Understanding the Informativeness of Book-Tax Differences

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Abstract: We contribute to the literature attempting to understand the specifics of the information contained in book-tax differences. We begin by illustrating that the relation found in the literature between book-tax differences, earnings growth and persistence stems from uncorrelated measurement error in the accountings systems developed to report income for tax filings and financial statements. Using a series of counterfactual tests and simulation analyses, we show that the information contained in book-tax differences is not necessarily unique. We also develop a theoretical model that incorporates a report of taxable income in the Fischer and Verrecchia (2000) reporting bias framework. The model suggests that large book-tax differences are particularly informative when there is greater noise in the measurement of book and/or taxable income. However, manipulation of earnings by managers *reduces* the information content of book-tax differences. Ultimately, we find evidence consistent with our theory. Namely, that book-tax differences are informative because they provide information regarding the potential inability of the accounting systems underlying book and taxable incomes to capture economic income.

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1. Introduction

Book-tax differences (BTDs) have been studied extensively. In one vein of the literature, BTDs are presumed to provide a signal regarding the "informativeness" of earnings. Hanlon (2005) and Lev and Nissim (2004) are contemporaneous papers that provide evidence that BTDs provide information regarding the persistence and growth, respectively, of pre-tax income. This work essentially argues that greater BTDs signal poor earnings quality, or have unfavorable consequences for future performance. Another stream of literature suggests that BTDs can provide information regarding the extent of firms' book and/or taxable income manipulation. For example, Desai (2003) and Desai and Dharmapala (2006) argue that BTDs are indicative of tax sheltering activity. Mills (1998) supports this conjecture by providing evidence that large BTDs are associated with a greater likelihood of being audited and greater settlement payments. Notice that the general tenor of this stream of literature is that larger spreads between book income and taxable income provide useful information about the manipulation of either book or taxable income. However, despite the evidence in the literature that BTDs are meaningful, it is not at all clear *why* they would be—BTDs are somewhat of a black box. Our objective is to provide analytical and empirical insight into the economics underlying the BTD.

Recently, work has begun to explore what particular aspects of BTDs provide information to equity investors. Consider that many BTDs simply represent mechanical timing differences generated by differences in GAAP and IRS reporting rules. For example, the BTD for the allowance for doubtful accounts is the firm's allowance for doubtful accounts multiplied by the blended tax rate that the firm expects to bear when the bad debt comes to fruition. Arguably, these mechanically-driven BTDs should have little information content over and above the accounting construct (i.e., the allowance for doubtful accounts). Raedy, Seidman, and

Shackelford (2011) recognize that if aggregate BTDs are informative about future performance then there should be specific parts of the BTDs that should be relatively more informative than others. Interestingly, these authors fail to find any evidence that the market responds differently to those BTDs that are potentially better signals of future performance. Raedy, Seidman, and Shackelford (2011) argue that the lack of market response is attributable to the complexity of the tax footnote.

Like Raedy, Seidman and Shackelford (2011), we, too, are curious as to the precise BTD signal to which the market is responding. To provide some structure to our thinking, we conceptualize both book and taxable income as measures of "true" firm performance plus error. We begin by considering a setting where there are no agency conflicts or tax incentives and "true" earnings evolve via a random walk. In this highly stylized world, mechanical differences in GAAP and IRS rules are the sole determinants of BTDs. BTDs capture the portions of measurement error in both reporting systems that are uncorrelated. Under this conceptualization, BTDs themselves provide no information about actual firm performance. Instead, they provide a signal about the quality of the underlying accounting systems. By construction, we do not allow for there to be a causal relationship between BTDs and future firm performance. Nonetheless, we demonstrate that BTDs are predictive of growth in book income.

The key insight from the model is that book-tax differences are informative about growth in book income because uncorrelated measurement error in the systems used to report income for tax purposes and for financial statements allows us to estimate a more precise signal of current performance than we would obtain from book income alone. This insight contributes to the debate regarding book-tax conformity (e.g., Hanlon, Laplante, and Shevlin, 2005; Hanlon, Maydew, and Shevlin. 2008); differences between GAAP and the tax code result in the availability of more precise information for both market valuation and governance purposes. Our model also provides insight into the observed relationships between the absolute magnitude of book-tax differences and earnings persistence. The likelihood of observing extreme book-tax differences is highest when the underlying accounting systems yield noisier measures of performance. Therefore, we argue that large positive or large negative book-tax differences are a reasonable proxy for the overall level of noise in the accounting systems.

The inferences from our analysis suggest that researchers should exercise caution when interpreting the empirical findings related to BTDs. We show mathematically that empirical studies will find associations between BTDs and measures of earnings quality even in the absence of any strategic behavior by managers to manipulate either book or taxable income. To demonstrate this, we first revisit the Lev and Nissim (2004) association between BTDs and measures of earnings growth. As our model suggests that the information in BTDs stems from the uncorrelated measurement error in book and taxable income, we develop empirical tests that rely on arbitrarily created alternative performance measures. Essentially, if the informativeness of BTDs stems from measurement error, then we should find the same association between growth and our alternative measures. For example, we develop an alternative measure of sales by (arbitrarily) grossing up cost of goods sold (COGS) by the statutory tax rate. Similar to the methodology used by researchers studying BTDs, we develop a measure of difference by subtracting our alternative measure of sales from reported sales. In addition to sales/COGS, we also develop a difference measure using gross margin and sales, general and administrative expenses. Ultimately, we document the same association between our alternative measures of difference and future performance suggesting that the Lev and Nissim (2004) results are attributable to uncorrelated measurement error rather than a BTD signal regarding manipulation of either book or taxable income.

Second, we investigate whether the association between BTDs and earnings persistence (Hanlon 2005) holds for our alternative measures of performance. As we argue that the information contained in BTDs stems from measurement error, we expect that firms with noisier measures of performance should have greater differences between the performance measures comprising BTDs. Using the alternative measures of performance based on sales/COGS and gross margin/sales and general expenses, we find that earnings persistence is decreasing in the differences between our alternative measures. Once again, these results are consistent with the information content of differences between measures of performance being attributable to their inherent measurement error.

Finally, we undertake a simulation analysis to mitigate concerns that the alternative performance measures used in our empirical analyses contain some signal of future performance. We first replicate the primary findings of Lev and Nissim (2004) and Hanlon (2005). We then randomly assign taxable income and book-tax differences from the empirical distribution. The output from our simulations consistently matches the findings documented in the prior empirical literature.

It is important to note that nothing in this paper refutes the empirical results in the above studies. Rather, we provide an explanation for *why* these results exist. We argue that BTDs do not need to provide any information regarding future growth to generate the previously documented empirical results; they only need to provide information regarding the efficacy of the underlying accounting systems in measuring true economic earnings. Moreover, the information provided by BTDs regarding the efficacy of the underlying accounting systems does not need to be driven by manipulation of either book or taxable income.

Nonetheless, we have noted that the conventional wisdom in the literature that followed the Hanlon (2005) and Lev and Nissim (2004) studies regarding BTDs is that they are indicative of the manipulation of either book or taxable income. We therefore relax our earlier theoretical assumption that BTDs are exogenously determined and investigate how agency conflicts and tax incentives may result in biased reports of firm performance. To do so, we extend the Fischer and Verrecchia (2000) reporting bias framework to include a potentially biased report of taxable income. As in our stylized setting, we present a model where firms' underlying economic performance is not directly observable but can be measured with error by an accounting system. Firms provide two different measures of performance, book income and taxable income. The noise component in both of these income measures is due to either the inability of the measurement system to capture firms' true economic performance or manipulation by managers. We further assume that the noise contained in book earnings is independent of the noise in taxable earnings (i.e., the manager can manipulate book income separately from taxable income).

In our model, both book and taxable income provide information to the market about the value of the firm. But reporting a higher taxable income also decreases firm value because it increases firms' tax liabilities and thus lowers future cash flows to investors. Therefore, when choosing how aggressively to avoid taxes, managers face a tradeoff between lowering firms' tax liabilities and increasing the market's assessment of firm performance. When managers face strong incentives to upwardly manage book income the market places greater emphasis on reported taxable income and, thus, managers weigh the signaling benefits of taxable income more than the real cash flow consequences of taxable income. This generally leads managers to report a smaller BTD when they are managing book income. Therefore, we conjecture that BTDs do not provide a reliable signal of earnings manipulation.

We perform empirical tests to investigate this conjecture. First, to study whether BTDs are associated with earnings manipulation, we test whether firms more likely to be managing earnings also have larger BTDs. To proxy for earnings management activity, we rely on a sample of firms that have been identified ex post as having reported fraudulent earnings. Ultimately, we fail to find evidence that these firms report larger BTDs while committing fraud. Rather, we find that the sample of fraudulent firms has relatively smaller BTDs. These results suggest that BTDs are a poor proxy of earnings manipulation.

Overall, our model implies that the information content of BTDs stems from their ability to provide a signal about the ability of accounting systems to measure firm performance. We can think of both book and taxable income as measures of "true" firm performance plus error. Because a portion of the error that stems from different standards is uncorrelated, a combination of the two reports provides a more precise signal of firm performance than either report would individually. We argue that the validity of this proxy stems from differences between GAAP and the tax code and that managerial manipulation of either book or taxable earnings limits the proxy's usefulness.

Our paper proceeds as follows. Section 2 provides background, Section 3 develops our simple model of the relation between book and taxable income, and Section 4 describes the data, research design and empirical results of tests of our simple model. In Section 5, we present a theoretical model to examine how managers' reporting and tax planning incentives are likely to affect reported BTDs and provides empirical tests of the model. Section 6 concludes.

2. Background Literature/Motivation

Mills (1998) is the first paper to empirically investigate whether BTDs could be incrementally informative to book income and taxable income.[1] She conjectures that tax authorities may view larger spreads between book and tax income as being evidence of tax planning. Ultimately, she finds that proposed IRS audit adjustments are increasing in the spread between book and taxable incomes. Her evidence suggests that the tax authorities rely on BTDs to signal that firms are potentially managing taxable income downward.

Relying on Mills' findings, a series of papers, including Desai (2003), Desai and Dharmapala (2006), Frank, Lynch, and Rego (2009), and Seidman (2010) use an estimate of BTDs as their measure of tax sheltering activity. These authors recognize that the spread between book and taxable incomes is a function of tax planning and earnings management. In some of this work, the authors attempt to strip out either the tax planning or earnings management component of the BTD in order to study the remaining component. This work generally finds support for BTDs capturing tax sheltering activity.

Hanlon (2005) and Lev and Nissim (2004) concurrently realized that, if BTDs are a function of firms' tax planning and/or earnings management, they should provide information regarding future GAAP performance. Hanlon (2005) specifically investigates the role of large BTDs on the persistence of pre-tax earnings, whereas Lev and Nissim (2004) find that BTDs provide a signal regarding future growth in pre-tax income.[2] These two papers spawned a literature on the role of BTDs on earnings quality. For example, Phillips, Pincus and Rego

[1] Cloyd (1995) and Cloyd, Pratt and Stock (1997) provide survey evidence consistent with tax advisors believing that spreads between book and taxable income provides a red-flag to tax authorities. Also, Amir et al. (1997) also study deferred tax assets/liabilities. However, they investigate whether these amounts are value-relevant.
[2] Note that Lev and Nissim (2004) investigate the ratio of taxable income to book income as their proxy of book-tax differences.

