finally, while moving from observed returns and earnings to their unexpected components eliminates the PT bias, it strains links to accounting rules observed in practice (more details in Section 5).

The rest of our study is organized as follows. Section 2 develops our extension of the BKN framework. Section 3 describes our investigation of alternative explanations for the PT bias. Section 4 considers other potential biases in the Basu measure and focuses on biases associated with BKN’s revised measures of conditional conservatism. Section 5 concludes.

2. THE BKN FRAMEWORK AND OUR EXTENSION

The BKN framework begins with the version of the Basu measure derived from the cross-sectional regression model described in equation (1). The coefficient $b_1$ measures differential timeliness, where timeliness is the slope of a regression of earnings per share, deflated by lagged share price, on observed returns. Asymmetry in the conditional earning/returns relation, which reflects the difference between the fraction of bad news and good news reflected in contemporaneous earnings, is a measure of conditional conservatism because it reflects the extent to which earnings recognizes bad news more quickly than good news.
\[
\frac{X_{it}}{P_{it-1}} = \alpha_0 + \alpha_i D_{it} + b_0 R_{it} + b_1 R_{it} \times D_{it} + e_{it},
\]

(1)

where,

\(X_{it}\) = earnings per share reported by firm \(i\) in year \(t\),

\(P_{it-1}\) = price per share for firm \(i\) at the end of year \(t-1\),

\(R_{it}\) = stock return for firm \(i\) in year \(t\),

\(D_{it}\) = 1 if \(R_{it} < 0\), which represents bad news, and 0 otherwise.

The good and bad news timeliness measures are given by the slope coefficients in equations (2) and (3) below, estimated separately for non-negative \((R_{it} \geq 0)\) and negative returns \((R_{it} < 0)\), respectively, and the Basu conditional conservatism measure is given by the excess of the bad news slope \((b_0+b_1)\) over the good news slope \((b_0)\), as described in equation (4):

\[
b_0 = \frac{\text{Cov}\left(\frac{X_{it}}{P_{it-1}}, R_{it} \mid R_{it} \geq 0\right)}{\text{Var}(R_{it} \mid R_{it} \geq 0)},
\]

(2)

\[
b_0 + b_1 = \frac{\text{Cov}\left(\frac{X_{it}}{P_{it-1}}, R_{it} \mid R_{it} < 0\right)}{\text{Var}(R_{it} \mid R_{it} < 0)},
\]

(3)

\[
b_1 = \frac{\text{Cov}\left(\frac{X_{it}}{P_{it-1}}, R_{it} \mid R_{it} < 0\right)}{\text{Var}(R_{it} \mid R_{it} < 0)} - \frac{\text{Cov}\left(\frac{X_{it}}{P_{it-1}}, R_{it} \mid R_{it} \geq 0\right)}{\text{Var}(R_{it} \mid R_{it} \geq 0)}.
\]

(4)

We follow BKN and separate reported earnings and observed returns into their expected and unexpected components, as follows:

\[
\frac{X_{it}}{P_{it-1}} = E_{t-1}\left[\frac{X_{it}}{P_{it-1}}\right] + x_{it},
\]

(5)

\[
R_{it} = E_{t-1}[R_{it}] + r_{it},
\]

(6)

where,

\(E_{t-1}[.]\) = expectations formed at the end of year \(t-1\), and

\(x_{it}\) and \(r_{it}\) = unexpected component of \(X_{it}/P_{it-1}\) and stock return for firm \(i\) in year \(t\).
2.1 Our extension of the BKN framework

Replacing price-deflated earnings and returns in equation (4) with their expected and unexpected components from equations (5) and (6) allows us to separate potential biases in the Basu measure into four terms, where each term focuses on one of the four conditional relations created by interacting expected and unexpected components of observed earnings with expected and unexpected components of observed returns:

\[ b_1 = \lambda_1 + \lambda_2 + \lambda_3 + \lambda_4, \]  

\[ \lambda_1 = \frac{Cov\left(E_{t-1} \left[ \frac{X_{it}}{P_{it-1}} \right], E_{t-1} \left[ R_{it} \right] | R_{it} < 0 \right)}{Var\left(R_{it} | R_{it} < 0 \right)} - \frac{Cov\left(E_{t-1} \left[ \frac{X_{it}}{P_{it-1}} \right], E_{t-1} \left[ R_{it} \right] | R_{it} \geq 0 \right)}{Var\left(R_{it} | R_{it} \geq 0 \right)}, \]  

\[ \lambda_2 = \frac{Cov\left(E_{t-1} \left[ \frac{X_{it}}{P_{it-1}} \right], r_{it} | R_{it} < 0 \right)}{Var\left(R_{it} | R_{it} < 0 \right)} - \frac{Cov\left(E_{t-1} \left[ \frac{X_{it}}{P_{it-1}} \right], r_{it} | R_{it} \geq 0 \right)}{Var\left(R_{it} | R_{it} \geq 0 \right)}, \]  

\[ \lambda_3 = \frac{Cov\left(x_{it}, E_{t-1} \left[ R_{it} \right] | R_{it} < 0 \right)}{Var\left(R_{it} | R_{it} < 0 \right)} - \frac{Cov\left(x_{it}, E_{t-1} \left[ R_{it} \right] | R_{it} \geq 0 \right)}{Var\left(R_{it} | R_{it} \geq 0 \right)}, \]  

\[ \lambda_4 = \frac{Cov\left(x_{it}, r_{it} | R_{it} < 0 \right)}{Var\left(R_{it} | R_{it} < 0 \right)} - \frac{Cov\left(x_{it}, r_{it} | R_{it} \geq 0 \right)}{Var\left(R_{it} | R_{it} \geq 0 \right)}. \]

Prior to BKN researchers used observed earnings/returns and unexpected earnings/returns interchangeably. The implicit assumption is that \( \lambda_1, \lambda_2, \) and \( \lambda_3 \) are all equal to zero, and that \( \lambda_4 \) is an unbiased estimate of conditional conservatism. BKN raise the possibility of bias in \( b_1 \) due to \( \lambda_1 \) being different from zero. We investigate that possibility as well as potential biases in \( b_1 \) due to \( \lambda_2 \) or \( \lambda_3 \) being non-zero, as well as due to bias in estimates of \( \lambda_4 \). Whereas biases in any of the four \( \lambda \)s affect the Basu measure, only bias in \( \lambda_4 \) affects the revised BKN measures.

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4 Even though the covariances below refer to conditional relations, described separately for good and bad news in \( t \), the BKN framework uses unconditional expectations formed in \( t-1 \) for earnings and returns in \( t \).
To obtain estimates of the four $\lambda$s, we use BKN’s expectation models for returns and earnings. BKN’s proxy for expected returns for each firm-year is the mean return earned by a portfolio of firms with similar market capitalization (size) and book-to-market ratio (B/M). At the beginning of each year, firms are sorted into quintile portfolios formed on size and quintile portfolios formed on B/M to generate 25 portfolios, each of which contains firms that are similar in terms of size and B/M. The mean return for each portfolio ($R_{pt}$) is the expected return for all firms in that portfolio.

BKN propose three alternative proxies for expected earnings that incorporate information contained in lagged earnings. The first two proxies use the history of firm-specific price-deflated earnings, whereas the third proxy also incorporates information from other firms in the same industry. The first measure, $E_{rw}[X_{it}/P_{it-1}]$, assumes that earnings follows a random walk process, and expected earnings equals lagged earnings. This measure has been used in prior conditional conservatism research that elected to focus on unexpected rather than observed earnings (e.g., Lobo et al., 2008; Shroff et al., 2012). The second measure, $E_{ffe}[X_{it}/P_{it-1}]$, assumes that price-deflated earnings revert over time to a firm-specific mean, and inserting a firm fixed effect captures that mean value of $X_{it}/P_{it-1}$. The third measure, $E_{ind}[X_{it}/P_{it-1}]$, assumes that the relation between current and lagged price-deflated earnings is similar within two-digit SIC industry codes, but differs for subgroups with non-negative and negative earnings. Expectations for $X_{it}/P_{it-1}$ are obtained from within-industry, annual cross-sectional regressions, that allow coefficients to vary between non-negative and negative earnings.

The expectation models for returns and earnings are defined by the relations below:

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5 BKN also propose a fourth proxy which is obtained by adding control variables to the regression of unexpected earnings on returns. Given that the results do not vary much when these controls are added, we do not explore that proxy here.
(a) $E[R_w] = R_p (= \text{mean return of portfolio with similar size and B/M})$

(b) $E_{rw} \left[ \frac{X_{it}}{P_{it-1}} \right] = \frac{X_{it-1}}{P_{it-1}}$

(c) $E_{ffe} \left[ \frac{X_{it}}{P_{it-1}} \right] = \text{time-series mean of } \frac{X_{it}}{P_{it-1}}$

(d) $E_{ind} \left[ \frac{X_{it}}{P_{it-1}} \right] = \alpha_{0t} + \alpha_{2t} D(X_{it-1} < 0) + \alpha_{3t} \frac{X_{it-1}}{P_{it-1}} + \alpha_{4t} \frac{X_{it-1}}{P_{it-1}} \times D(X_{it-1} < 0)$

(12)

Subtracting these expectations from the corresponding observed values generates BKN’s proxies for unexpected returns and unexpected earnings. When estimating the fixed effect in equation (12c), we require at least two years of data per firm. When estimating the coefficients $\alpha_{0t}$ to $\alpha_{4t}$ in equation (12d), we require at least 10 firms for each annual industry subgroup.

Except for the random walk expectation model in equation (12b), the remaining expectation models used in BKN’s empirical analysis deviate conceptually from the expectations built into the BKN framework, because they include current period information. In essence, BKN separate returns and earnings into “normal” and “abnormal” components, more akin to an event-study methodology, rather than expected and unexpected components. As a result, BKN’s expectations measure true expectations (based only on prior period information) with error, and those errors might bias their estimates of asymmetry in conditional relations ($\lambda_1$ to $\lambda_4$).

