

LEVELING THE PLAYING FIELD: UNBIASED TESTS OF THE RELATIVE  
INFORMATION CONTENT OF BOOK INCOME AND TAXABLE INCOME

by

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## ABSTRACT

In this study, I document that at least a portion of the superior ability of book income relative to taxable income to explain the market value of equity may be due to market mispricing arising from investors' fixation on book income and underemphasis on the information contained in taxable income, rather than book income's superior information content. I find that this result generally intensifies as book earnings quality and tax planning decrease. Indeed, I show that once market mispricing is removed from the valuation model, taxable income possesses statistically equivalent or even superior ability relative to book income to explain firm value among firms with particularly low book earnings quality and firms that engage in a relatively low degree of tax planning. This study adds to the growing literature on the informativeness of firms' tax-related financial statement disclosures by demonstrating that prior research may have conducted tests of value relevance that are inherently biased in favor of book income and, consequently, understated the relative information content of taxable income.



## SECTION 1: INTRODUCTION

A growing body of research examines the information content of firms' tax-related financial statement disclosures for equity valuation purposes (see Graham, Raedy, & Shackelford, 2012, for a review). In particular, Hanlon, Laplante, and Shevlin (2005) and Ayers, Jiang, and Laplante (2009) examine the information content of a firm's estimated taxable income relative to its book income, concluding that book income is superior to taxable income as a summary measure of firm performance, even when book earnings are of relatively low quality and when the firm engages in a relatively low degree of tax planning. Hanlon et al. and Ayers et al. use contemporaneous stock returns as the performance criterion. However, other research indicates that contemporaneous stock returns may be biased by investors' overemphasis, or fixation, on the information contained in book income (e.g., Sloan, 1996; Xie, 2001), and underemphasis on the information contained in taxable income (e.g., Lev & Nissim, 2004; Thomas & Zhang, 2011) when forecasting future earnings and pricing securities. These findings suggest that Hanlon et al. and Ayers et al. may have understated the relative information content of taxable income as compared to book income as a result of these sources of market mispricing.<sup>1</sup>

In this study, I conduct empirical tests that attempt to overcome biases related to market mispricing. My findings indicate that the ability of taxable income relative to book income to explain firm value increases after removing the effects of market mispricing from the valuation model, suggesting that Hanlon et al. (2005) and Ayers et al. (2009) may have understated the information content of taxable income relative to book income. Further, in contrast to Ayers et

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<sup>1</sup> In the remainder of the text, "market mispricing" refers to mispricing arising from investors' overemphasis on book income and underemphasis on taxable income when forecasting future earnings and pricing securities.

al., my results indicate that taxable income actually surpasses book income as a summary measure of firm performance when book income is of particularly low quality. These findings are important because the information content of taxable income is a fundamental concern in the literature on the value relevance of the tax information reported in firms' financial statements. Further, this issue is also pertinent to the policy debate on book/tax conformity (e.g., Hanlon & Shevlin, 2005). In particular, if the information content of taxable income has been understated by prior studies, then so has the information that would be lost if taxable income were conformed to book income.

In my empirical tests, I compare the abilities of book income and taxable income to explain the market value of equity and the ex-post intrinsic value of equity (Subramanyam & Venkatachalam, 2007).<sup>2</sup> The market value of equity is a function of investors' potentially-biased expectations of future earnings and terminal stock price, and is therefore likely tainted by the same sources of market mispricing that confound the tests performed by Hanlon et al. (2005) and Ayers et al. (2009). On the other hand, ex-post intrinsic value attempts to remove market mispricing from the valuation model by replacing investors' *ex-ante expectations* of future earnings and terminal stock price in the residual income model with five years of their *ex-post realizations*. Consequently, using ex-post intrinsic value allows me to conduct tests of the relative information content of book income and taxable income that overcome documented biases arising from investors' fixation on book income and underemphasis on taxable income when forecasting future earnings and pricing securities.

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<sup>2</sup> Hanlon et al. (2005) and Ayers et al. (2009) use returns (changes) rather than price (levels) specifications in their studies. Subramanyam and Venkatachalam (2007) note that using ex-post intrinsic value precludes the use of a changes specification. I argue that my results are comparable to those reported by Hanlon et al. and Ayers et al. because Kothari and Zimmerman (1995) suggest that price and returns frameworks are theoretically equivalent.

Consistent with Hanlon et al. (2005), I find that book income possesses superior ability relative to taxable income to explain the market value of equity. However, if at least part of this superiority is attributable to market mispricing of the information contained in the two measures of income, then I expect that book income's superior ability to explain firm value will decrease once market mispricing is removed from the valuation model. The results of my tests bear out this prediction. Specifically, I document that when ex-post intrinsic value replaces the market value of equity as the measure of firm value, the superior explanatory power of book income relative to taxable income decreases by 26.54%.<sup>3</sup> Since ex-post intrinsic value attempts to overcome biases related to investors' fixation on book income and underemphasis on taxable income, this result suggests that at least part of book income's superior ability to explain the market value of equity may be due to market mispricing, and not due to book income's superior information content.