(2003), Badertscher, Phillips, Pincus and Rego (2009) and Blaylock, Shevlin and Wilson (2012) provide evidence suggesting that BTDs are capturing management of book income. This has led to papers such as Dhaliwal, Huber, Lee and Pincus (2008), Ayers, Laplante, and McGuire (2010) and Crabtree and Maher (2009), which investigate the association between BTDs and the cost of capital, changes in credit ratings and levels of credit ratings, respectively. Ayers et al. (2010) states that a "widening book-tax difference represents a potential danger as it might indicate deteriorating earnings quality", which nicely illustrated the premise that large BTDs signal something about management's manipulation of book income. Interestingly, this literature suggests when BTDs are a greater function of tax planning that they are less informative (see Blaylock et al. 2012).

However, what is curious about this line of research is that it is never explicit regarding the attribute of the BTDs' from which the market is gathering information. Consider that many standard tax accruals represent the fact that there is simply an accounting difference in the measurement of book and taxable income (e.g., allowance for doubtful accounts, warranty, pensions, compensation). Guenther (2011) and Raedy, Seidman, and Shackelford (2011) both recognize this apparent hole in the literature and attempt to address it in different ways.

In Guenther (2011), the author revisits the Hanlon (2005) analysis to ascertain which firms are driving the persistence results. In an exploratory analysis, Guenther (2011) documents that the results are attributable to 113 observations that are predominantly young and/or small firms with either net operating losses or special items. – i.e., firms that are more likely to have transitory earnings. Guenther (2011) concludes that there are some firm-year observations (34) for which there does appear to be information content in BTDs. However, once controls for special items, firm age, presence of large accruals and pre-tax return on assets are included in the persistence model, there is no longer any evidence that earnings of firms with large book-tax differences are less persistent that those firm years with small BTDs.

Raedy, Seidman, and Shackelford (2011) take a different approach to investigating the information content of BTDS: they break the aggregate BTDs into its parts. These authors are implicitly arguing that if aggregate BTDs provide information then the specific components that are more likely to signal about management manipulation should be informative. Although the authors find that firms with higher earnings persistence have smaller BTDs associated with accruals quality (revenue recognition, asset impairments, employee benefits and mark-to-market accounting), the authors do not find any evidence that the market uses these detailed BTDs in its assessment of firm value. Ultimately, the authors conclude that BTD information in the tax footnote is simply too complicated to be used for valuation purposes.

Although we now have some information regarding what BTDs do not represent, we still do not understand what they do capture. We hope to fill this void in our understanding of the informativeness of BTDs.

3. A Simple Model of Book and Taxable Earnings

We begin with a simple model of book and taxable earnings. We assume that a firm engages in activities that result in pre-tax economic earnings of $\tilde{x}_t = \mu_x + \tilde{\varepsilon}$, where $\tilde{\varepsilon}$ is independent and normally distributed with mean 0 and variance σ_{ε}^2.[3] Without loss of generality, we set $\mu_x = 0$. We then assume that economic earnings evolve according to a random walk, that is, $\tilde{x}_{t+1} = \tilde{x}_t + \tilde{\varphi}$, where $\tilde{\varphi}$ is independent and normally distributed with mean 0 and variance σ_{φ}^2.

[3] We follow the standard convention and denote random variables with a tilde, and their realizations without a tilde.

The firm has two separate accounting systems. Book income conforms with rules for external financial reporting and is represented by $\widetilde{BI}_t = \tilde{x}_t + \tilde{v}_t$. Taxable income conforms with rules for tax reporting and is represented by $\widetilde{TI}_t = \tilde{x}_t + \tilde{\eta}_t$. We assume that $\tilde{v}_t$ and $\tilde{\eta}_t$ are independently distributed with 0 means and respective variances of σ_v^2 and σ_η^2. Thus, each accounting system measures the firm's true economic performance with error, and this error is uncorrelated between the two accounting systems.[4] In the second period, the firm reports book income of $\widetilde{BI}_{t+1} = \tilde{x}_{t+1} + \tilde{v}_{t+1}$.[5] As with the previous period, we assume that $\tilde{v}_{t+1}$ is independently distributed with mean 0 and variance of σ_v^2

Before continuing, we highlight three assumptions that are implicit in our analysis. First, we assume that both book and taxable income measure the same underlying construct. We believe that this assumption is generally maintained throughout the BTD literature. Second, we assume that true earnings follow a random walk. Prior empirical studies on the time-series properties of earnings consistently find evidence that earnings follow an autoregressive process. Our results hold for any autoregressive process, but the random walk assumption allows for clearer insights. Finally, we assume that book and taxable income are exogenously determined. This implies that neither agency conflicts nor tax incentives affect their outcome. We recognize that this is a strong assumption, but believe that it provides us with a useful base case for thinking about the information content of book and taxable earnings. We relax this assumption in subsequent sections.

[4] We abstract away from the portion of the measurement error in firms' book and tax income reports that is common to both accounting systems because we are interested in understanding what drives the information content of book-tax differences, and the common error is cancelled out of the book-tax difference when taxable income is subtracted from book income. Furthermore, if the error terms have non-zero means our inferences are unchanged.

[5] As constructed, measurement error from one period to another does not reverse. Therefore, the book-tax differences we model could be either permanent or temporary. If we allow measurement error from the previous period to reverse, then our results are strengthened.

Under our assumptions, the book-tax difference, $\widetilde{BTD} = \widetilde{BI}_t - \widetilde{TI}_t = \tilde{\nu}_t - \tilde{\eta}_t$. By itself, the book-tax difference provides no information about underlying firm performance. In fact, by construction, the book-tax difference is uncorrelated with both future economic and book income. Nonetheless, simple application of Bayes' Rule implies that:

$$E\left[\tilde{x}_{t+1} \middle| BI_t, BTD\right] = \frac{\sigma_\varepsilon^2 \sigma_\nu^2 + \sigma_\varepsilon^2 \sigma_\eta^2}{\sigma_\varepsilon^2 \sigma_\eta^2 + \sigma_\varepsilon^2 \sigma_\nu^2 + \sigma_\eta^2 \sigma_\nu^2} BI_t - \frac{\sigma_\varepsilon^2 \sigma_\nu^2}{\sigma_\varepsilon^2 \sigma_\eta^2 + \sigma_\varepsilon^2 \sigma_\nu^2 + \sigma_\eta^2 \sigma_\nu^2} BTD \,. \qquad (1)$$

The coefficient on *BTD* is unambiguously negative. Thus, we should expect that firms with large book-tax differences experience lower future economic income than firms with small book-tax differences. The reason for the relation between BTDs and future earnings is because BTDs provide a signal of the measurement error in the book and tax accounting systems. A large (i.e., positive) BTD suggests that book income overestimates *current* economic performance. And, if true earnings follow an autoregressive process, then current economic performance is the best predictor of future economic performance.

While BTDs in our simplified setting are uncorrelated with future economic performance or future book income, they are mechanically correlated with the growth in book income. To see this, note that we can represent growth in book income by $\tilde{G} = \widetilde{BI}_{t+1} - \widetilde{BI}_t = \tilde{\varphi} + \tilde{\nu}_{t+1} - \tilde{\nu}_t$. Observe that any measurement error in book income that is not completely persistent will lead inevitably to a negative correlation with the BTD:

$$E\left[\tilde{G} \middle| BTD\right] = -\frac{\sigma_\nu^2}{\sigma_\nu^2 + \sigma_\eta^2} BTD. \qquad (2)$$

Furthermore, if the measurement error reverses in future periods, then this negative correlation is exacerbated.

Our analysis further extends to the relation between BTDs and persistence. Note that, in our setting, $E\left[\widetilde{BI}_{t+1}|BI\right] = \frac{\sigma_\varepsilon^2}{\sigma_\varepsilon^2+\sigma_\nu^2}BI$. The persistence parameter one would expect to observe is unambiguously decreasing in σ_ν^2. In an empirical setting, σ_ν^2 is unknown. However, the law of large numbers suggests that firms with the largest book-tax differences in absolute magnitude are those where σ_ν^2 and σ_η^2 are largest. Therefore, we would expect these firms to have less persistent book earnings than firms with smaller book-tax differences.

4. Empirical Implications

Our discussion above suggests that BTDs need only proxy for measurement error in accounting systems to generate a relation between BTDs and earnings growth and persistence. Conceptually, we lend support to the overall conclusion of Hanlon (2005) and Lev and Nissim (2004) that BTDs provide information regarding earnings quality. We argue, however, that their findings cannot be interpreted as evidence that BTDs are a signal that either book or taxable income is manipulated. To illustrate why, we conduct a series of falsification tests to demonstrate the extent to which idiosyncratic measurement error in book and tax income likely contributes to the observed relation between BTDs and earnings growth.

4.1. Uncorrelated measurement error and future growth

We examine two measures of firm performance, sales and gross margins and use methodology similar to that commonly used in the tax research to generate alternative measures of sales and gross margins. We then demonstrate that the relation between the alternative measures and future firm performance is consistent with the predictions of our model. Said another way, we create a de facto BTD that is the difference between measures other than book and taxable income. We acknowledge that it is possible that one or more of our alternative measures provides a signal regarding future performance innovations. However, consistent evidence of a relationship between our "synthetic" differences and future performance suggests that researchers should use care in interpreting findings that relate BTDs with earnings attributes. The general specification for our analysis is as follows:

$$G_t = \alpha_{indu} + \beta_1 FUND_t + \varepsilon \tag{3}$$

Where *G* is the average growth in the performance measure over various periods, scaled by lagged total assets and α_{indu} is an industry fixed effect. *FUND* is a Lev and Nissim (2004) style fundamental calculated using our arbitrarily created alternative performance measure. We follow the methodology in Lev and Nissim(2004) and estimate equation (3) using Fama-MacBeth regressions.

The first measure of firm performance that we examine is sales revenue, *SALES*. We create an alternative measure of sales by grossing up firms' cost of goods sold, *COGS*, by the current period tax rate:

$$SALES\_ALT_{j,t} = \frac{COGS_{j,t}}{tax\_rate_t}. \tag{4}$$

This measure is roughly equivalent to the methodology generally used by researchers to determine firms' taxable income, with *COGS* serving the role of current period taxes. We then construct a measure of deferred COGS, *DEFCOGS*, by subtracting *SALES_ALT* from *SALES* and scaling the difference by lagged total assets. The construction of *DEFCOGS* mimics the construction of book-tax differences frequently observed in the literature (e.g. Hanlon 2005). If our alternate sales measure contains measurement error that is independent of the measurement error in the reported sales number, then we would expect to observe a negative relation between *DEFCOGS* and future revenues. While current period *COGS* is certainly related to current period *SALES*, we find it unlikely that current COGS provides a signal about future revenue innovations, although we cannot rule out such a possibility.[6]

Our second measure of performance is the gross margin, *GROSS*, calculated as the difference between *SALES* and *COGS*, scaled by lagged total assets. We create an alternative measure of gross margin, *GROSS_ALT,* by grossing up firms' sales, general, and administrative expenses by the current period tax rate. As before, our variable of interest, *DEFSGA*, is calculated as the difference between the *GROSS* and *GROSS_ALT*, scaled by average total assets.