The definition of news also varies between BKN’s framework and their empirical analyses. When describing their framework, news is based on the sign of observed returns ($R_{it}$). In their empirical analyses, however, news is based on the sign of “abnormal” returns, adjusted for the returns earned by the value-weighted market return or those earned by portfolios of similar size and B/M. We use the sign of observed returns to partition the sample into good and bad news subgroups when describing our extension of the BKN framework and switch to the sign of size and B/M adjusted returns in Section 4 when investigating the revised BKN measures.
2.2 Estimates of $\lambda$s and implications for bias in the Basu measure

Our sample, which resembles the one in BKN, is obtained from the intersection of the Compustat annual file (Merged Fundamental Annual File) and the CRSP monthly returns file. We scan the Compustat file for firm-years ending during the period 1963 to 2010 that have non-missing values for earnings per share before extraordinary items for the current and prior year ($X_{it}$ and $X_{it-1}$), and the prior year’s fiscal year-end stock price ($P_{it-1}$), number of shares outstanding, and book value per share. We delete firms with lagged stock price less than $1$.

Next, we compute compounded inter-announcement twelve-month returns ($R_{it}$), which begin with the fourth month of the fiscal year and end with the third month of the next fiscal year. We obtain monthly returns from the CRSP monthly returns file and drop observations with missing values for $R_{it}$. To mitigate the impact of outliers, we exclude firm-years falling in the top or bottom 1% of the annual cross-sectional distributions of the following variables: $X_{it}/P_{it-1}$, $X_{it-1}/P_{it-1}$, and $R_{it}$. The resulting sample contains 163,675 firm-year observations over the 48-year period (BKN’s sample, which begins in 1964, contains 162,119 firm-year observations). Table 1 reports descriptive statistics for the different variables we use. Our empirical distributions in Table 1, Panel A, and pairwise correlations in Table 1, Panel B, resemble the corresponding descriptive statistics reported in BKN’s Table 1.

We estimate the values of $\lambda_1$ to $\lambda_4$ for each year using equations (8) through (11) and report in Table 2 the means of those 48 annual estimates and the associated Fama-MacBeth t-statistics based on the time-series distribution of those estimates. While the estimates vary slightly across the three earnings expectations models, they are reasonably similar. To confirm the accuracy of these estimates, we also report in the bottom row the mean estimate of $b_1$ from
equation (1), which is 0.251. The sums of the four values of $\lambda$ should equal 0.251 for all three earnings expectations models.

Results reported for $\lambda_1$ in the first row of Table 2 clearly contradict BKN’s explanation for the PT bias: none of the three estimates for $\lambda_1$ are significantly different from zero. Although BKN provide evidence to support their explanation, the evidence they rely on documents non-linearity in the unconditional relation between expected earnings and returns, which has no bearing on asymmetry in the conditional relation that is relevant here (see Section 3).

Given that $\lambda_1$ does not explain the PT bias, we turn to the other relevant component, $\lambda_2$, which describes asymmetry in the conditional relation between expected earnings and unexpected returns.\(^6\) This asymmetry does not require non-linearity in the unconditional relation between expected earnings and unexpected returns. A relation between expected earnings and variances of unexpected returns is sufficient to generate opposite conditional relations between expected earnings and levels of unexpected returns for positive and negative returns, corresponding to good and bad news, respectively.

This is the insight that motivates PT’s explanation for their result (see, for example, PT’s Figure 2, Panel A) and it suggests that the PT bias should be reflected in a positive $\lambda_2$. To be sure, PT investigates the variance of observed returns, not the variance of unexpected returns. However, the variances of observed returns and unexpected returns have a similar impact on $\lambda_2$. The variance of expected returns has no impact on $\lambda_2$, because expected returns are similar for good and bad news.

\(^6\) The other two components, $\lambda_3$ and $\lambda_4$, relate to unexpected earnings in period $t$ and are therefore not relevant for the PT bias, which is observed for lagged earnings from period $t-1$. 
The results reported in the second row of Table 2 confirm our prediction. All three mean estimates for \( \lambda_2 \) are significantly positive, with magnitudes that are substantial relative to 0.251, i.e., the estimate of \( b_1 \) from equation (1) reported in the bottom row. Our findings regarding \( \lambda_2 \) suggest that the PT explanation is supported by evidence of asymmetry in the conditional relations between expected earnings and unexpected returns. We find these results particularly surprising because the BKN framework was created to support an alternative explanation for the PT bias, not support the explanation offered by PT.

Results reported for \( \lambda_3 \) in the third row of Table 2 suggest a significant asymmetry from another surprising source, relating to the conditional relation between unexpected earnings and expected returns. Also, the negative estimates of \( \lambda_3 \) suggest downward bias in estimates of \( b_1 \). In Section 4, we show that this asymmetry arises because of a relation between the level of expected returns and the variance of unexpected earnings. The source of asymmetry is similar in spirit to that underlying \( \lambda_2 \), as it requires two general conditions: (a) the first moment of one variable (expected returns) should be related to the second moment of the other variable (unexpected earnings), and (b) the second variable should be correlated with the partitioning variable.\(^7\) And, similar to the PT explanation for their bias, we find that scale plays a key role: it is negatively related to both the level of expected returns and variances of unexpected earnings.

Results reported for \( \lambda_4 \) in the fourth row of Table 2 indicate positive values, with magnitudes similar to those reported for \( \lambda_2 \) in the second row. Conceptually, unlike non-zero values for \( \lambda_1, \lambda_2, \) and \( \lambda_3 \), which could not be due to conditional conservatism because they reflect

\(^7\) The partitions formed here are based on the sign of observed returns, which are correlated with partitions formed on the sign of unexpected earnings.
conditional relations based on expectations set in the prior year, non-zero values of $\lambda_4$ could reflect conditional conservatism in reported earnings. We return to this discussion in Section 4.

### 3. RE-EXAMINING THE PT BIAS

In this Section, we present a reconciliation of inconsistencies between PT and BKN regarding the PT bias, which refers to the Basu measure exhibiting evidence of conditional conservatism for lagged earnings. We confirm first the conclusions from Section 2 based on $\lambda_1$ and $\lambda_2$: there is no asymmetry in the expected earnings/expected returns relation, and the PT bias is due to asymmetry in the expected earnings/unexpected returns relation. We also confirm that scale plays a role in creating this asymmetry. Next, we explain why BKN incorrectly conclude that the PT explanation is invalid and that scale effects do not explain the PT bias.

To better understand the link between the PT bias and the different estimates of $\lambda$ reported in Table 2, we return to the PT regression, which replaces the dependent variable in equation (1) with lagged earnings, deflated by lagged price ($X_{it-1}/P_{it-1}$).

\[
\frac{X_{it-1}}{P_{it-1}} = \alpha_0 + \alpha_1 D_{it} + b_1 R_{it} + b_1 R_{it} \times D_{it} + \varepsilon_{it}. \tag{13}
\]

To connect the BKN framework with estimates of $b_1$ from equation (13), we use the approximation suggested by BKN and others (e.g., Gerakos and Gramacy, 2012) that lagged earnings is a reasonable proxy for expected earnings:

\[
\frac{X_{it-1}}{P_{it-1}} \approx E_{it-1} \left[ \frac{X_{it}}{P_{it-1}} \right]. \tag{14}
\]

Note that the estimates of conditional conservatism that we describe hereafter, which are based on variants of the Basu-type regressions, are similar but not identical to the corresponding estimates of $\lambda$s in Section 2. Specifically, a regression of expected earnings on expected returns
generates slope coefficients for bad and good news that have the same numerators as the conditional terms on the right-hand side of equation (8), but the denominators are different: they equal the conditional variance of expected returns for the regression slopes but equal the conditional variance of observed returns for $\lambda_1$. We use $\lambda$s in Section 2 to allow addition across the four specifications (because the denominators are held constant), but switch now to the analogous slope coefficients obtained from regressions of the corresponding expected and unexpected components of earnings/returns to allow direct comparisons with BKN.

3.1 Comparison of BKN’s and PT’s explanations for PT’s lagged earnings result

BKN provide no empirical support for their claim that PT’s lagged earnings result can be explained by asymmetry in the conditional relation between expected returns and expected earnings. They point to an inverted U-shaped relation between lagged earnings ($X_{it-1}/P_{it-1}$) and current observed returns, described in their Figure 2C, and assert that such non-linearity “imparts a bias in conventional Basu estimates.”

We next consider a direct test of that assertion, because we see no reason why non-linearity in the unconditional expected earnings/expected return relation necessarily implies differences between the conditional relations for good and bad news subgroups.

Table 3, Panel A, contains the results based on estimating equation (13) with the regressor being one of three return measures: (a) observed returns ($R_{it}$), (b) expected returns ($R_{pt}$), equal to the mean return for the size and B/M-matched portfolio that the firm belongs to, and (c) unexpected returns, equal to observed returns minus expected returns ($R_{it} - R_{pt}$). According to BKN also point to a different type of non-linearity in their Figure 2B, which shows a V-shaped relation between current returns and lagged price-deflated earnings. Untabulated results show that this non-linearity in the unconditional expected earnings/expected earnings relation is also unrelated to the PT bias.

9 We considered an alternative proxy for expected returns, equal to predicted values from cross-sectional regressions of observed returns on lagged earnings (deflated by lagged price), estimated separately for profit and loss firms.
BKN’s explanation, the coefficient on $b_1$ should be positive when the regressor is expected returns (bias due to $\lambda_1$). An alternative, but not mutually exclusive, explanation is that the bias is due to $\lambda_2$, in which case the coefficient $b_1$ should be positive when the regressor is unexpected returns.

The results reported in the first row confirm the general findings reported in PT and BKN. The conditional coefficient for good news firm-years, indicated by the coefficient $b_0$, is negative and significant. And the excess of the conditional coefficient for the bad news subgroup over that for the good news subgroups, indicated by $b_1$, is positive and significant. This result reflects bias in the Basu measure because the regressions are estimated on lagged earnings.

The results reported in the second row, based on expected returns, do not support BKN’s explanation for the findings in the first row, which predicts a positive estimate of $b_1$. Instead, the estimate of $b_1$ is insignificant (and negative). These results, which are consistent with the insignificant estimates of $\lambda_1$ reported in Table 2, reject BKN’s assertion that non-linearity in the conditional expected earnings/expected returns relation creates asymmetry in the corresponding conditional relation.