Next, in cross-sectional tests, I follow Ayers et al. (2009) and partition my sample into quintiles based on the absolute value of discretionary accruals (as a proxy for book earnings quality) and five-year "long-run" cash effective tax rates, or ETRs (as a proxy for tax planning). I then rerun my primary analyses within each quintile. Similar to Ayers et al., I find that although the ability of taxable income relative to book income to explain the market value of equity generally increases as book earnings quality and tax planning decrease, book income nonetheless retains its superior explanatory power, regardless of the degree of book earnings quality or tax planning.

As before, however, I contend that at least part of the superior ability of book income relative to taxable income to explain the market value of equity (even in the presence of low

<sup>3</sup> As discussed in greater detail in Section 4.2, this figure is calculated by comparing the ratio of the  $R^2$ s when the market value of equity is regressed separately on book income and taxable income to the ratio of the  $R^2$ s when ex-post intrinsic value is regressed separately on book income and taxable income.

book earnings quality and low tax planning) may be due to market mispricing and, as a result, that book income's superior explanatory power will decrease once market mispricing is removed from the valuation model. Further, I expect that investors' overreliance on book income and underreliance on taxable income will lead to more severe mispricing as the information content of taxable income increases. Ayers et al. (2009) show that the informativeness of taxable income relative to book income increases as book earnings quality and tax planning decrease. Thus, I predict that once market mispricing is removed from the valuation model, the decrease in the superior explanatory power of book income will intensify as book earnings quality and tax planning decrease.

The results of my tests are generally consistent with this prediction. Specifically, I find that when ex-post intrinsic value replaces the market value of equity as the measure of firm value, the superior explanatory power of book income relative to taxable income increases by 18.05% then decreases by 6.77%, 62.46%, 44.20%, and 233.31% in the first (highest book earnings quality) through fifth (lowest book earnings quality) quintiles of discretionary accruals, respectively. Similarly, when ex-post intrinsic value replaces the market value of equity as the measure of firm value, the superior explanatory power of book income relative to taxable income decreases by 20.38%, 17.19%, 26.33%, 37.50%, and 77.38% in the first (highest tax planning) through fifth (lowest tax planning) quintiles of cash ETRs, respectively. These trends show that the decrease in book income's superior explanatory power generally intensifies as book earnings quality and tax planning decrease. Indeed, I find that when ex-post intrinsic value replaces the market value of equity as the measure of firm value, taxable income possesses statistically equivalent or even *superior* ability relative to book income to explain firm value among firms

with particularly low book earnings quality and among firms that engage in a relatively low degree of tax planning.

This study contributes to the literature on the valuation of the tax information reported in firms' financial statements. For example, Hanlon et al. (2005) document that book income possesses superior ability relative to taxable income to explain contemporaneous stock returns. However, I find that book income's superior ability to explain firm value decreases once market mispricing arising from investors' fixation on book income and underemphasis on taxable income is removed from the valuation model. In this way, I show that Hanlon et al. may have understated the relative information content of taxable income by conducting empirical tests that are inherently biased in favor of book income.

My findings also contribute to the emerging literature on the use of taxable income as an alternative to book income as a summary measure of firm performance. Using contemporaneous stock returns as the performance criterion, Ayers et al. (2009) show that the informativeness of taxable income as a summary measure of firm performance is greatest when book earnings quality is relatively low but, nonetheless, that book income retains its superior ability to explain contemporaneous stock returns regardless of the degree of book earnings quality. However, my results indicate that once market mispricing is removed from the valuation model, the ability of taxable income to explain firm value actually surpasses that of book income among firms with particularly low book earnings quality. Therefore, in contrast to Ayers et al., my findings suggest that in certain subsamples, taxable income may actually be more informative than book income as a summary measure of firm performance.

Finally, the results reported in this study contribute to the policy debate on book/tax conformity. Although prior research generally concludes that there would be a loss of

information to the market if book income and taxable income were conformed to one measure, my findings indicate that the information content of taxable income may be even greater than prior studies suggest. Thus, I demonstrate that conforming taxable income to book income could result in a more severe loss of information than previously proposed.

The remainder of this paper proceeds as follows. Section 2 provides background information on book income and taxable income, discusses prior literature on the information content and market mispricing of these two measures of income, and develops my hypotheses. Section 3 details the research design of this study. Section 4 reports its empirical results, while Section 5 discusses additional analyses conducted to assess the robustness of these results. Section 6 concludes and discusses potential avenues for future research related to the findings reported in this study.

## SECTION 2: BACKGROUND, PRIOR LITERATURE, AND HYPOTHESIS DEVELOPMENT

### 2.1. Background Information on Book Income and Taxable Income

In the United States, firms report one measure of income to shareholders on their income statements and another measure of income to tax authorities on their tax returns. I refer to these measures of income as book income and taxable income, respectively. Book income is calculated pursuant to Generally Accepted Accounting Principles (GAAP), the objective of which is to provide relevant and faithfully-represented accounting information to financial statement users such as current or potential investors and creditors (FASB, 2010). On the other hand, taxable income is calculated according to the tax law, the objective of which is to raise revenue for the federal government and achieve policy objectives such as encouraging or discouraging certain activities and supporting certain industries (Scholes, Wolfson, Erickson, Maydew, & Shevlin, 2008).