Next, we create Lev and Nissim (2004) style fundamentals based on our arbitrary performance measures:

$$FUND = \frac{ALT\_PERF(1 - tax\_rate)}{PERF} \quad , \tag{5}$$

where *ALT_PERF* is our alternative performance measure, and *PERF* is the performance measure of interest. For example, our COGS fundamental = *SALES_ALT*(1-0.35)/*COGS*. As in Lev and Nissim (2004), we then use the quintile rank of *FUND* by industry and year as our treatment variable of interest.

4.2. Relationship between large measurement differences and the persistence of reported performance

We have argued that when two alternative signals of performance measure the same underlying phenomenon with idiosyncratic error, the unexpected differences between them will

[6] Abnormally low COGS could signal the opportunity for other firms to earn abnormally large profits, which in turn could lead to increased competition and lower future revenues.

be a function of the aggregate measurement error contained in each signal. Therefore, we expect firms with noisier measures to make up a larger proportion of observations with extreme differences between the two measures. By extension, the persistence of reported performance should be lower for firms with large positive or negative differences between the reported and alternative measure. We expect this relationship to be particularly strong for firms with large (in absolute magnitude) BTDs because book and taxable income aggregate a large number of accruals. However, this relationship likely extends to our alternative measure. We investigate this possibility by using an approach similar to Hanlon (2005) and testing the following specification:

$$\begin{aligned} PERF_{t+1} = {} & \beta_0 + \beta_1 LNDIFF_{j,t} + \beta_2 LPDIFF + \beta_3 PERF_{j,t} + \beta_4 LNDIFF_{j,t} \times PERF_{j,t} \\ & + \beta_5 LPDIFF_{j,t} \times PERF_{j,t} + \varepsilon \end{aligned} \tag{6}$$

Where *PERF* is defined as before. *LNDIFF* is an indicator variable equal to one for firms for which differences between the performance measure and the alternate performance are in the bottom quintile by 2-digit SIC industry code and year, and *LPDIFF* is an indicator variable equal to one when the difference is in the top quintile by 2-digit SIC industry code and year.

4.3. Empirical Tests

We construct a sample to conduct our falsification tests by downloading all firms from the Compustat database for fiscal years between 2001 and 2012. We eliminate firms in the financial services or utilities industries, and firms that do not have one-year ahead data. In addition, we require non-negative performance in the current year (though not future years) for each of our performance measures. Finally, for each set of analyses, we require the existence of variables necessary to calculate each of our alternative performance metrics. This results in a final sample containing 19,129 firm-year observations. Summary statistics are provided in Table 1, Panel A.

4.3.1. Tests of the relation between uncorrelated measurement error and earnings growth

The results of our tests of the relationship between uncorrelated measurement error of two performance measures and the growth of the measurement of interest are presented in Table 2. The first column replicates the Lev and Nissim (2004) results iusing our sample. As in Lev and Nissim (2005), we find that firms with higher ratio of estimated taxable income to book income experience the highest rate of growth in book income for one to five years (*NI_G1* to *NI_G5*) in the future, and these coefficients are increasing for longer growth periods.

In the second column, we test whether this relation holds for future sales and the fundamental based on our alternative measure of sales, which is calculated by grossing firms' cost of goods sold by the corporate tax rate. As expected, firms with larger alternative sales experience higher sales growth (*Sale_G1* to *Sale_G5*), even five years into the future. This is consistent with the relationship that we would expect to observe between two uncorrelated signals of the same underlying construct when that construct follows an autoregressive process. A potential alternative explanation for this finding is that firms reporting higher cost of goods sold are less likely to be engaging in real earnings management and thus have healthier underlying sales.

Nonetheless, we find the same relationship in the third column between future gross margin (*Gross_G1* to *Gross_G5*) and our alternative margin measure calculated using sales, general, and administrative expenses. While the relation is insignificant for one year ahead, it becomes significant in the measures of gross margin growth that use three and five year ahead gross margins. We are unable to think of any reason why we observe that firms with larger period expenses have higher growth in future gross margins other than the role that uncorrelated measurement error in the alternative measure plays in helping to resolve uncertainty about actual performance. Taken in aggregate, our results suggest that uncorrelated measurement error between GAAP and the tax code is a major source of the information contained in book-tax differences regarding future performance.

4.3.2. Tests of the relation between uncorrelated measurement error and earnings persistence

Our tests of persistence are presented in Table 3. Panel A replicates the Hanlon (2005) results for our sample. Consistent with prior studies, we find that a large positive) difference between book and taxable income is associated with less persistent pre-tax book earnings. However, we fail to find a statistically significant coefficient on persistence for firms with a large negative difference between book and taxable income.[7] In panel B, we show that the persistence of sales is also lower when there is a large (in absolute magnitude) difference between reported sales and the alternative measure based on cost of goods sold in panel B. A possible explanation for our finding is that *DEFCOGS*, the difference between reported sales and our alternative measure is a proxy for real earnings management. For instance, we might observe a particularly small value of *DEFCOGS* when firms offer large discounts. Therefore, we would expect next period sales to be lower for these firms. However, if *DEFCOGS* is a proxy for real earnings management, then we would expect to observe particularly large values of *DEFCOGS* when firms overproduce inventory to allocate fixed costs to a greater number of units. Under this

[7] In Section 4.4, we replicate the Hanlon(2005) analysis using her original sample period (1994-2000) and replicate her results of a significant negative coefficients on *LNBTDxPTBI* and *LPBTDxPTBI*.

circumstance, next period sales might be higher for firms with large values of *DEFCOGS*, which is the opposite of our findings.

In panel C we observe that the persistence of gross margins is lower when there is a large difference (in absolute magnitude) between reported margins and the alternative measure based on sales, general, and administrative expenses (i.e., *DEFSGA*). Overall, these results suggest that the findings documented in the tax literature are not unique to issues that arise due to accounting for income taxes.

4.4. Simulated Book-Tax Differences

To mitigate concerns that the alternative performance measures used in our empirical analyses might contain signals regarding future performance rather than merely uncorrelated measurement error, we replicate the main findings of Lev and Nissim (2004) and Hanlon (2005).

We replicate the main results from Lev and Nissim (2004) in panel A of table 4, using data for firm years between 1993 and 2000. Our sample composition differs somewhat from the sample in Lev and Nissim's study due to the availability of additional data for long-term growth and Compustat backfilling. As in Lev and Nissim, we calculate additional fundamentals for cash flows, *CFO*, and deferred taxes, *DEF*, and rank the fundamentals by industry-year. Our findings mirror those in the original study; we find significantly positive coefficients on the ranked *TAX (R_TAX)* and *CFO (R_CFO)* fundamentals, but a significant negative coefficient on the ranked *DEF (R_DEF)* fundamental.[8] We next perform our simulation analysis to illustrate that the relationship between *R_TAX* and growth is not due to the difference in book and taxable income. We randomly assign each firm in the Lev and Nissim sample a BTD scaled by lagged total assets

[8]In untabulated results, we are able to replicate each of the alternative specifications used to estimate the relation between *TAX* and growth from Lev and Nissim (2004).

from the empirical distribution. We then subtract the randomly assigned BTD from actual scaled pre-tax book income and multiply this number by total assets to generate a randomly assigned measure of taxable income. We use our random measures of the BTD and taxable income to calculate simulated fundamentals for *TAX* and *DEF*. and re-estimate the Lev and Nissim (2004) tests to estimate coefficients for *R_TAX* and *R_DEF*. We repeat this procedure 1,000 times. The average coefficients from the simulation are reported in table 4 panel B. The average results from the simulations have the same signs and similar magnitude as the coefficients we report in our replication. We find a significantly positive coefficient on *R_TAX* in every one of our simulations. We obtain similar results in untabulated tests when we run our simulations using only out-of-sample data. These results suggest that researchers should exercise caution before interpreting the Lev and Nissim (2004) findings.

We also replicate the main findings of Hanlon (2005) in panel A of table 5. As with the Lev and Nissim (2004) replication, our sample is significantly larger than the sample use in the original paper, most likely due to backfilling of Compustat data. Nonetheless, our findings are consistent with prior studies—pre-tax book income is less persistent when BTDs are large in absolute magnitude.

Next, we conduct our simulations by randomly assigning each firm in the sample with estimated taxable income from the empirical distribution.[9] We then create an indicator variable, *LNBTD*, for observations with simulated BTDs in the lowest quintile and *LPBTD*, for observations with simulated BTDs in the highest quintile. We then interact *LNBTD* and *LPBTD* with the first period book earnings report. For each sample, we then perform persistence

[9] We randomly assign each firm a total tax expense (Compustat *txt*) and deferred tax expense (Compustat *txdi*). We then estimate taxable income as (*txt*-*tx*di)/0.35. We can then estimate our simulated BTDs as the difference between pre-tax book income and our randomly assigned estimated taxable income.

regressions as in Hanlon (2005). The average regression coefficients are provided in panel B of table 5. We consistently find negative coefficients on each of the interaction terms and reject the null hypothesis of no difference in persistence in roughly forty to seventy percent of the simulations. In panel C, we replicate the original Hanlon (2005) result for pre-tax accruals, *PTACC*, and pre-tax cash flows, *PTCF*. Using the same simulation procedure, once again, we consistently replicate Hanlon's findings when the BTDs are pure noise and reject the null hypothesis of no difference in persistence in over sixty percent of our simulations. Consider that Hanlon (2005) notes that it was a puzzle as to why large BTDs provided a signal about the persistence of firms' cash flows (see pg. 152). But if BTDs represent uncorrelated measurement error in the accounting systems, then we would expect BTDs to provide information regarding the persistence of both components of pre-tax book income.

5. The Effect of Biased Reporting on BTDs

Next, we seek to understand what drives the information contained in firms' book-tax differences. The conventional wisdom adopted by most researchers has been that book-tax differences are the result of earnings management, tax aggressiveness, differences in GAAP and taxable reporting standards, or a combination of these forces. The maintained assumption in much of the literature that followed Hanlon (2005) and Lev and Nissim (2004) is that non-conforming manipulation of either book or taxable income widens the gap between the two measures and, therefore, a large BTD is indicative of such activity. To gain insight into the effects that these forces have on firms' reporting choices, we construct a parsimonious model similar to that used by Fisher and Verrecchia (2000), Beyer (2009), and Ewert and Wagenhofer (2011; 2013).