The results reported in the third row, based on unexpected returns, support PT’s explanation for their bias. The coefficient $b_1$ is positive and significant, and explains most of the differential timeliness noted in the first row. The slopes of the conditional relations for good and bad news, given by $b_0$ and $b_0 + b_1$, respectively, are substantially negative and positive, consistent with PT’s explanation that lagged earnings are negatively related to return variance.

To confirm that the results in Table 3, Panel A, are robust and not driven by outliers, we report in Figure 1 the time-series variation in the underlying annual $b_1$ estimates. The $b_1$

Untabulated results confirm that our main findings in Table 3 remain unchanged for this measure of expected returns.
coefficient based on observed returns comoves closely with the $b_1$ coefficient based on unexpected returns, and the levels of the two estimates are very similar. In contrast, the $b_1$ coefficient based on expected returns hovers around zero and does not comove with $b_1$ for observed returns.

Even though BKN do not directly test their explanation by investigating asymmetry in the conditional relation between lagged earnings and expected returns, they report results for observed (row 2 of their Table 2) and unexpected returns (row 2 of their Table 4). As in our results (first and third row of our Table 3, Panel A), estimates of $b_1$ in BKN are similar across the two specifications. BKN do not, however, make the important inference that similar levels of asymmetry for observed and unexpected returns imply that there is no asymmetry in the conditional relation between lagged earnings and expected returns.

Not only do BKN not make this relevant inference, they document very different results in their Figure 3. The top and bottom lines in BKN’s Figure 3 are obtained by regressing lagged earnings on observed returns and unexpected returns, but rather than estimate those regressions on the overall sample, they do so separately on 50 partitions based on share price. They find that slope estimates for observed returns are higher than those for unexpected returns, which is inconsistent with the similar slopes reported in our Table 3 and BKN’s Tables 2 and 4. Not only do we see no reason to estimate these regressions on price partitions, we are unable to replicate their Figure 3 results. Specifically, as shown in our Figure 2, estimates of $b_1$ for price partitions

---

10 In cross-sectional regressions, similar results are observed for market-adjusted returns (row 2 of BKN Table 2) and observed returns (first row of our Table 3).

11 Relatedly, BKN provide no explanation for why they investigate variation across price partitions, and why they report estimates of $b_0 + b_1$, rather than $b_1$. 

17
are similar for observed and unexpected returns, consistent with the full sample results discussed above.\textsuperscript{12}

The evidence is clearly inconsistent with BKN’s explanation for the PT bias. There is no asymmetry in the conditional relation between expected (or lagged) earnings and expected returns, and the nonlinearity documented by BKN in the unconditional relation is unrelated to asymmetry in the conditional relation. And finding asymmetry in the conditional relation for unexpected returns that is similar in magnitude to that for observed returns suggests that the explanation for the PT bias lies with unexpected returns, not expected returns.

Separating observed returns into expected and unexpected components allows us to provide additional confirmation, beyond that already provided in PT, for the role played by scale. To extend PT’s investigation of the return variance effect, which documents a difference between good and bad news in the conditional relation between scale and observed returns, we repeat those regressions after replacing observed returns with expected returns and then with unexpected returns. Given the evidence in Panel A of Table 3, which suggests that the PT bias is due mainly to the unexpected component of returns, the PT explanation is supported if we find that the return variance effect is due to a relation between scale and the variance of the unexpected component of returns. We expect this result because we see no reason to believe that the variance of the expected component of returns varies with scale.

The results reported in Table 3, Panel B, are consistent with our expectations. The first row confirms the return variance effect documented in PT: the slope coefficient on good news ($b_0$) is positive, and the slope coefficient on bad news ($b_0 + b_1$) is negative, indicating that share price and return magnitudes are negatively related, which causes a negative (positive)

\textsuperscript{12} The results for expected returns (not reported here but available from authors) exhibit considerable fluctuation around zero, especially in the early years where each price partition consists of relatively few firms. Those $b_1$ estimates are all insignificantly different from zero.
conditional relation between scale and returns for good (bad) news. Our estimate of $b_1$ is insignificant for expected returns in the second row, which suggests that there is no relation between scale and variances of expected returns. In contrast our estimate of $b_1$ is significantly negative for unexpected returns in the third row, and of the same order of magnitude as that for observed returns in the first row. Because the return variance effect documented by PT for observed returns is due to the unexpected component of returns, scale is the variable that explains asymmetry in the conditional relation between lagged earnings and unexpected returns documented in Panel A. Analysis of the year-by-year results (not tabulated here) underlying the mean values reported in Table 3, Panel B, confirm that those results are observed each year and are not due to outliers. Hereafter, we use return variance effect to refer to the relations between scale and the variance of both observed and unexpected returns.

3.2 Reexamination of BKN evidence against scale as an explanation for the PT bias

We consider next the evidence described in Section IV and Figure 1 of BKN, which investigates regressions based on equations (1) and (13), for current and lagged earnings, respectively, estimated separately across 50 partitions based on price per share. BKN assert that reducing variation in scale within each of the price partitions removes the loss and variance effects underlying PT’s explanation. Therefore, observing any evidence of conditional conservatism for lagged earnings, indicated by a positive value of $b_1$, within the price partitions suggests that those two effects are unrelated to PT’s lagged earnings results.

BKN’s conclusion against the PT explanation relies critically on their assertion that they have successfully suppressed the return variance and loss effects within narrow price partitions. Their assertion is without basis at both conceptual and empirical levels. The conceptual counterargument is as follows. As described in Panel A (B) of Figure 1 in PT, mean values of
lagged price-deflated earnings (return variances) increase (decline) with price per share. Given that share price is the *exogenous* variable for both effects, estimates of the slope in a properly-specified OLS regression should not be affected by the range over which the regressor is sampled from. Stated differently, focusing on narrow vertical slices in Panels A and B of Figure 1 in PT, corresponding to partitions with little variation in price, does not change the (local) slopes of those lines within each slice.

To provide empirical evidence on the validity of BKN’s assertion, we investigate directly whether the return variance and loss effects remain within each narrow price partition. A simple test of the return variance effect is to regress the inverse of lagged scale \( S_{it-1} \) on returns for the good and bad news subgroups, within each price partition. Under the return variance effect, we expect the inverse of scale to be negatively (positively) related to returns for negative (positive) return subgroups, which should result in a negative estimate of \( b_1 \) in equation (15) below. (See also equation (2b) in BKN.)

\[
\frac{1}{S_{it-1}} = \alpha_0 + \alpha_1 D_{it} + b_0 R_{it}^g + b_1 R_{it}^b \times D_{it} + \epsilon_{it} \tag{15}
\]

Similarly, a simple test of the loss effect is to regress the inverse of scale on lagged price-deflated earnings. Under the loss effect, we expect the inverse of scale to be negatively related to the level of earnings, resulting in a negative estimate of \( \gamma_1 \) in equation (16) below.

\[
\frac{1}{S_{it-1}} = \gamma_0 + \gamma_1 \frac{X_{it-1}}{P_{it-1}} + \omega_{it} \tag{16}
\]

Estimating equations (15) and (16) within narrow price partitions biases the slopes toward zero, because the partitioning variable is also the dependent variable (e.g., Hausman and
Wise, 1975). This bias is most severe if we use share price to measure scale. The severity of bias is reduced, however, if we use other measures of scale that are less than perfectly correlated with price per share, such as book value of equity per share or total assets per share. We report slopes from both equations for each price partition based on all three measures of scale. We expect to see no evidence of the return variance or loss effects for share price because the slopes are severely biased to be almost zero, but we expect to see some evidence of those effects for the other two measures of scale.

Our predictions are confirmed by the coefficient estimates for $b_1$ and $\gamma_1$ in equations (15) and (16) reported in Panels A and B of Figure 3, respectively. We see clear evidence of the return variance and loss effects when scale is measured as book value per share and total assets per share, but that evidence is almost completely suppressed when scale is measured as price per share. The substantially negative estimates of $b_1$ and $\gamma_1$ reported in Panels A and B for equity book value per share and total assets per share confirm that suppressing price variation by forming narrow price partitions does not suppress the return variance and loss effects.

Both logic and empirical results reject the critical assertion underlying BKN’s test of PT’s explanation and the underlying scale effects. As a result, BKN conclude incorrectly that observing PT’s lagged earnings result within price partitions rejects PT’s scale-based explanation.

Overall, the results in Section 3 confirm the findings from Section 2 that are based on our extension of the BKN framework and estimates of $\lambda_1$ and $\lambda_2$: the evidence consistently supports PT’s scale-based explanation for their finding of conditional conservatism in lagged earnings and consistently rejects BKN’s explanation. In addition, PT’s explanation can be derived from

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13 The reason why estimated slopes are not biased toward zero for price partitions based on PT’s Figure 1 is that share price is the regressor there, whereas it is the dependent variable in equations (15) and (16).
BKN’s framework. We see no remaining debate about the source of the PT bias, and proceed to discuss other sources of bias in the Basu measure.

4. OTHER SOURCES OF BIAS IN THE BASU MEASURE

We consider next potential biases related to the $\lambda_3$ and $\lambda_4$ terms described in Section 2. In Section 4.1, we confirm that the negative estimates observed for $\lambda_3$ cause the Basu measure to understate conditional conservatism. We do so by estimating the asymmetry ($b_1$) from equation (1) regressions of unexpected earnings on expected returns. We then show that this bias is due to a relation between expected returns and variances of unexpected earnings, and that scale plays a role again, similar to that for $\lambda_2$. In Section 4.2 we supplement our analysis of $\lambda_4$ and confirm BKN’s results by estimating the asymmetry coefficient ($b_1$) from equation (1) regressions of unexpected earnings on unexpected returns, where $b_1$ represents BKN’s revised measures of conditional conservatism. To document bias in BKN’s measures, we show that the asymmetry underlying $b_1$ is associated with factors that are unrelated to conditional conservatism and is observed in samples from which conditional conservatism has been scrubbed. Results in Section 4.3 indicate that time-series and cross-sectional variation in $b_1$ mirrors corresponding variation in the return variance effect. As accounting conservatism should not affect the unconditional relation between scale and return variance, observing comovement between the return variance effect and $b_1$ is clear evidence that $b_1$, BKN’s revised measure, is associated with bias. In Section 4.4, we use a different approach, based on the methodology proposed in Table 2 of DMR, to show that the bias DMR document in the Basu measure remains for BKN’s revised measures.