Book income and taxable income are aligned to a large extent, as evidenced by prior research documenting that firms must frequently make tradeoffs between reporting relatively high book income but paying higher taxes or reporting relatively low book income but paying lower taxes (e.g., Erickson, Hanlon, & Maydew, 2004; Guenther, Maydew, & Nutter, 1997). Despite many similarities, however, considerable differences exist between book income and taxable income due to the different objectives and sources of GAAP rules and tax law. Many of these differences arise from the fact that book income is calculated under the accrual basis whereas taxable income, although generally accrual-based, is in many ways calculated pursuant to a method of accounting that is closely related to the cash method. For example, in calculating

taxable income, firms are often not permitted to deduct expenses before cash is paid. As a result, the determination of taxable income lacks much of the subjectivity and discretion inherent in the determination of book income. The U.S. Supreme Court summarized this view in the landmark tax case *Thor Power Tool Co. v. Commissioner*:

“Financial accounting... is hospitable to estimates, probabilities, and reasonable certainties. The tax law, with its mandate to preserve the revenue, can give no quarter to uncertainty.”<sup>4</sup>

This relative lack of subjectivity has led some observers to suggest that taxable income can be used as a “baseline” measure of firm performance that is not as subject to manipulation as is book income (e.g., Palepu & Healy, 2007; Revsine, Collins, Johnson, & Mittelstaedt, 2011; Seida, 2003).

Book income is reported to financial statement users on the firm’s income statement, while taxable income is reported to tax authorities on the firm’s tax return. Despite many experts’ calls for increased transparency of firms’ tax-related information (e.g., Lenter, Shackelford, & Slemrod, 2003; Mills & Plesko, 2003), firms are not currently required to publicly disclose taxable income. However, GAAP does require that firms report some limited tax information in their financial statements. Income tax expense, calculated pursuant to GAAP and reported in the firm’s financial statements, is intended to represent total tax expense related to the current period’s book income. Total tax expense is separated into current and deferred components, where current tax expense is intended to represent taxes payable (or receivable) in the current period, while deferred tax expense records the effect of items that are recognized in different periods for book and tax purposes.<sup>5</sup> In theory, then, current tax expense is analogous to

<sup>4</sup> *Thor Power Tool Co. v. Comm.*, 99 S. Ct. 773 (USSC, 1979).

<sup>5</sup> Items that affect deferred tax expense are called temporary book-tax differences (as opposed to permanent book-tax differences) and arise from timing differences between book and tax treatment. There is a large literature on the information content of temporary book-tax differences (e.g., Blaylock, Shevlin, & Wilson, 2012; Hanlon, 2005).



the tax due to (or receivable from) tax authorities on the current period's tax return, and thus grossing-up (dividing) current tax expense by the top U.S. statutory corporate tax rate can provide financial statement users with an estimate of a firm's taxable income.

Hanlon (2003) identifies a number of reasons why this estimate of taxable income likely does not equal actual taxable income as reported on the firm's tax return. Briefly, these reasons relate to accounting for employee stock options; reserves for uncertain tax positions; intraperiod tax allocation among continuing operations, discontinued operations, and extraordinary items; tax credits; differential tax rates faced by multinational firms; and differing consolidation rules between book and tax. It is generally not possible to adjust the estimate of taxable income to more precisely account for these issues in a large-sample study such as this one. Nonetheless, as discussed in greater detail in Section 5.2, I conduct robustness tests to at least partially address some of the concerns identified by Hanlon. The results of these analyses are qualitatively unchanged from the results of my primary tests. Further, despite the issues identified by Hanlon, Plesko (2000, 2003) matches publicly-available financial statement data with confidential tax return data and concludes that current tax expense is a reasonable approximation of actual taxes owed in the current year.<sup>6</sup>

## 2.2. Prior Literature on the Information Content of Taxable Income

Motivated by a growing gap between firms' reported book income and estimated taxable income, some policymakers and academics (e.g., Desai, 2005), have called for increased or even complete conformity between book income and taxable income in order to constrain book

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The primary finding of this stream of literature is that temporary book-tax differences may provide insight into the quality of book income, or more specifically, the persistence of book income.

<sup>6</sup> Specifically, Plesko (2000, 2003) reports a regression coefficient of .986 when actual tax liability (before tax credits) is regressed on current federal tax expense as reported in the firm's financial statements.

earnings management and overly aggressive tax planning by forcing firms to make book/tax tradeoffs. Hanlon et al. (2005) study the potential consequences of book/tax conformity by examining the value relevance of taxable income as compared to book income. Since the objective of GAAP is to provide relevant and faithfully-represented information about firm performance to financial statement users, Hanlon et al. predict that book income should be relatively more informative to investors than is taxable income, which is not designed to be a measure of firm performance per se. However, the authors also expect that investors may rely on taxable income as an alternative to book income as a summary measure of firm performance due to the lack of subjectivity inherent in the determination of taxable income as compared to book income.

As predicted, Hanlon et al. (2005) document that taxable income provides additional information content *incremental* to book income, but that book income possesses superior information content *relative* to taxable income, in explaining contemporaneous stock returns. Based on this evidence, Hanlon et al. conclude that book income and taxable income each contain value-relevant information incremental to the other, but that book income is superior to taxable income as a summary measure of firm performance when contemporaneous stock returns are used as the performance criterion.