5.1. Basic Structure

In our model, a firm produces a terminal pre-tax cash flow consisting of two components, $\tilde{x}_1$, and $\tilde{x}_2$. The first component, $\tilde{x}_1$, is normally distributed with mean μ_x and variance σ_x^2. The second component, $\tilde{x}_2 = \rho\tilde{x}_1 + \tilde{\varepsilon}$, is correlated with the first and contains an independent innovation, $\tilde{\varepsilon}$, that is normally distributed with mean 0 and variance σ_ε^2. Before the terminal cash flow is realized, the firm's manager obtains private information about it over two periods via two accounting systems. The first accounting system is used for financial reporting. It produces a signal, $\tilde{e}_{f,1} = \tilde{x}_1 + \tilde{v}_1$, that the manager observes in the first period and a signal, $\tilde{e}_{f,2} = \tilde{x}_2 + \tilde{v}_1 - \tilde{v}_2$, that the manager observes in the second period. We assume that $\tilde{v}_1$ and $\tilde{v}_2$ are independent and normally distributed with mean 0 and variance σ_v^2. The accounting system used for financial reporting purposes thus provides a noisy signal of the underlying pre-tax cash flows. The accounting system used for tax purposes also produces two signals, $\tilde{e}_{\tau,1} = \lambda\tilde{x}_1 + \tilde{\eta}_1$ and $\tilde{e}_{\tau,2} = \lambda\tilde{x}_2 + \tilde{\eta}_2 - \tilde{\eta}_1$, that the manager privately observes in the first and second periods, respectively. We assume that $\lambda \in (0,1)$ and that $\tilde{\eta}_1$ and $\tilde{\eta}_2$ are independent and normally distributed with mean μ_η variance σ_η^2. Thus, we allow the tax accounting system to measure a different construct than the financial reporting system. Without loss of generality, we set $\mu_\eta = 0$.

After observing the signals in each period, the manager prepares two publically observable reports $\tilde{r}_{f,t}$ and $\tilde{r}_{\tau,t}$, where $t \in \{1,2\}$ denotes the period[10]. The first report, $\tilde{r}_{f,t}$, is prepared to satisfy financial reporting requirements and the second, $\tilde{r}_{\tau,t}$, is prepared to satisfy tax

[10] We note that, while the tax report is not directly observable in reality, investors can infer firms' taxable income from their financial statements.

reporting requirements. The tax authority bases its tax charge on the two tax reports, resulting in a terminal after-tax cash flow of $\tilde{x}_1 + \tilde{x}_2 - \tau\left(\tilde{r}_{\tau,1} + \tilde{r}_{\tau,2}\right)$. In the first period, the manager can exercise discretion and bias each of the reports. Therefore, we denote the observable report for financial reporting purposes as $\tilde{r}_{f,1} = \tilde{e}_{f,1} + b_f$, and the observable tax report as $\tilde{r}_{\tau,1} = \tilde{e}_{\tau,1} + b_\tau$. We assume a clean surplus relation for the bias; therefore, it reverses in the subsequent period. The second period reports are thus $\tilde{r}_{f,2} = \tilde{e}_{f,2} - b_f$, for financial reporting purposes, and $\tilde{r}_{\tau,2} = \tilde{e}_{\tau,2} - b_\tau$, for tax reporting purposes. As in Ewert and Wagenhofer (2011), we only allow the manager to decide on the bias in the first period for simplicity. However, we note that allowing the manager choose a bias term in the second period does not substantively change our inferences.

The manager chooses the bias term for each report to maximize his objective function, which is given by:

$$U_M = \kappa P - \pi \tilde{r}_{\tau,1} - \frac{c_f\left(b_f - \tilde{y}\right)^2}{2} - \frac{c_\tau\left(b_\tau - \tilde{y}\right)^2}{2} \tag{7}$$

Where P represents the market valuation of the firm's terminal value after the first period reports are issued, $\tilde{y}$ is a normally distributed random variable with mean μ_y and variance σ_y^2 that represents a stochastic shock (that only the manager observes) in incentives to bias the reports.[11] This shock can have many different interpretations. One is that it represents the aggregate importance that the manager places on influencing the market price versus other contracting considerations. Another possibility is that it represents an unobservable realization of the manager's type, such as innate attributes such as honesty. The key factor for our analysis is that

[11] While Fisher and Verrecchia (2000) introduce uncertainty regarding managers' reporting incentives by adding a stochastic weight on price in the manger's utility function, other papers such as Dye and Sridhar (2004) and Beyer (2009) model uncertainty via the manager's costs to bias the report. If we model uncertainty as a stochastic weight on price it greatly increases the complexity of the model but does not affect the general tenor of our inferences.

the uncertainty prevents market participants from perfectly removing managers' biases from the reported tax and book earnings. In addition, we include a parameter, κ , that measures the strength of the manager's incentive to provide information to market participants that increases their perception of firm value. We also include a parameter, π , that measures the manager's incentives to lower the firm's period one tax burden. The other two cost parameters are , c_f which is the known cost of biasing the firm's financial reports, and c_τ , which represents the known costs of biasing the firm's tax report. We exclude the second period market price from the manager's utility function to simplify our analysis, but note that including it does not materially affect our main inferences.

After the manager reports both taxable and book earnings in the first period, the market assigns an after-tax price for the firm that is based on the two reports:

$$P = E\left[\tilde{x}_1 + \tilde{x}_2 - \tau\left(\tilde{r}_{\tau,1} + \tilde{r}_{\tau,2}\right) \middle| r_{f,1}, r_{\tau,1}\right]. \tag{8}$$

Thus, even if the report generated by the tax system is uncorrelated with the pre-tax cash flows (i.e., $\lambda = 0$), it provides market participants with value-relevant information. In any equilibrium, the market bases its clearing price on both of the observable earnings reports and its conjecture about the manager's biasing strategy. The manager, in turn, chooses the bias for the financial and tax earnings reports to maximize his utility function, which is dependent on his expectation of the market price.

5.2. A linear equilibrium

To solve the model, we conjecture the existence of a linear rational expectations equilibrium such that:

$$b_f = \phi_1 e_{f,1} + \phi_2 e_{\tau,1} + \phi_3 y + \phi_4$$

$$b_\tau = \gamma_1 e_{f,1} + \gamma_2 e_{\tau,1} + \gamma_3 y + \gamma_4$$

$$P = \alpha + \beta_f r_{f,1} + \beta_\tau r_{\tau,1}$$

If rational expectations hold, then the manager conjectures that $P = \hat{\alpha} + \hat{\beta}_f r_f + \left(\hat{\beta}_\tau - \tau\right) r_t$ to solve his optimization problem. The optimal biases to the financial and tax earnings reports can be characterized by the first-order conditions with respect to each bias on the manager's objective function, which respectively imply that:

$$b_f = y + \frac{\kappa \hat{\beta}_f}{c_f}$$

and

$$b_\tau = y + \frac{\kappa \hat{\beta}_\tau - \pi}{c_\tau}$$

Given our earlier conjecture, in an equilibrium, it must be that $\phi_1 = \phi_2 = \gamma_1 = \gamma_2 = 0$, $\phi_3 = \gamma_3 = 1$, $\phi_4 = \frac{\kappa \hat{\beta}_f}{c_f}$, and $\gamma_4 = \frac{\kappa \hat{\beta}_\tau - \pi}{c_\tau}$. Therefore, we only consider such cases when determining the market pricing function.

In equilibrium, the market sets the firm's price given observable information:

$$P = E\left[\tilde{x}_1 + \tilde{x}_2 - \tau\left(\tilde{r}_{\tau,1} + \tilde{r}_{\tau,2}\right) \middle| r_{f,1}, r_{\tau,1}\right]$$

Solving for the price, and assuming rational expectations, our linear conjecture then implies that:

$$\alpha = \left(1+\rho-\beta_f-\lambda\beta_\tau\right)\mu_x - \left[\left(\beta_f+\beta_\tau\right)\mu_y + \frac{\kappa\beta_f^2}{c_f} + \frac{\kappa\beta_\tau^2-\pi\beta_\tau}{c_\tau}\right],$$

$$\beta_f = A\sigma_x^2 \frac{\sigma_\eta^2+\left(1-\lambda\right)\sigma_y^2}{\sigma_\eta^2\sigma_v^2+\sigma_\eta^2\sigma_y^2+\sigma_\eta^2\sigma_x^2+\sigma_v^2\sigma_y^2+\left(1+\lambda\right)^2\sigma_x^2\sigma_y^2+\lambda^2\sigma_v^2\sigma_x^2}$$

and,

$$\beta_\tau = A\sigma_x^2 \frac{\lambda\sigma_v^2+\left(\lambda-1\right)\sigma_y^2}{\sigma_\eta^2\sigma_v^2+\sigma_\eta^2\sigma_y^2+\sigma_\eta^2\sigma_x^2+\sigma_v^2\sigma_y^2+\left(1+\lambda\right)^2\sigma_x^2\sigma_y^2+\lambda^2\sigma_v^2\sigma_x^2}$$

where,

$$A = \left(1+\rho\right)\left(1-\lambda\tau\right).$$

Because β_f and β_τ are uniquely determined, it must be that $\hat{\beta}_f = \beta_f$ and $\hat{\beta}_\tau = \beta_\tau$. Therefore there exists a unique linear equilibrium for which they are the solution.

5.3. Model implications for BTDs

What does our model tell us about the relation between BTDs and earnings quality? First, note that the coefficient on reported earnings, β_f, is always positive. The coefficient on the tax report, β_τ, is only positive when $\lambda\sigma_v^2 > \left(1-\lambda\right)\sigma_y^2$. When the tax report is sufficiently correlated with the underlying cash flow, x_1, (i.e., when λ is large) or when there is a large amount of measurement error in the financial reporting system (i.e., σ_v^2 is large) it provides information regarding the firm's pre-tax earnings incremental to the financial reports, and thus exhibits a positive relation with the market price of the firm. However, when either λ is low or the financial reporting system has low measurement error, the value of information provided by the tax report is primarily the signal it provides regarding the firm's overall tax burden, which negatively affects the terminal cash flow.

But, in the presence of uncertainty regarding managers' incentives to bias reported financial and tax earnings, what information is contained in the BTD? Note that we can write the BTD as:

$$btd = r_{f,1} - r_{\tau,1} = (1-\lambda)\tilde{x}_1 + \tilde{v}_1 - \tilde{\eta}_1 + b_f - b_\tau \tag{9}$$

Upon casual inspection, this equation suggests that the firms that report the largest BTDs in absolute terms are likely to be those for which both the financial and tax accounting systems report economic performance with the most error—either due to measurement error in the reporting systems or due to a low correlation between the tax report and the underlying cash flow. To see this, one simply needs to note that $\mathrm{var}(btd) = (1-\lambda)^2 \sigma_x^2 + \sigma_v^2 + \sigma_\eta^2$. But much of the literature uses BTDs as a proxy for earnings management or tax aggressiveness, which assumes—respectively—that $b_f > 0$ or $b_\tau < 0$. Therefore, it is of interest to ask how earnings management or tax aggressiveness is likely to be reflected in BTDs.