4.1 Asymmetry in the conditional unexpected earnings/expected return relation

We estimate annual cross-sectional regressions based on equation (1) after replacing observed earnings with unexpected earnings and observed returns with expected returns. As in
Section 2, the BKN relations described in equation (12) provide expectations for returns and earnings. Means of the annual estimates for $b_0$ and $b_1$ and associated Fama-MacBeth t-statistics based on the time-series distribution of those coefficients are reported in Table 4, Panel A. Consistent with the results reported in Table 2 for $\lambda_3$, estimates of $b_1$ are substantially negative for all three earnings expectations models proposed by BKN.\(^{14}\) That is, asymmetry in the conditional relation between unexpected earnings and expected returns biases downward estimates of the Basu measure obtained from equation (1).

To further probe this surprising source of asymmetry, we first partition the sample into deciles each year based on expected returns to confirm graphically the regression results. We split each decile into good and bad news subgroups based on the sign of returns, compute the mean value of unexpected earnings for each subgroup, and report in Figure 4, Panel A, the time-series average of those annual means. The slopes for the good news subgroup are slightly positive, while the slopes for the bad news subgroup are clearly negative, consistent with the pattern implied by the estimates of $b_0$ and $b_1$ reported in Table 4, Panel A.

To investigate whether scale plays a role in explaining the conditional asymmetry between unexpected earnings and expected returns described in Panel A of Figure 4, we form deciles each year based on share price. In Panel B of Figure 4, we report the time-series average of mean expected returns for different price deciles, and in Panel C we report the time-series average of mean unexpected price-deflated earnings for both good and bad news subgroups.

Our results confirm that scale explains the asymmetry described in Panel A: it is negatively related to expected returns in Panel B and negatively related to the variance (or

\(^{14}\) The t-statistics on estimates of $b_1$ are significant at the 10%, 1% and 15% levels for the first, second, and third rows of Table 3, Panel A, respectively, based on two-tailed tests.
absolute magnitude) of unexpected price-deflated earnings in Panel C.\textsuperscript{15} As described in Section 2, asymmetries are created in conditional earnings/returns relations if scale is related to both the first moment of earnings/returns and the second moment of the other variable. Just as scale explains the upward bias in the Basu measure documented by PT, relating to asymmetry in the conditional expected earnings/unexpected returns relation, it also explains the downward bias caused by asymmetry in the conditional unexpected earnings/expected returns relation.

4.2 Asymmetry in the conditional unexpected earnings/unexpected return relation

We turn to the fourth potential source of asymmetry in the conditional relations between the expected and unexpected components of earnings and returns, and estimate annual cross-sectional regressions based on equation (1) after replacing observed earnings with unexpected earnings and observed returns with unexpected returns. These results are reported in Table 4, Panel B. Removing the expected components of earnings and returns sharply reduces the extent of asymmetry in the conditional earnings/returns relations, as the estimates for $b_1$ are considerably lower than those reported for equation (1) in the bottom row of Table 2. Untabulated results indicate that this reduction is due almost entirely to controls for expected earnings, while controls for expected returns have only a small effect.\textsuperscript{16}

These regressions in Table 4, Panel B, are similar to, but not exactly the same as, the regressions estimated by BKN in their Tables 4 and 5 because news is defined here by the sign of

\textsuperscript{15} This latter relation is explained by the lack of scale variation exhibited by volatility of per share earnings caused by differential managerial earnings smoothing (see Cheong and Thomas, 2012). Deflation by price creates a negative relation with scale.

\textsuperscript{16} We offer two sets of results as support for this conclusion. First, the estimate of $b_1$ equal to 0.251 reported in the bottom row of Table 2 for the equation (1) regression of observed earnings on observed returns declines only slightly to 0.240 when we replace observed returns with unexpected returns to control for expected returns. Second, the coefficients for $b_1$ observed in Panel B of Table 4 (equal to 0.091, 0.111, and 0.132) based on regressions of unexpected earnings on unexpected returns remain relatively unchanged when we replace unexpected returns with observed returns ($b_1=0.091, 0.103, \text{and} 0.130$).
observed returns, whereas in BKN news is based on the sign of unexpected returns. We repeat
the analyses in Panel B with the BKN definition of news and report our results in Table 4, Panel
C. The results remain relatively unchanged, although the magnitude of asymmetry declines a bit
for all three measures of unexpected earnings.

4.3 Time-series and cross-sectional covariation between BKN measures and the return variance
effect.

Figure 5 describes time-series (in Panel A) and cross-sectional variation (in Panels B and
C) for BKN’s three revised measures of conditional conservatism. We also juxtapose
corresponding variation in the return variance effect, represented by the coefficient $b_1$ obtained
from equation (15) regressions of the inverse of lagged price on unexpected returns. As the return
variance effect reflects the unconditional relation between scale and variances of unexpected
returns, it is unrelated to accounting rules and firm-level accounting choices and thus could not
reflect conditional conservatism in reported earnings. Observing co-variation between the return
variance effect and BKN’s measures suggests that the BKN measures are contaminated by
factors unrelated to conditional conservatism that create the return variance effect.

The results in Panel A of Figure 5 suggest substantial time-series variation in annual
estimates of the three BKN measures. It seems unlikely that changes in underlying conditional
conservatism can explain the sharp year-to-year changes observed in Panel A or the wide range
observed for the BKN measures—from the negative values observed early in the sample period
to the large positive values (approaching 0.3) observed for some subperiods. BKN imply that the
Basu measure (which is about 0.25 for the overall sample) is too high an estimate of conditional
conservatism. If so, are estimates approaching 0.3 for certain periods also too high?

Most importantly, the time-series variation observed for all three BKN measures is
clearly negatively related to variation in the return variance effect. Pearson (Spearman)
correlations between estimates of the return variance effect and estimates of conditional conservatism based on the random walk, firm fixed effect, and industry adjusted earnings expectation models are -20 percent, -54 percent, and -54 percent (-27 percent, -62 percent, and -66 percent).

Next, we turn to cross-sectional variation in the BKN measures across two attributes studied in prior work: market capitalization and the book-to-market (B/M) ratio. We acknowledge there are reasons to expect variation in conditional conservatism across these and other firm attributes. However, our focus is more on variation in the BKN measures that is explained by the return variance effect, which is unrelated to conditional conservatism. The results in Panel B indicate a strong negative relation between the cross-sectional variation exhibited by the BKN measures and that associated with the return variance effect. The results also reveal considerable variation in BKN’s measures across deciles of lagged market capitalization (size), ranging between values close to 0.2 for the lowest size decile and 0.05 for the highest size decile. We are unaware of prior research that anticipates either the high levels of conditional conservatism observed for small firms or the magnitude of variation observed across levels of market capitalization.

The results in Panel C reveal even more cross-sectional variation in BKN’s measures across deciles of the book-to-market (B/M) ratio. For example, the BKN measure based on firm fixed effects ranges between negative values for the lowest B/M decile to values close to 0.3 for the highest decile. Again, we are unaware of prior research that predicts either the levels of conditional conservatism we observe for the extreme B/M deciles or the magnitude of the difference between those extremes. And consistent with the main finding in Panels A and B,

17 We are aware that prior research provides different rationales for a positive relation between the B/M ratio and the Basu measure (e.g., Roychowdhury and Watts, 2007, and Ball et al., 2013).
variation in BKN’s measures documented in Panel C is associated with variation in the return variance effect.

Again, observing time-series and cross-sectional co-variation between the return variance effect and BKN’s measures suggests that the BKN measures are contaminated by factors unrelated to conditional conservatism that create the return variance effect. Also, use of BKN’s measures to study time-series and cross-sectional variation in conditional conservatism might result in unreliable inferences because of corresponding variation in the return variance effect.18

4.4 Replicating the DMR methodology on the BKN measures.

We turn finally to the methodology used by DMR to test the validity of the Basu measure, and replicate that methodology on BKN’s revised measures. We create synthetic values of the regressor (unexpected returns) that are effectively scrambled across firm-years so the dependent variable (unexpected earnings) for each observation is no longer matched exactly with the corresponding regressor (see Easton, 1998, for a related procedure). Our description provided below, which is taken mainly from DMR, explains how to construct synthetic returns which should result in BKN measures that exhibit no evidence of conditional conservatism even if it is present in the underlying data.

We first estimate annual cross-sectional regressions, described below in equation (17), of unexpected returns ($r_{it}$) on unexpected earnings ($x_{it}$) based on the three measures of expected earnings proposed by BKN.

$$ r_{it} = \delta_0 + \delta_1 x_{it} + \tau_{it} $$ (17)

18 Billings et al. (2012) adjust Khan and Watts’ (2009) firm-year estimates of conditional conservatism based on the Ball et al. (2013) regressions of unexpected earnings on positive and negative unexpected returns. Our findings suggest that these adjusted firm-year estimates are likely to be contaminated by factors unrelated to conditional conservatism.
Each pair of estimated intercept ($\delta_0$) and slope ($\delta_1$) coefficients captures the mean association between unexpected returns and unexpected earnings. Because the coefficients are not allowed to vary across good and bad news firm-years in equation (17), any differences between good and bad news firm-years due to conditional conservatism will be captured by the estimated error term ($\tau_i$). The error term also captures “other information”, an unobservable omitted variable, which relates to unexpected returns but is orthogonal to unexpected earnings.

We use estimates of the slope and intercept from equation (17) to generate for firm $i$ in year $t$ a “fitted” value of unexpected returns based on observed values of unexpected earnings. We then generate a “synthetic” unexpected return by adding to the fitted unexpected return of firm $i$ in year $t$ a randomly selected (without replacement) error term of firm $k$ in year $t$ ($\tau_{kt}$). Conditional conservatism is scrubbed from the synthetic unexpected return for firm $i$ in year $t$ ($sr_{it}$) because the error term associated with firm $i$ for year $t$ is not used to calculate the corresponding synthetic return.