Ayers et al. (2009) extend Hanlon et al. (2005) by examining settings in which book income may be a relatively less informative, and taxable income may be a relatively more informative, summary measure of firm performance. Ayers et al. draw their hypotheses from comments such as those made by Seida (2003), who suggests that investors can benchmark book income against taxable income to evaluate book earnings quality, and Desai (2006), who speculates that aggressive tax planning can obfuscate the relation between taxable income and

firm value. Based on these observations, Ayers et al. predict that the usefulness of taxable income as an alternative to book income as a summary measure of firm performance is greatest when book income is of relatively low quality, but least when firms engage in a relatively high degree of tax planning.

Consistent with these predictions, Ayers et al. (2009) find that the ability of taxable income relative to book income to explain contemporaneous stock returns is greatest among firms in the lowest quintile of book earnings quality and, conversely, lowest among firms in the highest quintile of tax planning. Notably, however, the authors find that book income retains its superior ability relative to taxable income to explain contemporaneous stock returns across all quintiles of book earnings quality and tax planning. That is, regardless of the degree of book earnings quality or tax planning, book income remains superior to taxable income as a summary measure of firm performance when contemporaneous stock returns are used as the performance criterion. These findings are again consistent with the notion that book income is intended to be an informative measure of firm performance, whereas taxable income is not.

### **2.3. Prior Literature on Market Mispricing of Book Income and Taxable Income**

In summary, Hanlon et al. (2005) and Ayers et al. (2009) provide compelling evidence that book income possesses superior ability relative to taxable income to explain contemporaneous stock returns, even when book earnings quality and the degree of tax planning are relatively low (i.e., when book income should be relatively less informative and when taxable income should be relatively more informative). However, an underlying assumption in value relevance studies such as Hanlon et al. and Ayers et al. is that investors correctly impound the information contained in the measures of income under examination (Aboody, Hughes, & Liu,

2002). Prior research suggests that this is likely not the case with regards to both book income and taxable income.

First, numerous studies, such as Sloan (1996) and Xie (2001), document that investors fixate on book income when forming expectations of future earnings and pricing securities. If investors fixate on book income, it follows that the observed superior ability of book income relative to taxable income to explain contemporaneous stock returns could be at least partially attributable to the fact that the market overemphasizes its reliance on book income, rather than due to book income's superior information content.

Second, a separate line of research provides evidence that the superior ability of book income relative to taxable income to explain contemporaneous stock returns could be at least partially due to the fact that investors do not fully appreciate the implications of taxable income for future earnings. For example, Lev and Nissim (2004) document that the ratio of taxable income to book income is associated with future earnings growth. However, since the authors also find that this ratio is associated with future abnormal stock returns, Lev and Nissim conclude that contemporaneous stock prices do not fully reflect the information contained in taxable income. In a related study, Weber (2009) attributes at least part of the market mispricing of the information contained in taxable income to the fact that analysts underemphasize this information when making earnings forecasts. More recently, Thomas and Zhang (2011) find that the unexpected component of tax expense, which the authors argue is informative about a firm's core profitability, is associated with future abnormal stock returns. This result again suggests that contemporaneous stock prices do not fully reflect the information contained in taxable income, despite its apparent usefulness in forming earnings expectations.

The previous findings discussed in this section are consistent with the broader behavioral literature on the limited attention and incomplete revelation hypotheses (e.g., Bloomfield, 2003; Hirshleifer & Teoh, 2003), which posit that investors tend to overemphasize (underemphasize) their reliance on information that is easy (difficult) to gather or process. Since book income is clearly and separately stated on the income statement, whereas constructing an estimate of taxable income requires that investors use and comprehend complicated tax footnote disclosures, the limited attention and incomplete revelation hypotheses would predict that investors both overemphasize their reliance on book income and underemphasize their reliance on taxable income when forming expectations of future earnings and pricing securities.

#### **2.4. Removing Market Mispricing from the Valuation Model**

To summarize the discussion thus far, Hanlon et al. (2005) and Ayers et al. (2009) document that book income possesses superior ability relative to taxable income to explain contemporaneous stock returns. However, other research suggests that the empirical tests conducted by Hanlon et al. and Ayers et al. may be inherently biased in favor of book income because of market mispricing arising from investors' fixation on book income and underemphasis on the information contained in taxable income. Thus, it is unclear to what extent the superior ability of book income relative to taxable income to explain contemporaneous stock returns is due to these sources of market mispricing rather than due to book income's superior information content.

Hanlon et al. (2005) and Ayers et al. (2009) use contemporaneous stock returns to measure firm performance. In contrast, in this study I compare the relative abilities of book income and taxable income to explain both the market value of equity and the ex-post intrinsic

value of equity. While the market value of equity is likely contaminated by the same sources of market mispricing that bias the tests conducted by Hanlon et al. and Ayers et al., ex-post intrinsic value, a measure of fundamental firm value developed by Subramanyam and Venkatachalam (2007), attempts to remove market mispricing from the valuation model.