Because we assume that the inherent measurement error in both the financial accounting and tax accounting systems is zero in expectation[12], this implies that the expected book-tax difference is equal to the expected difference between the bias chosen by the manager in the financial report and the bias chosen by the manager in the tax report:

$$E[btd] = (1-\lambda)\mu_x + b_f - b_\tau = (1-\lambda)\mu_x + \frac{\kappa\beta_f}{c_f} - \frac{\kappa\beta_\tau - \pi}{c_\tau} \tag{10}$$

[12] If we assume that measurement error is biased, our inferences regarding slope coefficients are unchanged.

Consistent with the benefit to tax planning increasing in tax rates, we observe that this formulation yields the intuitive result that the expected book tax difference is increasing in managers incentive to reduce their current period tax expense, π .the rate assessed by the tax authority, τ . We provide additional comparative statics on the expected BTD in proposition 1.

Proposition 1: *The expected book-tax difference is increasing in the manager's incentives to lower current period taxes, and increasing (decreasing) in the manager's incentives to increase share price when the value relevance of the financial report relative to the costs of biasing the financial report is greater (less) than the value relevance of the tax report relative to the costs of biasing the tax report.*

Proof:

The proof is obtained by taking the respective derivatives of (10). Note that:

$$\frac{d}{d\pi}E\left[btd\right]=\frac{1}{c_\tau}>0$$

and

$$\frac{d}{d\kappa}E\left[btd\right]=\frac{\beta_f}{c_f}-\frac{\beta_\tau}{c_\tau}>(<)0 \text{ when } \frac{\sigma_\eta^2+\left(1-\lambda\right)\sigma_y^2}{c_f}>(<)\frac{\lambda\sigma_v^2+\left(\lambda-1\right)\sigma_y^2}{c_\tau}.$$

□

The economic intuition for our results follows from the tension that comes from managers' desire to simultaneously increase the market's expectations regarding future cash flows and to reduce the real effects of taxes that are assessed based on the report of taxable income. When the measurement error in the financial accounting system has a higher variance, it has less value relevance to market participants. This increases the relative value relevance of the tax report, assuming that the tax report is reasonably correlated with the underlying pre-tax cash flows of the firm.

Because managers are concerned about the market assessment of firm value, they are willing to incur real tax costs and to reduce downward biases in taxable income when the tax report is sufficiently value relevant. Thus, consistent with the findings of Erickson, Hanlon, and Maydew (2004), we find that managers will be willing to pay taxes on non-existent earnings when the incentives to manage book income and the value relevance of taxable income are sufficiently high[13].

5.4. Empirical Implications

The results of our model are generally consistent with extant empirical findings, related to book and taxable income. Similar to Lev and Nissim (2004), we can define growth in book income as $\tilde{G} = \tilde{r}_{f,2} - \tilde{r}_{f,1}$. In the context of our model, the relationship between book-tax differences and the growth in book income can be expressed as follows:

$$E\left[\tilde{G} \middle| btd\right] = \Omega + \frac{-2\sigma_v^2 - (1-\lambda)(1-\rho)\sigma_x^2}{(1-\lambda)^2 \sigma_x^2 + \sigma_v^2 + \sigma_\eta^2} btd \quad ,$$

where Ω is a constant.

The coefficient on the book-tax difference is unambiguously negative. Note, however, that the relationship is mechanical, as both sides of the equation are a linear function of $\tilde{r}_{f,1}$. To address this issue, we consider whether book-tax differences are associated with future book income:

$$E\left[r_{f,2} \middle| btd\right] = \Psi + \frac{-\sigma_v^2 + \rho(1-\lambda)\sigma_x^2}{(1-\lambda)^2 \sigma_x^2 + \sigma_v^2 + \sigma_\eta^2} btd \quad ,$$

[13] We can think managers as having aggregate incentives that place more emphasis on the market price when $\mu_y > 0$ and as having aggregate incentives that place more emphasis on the tax expense when $\mu_y < 0$.

where Ψ is a constant. The relationship between book-tax differences and future book earnings is ambiguous. If, however, taxable income is sufficiently correlated with the underlying pre-tax cash flows (i.e., λ large), then we will observe the negative relationship between book-tax differences and future book earnings as documented in the empirical literature. Note, however, that the magnitude of this relationship is a function of measurement error; biasing incentives do not affect the slope coefficient.

Likewise, book-tax differences do not directly affect the expected persistence component. However, uncertainty regarding biasing incentives does affect the expected persistence coefficient, which is:

$$\frac{\rho\sigma_x^2 - \sigma_v^2 - \sigma_y^2}{\sigma_x^2 + \sigma_v^2 + \sigma_y^2}$$

However, the ability of the book accounting system to capture true income is sufficient to result in variation in the persistence of earnings. Moreover, in the context of our model, BTDs have an ambiguous relationship with σ_y^2, and do not necessarily provide information regarding manipulation of either accounting report. However, the noise components of book and taxable income due to measurement error are likely to vary in the cross-section and are unobservable. If the noise components are independent, then the variance of the BTD is equal to the sum of the variance of each of the noise components. All else equal, the BTD of a firm with a noisier accounting system will have a higher variance than the BTD of a firm with a less noisy accounting process. Therefore, after controlling for the expected BTD we should expect to observe more extreme values of BTDs for firms with accounting systems that inherently measure firm performance with greater error. Because the underlying accounting systems are likely to be noisier, one would expect these firms to have less persistent earnings than firms where the earnings process contains less measurement error.

In addition, our model has implications that should be of interest for researchers in this area—particularly those who use BTDs as a proxy for earnings quality. First, one can think of β_τ as a measure of the information content provided by firms' disclosures regarding taxable income. In our model, the additional information content that taxable income provides relative to book income derives from the assumption that the measurement errors in the financial and tax accounting systems are uncorrelated. Consistent with the book-tax conformity opponents (see Hanlon, Laplante, and Shevlin, 2005; Hanlon, Maydew, and Shevlin, 2008), our results indicate that there is information content in taxable income incremental to that in book income.

Second, our comparative statics cast doubt on researchers' interpretation of large BTDs as a proxy for firms' management of reported book earnings. As noted earlier, if markets perceive that book income is noisy, then markets will place more emphasis on the firm's reported taxable earnings for valuation purposes. This creates an incentive for managers to report higher taxable earnings, and thus we may observe *lower* BTDs when managers are engaging in earnings manipulation—even if the manipulation is non-conforming. We test this hypothesis empirically.

Our comparative statics also suggest when incentives to manage taxable income are high, that the BTDs increase and there is a greater downward bias in reported taxable income. In addition, when there is more "opportunity" to tax plan, due to subjectivity in the rules or organizational complexity, firms are more likely to do so. This suggests that observed book-tax differences may be a reasonable proxy for firms' tax aggressiveness. However, this proxy also captures the fundamental noisiness of firms' accounting systems, which may be correlated with key variables of interest in empirical studies. Therefore, we urge researchers who use BTDs as a proxy for tax aggressiveness to incorporate controls for the noisiness of underlying accounting systems into their research designs.

5.5. *Empirical evaluation of earnings manipulation and the book-tax gap*

Our theoretical model suggests that, when managers have incentives to upwardly bias book earnings, they are likely to report lower BTDs. This conclusion runs counter to the prevailing view in the empirical literature that uses BTDs as a proxy for earnings management. We test our hypothesis using the following reduced form model:

$$BTD_{it} = \alpha_i + \alpha_t + \beta EarnMgmt_{it} + \gamma' X_{it} + \varepsilon_{it} \qquad (11)$$

The dependent variable, *BTD*, is the difference between pre-tax book earnings and taxable income, which—following the literature in this area—is calculated by grossing up the current tax expense by the statutory rate. The main variable of interest is *EarnMgmt*, which is a proxy for firm-years during which firms manage earnings. Our proxy for earnings management is an indicator variable equal to one for firm-years during which a firm misreported book earnings. We rely on three sources to identify these instances: the SECs AAER database, Audit Analytics restatement data, and the Stanford Class Action Litigation Clearinghouse. We only count fiscal years from the Audit Analytics restatement database that are due to fraud to distinguish between intentional and unintentional misreporting (Hennes et al. 2008). And, we only include observations from the Stanford Litigation data when the lawsuit relates to a GAAP violation or accounting irregularity. An advantage to this approach is that we have a high degree of certainty that the years we classify as manipulation years are indeed years when managers engaged in accounting manipulation. A disadvantage is that regulators and market participants might use large book-tax differences as a screening mechanism to identify firms that manipulate book earnings. We note, however, that this sample bias works against our prediction, as it would result in a positive relation between earnings management and BTDs. Another disadvantage is that we likely include manipulation years in our control sample, as we only identify manipulation years where managers have subsequently been caught. However, we note that alternative proxies for earnings management, such as discretionary accruals, may also proxy for measurement error of the fundamental accounting system, which our analytical model suggests will be positively correlated with BTDs. The *i* and *t* subscripts denote individual firms and years, respectively. Therefore, the α_i coefficient denotes firm fixed effects and the α_t coefficient denotes year fixed effects. This effectively converts our research design into a differences-in-differences specification. We are thus able to show how firm-specific BTDs change when firms engage in earnings manipulation.

In addition, we include a vector of control variables, *X*, to account for time-variant characteristics that the prior literature suggests might contribute to differences in book and taxable earnings. Prior literature (Manzon and Plesko 2002, Seidman 2010) suggests that differences BTDs arise due to both economic activity and fundamental differences between the accounting systems for book and taxable income. In all specifications, we include controls for firm size, which could proxy for a wide number of constructs. Seidman 2010, suggests that industry specific general business conditions lead to variation in BTDs. We follow her lead and include the following industry-adjusted factors that might result in a wedge between book and tax income: growth in sales, capital expenditures, and the cost of debt. In addition, we control for fundamental economic performance by including stock returns. Finally, auditor preferences might limit a firms' ability to engage in either tax aggressive behavior or earnings manipulation. Therefore, we include controls for auditor type and tenure.

Both Manzon and Plesko (2002) and Seidman (2010) identify several differences between GAAP and tax reporting rules that are likely to contribute to BTDs. Manzon and Plesko (2002) note that firms with positive pre-tax book income are able to take advantage of tax deductions and exemptions. Manzon and Plesko (2002) and Seidman (2010) identify several differences between GAAP and taxable reporting requirements that create a mechanical difference between the two measures. These include differences in accounting for post-retirement obligations and differences in reporting asset impairments. Finally, the existence and use of net operating loss carryforwards also contributes to differences in book and taxable income.