Finally, we regress unexpected earnings on synthetic unexpected returns, based on equation (1). Observed earnings and observed returns are replaced by unexpected earnings and synthetic unexpected returns, and good and bad news partitions are based on the sign of synthetic unexpected returns. For each trial, we obtain the time-series mean of estimates from annual regressions, and then repeat the procedure over 100 trials. If biases are present (absent) for BKN’s measures, corresponding estimates of $b_1$ should be non-zero (zero) in the synthetic unexpected returns regressions.

Mean estimates of $b_0$ and $b_1$ across the 100 trials are reported in Table 5 for the three BKN measures of unexpected earnings. Even though those estimates are based on synthetic unexpected returns which should not exhibit evidence of conditional conservatism, their
magnitudes are similar to those reported in Table 4, Panel C, for actual unexpected returns. These results suggest upward bias in the BKN measures of conditional conservatism.

BKN and Ball et al. (2013) offer logical and empirical arguments against the DMR approach. The logical argument is that the DMR approach fails to recognize that both the Basu and BKN regressions are well specified given specific research objectives (this argument is considered next in Section 5). The empirical argument, offered in BKN’s footnote 16, asserts a series of connections among empirical regularities which result in underlying conditional conservatism remaining in the DMR estimates. We do not investigate the validity of each of these different connections and the assumptions on which they are based, all of which must hold for the BKN critique to be relevant. We do, however, offer a simple test of their critique by replacing raw values of unexpected earnings with percentile ranks based on the annual cross-sectional distributions. The distribution of percentile ranks is by construction free of skewness and so effectively we eliminate left-skewness in the unexpected earnings distribution. BKN’s footnote 16 states that left-skewness in this distribution is a necessary condition for the DMR procedure to produce biased results. Our Table 5 estimates of $b_1$ for transformed data for the three earnings expectations models in Table 5 are 0.093, 0.080, and 0.090, all with t-statistics in excess of 10. Observing similar results for transformed and untransformed values of unexpected earnings suggests that BKN’s empirical argument against the DMR procedure is not valid.

We emphasize that we did not conduct an extensive investigation of potential biases in the BKN measures. We consider two analyses used in prior research to investigate the Basu measure and replicate them on the BKN measures (results discussed in Sections 4.3 and 4.4). Also, we do not investigate whether the other concerns expressed in prior research (e.g., Givoly et al., 2007) about the Basu measure also apply to the BKN measures. But even our limited
investigation provides sufficient reason to believe that the BKN measures of conditional conservatism are not reliable.

5. CONCLUDING REMARKS

Prior research on conditional conservatism has used the Basu (1997) measure, which equals the excess of the slope of the earnings/returns relation for bad news firm-years over that for good news firm-years. BKN propose a framework that is based on separating earnings and returns into expected and unexpected components. We extend that framework to study asymmetry in the four combinations of conditional relations that emerge: (a) expected earnings and expected returns, (b) expected earnings and unexpected returns, (c) unexpected earnings and expected returns, and (d) unexpected earnings and unexpected returns. Observing asymmetry in the first three relations is evidence of bias in the Basu measure, because the earnings and returns measures are based on expectations formed in the prior period, before news for this period is observed. And observing asymmetry in the fourth relation that is unrelated to accounting conservatism is again evidence of bias in the Basu measure. Below we provide a discussion of the conclusions we generate from the results of our study.

a) There is no evidence to support BKN’s explanation for the PT bias, which relates to the Basu measure indicating conditional conservatism in lagged earnings. There is no asymmetry in the conditional relation between expected earnings and expected returns. The non-linearity that BKN rely on to support their explanation is based on unconditional relations, and has no bearing on the conditional relations that underlie the Basu measure.

b) All our evidence is consistent with PT’s explanation for their bias. Scale is positively related to expected earnings and negatively related to the variance of unexpected (and observed) returns, referred to as the loss and return variance effects, respectively. As a result, asymmetry is created in the conditional relation between expected earnings and unexpected returns. BKN’s test, designed to reject the PT explanation, leads them to the opposite conclusion, however, because they incorrectly assume that forming narrow price partitions suppresses the return variance and loss effects.

c) Additional bias in the Basu measure is created by asymmetry in the conditional relation between unexpected earnings and expected returns. Although the bias in this case is
downward, opposite to the upward biases we document elsewhere, scale again plays a role: it is negatively related to expected returns and the variance of unexpected earnings.

d) We see three reasons why more bias in the Basu measure is created by asymmetry in the conditional relation between unexpected earnings and unexpected returns that is unrelated to conservatism. First, time-series and cross-sectional variation in this asymmetry is associated with similar variation in the return variance effect, which is unrelated to accounting conservatism. Second, we doubt that actual variation in conditional conservatism is as wide as the variation we document across firms and over time, or as sudden as the sharp year-to-year changes noted in our results. Third, we observe considerable asymmetry when we employ the DMR procedure that is designed to remove conditional conservatism from the data.

e) BKN state that the magnitudes of asymmetry observed for their measures (around 0.10) are “arguably … more consistent with reasonable priors” than the magnitudes associated with the Basu measure (around 0.25). We see no mention of reasonable priors in the prior literature or theoretical basis to support this conclusion. Moreover, the mean level of asymmetry that BKN base their conclusion on masks considerable cross-sectional and time-series variation in their measures. Not only is the range of variation very high, as discussed in d) above, the levels of conditional conservatism at the extremes deviate substantially from the values observed in aggregate. Are estimates as high as 0.3 for certain years or firms with high B/M too high to be consistent with reasonable priors? Conversely, are estimates that are close to zero (and even negative) for other years and firms with high B/M too low to be consistent with reasonable priors?

f) The BKN measures have the unappealing property that they are not easily linked to accounting practice. Consider two cases: case A where a firm’s returns are positive but less so than the reference group (firms of similar size and B/M ratios), and case B where firm returns are negative but less so than the reference group. Would accountants classify cases A and B as bad and good news, respectively, and would they be more timely in recognizing news for case A, relative to case B? Accounting rules associated with conditional conservatism typically compare asset values to cost, and do not adjust for the performance of the BKN reference group. In fact, accounting rules do not require that firms be publicly traded, to allow the computation of unexpected returns per BKN.

g) BKN (and Ball et al., 2013) suggest that the research objective determines whether a regression is well specified. For example, BKN argue that the original Basu regression is well specified in certain contexts, such as leverage covenants, where no distinction is made between the expected and unexpected components of returns. We do not understand how the Basu regression can be well specified if the coefficient estimates are known to be biased. Similarly, consistency with research objectives is not sufficient for the BKN regressions to be well specified, if the BKN measures are also associated with bias.

h) More generally, BKN (and Ball et al., 2013) model the underlying relation between earnings and returns as being completely described by a simple piece-wise linear regression, and any asymmetry observed between good and bad news subgroups is due to conditional conservatism. Not only are there reasons to believe that the relation between earnings and returns is more complex, there is evidence to suggest that asymmetry might arise because of
factors unrelated to conditional conservatism (e.g., the cost stickiness noted in Banker et al., 2012).

The implication that emerges is a disappointing one because it suggests that there is considerable potential for biases in estimated earnings/returns relations for partitions based on good and bad news. One interim strategy for researchers investigating conditional conservatism is to confirm that results are not altered when different measures currently available are used. Another approach is to use the BKN measures, based on the hope that despite potential biases they might still be correlated with underlying conditional conservatism. While some may find this approach appealing, it does run the risk of generating conclusions that may later be found invalid. A third approach is to turn to transaction-level data and investigate how firms apply conditional conservatism in practice.

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19 Consider, for example, Biddle et al. (2011), which uses four measures of conditional conservatism: (a) minus one times the ratio of accumulated non-operating accruals to total assets adapted from Zhang (2008); (b) the ratio of the C score plus G score to G score (Khan and Watts, 2009); (c) a CR ratio of unexpected current earnings to total earnings news (adapted from Callen et al., 2010); and (d) a factor score from a principal component analysis of the above three metrics.
### TABLE 1
Descriptive Statistics

This table provides descriptive statistics for the following variables: observed returns ($R_{it}$), expected returns ($R_{pt}$), unexpected returns ($R_{it} - R_{pt}$), price-deflated earnings ($X_{it}/P_{it-1}$), expected and unexpected price-deflated earnings denoted as $E[X_{it}/P_{it-1}]$ and $X_{it}/P_{it-1} - E[X_{it}/P_{it-1}]$, respectively, and the inverse of lagged share price ($1/P_{it-1}$). Earnings expectations are based on three models based on the expectation models proposed in BKN and described in equation (12): (a) random walk ($E_{rw}[X_{it}/P_{it-1}]$), (b) firm fixed effects ($E_{ffe}[X_{it}/P_{it-1}]$), and (c) industry-adjusted ($E_{ind}[X_{it}/P_{it-1}]$).

Panel A: Empirical distributions (163,675 firm years, over the 48-year period from 1963 to 2010).

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Q1</th>
<th>Median</th>
<th>Q3</th>
</tr>
</thead>
<tbody>
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<td>$R_{it}$</td>
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<td>-0.183</td>
<td>0.071</td>
<td>0.355</td>
</tr>
<tr>
<td>$R_{pt}$</td>
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<td>0.241</td>
<td>-0.006</td>
<td>0.141</td>
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<tr>
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<td>-0.051</td>
<td>0.194</td>
</tr>
<tr>
<td>$X_{it}/P_{it-1}$</td>
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<td>0.166</td>
<td>0.017</td>
<td>0.059</td>
<td>0.102</td>
</tr>
<tr>
<td>$E_{rw}[X_{it}/P_{it-1}]$</td>
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</tr>
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<td>0.038</td>
<td>0.115</td>
<td>0.012</td>
<td>0.048</td>
<td>0.084</td>
</tr>
<tr>
<td>$X_{it}/P_{it-1} - E_{rw}[X_{it}/P_{it-1}]$</td>
<td>0.003</td>
<td>0.170</td>
<td>-0.027</td>
<td>0.003</td>
<td>0.027</td>
</tr>
<tr>
<td>$X_{it}/P_{it-1} - E_{ffe}[X_{it}/P_{it-1}]$</td>
<td>0.000</td>
<td>0.139</td>
<td>-0.032</td>
<td>0.004</td>
<td>0.050</td>
</tr>
<tr>
<td>$X_{it}/P_{it-1} - E_{ind}[X_{it}/P_{it-1}]$</td>
<td>0.001</td>
<td>0.120</td>
<td>-0.020</td>
<td>0.008</td>
<td>0.039</td>
</tr>
<tr>
<td>$1/P_{it-1}$</td>
<td>0.114</td>
<td>0.136</td>
<td>0.036</td>
<td>0.065</td>
<td>0.131</td>
</tr>
</tbody>
</table>

Panel B: Pairwise correlations (Pearson and Spearman correlations above and below main diagonal). All correlations, except those =0.00 and marked §, are significant at the 1% level.