Ex-post intrinsic value is calculated by expressing two popular valuation models, the dividend discount model and the residual income model formalized by Ohlson (1995), over three-year and five-year finite time horizons. In brief, ex-post intrinsic value determined using the dividend discount model is calculated by replacing investors' expectations of future dividends and terminal stock price in the traditional dividend discount model with three or five years of their ex-post realizations. Similarly, ex-post intrinsic value determined using the residual income model is calculated by replacing investors' expectations of future earnings, book value, and terminal stock price in the traditional residual income model with three or five years of their ex-post realizations. The calculation of ex-post intrinsic value is expressed mathematically and discussed in greater detail in Section 3.1.

Subramanyam and Venkatachalam (2007) contend that by removing investors' potentially-biased expectations of future earnings and terminal stock price from the valuation model, ex-post intrinsic value allows researchers to conduct tests of the relative information content of alternative measures of income (such as book income and taxable income, in the case of this study) that are not confounded by market mispricing. In their empirical tests, Subramanyam and Venkatachalam find that book income possesses superior ability relative to operating cash flows to explain both the market value of equity and ex-post intrinsic value. Since ex-post intrinsic value is arguably unbiased by market mispricing, the authors conclude that book income's superior ability relative to operating cash flows to explain firm value (Dechow, 1994)

is due to book income's superior information content and not due to mispricing arising from the market's fixation on book income.

## 2.5. Hypothesis Development

In this study, I conduct tests analogous to those performed by Subramanyam and Venkatachalam (2007) to examine the extent to which the superior ability of book income relative to taxable income to explain firm value decreases once market mispricing is removed from the valuation model. To do this, I first test the relative abilities of book income and taxable income to explain the market value of equity. These tests are equivalent to those conducted by Hanlon et al. (2005) except that my tests use a price (levels) rather than a returns (changes) specification. Consistent with Hanlon et al., I expect that book income will possess superior ability relative to taxable income to explain the market value of equity.

However, the superior ability of book income relative to taxable income to explain the market value of equity may be at least partially due to market mispricing arising from investors' overemphasis on book income and underemphasis on taxable income, rather than due to book income's superior information content. Since ex-post intrinsic value attempts to overcome biases arising from market mispricing, I predict that book income's superior ability to explain firm value will decrease when ex-post intrinsic value replaces the market value of equity as the measure of firm value. This leads to my first formal hypothesis:

**H1: The superior ability of book income relative to taxable income to explain firm value will decrease when ex-post intrinsic value replaces the market value of equity as the measure of firm value.**

If mispricing is severe enough, this hypothesis suggests it is possible that the explanatory power of taxable income may even surpass that of book income when ex-post intrinsic value replaces the market value of equity as the measure of firm value.

My next hypotheses make cross-sectional predictions regarding settings in which taxable income should be particularly informative about firm value relative to book income. As discussed earlier, Ayers et al. (2009) find that although the ability of taxable income relative to book income to explain contemporaneous stock returns increases as book earnings quality and tax planning decrease, book income retains its superior explanatory power, regardless of the degree of book earnings quality or tax planning. My tests are equivalent to those performed by Ayers et al. except that I use a price (levels) rather than a returns (changes) specification. As such, I expect that in my tests the ability of taxable income relative to book income to explain the market value of equity will increase as book earnings quality and tax planning decrease, but that book income will retain its superior explanatory power, regardless of the degree of book earnings quality or tax planning.

However, I argue that the superior ability of book income relative to taxable income to explain the market value of equity (even in the presence of low book earnings quality and low tax planning) may be at least partially due to market mispricing rather than due to book income's superior information content. Thus, as before, I expect that book income's superior explanatory power will decrease once market mispricing is removed from the valuation model. Further, I predict that investors' overreliance on book income and underreliance on taxable income will lead to more severe mispricing as the information content of taxable income (relative to book income) increases. Ayers et al. (2009) suggest that the informativeness of taxable income relative to book income increases as book earnings quality decreases. Therefore, I expect that once



market mispricing is removed from the valuation model, the decrease in book income's superior explanatory power will intensify as book earnings quality decreases. This logic leads to my next formal hypothesis:

**H2: When ex-post intrinsic value replaces the market value of equity as the measure of firm value, the decrease in the superior ability of book income relative to taxable income to explain firm value will intensify as book earnings quality decreases.**

Ayers et al. (2009) also suggest that the informativeness of taxable income relative to book income increases as tax planning decreases. As before, I predict that investors' overreliance on book income and underreliance on taxable income will lead to more severe mispricing as the information content of taxable income (relative to book income) increases. Thus, I expect that once market mispricing is removed from the valuation model, the decrease in book income's superior explanatory power will intensify as tax planning decreases. This discussion leads to my final formal hypothesis:

**H3: When ex-post intrinsic value replaces the market value of equity as the measure of firm value, the decrease in the superior ability of book income relative to taxable income to explain firm value will intensify as tax planning decreases.**

Note that these hypotheses imply that once market mispricing is removed from the valuation model, it is possible that the explanatory power of taxable income may even surpass that of book income as book earnings quality and tax planning decrease.

## SECTION 3: RESEARCH DESIGN

### 3.1. Variable Definitions

In this section I provide detailed definitions of the variables employed in this study.

Variable definitions are also summarized in the Appendix.