5.5.1 Tests of the relation between earnings management and book-tax differences

Table 6 provides the results from our tests of the relationship between earnings management and book-tax differences. In each set of tests, we consider five different measures of book-tax differences commonly used in the literature. In panel A, we use AAERs as our proxy for earnings management. We find a weakly significant positive relationship between AAERs and the deferred tax expense. For all of our other BTD measures the relationship is negative, but insignificant. In panel B, we use restatements as our proxy for earnings management. In this case, we find a negative relation between earnings management and BTDs across all specifications, although none are statistically significant. Finally, in panel C, we use class action litigation as our proxy for earnings management. In this case, we find highly significant negative coefficients for all of our BTD measures except for the deferred tax expense, which has a negative but insignificant coefficient. The inclusion of firm fixed effects suggests that, once the average firm begins manipulating book income, it reports a lower difference between book and taxable income than when it is not manipulating book income. These results are consistent with Lennox et al. (2013), who find that managers of tax aggressive firms are less likely to commit fraud than managers of firms that are not. Our theoretical analysis, however, suggests that the causality may run the opposite direction. Consistent with the findings of Erickson et al. (2004), our results suggest that the incentives that lead managers to manipulate book income also lead them to report higher taxable income than they might otherwise. In other words, managers of firms who commit fraud may be less willing to engage in tax aggressive behavior. We acknowledge that the validity of our tests is limited by concerns regarding endogeneity and omitted variables. Nonetheless, our findings should cast serious doubt on the prevailing view that large BTDs are indicative of earnings manipulation.

6. Conclusion

We present a framework to help clarify issues related to the information content of book-tax differences and the forces that shape them. We demonstrate that previously documented empirical findings regarding book-tax differences arise even when BTDs themselves provide no information regarding future book income and there is no manipulation of either book or taxable income. We then develop a theoretical model that suggests that, when deciding how to bias book and taxable income, managers face a tension between increasing the market's perception of firm value and the real costs to firm value imposed by the tax authority. Given this tension, the extent to which managers manipulate reported book and taxable income reports is a function of their incentives, the known costs of manipulating either report, the value relevance of the report, and the tax rate. The value relevance of book and taxable income, in turn, will be a function of the precision of the underlying measurement systems and uncertainty regarding managers' incentives. Because the combination of the two earnings signals provides market participants and regulators with a more precise signal of underlying firm value than one signal alone, managers who intend to manipulate earnings may face incentives to *decrease* BTDs. Both our empirical findings and simulations lend support to this argument.

Our analysis suggests that the information content of BTDs is derived primarily from uncorrelated measurement error between book and taxable income that arises due to differences between GAAP and the tax code. We provide evidence that uncorrelated measurement error between the two accounting systems is sufficient to drive many of the empirical results commonly found in the literature. The combination of our analytical, empirical, and simulated findings suggests that research that attempts to infer earnings management from large book-tax differences risks drawing incorrect conclusions, as the associations measured in such studies likely apply to the *ability* of accounting systems to measure firm performance rather than managerial malfeasance.

Nonetheless, we believe that this feature of BTDs creates a research opportunity. Extreme BTDs may be a particularly powerful proxy for inherent measurement error in the accounting system precisely because managerial manipulation of earnings tends to reduce the BTDs. Thus, research such as Guenther (2011), which examines specific properties of firms that report extreme BTDs, may be a first step towards contributing to Dechow, Ge and Schrand’s (2010) call for research into the effect of fundamental performance on earnings quality.

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Appendix A: Variable Descriptions

BTD1	The total book-tax difference, calculated as Compustat items (*pi-mii*) –(*txfed+txfo)*/.35, or, where missing *(pi-mii)-(txt-txdi)/.35*, scaled by lagged total assets.
BTD2	The temporary book-tax difference, calculated as Compustat items (*txdfed+txdo)*/.35, or, where missing, *txdi*/.35, scaled by lagged total assets.
BTD3	The total book-tax difference, calculated as Compustat items (*pi-mii*) –*txt*/.35, scaled by lagged total assets.
BTD4	The total book-tax difference, calculated as Compustat items (*pi-pifo-mii*) –*txt*/.35, scaled by lagged total assets.
BTD5	The total book-tax difference, calculated as Compustat items *(pi-mii)-txfed/.35-txfo/Ave_foretr*, where *Ave_foretr* is calculated as the average of the prior three years' Compustat items *txfo/pifo*, or, where missing *pifo*, *(pi-mii)-txfed/.35.*
PTBI	Compustat items *pi-mii*, scaled by lagged total assets.
PTCF	Compustat items *oancf-xidoc+txpd*, scaled by lagged total assets.
PTACC	*PTBI-PTCF*
SALES	Compustat item *sale*, scaled by lagged total assets.
GROSS	Compustat items *sale – cogs,* scaled by lagged total assets.
R_TAX	The industry-year rank of the Lev and Nissim Tax fundamental, calculated as Compustat items (*txfed+txfo)(1-0.35)/(0*.35*ib*) or, where missing *txt(1-0.35)/(0.35*ib).*
R_DEF	The industry-year rank of -1*BTD2*.
R_CFO	The industry-year rank of the ratio of operating cash flows to book income.
R_COGS	The industry-year rank of the COGS fundamental, calculated as Compustat items *cogs(1-0.35)/(0.35*sale).*
R_SGA	The industry-year rank of the SGA fundamental, calculated as Compustat items *sga(1-0.35)/(0.35*Gross).*
DEFCOGS	Compustat items *sale – cogs/0*.35, scaled by lagged total assets.
DEFSGA	*Gross* minus Compustat item *sga*/0.35, scaled by lagged total assets.
LNBTD	An indicator variable equal to one for firms with values of *BTD2* in the bottom quintile of the sample distribution.
LNBCD	An indicator variable equal to one for firms with values of *DEFCOGS* in the bottom quintile of the sample distribution.
LNBXD	An indicator variable equal to one for firms with values of *DEFSGA* in the bottom quintile of the sample distribution.
LPBTD	An indicator variable equal to one for firms with values of *BTD2* in the top quintile of the sample distribution.
LPBCD	An indicator variable equal to one for firms with values of *DEFCOGS* in the top quintile of the sample distribution.
LPBXD	An indicator variable equal to one for firms with values of *DEFSGA* in the top quintile of the sample distribution.
NI_G1	Year-ahead Compustat item *ib* minus current year *ib*, scaled by lagged total assets.
NI_G3	The average three years ahead Compustat item *ib* minus current year *ib*, scaled by lagged total assets.
NI_G5	The average five years ahead Compustat item *ib* minus current year *ib*, scaled by lagged total assets.
Sale_G1	Year-ahead Compustat item *sale* minus current year *sale,* scaled by lagged total assets.
Sale_G3	The average three years ahead Compustat item *sale* minus current year *sale*, scaled by lagged total assets.
Sale_G5	The average five years ahead Compustat item *sale* minus current year *sale*, scaled by lagged total assets.

Gross_G1	Year-ahead Compustat *sale-cogs* minus current year Compustat *sale-cogs*, scaled by lagged total assets.
Gross_G3	The average three years ahead Compustat *sale-cogs* minus current year Compustat *sale-cogs*, scaled by lagged total assets.
Gross_G5	The average five years ahead Compustat *sale-cogs* minus current year Compustat *sale-cogs*, scaled by lagged total assets.
AAER	An indicator variable equal to one for firm years with manipulated earnings as identified in the SEC's AAER database.
Lawsuit	An indicator variable equal to one for firm years with manipulated earnings as identified in the Stanford Securities Class Action Litigation database.
Restatement	An indicator variable equal to one for firm years with manipulated earnings as identified in the Audit Analytics Restatement database.
AbsDA_MJ	The absolute value of the residual calculated from the modified Jones accrual model estimated by 2-digit SIC code.
MVE	Compustat *prcc_f*csho.*
Total Assets	Compustat item *at.*
BM	Compustat *ceq*/*prcc_f*csho.*
Leverage	Compustat (*dlc*+*dltt*)/*at.*
Size	The natural log of a firm's market value of equity. Calculated as the natural log of Compustat items *prcc_f*csho*.
Ret	Buy and hold stock returns calculated from the CRSP dataset for the concurrent fiscal year.
Big4	An indicator variable equal to one for firms who employ a Big 4 auditing firm (inclusive of Arthur Anderson)
AuditorTenure	The number of years the firm has been audited by its current auditor.
ΔSales	The average 2-digit SIC code growth rate in sales, multiplied by lagged firm-specific sales, scaled by lagged total assets.
Cost_Debt	The average 2-digit SIC code interest rate (Compustat items *xint*/(*dlc+dltt*)), multiplied by firm-specific total debt (Compustat items *dlc+dltt*), scaled by lagged total assets.
Cap_Ex	The average 2-digit SIC code capital expenditure rate (Compustat items *capxv/ppegt*) multiplied by firm-specific *ppegt*, scaled by total assets.
PosIncome	An indicator variable equal to one when *PTBI* is greater than zero.
ΔOPEB	The change in Compustat item *prba*, scaled by lagged total assets.
Impair	Compustat item *wda* for fiscal years after 2002, *wda+gdwlia* for fiscal year prior to 2002, scaled by lagged total assets.
GW_Impair	Compustat item *gdwlia*, scaled by total assets. This item set to zero for fiscal years prior to 2002.
ΔIntang	The change in Compustat items *intan-gdwl*, scaled by lagged total assets.
NOL	An indicator variable equal to one for firms with non-zero tax loss carryforwards.
ΔNOL	The change in Compustat item *tlcf*, scaled by lagged total assets.
PIDOM	Compustat item *pidom*, scaled by lagged total assets.
PIFO	Compustat item *pifo*, scaled by lagged total assets.

Table 1
Summary Statistics

Panel A: Summary Statistics for Falsification Sample

Variable	Mean	Std Dev	25th Pctl	Median	75th Pctl	N
TotalAssets	5310.38	16292.88	122.80	510.15	2262.86	19,129
MVE	5957.33	18355.20	123.05	597.46	2659.95	17,855
Leverage	0.204	0.206	0.010	0.166	0.320	19,127
BM	0.609	0.499	0.291	0.479	0.758	17,387
PTBI	0.163	0.291	0.050	0.100	0.177	19,129
PTCF	-0.037	0.109	-0.082	-0.042	-0.004	17,049
PTACC	0.181	0.187	0.085	0.146	0.227	17,049
Sale	1.487	1.514	0.685	1.135	1.768	19,129
GROSS	0.532	0.649	0.247	0.394	0.608	19,129
BTD1	0.040	0.069	0.004	0.024	0.055	19,129
BTD2	0.005	0.045	-0.009	0.001	0.020	19,092
DEFCOGS	-1.285	1.932	-1.722	-0.789	-0.173	19,129
DEFSGA	-0.407	0.621	-0.580	-0.262	-0.033	17,912
NI_G1	-0.014	0.113	-0.028	0.004	0.026	19,129
NI_G3	-0.010	0.123	-0.038	0.004	0.037	15,980
NI_G5	-0.003	0.135	-0.044	0.005	0.048	12,048
Sale_G1	0.128	0.319	-0.006	0.074	0.211	19,129
Sale_G3	0.293	0.571	0.008	0.157	0.419	15,980
Sale_G5	0.477	0.859	0.032	0.247	0.650	12,048
Gross_G1	0.041	0.127	-0.012	0.025	0.080	19,129
Gross_G3	0.096	0.217	-0.009	0.052	0.149	15,980
Gross_G5	0.161	0.323	-0.001	0.083	0.222	12,048