<table>
<thead>
<tr>
<th>Variable</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
</tr>
</thead>
<tbody>
<tr>
<td>$R_{it}$</td>
<td></td>
<td>0.43</td>
<td>0.90</td>
<td>0.20</td>
<td>-0.02</td>
<td>0.12</td>
<td>0.07</td>
<td>0.22</td>
<td>0.16</td>
<td>0.21</td>
<td>0.08</td>
</tr>
<tr>
<td>$R_{pt}$</td>
<td></td>
<td>0.44</td>
<td>0.00§</td>
<td>0.03</td>
<td>-0.03</td>
<td>0.05</td>
<td>0.05</td>
<td>0.06</td>
<td>0.00§</td>
<td>-0.01</td>
<td>0.14</td>
</tr>
<tr>
<td>$R_{it} - R_{pt}$</td>
<td></td>
<td>0.83</td>
<td>-0.06</td>
<td>0.21</td>
<td>-0.01</td>
<td>0.11</td>
<td>0.06</td>
<td>0.21</td>
<td>0.18</td>
<td>0.23</td>
<td>0.02</td>
</tr>
<tr>
<td>$X_{it}/P_{it-1}$</td>
<td></td>
<td>0.36</td>
<td>0.14</td>
<td>0.32</td>
<td>0.53</td>
<td>0.55</td>
<td>0.69</td>
<td>0.40</td>
<td>0.84</td>
<td>0.72</td>
<td>-0.26</td>
</tr>
<tr>
<td>$E_{rw}[X_{it}/P_{it-1}]$</td>
<td></td>
<td>0.16</td>
<td>0.15</td>
<td>0.09</td>
<td>0.64</td>
<td>0.43</td>
<td>0.77</td>
<td>-0.56</td>
<td>0.35</td>
<td>0.00§</td>
<td>-0.34</td>
</tr>
<tr>
<td>$E_{ffe}[X_{it}/P_{it-1}]$</td>
<td></td>
<td>0.18</td>
<td>0.08</td>
<td>0.16</td>
<td>0.57</td>
<td>0.56</td>
<td>0.52</td>
<td>0.07</td>
<td>0.00§</td>
<td>0.27</td>
<td>-0.31</td>
</tr>
<tr>
<td>$E_{ind}[X_{it}/P_{it-1}]$</td>
<td></td>
<td>0.20</td>
<td>0.15</td>
<td>0.13</td>
<td>0.69</td>
<td>0.83</td>
<td>0.57</td>
<td>-0.16</td>
<td>0.49</td>
<td>0.00§</td>
<td>-0.28</td>
</tr>
<tr>
<td>$X_{it}/P_{it-1} - E_{rw}[X_{it}/P_{it-1}]$</td>
<td>0.29</td>
<td>0.04</td>
<td>0.30</td>
<td>0.47</td>
<td>-0.19</td>
<td>0.10</td>
<td>-0.01</td>
<td>0.43</td>
<td>0.71</td>
<td>0.11</td>
<td></td>
</tr>
<tr>
<td>$X_{it}/P_{it-1} - E_{ffe}[X_{it}/P_{it-1}]$</td>
<td>0.24</td>
<td>0.08</td>
<td>0.21</td>
<td>0.61</td>
<td>0.26</td>
<td>-0.16</td>
<td>0.30</td>
<td>0.47</td>
<td>0.69</td>
<td>-0.11</td>
<td></td>
</tr>
<tr>
<td>$X_{it}/P_{it-1} - E_{ind}[X_{it}/P_{it-1}]$</td>
<td>0.27</td>
<td>0.02</td>
<td>0.29</td>
<td>0.52</td>
<td>-0.02</td>
<td>0.14</td>
<td>-0.12</td>
<td>0.73</td>
<td>0.49</td>
<td>-0.10</td>
<td></td>
</tr>
<tr>
<td>$1/P_{it-1}$</td>
<td></td>
<td>0.00§</td>
<td>0.13</td>
<td>-0.07</td>
<td>-0.11</td>
<td>-0.15</td>
<td>-0.16</td>
<td>0.07</td>
<td>0.11</td>
<td>0.01</td>
<td></td>
</tr>
</tbody>
</table>
This table provides means and Fama-MacBeth t-statistics based on annual estimates of the four components \((\lambda_1\) to \(\lambda_4)\), described in equations (8) through (11) of the Basu conditional conservatism estimate given by the coefficient \(b_1\) from equation (1). Whereas equation (1) describes the excess of the bad news slope from a regression of price-deflated earnings \((X_{it}/P_{it})\) on returns \((R_{it})\) over the good news slope, the four components are obtained by considering the different combinations obtained by splitting earnings and returns in equation (1) into their expected and unexpected components, based on the expectation models proposed in BKN and described in equation (12). We confirm that the sum of the four components \((\lambda_1 + \lambda_4)\) equals the estimate of \(b_1\) from equation (1) reported in the bottom row. Good and bad news is based on the sign of observed returns. Expected return equals the mean \(R_{it}\) for firms that year in the same portfolio as firm \(i\), with similar market capitalization (size) and book-to-market ratio (B/M). At the beginning of each year firms are sorted into quintile portfolios formed on size and quintile portfolios formed on B/M to generate 25 portfolios. Unexpected returns are observed returns less expected returns. Expected earnings are obtained from three models: (a) random walk, (b) firm-specific means, implemented by introducing firm-fixed effects, and (c) industry models based on regressions of current earnings on lagged earnings, with separate slopes for positive and negative earnings. Unexpected earnings are observed earnings less expected earnings. The variables above are defined as follows (described for firm \(i\) in year \(t\)). \(X_{it}\) is earnings per share before extraordinary items, \(P_{it}\) is price per share at the fiscal year-end, and \(R_{it}\) is the return from the beginning of the fourth month of the current fiscal year to the end of the third month of the next fiscal year.

<table>
<thead>
<tr>
<th>Basu measure and its components</th>
<th>Describes conditional covariance between</th>
<th>Statistic</th>
<th>Earnings expectation model</th>
</tr>
</thead>
<tbody>
<tr>
<td>(\lambda_1) see equation (8)</td>
<td>Expected earnings &amp; expected returns</td>
<td>Mean</td>
<td>-0.029</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(t)-statistic</td>
<td>-1.56</td>
</tr>
<tr>
<td>(\lambda_2) see equation (9)</td>
<td>Expected earnings &amp; unexpected returns</td>
<td>Mean</td>
<td>0.189</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(t)-statistic</td>
<td>6.11</td>
</tr>
<tr>
<td>(\lambda_3) see equation (10)</td>
<td>Unexpected earnings &amp; expected returns</td>
<td>Mean</td>
<td>-0.055</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(t)-statistic</td>
<td>-3.18</td>
</tr>
<tr>
<td>(\lambda_4) see equation (11)</td>
<td>Unexpected earnings &amp; unexpected returns</td>
<td>Mean</td>
<td>0.146</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(t)-statistic</td>
<td>7.00</td>
</tr>
<tr>
<td>(\lambda_1 + \lambda_2 + \lambda_3 + \lambda_4)</td>
<td></td>
<td></td>
<td>0.251</td>
</tr>
<tr>
<td>(b_1) see equation (1)</td>
<td>Observed earnings &amp; observed returns</td>
<td>Mean</td>
<td>0.251</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(t)-statistic</td>
<td></td>
</tr>
</tbody>
</table>
TABLE 3
Regressions of lagged earnings and inverse of lagged price on observed, expected, and
unexpected returns

This table provides results from annual regressions of different variables \((Y_{it})\) on different regressors \((V_{it})\): 
\[ Y_{it}=a_0+a_1D_{it}+b_0V_{it}+b_1V_{it}^*D_{it}+e_{it} \]
The regression is effectively estimated separately for positive and negative return subgroups because the indicator variable \(D_{it}\) is set to 1 when returns are negative, and 0 otherwise. In Panel A, the dependent variable is lagged earnings, deflated by lagged price \((X_{it-1}/P_{it-1})\) and the regressor is one of three measures of returns: observed returns \((R_{it})\), expected returns \((R_{pt})\), or unexpected returns \((R_{it}-R_{pt})\). The coefficient \(b_1\) should be positive when the regressor is expected (unexpected) returns according to the BKN (PT) explanation for PT’s lagged earnings result. In Panel B, the dependent variable is the inverse of lagged share price \((1/P_{it-1})\), and the regressor is again one of the three return measures. The coefficient \(b_1\) should be negative when the regressor is unexpected returns according to the PT explanation. The variables above are defined as follows (described for firm \(i\) in year \(t\)). 
\(X_{it}\) is earnings per share before extraordinary items, \(P_{it}\) is price per share at the fiscal year-end, and \(R_{it}\) is the return from the beginning of the fourth month of the current fiscal year to the end of the third month of the next fiscal year. Per BKN, expected returns equal the mean values of \(R_{it}\) for other firms that year in the same portfolio as firm \(i\), with similar size and B/M ratio. At the beginning of each year firms are sorted into quintile portfolios formed on size and quintile portfolios formed on B/M to generate 25 portfolios.

Panel A: Regressions of lagged earnings \((X_{it-1}/P_{it-1})\) on three return measures.