#### 3.1.1. Definitions of Measures of Income

As discussed in Section 2, the purpose of this study is to conduct tests of the relative information content of book income and taxable income that attempt to overcome biases related to market mispricing. Following Hanlon et al. (2005) and Ayers et al. (2009), I calculate book income as pretax book income less minority interest. I define this variable as *PTBI*. Using pretax book income rather than (post-tax) net income maintains its comparability with taxable income, which is itself a pretax figure.

To construct an estimate of a firm's taxable income using its publicly available financial statement data, I again follow Hanlon et al. (2005) and Ayers et al. (2009) by grossing-up (dividing) worldwide current tax expense (the sum of current federal plus foreign tax expense) by the applicable top annual U.S. statutory corporate tax rate<sup>7</sup>, then subtracting the change in tax net operating loss carryforwards from the result.<sup>8</sup> I define this variable as *TI*. Mathematically, *TI* is expressed as:

$$TI_{it} = \frac{TAXFED_{it} + TAXFO_{it}}{STR_t} - (\Delta TAXNOL_{it})$$

<sup>7</sup> The top annual U.S. statutory corporate tax rate applicable during my sample period is 46% for years 1986 and earlier, 40% for 1987, 34% from 1988 to 1992, and 35% from 1993 onwards.

<sup>8</sup> Mills, Newberry, and Novack (2003) document a number of issues with using tax net operating loss data reported in Compustat. In Section 5.3, I discuss robustness tests designed to address these issues.

where  $TAXFED$  is current federal tax expense,  $TAXFO$  is current foreign tax expense,  $STR$  is the top U.S. statutory corporate tax rate applicable in period  $t$ , and  $\Delta TAXNOL$  is the change in tax net operating loss carryforwards from period  $t-1$  to period  $t$ .<sup>9</sup> As discussed earlier, although this estimate of taxable income likely contains a degree of measurement error, it represents a reasonable approximation of actual taxable income as reported on the firm's current year income tax return.

### 3.1.2. Definitions of Measures of Firm Value

I compare the relative abilities of book income and taxable income to explain the market value of equity and the ex-post intrinsic value of equity. To provide some assurance that the market has had time to respond to the current period's earnings, I calculate the market value of equity as the stock price per common share three months after the end of the fiscal year, multiplied by the number of common shares outstanding on the same date. I define this variable as  $MVE$ .

Following Subramanyam and Venkatachalam (2007), I calculate ex-post intrinsic value in four ways: using the dividend discount model and the residual income model, each expressed over three-year and five-year finite time horizons.<sup>10</sup> For expositional clarity, I only report results from using ex-post intrinsic value calculated based on the five-year residual income model. In untabulated robustness tests discussed in greater detail in Section 5.3, I find that Pearson correlations among the four measures of ex-post intrinsic value are all greater than 0.90 (all  $p <$

<sup>9</sup> Following Hanlon et al. (2005) and Ayers et al. (2009), if either  $TAXFED$  or  $TAXFO$  is missing, I calculate worldwide current tax expense as total tax expense less deferred tax expense.

<sup>10</sup> In theory, the dividend discount model and the residual income model are equivalent, since the residual income model is merely an algebraic manipulation of the dividend discount model (assuming clean surplus accounting). However, empirical estimates of the two ex-post intrinsic value measures are generally not equal due to measurement errors over finite time horizons.

0.0001) and confirm that the results of this study are qualitatively unchanged when alternate ex-post intrinsic value measurements are used.

To express the ex-post intrinsic value of equity pursuant to the five-year residual income model, I begin with the infinite time horizon residual income model formalized by Ohlson (1995):

$$MVE_t = BV_t + \sum_{\tau=1}^{\infty} \rho^{-\tau} E(X_{t+\tau} - (\rho - 1)BV_{t+\tau-1})$$

where  $MVE$  is the market value of equity,  $BV$  is the book value of equity,  $X$  is accounting earnings (net income), and  $\rho$  is one plus the discount rate. I empirically estimate the discount rate as the annual equal-weighted realized return from period  $t-1$  to period  $t$  for the size and book-to-market decile portfolio of which the firm is a member (Barber & Lyon, 1997).<sup>11, 12</sup> In sensitivity tests discussed in greater detail in Section 5.3, I find that my results are robust to alternative discount rate estimates.

Next, the residual income model can be expressed over a finite time horizon of  $N$  periods by adding a terminal value term to the model as follows:

$$MVE_t = BV_t + \sum_{\tau=1}^N \rho^{-\tau} E(X_{t+\tau} - (\rho - 1)BV_{t+\tau-1}) + \rho^{-N} E(MVE_{t+N} - BV_{t+N})$$

where terminal value is equal to the market value of equity at time  $t+N$  less the book value of equity at time  $t+N$ .

Finally, to calculate ex-post intrinsic value, which I define as  $IV$ , I replace *expectations* of future earnings, book value, and terminal value in the residual income model with five years of their ex-post *realizations* as follows:

<sup>11</sup> Several studies (e.g., Claus & Thomas, 1999; Gebhardt, Lee, & Swaminathan, 2001) use analysts' earnings forecasts as inputs into the residual income model to estimate a firm-specific implied cost of equity capital, i.e., to solve for  $\rho$ . This approach is not appropriate for the purposes of my study because research suggests that analyst forecasts are biased by analysts' fixation on book income (Bradshaw, Richardson, & Sloan, 2001) and failure to properly comprehend the implications of taxable income for future earnings (Weber, 2009). Hence, using analyst forecasts to estimate the discount rate would introduce into my measure of ex-post intrinsic value the very same biases that the measure is designed to overcome.