Table 1 (Cont.)
Summary Statistics

Panel B: Summary Statistics for BTD and Earnings Management Sample

Variable	Mean	Std Dev	25th	Median	75th	N
Total Assets	2445.02	6603.30	78.71	341.99	1478.01	25,488
AbsDA_MJ	0.208	0.199	0.066	0.160	0.281	25,488
Size	5.846	2.140	4.350	5.876	7.302	25,488
Ret	0.137	0.687	-0.272	0.035	0.359	25,488
Big4	0.773	0.419	1.000	1.000	1.000	25,488
AuditorTenure	10.363	8.836	4.000	8.000	14.000	25,488
ΔSales	1.543	4.756	0.103	0.291	0.863	25,488
Cost_Debt	0.106	0.233	0.001	0.031	0.096	25,488
Cap_Ex	0.276	0.900	0.039	0.078	0.156	25,488
PosIncome	0.629	0.483	0.000	1.000	1.000	25,488
ΔOPEB	0.000	0.002	0.000	0.000	0.000	25,488
Impair	-0.003	0.013	0.000	0.000	0.000	25,488
GW_Impair	-0.005	0.023	0.000	0.000	0.000	25,488
ΔIntang	0.008	0.051	-0.003	0.000	0.002	25,488
NOL	0.656	0.475	0.000	1.000	1.000	25,488
ΔNOL	-0.058	0.273	-0.011	0.000	0.000	25,488
PIDOM	-0.034	0.262	-0.071	0.025	0.094	25,488
PIFO	0.011	0.035	0.000	0.000	0.011	25,488
BTD1	-0.079	0.240	-0.077	0.003	0.034	25,488
BTD2	0.001	0.052	-0.008	0.000	0.015	25,488
BTD3	-0.087	0.244	-0.066	-0.006	0.010	25,488
BTD4	-0.077	0.236	-0.069	0.001	0.030	25,488
BTD5	-0.082	0.247	-0.083	0.002	0.034	25,488
AAER	0.009	0.096	0.000	0.000	0.000	25,488
Restatement	0.013	0.115	0.000	0.000	0.000	25,488
Lawsuit	0.012	0.107	0.000	0.000	0.000	25,488

This table presents summary statistics for the observations used in our analyses. Panel A contains summary statistics for 19,129 firm years between 2001 and 2012 used in our falsification tests for the relation between BTDs and earnings growth and persistence, which require that current period pre-tax income be positive. Panel B contains summary statistics for 25,488 firm years between 2001 and 2012 used in our analysis of the relation between BTDs and earnings management. All variables are defined as in Appendix A.

Table 2
Alternative Measures of Performance and Growth

	R_TAX		*R_COGS*		*R_SGA*			
G	*Coeff*	*t-stat*	*Coeff*	*t-stat*	*Coeff*	*t-stat*	*Mean R^2*	*Mean n*
NI_G1	0.558***	(11.23)					0.093	1,446
NI_G3	0.766***	(7.95)					0.104	1,286
NI_G5	0.725***	(5.74)					0.105	1,023
Sale_G1			0.643	(1.60)			0.109	1,715
Sale_G3			1.162**	(1.99)			0.115	1,518
Sale_G5			1.239**	(2.02)			0.100	1,198
Gross_G1					0.140	(1.57)	0.099	1,593
Gross_G3					0.454***	(3.57)	0.112	1,405
Gross_G5					0.743***	(3.36)	0.096	1,101

This table presents the results from Fama-MacBeth regressions of growth on various measures of firm performance as a function of the Lev and Nissim (2004) style fundamentals calculated from the alternative measures, *FUND*, for firms between 2001 and 2012.

$$G = \alpha_{indu} + \beta FUND + \varepsilon$$

All variables are as defined in Appendix A. t-statistics appear in parentheses and are calculated using standard errors clustered by firm and year. ***, **, and * denote statistical significance at the 0.01, 0.05, and 0.10 levels, respectively.

Table 3
Alternative Measures of Performance and Persistence

Panel A: Persistence of Pre-Tax Book Income

Dependent variable = $PTBI_{t+1}$

Intercept	*LNBTD*	*LPBTD*	*PTBI*	*LNBTD×PTBI*	*LPBTD×PTBI*
0.034	0.002	0.006	0.545	-0.001	-0.040
(20.50)	(0.77)	(1.76)	(58.22)	(-0.08)	(-2.19)
				R^2	0.300
				n	14,681

Panel B: Persistence of Sales

Dependent variable = $SALES_{t+1}$

Intercept	*LNBCD*	*LPBCD*	*SALES*	*LNBCD×SALES*	*LPBCD×SALES*
0.236	0.857	0.096	0.793	-0.326	-0.225
(23.02)	(40.20)	(6.10)	(93.21)	(-30.91)	(-16.05)
				R^2	0.626
				n	22,415

Panel C: Persistence of Gross Margins

Dependent variable = $GROSS_{t+1}$

Intercept	*LNBXD*	*LPBXD*	*GROSS*	*LNBXD×GROSS*	*LPBXD×GROSS*
0.092	0.257	0.090	0.768	-0.278	-0.474
(24.46)	(36.57)	(15.26)	(94.24)	(-27.73)	(-35.09)
				R^2	0.603
				n	20,785

This table presents the results from Hanlon (2005) style regressions of performance persistence as a function of the spread between the measure of interest and its alternate measure for firm years between 2001-2012. Panel A presents the results for large differences between book and taxable income. Panel B presents the persistence results for large differences between sales and our alternative sales measures (*DEFCOGS*). And, Panel C presents the results for large differences between gross margins and our alternative gross margins measure (*DEFSGA*). All variables are as defined in Appendix A. t-statistics appear in parentheses and are calculated using standard errors clustered by firm and year. ***, **, and * denote statistical significance at the 0.01, 0.05, and 0.10 levels, respectively.

Table 4
Earnings Growth and the Lev and Nissim Tax Fundamental

Panel A: Replication of Lev and Nissim (2004) Table 2: Panel B

	NI_G1	***NI_G2***	***NI_G3***
R_TAX	0.895***	1.204***	1.501***
	(9.13)	*(17.28)*	*(16.57)*
R_DEF	-0.214**	-0.508***	-0.658***
	(-2.58)	*(-4.44)*	*(-3.61)*
R_CFO	0.496***	0.828	1.018***
	(4.79)	*(5.90)*	*(8.62)*
Mean R^2	0.088	0.108	0.117
Mean n	1,672	1,428	1,219

Panel B: Simulated Tax Fundamentals and Earnings Growth

	NI_G1	***NI_G2***	***NI_G3***
R_TAX	0.461***	0.523***	0.622***
	(7027.91)	*(5120.21)*	*(5029.54)*
R_DEF	-0.006***	-0.017***	-0.035***
	(-2.89)	*(-5.74)*	*(-8.98)*
R_CFO	0.433***	0.675***	0.921***
	(7152.10)	*(7395.74)*	*(7459.74)*
Simulations with Positive ***R_TAX***	1,000	1,000	1,000
Simulations with Significant Positive ***R_TAX***	1,000	1,000	1,000
Total Number of Simulations	1,000	1,000	1,000

This table examines the relation between the Lev and Nissim (2004) tax fundamental and earnings growth. The reported results are the Fama-MacBeth coefficients obtained from estimating the following model for firm-years between 1993 and 2000.

$$G = \alpha_{indu} + \beta_1 R\_TAX + \beta_2 R\_DEF + \beta_3 R\_CFO + \varepsilon$$

Panel A presents the results from replicating Lev and Nissim (2004). Panel B presents the average coefficients from 1,000 replications of the Lev and Nissim (2004) growth results using simulated data, where book-tax differences are randomly assigned with replacement from the empirical distribution. t-statistics appear in italics. ***, **, and * denote statistical significance at the 0.01, 0.05, and 0.10 levels, respectively.

Table 5
Earnings Persistence and Book-Tax Differences

Panel A: Replication of Hanlon (2005) Table 3 Panel B

Dependent variable = $PTBI_{t+1}$

Intercept	*LNBTD*	*LPBTD*	*PTBI*	*LNBTD×PTBI*	*LPBTD×PTBI*
0.047***	0.023***	0.019***	0.361***	-0.070***	-0.192***
(25.05)	*(6.06)*	*(5.06)*	*(38.08)*	*(-4.76)*	*(-12.00)*
				R^2	0.133
				n	15,782

Panel B: Simulated Earnings Persistence and Book-Tax Differences

Dependent variable = $PTBI_{t+1}$

Intercept	*LNBTD*	*LPBTD*	*PTBI*	*LNBTD×PTBI*	*LPBTD×PTBI*
0.055***	0.004***	0.001***	0.310***	-0.045***	-0.022***
(1048.97)	*(28.05)*	*(9.65)*	*(851.77)*	*(-44.34)*	*(-21.88)*
Simulations with negative coefficient				908	752
Simulations with significant negative coefficient				683	382
Total Simulations				1,000	1,000

Table 5 (Cont.)
Earnings Persistence and Book-Tax Differences

Panel C: Replication of Hanlon (2005) Table 4 Panel B

Dependent variable = $PTBI_{t+1}$

Intercept	*LNBTD*	*LPBTD*	*PTCF*	*LNBTD× PTCF*	*LPBTD× PTCF*	*PTACC*	*LNBTD× PTBI*	*LPBTD× PTBI*
0.036***	0.017***	0.012***	0.428***	-0.061***	-0.168***	0.241***	-0.069***	-0.192***
(18.88)	*(4.45)*	*(3.03)*	*(42.60)*	*(-3.90)*	*(-9.43)*	*(18.35)*	*(-3.35)*	*(-8.28)*
							R^2	0.171
							n	15,782

Panel D: Simulated Regressions of Future Earnings Performance and the Accrual and Cash Flow Components of Earnings with the Coefficients Allowed to Vary for Firm-Years with Large Book-Tax Differences

Dependent variable = $PTBI_{t+1}$

Intercept	*LNBTD*	*LPBTD*	*PTCF*	*LNBTD× PTCF*	*LPBTD× PTCF*	*PTACC*	*LNBTD× PTBI*	*LPBTD× PTBI*
0.041***	0.005***	0.001***	0.389***	-0.048***	-0.021***	0.191***	-0.043***	-0.014***
(692.16)	*(29.82)*	*(7.79)*	*(960.09)*	*(-43.60)*	*(-17.71)*	*(379.97)*	*(-30.94)*	*(-10.08)*
Simulations with negative coefficient				924	712		844	643
Simulations with significant negative coefficient				924	712		844	643
Total Simulations				1,000	1,000		1,000	1,000

This table presents the results of estimating future performance as a function of current performance when book-tax differences are large. Panel A is a replication of Table 3, Panel B in Hanlon (2005), for firm years between 1994 and 2000. Panel B presents the average coefficients from 1,000 replications of the Hanlon (2005) results, where deferred taxes are randomly assigned with replacement from the empirical distribution. Panel C is a replication of Table 4, Panel B in Hanlon (2005). And, Panel D presents the average coefficients from 1,000 replications of the Hanlon (2005) results, where deferred taxes are randomly assigned with replacement from the empirical distribution.