<table>
<thead>
<tr>
<th>Return measure ((V_{it}))</th>
<th>Statistic</th>
<th>(b_0)</th>
<th>(b_1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Observed returns ((R_{it}))</td>
<td>Mean</td>
<td>-0.031</td>
<td>0.159</td>
</tr>
<tr>
<td></td>
<td>(t)-statistic</td>
<td>-5.34</td>
<td>9.08</td>
</tr>
<tr>
<td>Expected returns ((R_{pt}))</td>
<td>Mean</td>
<td>0.016</td>
<td>-0.007</td>
</tr>
<tr>
<td></td>
<td>(t)-statistic</td>
<td>0.52</td>
<td>-0.42</td>
</tr>
<tr>
<td>Unexpected returns ((R_{it}-R_{pt}))</td>
<td>Mean</td>
<td>-0.033</td>
<td>0.149</td>
</tr>
<tr>
<td></td>
<td>(t)-statistic</td>
<td>-7.25</td>
<td>7.96</td>
</tr>
</tbody>
</table>

Panel B: Regressions of inverse of lagged share price \((1/P_{it-1})\) on three return measures.

<table>
<thead>
<tr>
<th>Return measure ((V_{it}))</th>
<th>Statistic</th>
<th>(b_0)</th>
<th>(b_1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Observed returns ((R_{it}))</td>
<td>Mean</td>
<td>0.055</td>
<td>-0.155</td>
</tr>
<tr>
<td></td>
<td>(t)-statistic</td>
<td>10.78</td>
<td>10.93</td>
</tr>
<tr>
<td>Expected returns ((R_{pt}))</td>
<td>Mean</td>
<td>0.051</td>
<td>0.036</td>
</tr>
<tr>
<td></td>
<td>(t)-statistic</td>
<td>0.71</td>
<td>2.19</td>
</tr>
<tr>
<td>Unexpected returns ((R_{it}-R_{pt}))</td>
<td>Mean</td>
<td>0.049</td>
<td>-0.188</td>
</tr>
<tr>
<td></td>
<td>(t)-statistic</td>
<td>12.08</td>
<td>-9.85</td>
</tr>
</tbody>
</table>
TABLE 4
Regressions of BKN’s three measures of unexpected earnings on expected and unexpected returns

To supplement estimates of $\lambda_3$ and $\lambda_4$ reported in Table 2, this table provides results from annual regressions of different proxies for unexpected earnings ($x_{it}$), on different returns variables ($V_{it}$): $x_{it}=a_0+a_1D_{it}+b_0V_{it}+b_1V_{it}*D_{it}+e_{it}$. The coefficient $b_1$ represents asymmetry in the conditional relations between unexpected earnings and the returns measures, as it is the excess of the bad news slope (when the indicator variable $D_{it}$ is set to 1) over the good news slope (when $D_{it}$ is set to 0). The two measures of returns are expected returns ($R_{pt}$), and unexpected returns, or observed returns minus expected returns ($R_{it}$). Earnings expectations are based on three models proposed in BKN: (a) random walk ($E_{rw}[X_{it}/P_{it-1}]$), (b) firm fixed effects ($E_{ffe}[X_{it}/P_{it-1}]$), and (c) industry-adjusted ($E_{ind}[X_{it}/P_{it-1}]$). The variables above are defined as follows (described for firm $i$ in year $t$). $X_{it}$ is earnings per share before extraordinary items, $P_{it}$ is price per share at the fiscal year-end, and $R_{it}$ is the return from the beginning of the fourth month of the current fiscal year to the end of the third month of the next fiscal year. $R_{pt}$ is the mean value of $R_{it}$ for other firms that year in the same portfolio as firm $i$, with similar size and B/M ratio. At the beginning of each year firms are sorted into quintile portfolios formed on size and quintile portfolios formed on B/M to generate 25 portfolios. The results in Panels A and B are based on news being defined by the sign of observed returns ($R_{it}$). The results in Panel C repeat the Panel B analyses for the case where news is defined by the sign of unexpected returns.

Panel A: Regressions of three unexpected earnings measures on expected returns ($R_{pt}$). News is based on sign of observed returns.

<table>
<thead>
<tr>
<th>Unexpected earnings measure ($x_{it}$)</th>
<th>Statistic</th>
<th>$b_0$</th>
<th>$b_1$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$X_{it}/P_{it-1} - E_{rw}[X_{it}/P_{it-1}]$</td>
<td>Mean</td>
<td>0.039</td>
<td>-0.081</td>
</tr>
<tr>
<td></td>
<td>$t$-statistic</td>
<td>1.67</td>
<td>1.73</td>
</tr>
<tr>
<td>$X_{it}/P_{it-1} - E_{ffe}[X_{it}/P_{it-1}]$</td>
<td>Mean</td>
<td>0.009</td>
<td>-0.121</td>
</tr>
<tr>
<td></td>
<td>$t$-statistic</td>
<td>0.44</td>
<td>2.70</td>
</tr>
<tr>
<td>$X_{it}/P_{it-1} - E_{ind}[X_{it}/P_{it-1}]$</td>
<td>Mean</td>
<td>0.002</td>
<td>-0.068</td>
</tr>
<tr>
<td></td>
<td>$t$-statistic</td>
<td>0.15</td>
<td>1.58</td>
</tr>
</tbody>
</table>

Panel B: Regressions of three unexpected earnings measures on unexpected returns ($R_{it} - R_{pt}$). News is based on sign of observed returns.

<table>
<thead>
<tr>
<th>Unexpected earnings measure ($x_{it}$)</th>
<th>Statistic</th>
<th>$b_0$</th>
<th>$b_1$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$X_{it}/P_{it-1} - E_{rw}[X_{it}/P_{it-1}]$</td>
<td>Mean</td>
<td>0.051</td>
<td>0.091</td>
</tr>
<tr>
<td></td>
<td>$t$-statistic</td>
<td>9.76</td>
<td>7.28</td>
</tr>
<tr>
<td>$X_{it}/P_{it-1} - E_{ffe}[X_{it}/P_{it-1}]$</td>
<td>Mean</td>
<td>0.039</td>
<td>0.111</td>
</tr>
<tr>
<td></td>
<td>$t$-statistic</td>
<td>9.41</td>
<td>6.92</td>
</tr>
<tr>
<td>$X_{it}/P_{it-1} - E_{ind}[X_{it}/P_{it-1}]$</td>
<td>Mean</td>
<td>0.033</td>
<td>0.132</td>
</tr>
<tr>
<td></td>
<td>$t$-statistic</td>
<td>8.93</td>
<td>10.10</td>
</tr>
</tbody>
</table>
Panel C: Regressions of three unexpected earnings measures on unexpected returns ($R_i - \bar{R}_p$). News is based on sign of unexpected returns.

<table>
<thead>
<tr>
<th>Unexpected earnings measure ($x_{it}$)</th>
<th>Statistic</th>
<th>$b_0$</th>
<th>$b_1$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$X_{it}/P_{it-1} - E_{rv}[X_{it}/P_{it-1}]$</td>
<td>Mean</td>
<td>0.052</td>
<td>0.081</td>
</tr>
<tr>
<td></td>
<td>$t$-statistic</td>
<td>9.80</td>
<td>7.40</td>
</tr>
<tr>
<td>$X_{it}/P_{it-1} - E_{ffe}[X_{it}/P_{it-1}]$</td>
<td>Mean</td>
<td>0.040</td>
<td>0.089</td>
</tr>
<tr>
<td></td>
<td>$t$-statistic</td>
<td>7.18</td>
<td>6.56</td>
</tr>
<tr>
<td>$X_{it}/P_{it-1} - E_{ind}[X_{it}/P_{it-1}]$</td>
<td>Mean</td>
<td>0.032</td>
<td>0.118</td>
</tr>
<tr>
<td></td>
<td>$t$-statistic</td>
<td>8.69</td>
<td>11.68</td>
</tr>
</tbody>
</table>
This table provides evidence of bias in BKN’s proposed measures of conditional conservatism by documenting asymmetry in the conditional unexpected earnings/unexpected returns relation for data that has been scrambled to eliminate any underlying conditional conservatism. The methodology used is described in Table 2 of DMR. In the first stage, we estimate annual cross-sectional regressions of unexpected returns ($r_{it}$) on unexpected earnings, deflated by lagged price ($x_{it}$), based on the following model:

$$r_{it} = \delta_0 + \delta_1 x_{it} + \tau_{it}.$$  

We use estimates of the slope ($\delta_1$) and intercept ($\delta_0$) to generate a fitted value of $r_{it}$ for firm $i$ in year $t$, based on observed values of $x_{it}$. We then generate a “synthetic” unexpected return by adding to the fitted unexpected return of firm $i$ in year $t$ a randomly selected (without replacement) error term of firm $k$ in year $t$ ($\tau_{kt}$). To identify asymmetry in the conditional relation between unexpected earnings and synthetic unexpected returns, we estimate the following annual regressions:

$$x_{it} = a_0 + a_1 D_{it} + b_0 s_{rit} + b_1 s_{rit} \ast D_{it} + \epsilon_{it},$$

where $D_{it}$ is set to 1 for negative values of synthetic unexpected return, and 0 otherwise. This regression based on synthetic unexpected returns is repeated each year, and the time-series mean coefficients and associated $t$-statistics are computed for each trial. After conducting 100 trials, we report below the average coefficients and $t$-statistics observed across 100 trials. The estimates of $b_1$ will be zero (positive) if the bias predicted by DMR is absent (present). Observing positive estimates of $b_1$ suggests that BKN’s measures of conditional conservatism are not free of the bias predicted in DMR. Earnings expectations are based on three models proposed in BKN: (a) random walk ($E_{rw}[X_{it}/P_{it-1}]$), (b) firm fixed effects ($E_{ffe}[X_{it}/P_{it-1}]$), and (c) industry-adjusted ($E_{ind}[X_{it}/P_{it-1}]$). The variables above are defined as follows (described for firm $i$ in year $t$). $X_{it}$ is earnings per share before extraordinary items, $P_{it}$ is price per share at the fiscal year-end, and $R_{it}$ is the return from the beginning of the fourth month of the current fiscal year to the end of the third month of the next fiscal year. $R_{it}$ is the mean value of $R_{it}$ for other firms that year in the same portfolio as firm $i$, with similar size and B/M ratio. At the beginning of each year firms are sorted into quintile portfolios formed on size and quintile portfolios formed on B/M to generate 25 portfolios.