<sup>12</sup> Return data is obtained from Ken French's website.

$$IV_t = BV_t + \sum_{\tau=1}^5 \rho^{-\tau} (X_{t+\tau} - (\rho - 1)BV_{t+\tau-1}) + \rho^{-5}(MVE_{t+5} - BV_{t+5})$$

As discussed earlier, prior research documents that investors fixate on book income and underemphasize the information contained in taxable income when forming expectations of future earnings and pricing securities. As shown above, the market value of equity is a function of these potentially-biased expectations. In contrast, ex-post intrinsic value removes investors' expectations of future earnings and terminal stock price from the valuation model. Therefore, using ex-post intrinsic value instead of the market value of equity as a measure of firm value allows me to conduct tests of the relative information content of book income and taxable income that are arguably unbiased by these sources of market mispricing.<sup>13</sup> Note that since market value at year t+3 or t+5 is used to express terminal value in the ex-post intrinsic value calculation, this statement assumes that market mispricing of current book income and taxable income does not persist three years or five years hence. This is likely a valid assumption, since Aboody et al. (2002) note that "measurement errors [between intrinsic value and current market value] tend to be resolved in no more than three years."

### 3.1.3. Definitions of Measures of Book Earnings Quality and Tax Planning

In my cross-sectional tests, I employ the absolute value of discretionary accruals as a proxy for book earnings quality. I define this variable as *DACC*. Consistent with Ayers et al. (2009), I calculate *DACC* as the absolute value of the residual from the Jones (1991) model of

<sup>13</sup> A number of studies, such as Francis, Olsson, and Oswald (2000), calculate intrinsic value using ex-ante analyst forecasts of accounting attributes rather than their ex-post realizations. However, as mentioned earlier, prior research shows that analysts fixate on book income when making earnings forecasts and that analysts fail to understand the implications of taxable income for future earnings. Therefore, using estimates of intrinsic value calculated using analyst forecasts of accounting attributes is not appropriate for my research design.

discretionary accruals as modified by Dechow, Sloan, and Sweeney (1995), run cross-sectionally by each industry-year<sup>14</sup> with at least 10 observations, as follows:

$$\frac{TACC_{it}}{TA_{it-1}} = \alpha_0 + \left[ \alpha_1 \left( \frac{1}{TA_{it-1}} \right) \right] + \alpha_2 \left[ \frac{(\Delta SALES_{it} - \Delta REC_{it})}{TA_{it-1}} \right] + \alpha_3 \left( \frac{PPE_{it}}{TA_{it-1}} \right) + \varepsilon_{it}$$

where *TACC* is total accruals (calculated as the change in current assets plus the change in short term debt and less the change in current liabilities, the change in cash, and depreciation and amortization expenses); *TA* is total assets;  $\Delta SALES$  is the change in net sales from period *t-1* to period *t*;  $\Delta REC$  is the change in accounts receivable from period *t-1* to period *t*; and *PPE* is gross property, plant, and equipment. Following Kothari, Leone, and Wasley (2005), I scale all variables by lagged total assets and include an intercept term in the model to mitigate issues related to heteroskedasticity and omitted size variable bias. Following Ayers et al., I partition observations into quintiles based on the magnitude of *DACC*, where a higher value of *DACC* suggests a relatively lower degree of book earnings quality.<sup>15</sup>

I employ the five-year “long-run” cash effective tax rate (cash ETR), as a proxy for the degree of tax planning undertaken by the firm. I define this variable as *CETR*. Following Dyreng, Hanlon, and Maydew (2008) and Ayers et al. (2009), I calculate *CETR* as the sum of cash tax expense from the current plus four prior years divided by the sum of pretax book income less special items from the current plus four prior years. Mathematically, *CETR* is expressed as:

$$CETR_{it} = \frac{\sum_{m=t-4}^t CTE_{im}}{\sum_{m=t-4}^t (PTBI_{im} - SI_{im})}$$

<sup>14</sup> In this and all other tests, I use two-digit SIC codes to define industries. SIC codes are only available in Compustat for years beginning in 1988. To remedy this issue, I backfill missing SIC codes for earlier years with the first available SIC code.

<sup>15</sup> An implicit assumption in this discussion is that discretionary accruals affect book earnings quality but not “taxable income earnings quality,” i.e., that discretionary accruals result in book-tax differences. In a study of firms that restated book earnings, Badertscher, Phillips, Pincus, and Rego (2008) provide evidence in support of this assumption by documenting that the “overwhelming majority” of restatement firms use nonconforming earnings management strategies (strategies that affect book income and taxable income differently) rather than conforming earnings management strategies (strategies with the same book and tax treatments).

where *CTE* is cash tax expense, *PTBI* is pretax book income as previously defined, and *SI* is special items. Using a “long-run” cash ETR aggregated over a multi-year time horizon overcomes measurement issues, such as noise related to annual fluctuations in cash taxes paid or refunded, inherent in using annual cash ETRs to measure tax planning. Further, using a cash ETR rather than a GAAP ETR calculated using book tax expense omits items such as valuation allowances and reserves for uncertain tax positions that are likely not associated with the level of a firm’s tax planning activities. To control for variation in tax planning opportunities across industries and intertemporal changes in statutory corporate tax rates, I follow Ayers et al. and rank observations into industry-year quintiles based on the magnitude of *CETR*, where a higher value of *CETR* indicates greater cash tax expense and therefore suggests that the firm engages in a relatively lower degree of tax planning.