Table 6
Earnings Management and Book-Tax Differences

Panel A: AAERs

	BTD1	*BTD2*	*BTD3*	*BTD4*	*BTD5*
$AAER_t$	-0.004	0.009*	-0.018	-0.004	-0.012
	(-0.70)	(1.66)	(-1.51)	(-0.78)	(-1.38)
$AbsDA\_MJ_t$	-0.021***	-0.011***	-0.006	-0.020***	-0.025***
	(-4.35)	(-4.05)	(-0.92)	(-4.28)	(-4.56)
$Size_t$	0.004***	-0.003***	0.006***	0.005***	0.005***
	(2.93)	(-3.81)	(3.76)	(3.36)	(3.05)
Ret_t	0.004***	-0.002**	0.007***	0.004***	0.003***
	(4.27)	(-2.45)	(5.31)	(4.24)	(2.58)
$Big4_t$	-0.000	0.000	-0.001	0.000	-0.002
	(-0.00)	(0.11)	(-0.22)	(0.07)	(-0.50)
$AuditorTenure_t$	0.000	0.000	-0.000	0.000	0.000
	(0.57)	(0.12)	(-0.01)	(0.41)	(1.41)
$\Delta Sales_t$	0.000	-0.000	0.000	0.000	0.000
	(0.29)	(-0.02)	(0.70)	(0.15)	(0.27)
$Cost\_Debt_t$	0.006*	0.004**	0.004	0.008**	0.009**
	(1.71)	(1.98)	(0.83)	(2.22)	(2.14)
Cap_Ex_t	-0.000	0.000	-0.001	-0.000	0.001
	(-0.19)	(0.08)	(-0.61)	(-0.24)	(0.75)
$PosIncome_t$	-0.003	0.014***	-0.015***	-0.004*	-0.003
	(-1.52)	(9.29)	(-4.71)	(-1.78)	(-1.25)
$\Delta OPEB_t$	0.438**	0.206	0.083	0.377**	0.367
	(2.32)	(0.91)	(0.23)	(2.13)	(1.17)
$Impair_t$	1.027***	0.222***	0.772***	0.925***	1.026***
	(11.17)	(4.94)	(6.89)	(10.36)	(10.50)
GW_Impair_t	0.715***	0.122***	0.567***	0.618***	0.721***
	(16.62)	(4.20)	(9.07)	(15.37)	(15.21)
$\Delta Intang_t$	0.069***	-0.015*	0.091***	0.080***	0.049**
	(4.04)	(-1.81)	(4.39)	(4.85)	(2.28)
NOL_t	-0.004*	-0.000	-0.003	-0.004*	-0.005**
	(-1.86)	(-0.16)	(-1.07)	(-1.89)	(-2.07)
ΔNOL_t	0.010**	-0.004**	0.017***	0.008*	0.010**
	(2.22)	(-2.25)	(3.18)	(1.72)	(2.18)
$PIDOM_t$	0.702***	0.014***	0.687***	0.717***	0.714***
	(56.39)	(3.41)	(46.41)	(60.09)	(55.48)
$PIFO_t$	0.722***	-0.030*	0.769***	-0.209***	0.617***
	(19.13)	(-1.68)	(16.03)	(-7.22)	(11.25)
Year Effects	yes	yes	yes	yes	yes
Firm Effects	yes	yes	yes	yes	yes
Observations	25,488	25,488	25,488	25,488	25,488
R^2	0.843	0.914	0.871	0.911	0.080

Table 6 (Cont.)
Earnings Management and Book-Tax Differences

Panel B: Restatements

	BTD1	***BTD2***	***BTD3***	***BTD4***	***BTD5***
Restatement$_t$	-0.006	-0.000	-0.002	-0.002	-0.002
	(-0.92)	(-0.04)	(-0.23)	(-0.41)	(-0.19)
AbsDA_MJ$_t$	-0.021***	-0.011***	-0.006	-0.020***	-0.025***
	(-4.34)	(-4.04)	(-0.93)	(-4.28)	(-4.57)
Size$_t$	0.004***	-0.003***	0.006***	0.005***	0.005***
	(2.95)	(-3.75)	(3.70)	(3.36)	(3.02)
Ret$_t$	0.004***	-0.002**	0.007***	0.004***	0.003***
	(4.26)	(-2.48)	(5.33)	(4.24)	(2.60)
Big4$_t$	0.000	0.000	-0.001	0.000	-0.002
	(0.01)	(0.07)	(-0.18)	(0.08)	(-0.48)
AuditorTenure$_t$	0.000	0.000	-0.000	0.000	0.000
	(0.55)	(0.15)	(-0.05)	(0.39)	(1.38)
ΔSales$_t$	0.000	-0.000	0.000	0.000	0.000
	(0.29)	(-0.02)	(0.70)	(0.15)	(0.27)
Cost_Debt$_t$	0.006*	0.004**	0.004	0.008**	0.009**
	(1.71)	(1.98)	(0.83)	(2.22)	(2.14)
Cap_Ex$_t$	-0.000	0.000	-0.001	-0.000	0.001
	(-0.19)	(0.08)	(-0.60)	(-0.24)	(0.75)
PosIncome$_t$	-0.004	0.014***	-0.015***	-0.004*	-0.003
	(-1.53)	(9.27)	(-4.69)	(-1.79)	(-1.25)
ΔOPEB$_t$	0.439**	0.208	0.079	0.377**	0.365
	(2.32)	(0.92)	(0.22)	(2.13)	(1.16)
Impair$_t$	1.028***	0.222***	0.773***	0.925***	1.026***
	(11.18)	(4.93)	(6.90)	(10.36)	(10.50)
GW_Impair$_t$	0.715***	0.122***	0.567***	0.618***	0.722***
	(16.62)	(4.19)	(9.08)	(15.37)	(15.22)
ΔIntang$_t$	0.069***	-0.015*	0.091***	0.080***	0.049**
	(4.04)	(-1.80)	(4.39)	(4.85)	(2.27)
NOL$_t$	-0.004*	-0.000	-0.003	-0.004*	-0.005**
	(-1.86)	(-0.15)	(-1.08)	(-1.89)	(-2.08)
ΔNOL$_t$	0.010**	-0.004**	0.017***	0.008*	0.010**
	(2.22)	(-2.25)	(3.18)	(1.72)	(2.18)
PIDOM$_t$	0.702***	0.014***	0.687***	0.717***	0.715***
	(56.40)	(3.41)	(46.41)	(60.10)	(55.49)
PIFO$_t$	0.722***	-0.030*	0.769***	-0.209***	0.617***
	(19.14)	(-1.69)	(16.04)	(-7.22)	(11.25)
Year Effects	yes	yes	yes	yes	yes
Firm Effects	yes	yes	yes	yes	yes
Observations	25,488	25,488	25,488	25,488	25,488
R^2	0.843	0.914	0.871	0.911	0.080

Table 6 (Cont.)
Earnings Management and Book-Tax Differences

Panel C: Class Action Litigation

	BTD1	***BTD2***	***BTD3***	***BTD4***	***BTD5***
$Lawsuit_t$	-0.020***	-0.003	-0.018**	-0.020***	-0.022***
	(-4.02)	(-0.73)	(-2.42)	(-4.01)	(-3.08)
$AbsDA\_MJ_t$	-0.021***	-0.011***	-0.006	-0.020***	-0.025***
	(-4.39)	(-4.05)	(-0.95)	(-4.32)	(-4.60)
$Size_t$	0.004***	-0.002***	0.007***	0.005***	0.005***
	(3.06)	(-3.69)	(3.79)	(3.48)	(3.14)
Ret_t	0.004***	-0.002**	0.007***	0.004***	0.003***
	(4.26)	(-2.48)	(5.32)	(4.23)	(2.58)
$Big4_t$	0.000	0.000	-0.001	0.001	-0.002
	(0.08)	(0.09)	(-0.13)	(0.15)	(-0.42)
$AuditorTenure_t$	0.000	0.000	-0.000	0.000	0.000
	(0.56)	(0.15)	(-0.05)	(0.39)	(1.38)
$\Delta Sales_t$	0.000	-0.000	0.000	0.000	0.000
	(0.29)	(-0.02)	(0.69)	(0.14)	(0.26)
$Cost\_Debt_t$	0.006*	0.004**	0.004	0.008**	0.009**
	(1.72)	(1.98)	(0.84)	(2.24)	(2.16)
Cap_Ex_t	-0.000	0.000	-0.001	-0.000	0.001
	(-0.21)	(0.07)	(-0.61)	(-0.26)	(0.73)
$PosIncome_t$	-0.003	0.014***	-0.015***	-0.004*	-0.003
	(-1.49)	(9.28)	(-4.68)	(-1.75)	(-1.22)
$\Delta OPEB_t$	0.443**	0.209	0.084	0.382**	0.371
	(2.34)	(0.92)	(0.23)	(2.16)	(1.18)
$Impair_t$	1.027***	0.222***	0.773***	0.925***	1.026***
	(11.18)	(4.93)	(6.90)	(10.36)	(10.51)
GW_Impair_t	0.715***	0.122***	0.567***	0.618***	0.721***
	(16.62)	(4.19)	(9.08)	(15.38)	(15.23)
$\Delta Intang_t$	0.070***	-0.015*	0.091***	0.080***	0.049**
	(4.09)	(-1.79)	(4.42)	(4.90)	(2.31)
NOL_t	-0.004*	-0.000	-0.003	-0.004*	-0.005**
	(-1.87)	(-0.15)	(-1.08)	(-1.90)	(-2.09)
ΔNOL_t	0.010**	-0.004**	0.018***	0.008*	0.010**
	(2.24)	(-2.24)	(3.19)	(1.74)	(2.20)
$PIDOM_t$	0.702***	0.014***	0.687***	0.717***	0.715***
	(56.43)	(3.41)	(46.43)	(60.14)	(55.53)
$PIFO_t$	0.722***	-0.030*	0.769***	-0.209***	0.617***
	(19.12)	(-1.70)	(16.02)	(-7.23)	(11.23)
Year Effects	yes	yes	yes	yes	yes
Firm Effects	yes	yes	yes	yes	yes
Observations	25,488	25,488	25,488	25,488	25,488
R^2	0.843	0.915	0.871	0.911	0.080

Table 6 (Cont.)
Earnings Management and Book-Tax Differences

This table presents the results from an OLS regression of book-tax differences as a function of earnings management. Panel A presents the results with AAERs as the proxy for earnings management. Panel B presents the results with restatements as the proxy for earnings management. And, Panel C presents the results with class-action litigation as the proxy for earnings management. All variables are as defined in Appendix A. t-statistics appear in parentheses and are calculated using standard errors clustered by firm. ***, **, and * denote statistical significance at the 0.01, 0.05, and 0.10 levels, respectively.