### TABLE 5
Replication of analyses in Table 2 of DMR for BKN measures of unexpected earnings and unexpected returns

<table>
<thead>
<tr>
<th>BKN measure of unexpected earnings ($x_{it}$)</th>
<th>Average estimates (across 100 trials)</th>
<th>Adj. R² from first-stage regression of $r_{it}$ on $x_{it}$ used to generate synthetic returns</th>
</tr>
</thead>
<tbody>
<tr>
<td>$X_{it}/P_{it-1} - E_{rw}[X_{it}/P_{it-1}]$</td>
<td>Coefficient 0.045 0.083</td>
<td>$t$-statistic 8.33 7.52 $6.7%$</td>
</tr>
<tr>
<td>$X_{it}/P_{it-1} - E_{ffe}[X_{it}/P_{it-1}]$</td>
<td>Coefficient 0.016 0.144</td>
<td>$t$-statistic 4.28 8.43 $5.4%$</td>
</tr>
<tr>
<td>$X_{it}/P_{it-1} - E_{ind}[X_{it}/P_{it-1}]$</td>
<td>Coefficient 0.015 0.164</td>
<td>$t$-statistic 5.67 12.06 $8.1%$</td>
</tr>
</tbody>
</table>
To supplement the results in Table 3, Panel A, this Figure provides results from annual regressions of lagged price-deflated earnings ($X_{it-1}/P_{it-1}$) on three measures of returns ($V_{it}$): $X_{it-1}/P_{it-1}=a_0+a_1D_{it}+b_0V_{it}+b_1V_{it}^*D_{it}+e_{it}$. The coefficient $b_1$ represents the excess of the bad news slope over the good news slope, as the indicator variable $D_{it}$ is set to 1 when returns are negative, and 0 otherwise. The three measures of returns are observed returns ($R_{it}$), expected returns ($R_{pt}$), and unexpected returns ($R_{it}-R_{pt}$). The variables above are defined as follows (described for firm $i$ in year $t$). $X_{it}$ is earnings per share before extraordinary items, $P_{it}$ is price per share at the fiscal year-end, and $R_{it}$ is the return from the beginning of the fourth month of the current fiscal year to the end of the third month of the next fiscal year. Per BKN, expected returns equal the mean values of $R_{it}$ for other firms that year in the same portfolio as firm $i$, with similar size and B/M ratio. At the beginning of each year firms are sorted into quintile portfolios formed on size and quintile portfolios formed on B/M to generate 25 portfolios. The coefficient $b_1$ estimated for observed returns should comove with the corresponding coefficient for expected (unexpected) returns according to the BKN (PT) explanation for the PT bias.
This analysis is based on that reported in Figure 3 of BKN. We report estimates of $b_1$ from the following annual regressions of lagged price-deflated earnings ($X_{it-1}/P_{it-1}$) on two measures of returns ($V_{it}$), estimated separately for 50 partitions based on lagged share price: $X_{it-1}/P_{it-1}=a_0+a_1D_{it}+b_0V_{it}+b_1V_{it}^*D_{it}+\varepsilon_{it}$. The coefficient $b_1$ represents the excess of the bad news slope over the good news slope, as the indicator variable $D_{it}$ is set to 1 when returns are negative, and 0 otherwise. The two measures of returns are observed returns ($R_{it}$) and unexpected returns ($R_{it}-\bar{R}_{it}$). The variables above are defined as follows (described for firm $i$ in year $t$). $X_{it}$ is earnings per share before extraordinary items, $P_{it}$ is price per share at the fiscal year-end, and $R_{it}$ is the return from the beginning of the fourth month of the current fiscal year to the end of the third month of the next fiscal year. Per BKN, expected returns ($\bar{R}_{it}$) equal the mean values of $R_{it}$ for other firms that year in the same portfolio as firm $i$, with similar size and B/M ratio. At the beginning of each year firms are sorted into quintile portfolios formed on size and quintile portfolios formed on B/M to generate 25 portfolios. Unexpected return equals observed return minus expected return.
FIGURE 3
PT’s return variance and loss effects are not eliminated within narrow share price partitions

The plots below consider the impact of using alternative measures of scale to determine whether the return variance and loss effects described in PT are observed when variation in share price is suppressed within BKN’s 50 partitions based on lagged share price. Panel A is a plot of the difference between the estimated slope coefficient for bad news over that for good news, for regressions designed to identify the return variance effect. The inverse of three lagged scale variables (1/Sit) are regressed on returns (Rit) within each partition and year, with separate slopes allowed for positive and negative returns as follows. 1/Sit = a0 + a1 Dit + b0 Rit + b1 Rit*Dit + εit. The three lagged scale variables are price per share (Pt-1), total assets per share (TAit-1), and book value of equity per share (BEit-1). Panel A is a plot of the mean estimated slope coefficients (b1). A similar analysis is conducted for the loss effect based on the regression 1/Sit = γ0 + γ1 Xit/Pit + εit. Panel B is a plot of the mean estimated slope coefficients (γ1). When lagged share price is both the partitioning variable and the dependent variable (1/Pit) in these regressions, the slopes b1 and γ1 are biased substantially toward zero. However, that bias should be less severe for the two other measures of scale (TAit-1 and BEit-1) and the corresponding slopes should be negative for all share price partitions, if PT’s return variance and loss effects are relevant. Variables are defined as follows (described for firm i in year t). Xit is earnings per share before extraordinary items, Pit is price per share at fiscal year-end, and Rit is the return from the beginning of the fourth month of the current fiscal year to the end of the third month of the next fiscal year. Dit =1 when Rit < 0, and =0 otherwise, representing bad and good news, respectively.

Panel A: Return variance effect across lagged share price partitions based on alternative measures of scale.
Panel B: Loss effect across lagged share price partitions based on alternative measures of scale.
FIGURE 4
Asymmetry in the conditional expected return/unexpected earnings relation

The plots below consider asymmetry in the conditional relation between expected return and unexpected earnings, where asymmetry refers to differences in that relation between good and bad news, based on the sign of returns. Earnings expectations are based on three models proposed in BKN: (a) random walk \((E_{rw}(X_{it}/P_{it}))\), (b) firm fixed effects \((E_{fe}(X_{it}/P_{it}))\), and (c) industry-adjusted \((E_{ind}(X_{it}/P_{it}))\). Expected returns equal the mean returns for other firms that year in the same portfolio as firm \(i\), with similar size and B/M ratio. At the beginning of each year firms are sorted into quintile portfolios formed on size and quintile portfolios formed on B/M to generate 25 portfolios. Panel A reports the time-series mean of unexpected earnings levels for deciles of expected returns, separately for good and bad news. Even if there is no unconditional relation between the two variables, asymmetry in the conditional relation can arise if expected returns is related to the variance of unexpected earnings and the sign of unexpected earnings is related to the sign of returns (used to form good and bad news subgroups). To illustrate how that relation can be created by scale, Panel B shows the relation between scale and expected returns and Panel C shows the conditional relation between scale and unexpected earnings for good and bad news. The results in Panel A are explained by scale being negatively related to both expected returns and the variance of unexpected earnings. Variables are defined as follows (described for firm \(i\) in year \(t\)): \(X_{it}\) is earnings per share before extraordinary items, \(P_{it}\) is price per share at fiscal year-end, and \(R_{it}\) is the return from the beginning of the fourth month of the current fiscal year to the end of the third month of the next fiscal year. Firm-years are included in the bad (good) news subgroup when \(R_{it} < 0\) (\(R_{it} \geq 0\)).

Panel A: Conditional relation for good and bad news between unexpected price-deflated earnings (based on three earnings expectations models) and expected returns.
Panel B: Relation between expected returns and scale (lagged share price deciles).

Panel C: Conditional relation for good and bad news between unexpected price-deflated earnings (based on three earnings expectations models) and scale (lagged share price deciles).
FIGURE 5
Co-variation between return variance effect and BKN’s revised Basu measures

The plots below describe co-variation between the return variance effect and BKN’s revised Basu measures of conditional conservatism over time and across firms. The return variance effect, which is created by a negative relation between variance of returns and scale, is measured as \( b_1 \), or asymmetry in the conditional relation between the inverse of lagged price (\( 1/P_{it-1} \)) and unexpected returns, where asymmetry refers to differences in that relation between good and bad news, based on the sign of unexpected returns. BKN’s revised Basu measures reflect \( b_1 \), or asymmetry in the conditional relation between unexpected earnings and unexpected returns. Earnings expectations are based on three models proposed in BKN: (a) random walk (\( E_{rm}[X_{it}/P_{it-1}] \)), (b) firm fixed effects (\( E_{ff}[X_{it}/P_{it-1}] \)), and (c) industry-adjusted (\( E_{ind}[X_{it}/P_{it-1}] \)). Expected returns equal the mean returns for other firms that year in the same portfolio as firm \( i \), with similar size and B/M ratio. At the beginning of each year firms are sorted into quintile portfolios formed on size and quintile portfolios formed on B/M to generate 25 portfolios. Panel A reports the time-series of annual estimates of \( b_1 \) for \( 1/P_{it-1} \) as well as the three measures of unexpected earnings. Panel B reports cross-sectional variation in \( b_1 \) across lagged B/M deciles and Panel C reports cross-sectional variation across lagged size deciles. Given that asymmetry for \( 1/P_{it-1} \) is not due to conditional conservatism, any co-variation between \( b_1 \) for \( 1/P_{it-1} \) and \( b_1 \) for the three revised BKN measures of conditional conservatism indicates bias in the BKN measures. Variables are defined as follows (described for firm \( i \) in year \( t \)). \( X_{it} \) is earnings per share before extraordinary items, \( P_{it} \) is price per share at fiscal year-end, and \( R_{it} \) is the return from the beginning of the fourth month of the current fiscal year to the end of the third month of the next fiscal year. Firm-years are included in the bad (good) news subgroup when unexpected \( R_{it} < 0 \) (unexpected \( R_{it} \geq 0 \)).

Panel A: Time-series variation in \( b_1 \) (asymmetry in conditional relations estimated for bad and good news) between unexpected returns and (a) lagged share price and (b) three measures of unexpected earnings.
Panel B: Variation across lagged market capitalization deciles in $b_1$, asymmetry in conditional relations between unexpected returns and (a) lagged share price and (b) three measures of unexpected earnings.

Panel C: Variation across lagged B/M deciles in $b_1$, asymmetry in conditional relations between unexpected returns and (a) lagged share price and (b) three measures of unexpected earnings.
REFERENCES