Guenther, Jones, and Njoroge (2012) note that inferences regarding the information content of estimated taxable income are sensitive to and can be significantly affected by the presence of extreme observations in the data. Therefore, to mitigate issues related to extreme observations and/or data errors, I winsorize (reset) all regression variables at the 1% and 99% levels.

### 3.2. Sample Selection

My initial sample consists of 47,366 U.S.-incorporated, non-financial/non-utility firm-year observations (representing 5,579 distinct firms) with five subsequent years of data available on Compustat, drawn from the period 1983 to 2005. Following Hanlon et al. (2005) and Ayers et al. (2009), I do not include foreign, financial (SIC codes 4900-4999), or utility (SIC codes 6000-6999) firms in my sample because these firms likely face different accounting rules and tax laws

than other firms in my sample. I begin my sample in 1983 to maintain consistency with Ayers et al. I end my sample in 2005 because the calculation of ex-post intrinsic value requires five years of subsequent data availability.

From this initial sample, I first delete 20,669 observations missing data necessary to calculate book income, taxable income, market value of equity, or ex-post intrinsic value. Then, consistent with Subramanyam and Venkatachalam (2007), I delete 1,375 observations with a negative market value of equity or a negative ex-post intrinsic value because negative firm value has no practical meaning or indicates a data error. I next delete 6,470 observations with negative book income or negative taxable income because prior research documents a diminished or non-specified relation between earnings and firm value among loss firms (e.g., Burgstahler & Dichev, 1997; Hayn, 1995) and because of inference issues related to combining samples of profit and loss firms when studying the information content of estimated taxable income (Guenther et al., 2012). This selection procedure results in a final sample of 18,852 firm-year observations representing 3,426 distinct firms available for my full sample tests. Table 1, Panel A summarizes the selection procedure for my full sample.<sup>16</sup>

Since my measures of discretionary accruals and cash ETRs impose considerable (and considerably different) data requirements on my sample, I follow Ayers et al. (2009) and construct two additional subsamples for my cross-sectional tests related to book earnings quality and tax planning. The subsample for my tests related to earnings quality begins with my full sample of 18,852 observations. From this full sample, I delete 2,676 observations missing data necessary to calculate discretionary accruals, resulting in a subsample of 16,176 firm-year

<sup>16</sup> The calculation of ex-post intrinsic value requires five years of subsequent data. Further, I delete loss firms from my sample of observations. I acknowledge that these data restrictions may introduce survivorship bias into my sample. Consistent with this notion, I find that firms in my sample are on average larger and more profitable than firms in the Compustat universe. As a result, I caution that the results reported in this study may not generalize to small or unprofitable firms.



observations representing 2,759 distinct firms available for my tests related to earnings quality. Table 1, Panel B summarizes the selection procedure for my subsample for tests related to earnings quality.

The subsample for my tests related to tax planning also begins with my full sample of 18,852 observations. From this full sample, I first delete 9,087 observations missing data necessary to calculate the five-year cash ETR. Note that data on cash tax expense is taken from the statement of cash flows, which is only available for years beginning in 1988. Since the calculation of my five-year cash ETR measure requires four years of lagged cash tax expense, the sample period for my tests related to tax planning is effectively limited to the years 1992 and later. I acknowledge that this restriction results in a significant loss of observations from my primary tests, whose sample selection period begins in 1983.

Next, again following Ayers et al. (2009), I delete 613 observations with a negative numerator (i.e., the five-year sum of cash taxes paid) or denominator (i.e., the five-year sum of pretax book income less special items) in the five-year cash ETR calculation, plus another 206 observations with five-year cash ETRs greater than 100%. These data restrictions result in a subsample of 8,946 firm-year observations representing 2,023 distinct firms available for my tests related to tax planning. Table 1, Panel C summarizes the selection procedure for my subsample for tests related to tax planning.

### **3.3. Full Sample Empirical Tests**

I first test the relative abilities of book income and taxable income to explain the market value of equity for my full sample of observations. To do this, I run a “horse race” between the following two regression models:

$$MVE_{it} = \alpha_0 + \alpha_1 * PTBI_{it} + \varepsilon_{it} \quad (1)$$

and

$$MVE_{it} = \beta_0 + \beta_1 * TI_{it} + \varepsilon_{it} \quad (2)$$

where all variables are as defined earlier and in the Appendix.

Models (1) and (2) are equivalent to those employed by Hanlon et al. (2005) in their tests of the relative information content of book income and taxable income, except that I use a levels (price) specification rather than a changes (returns) specification in my tests. Hanlon et al. document that book income possesses superior ability relative to taxable income to explain contemporaneous stock returns. Consistent with this result, I expect that book income will also possess superior ability relative to taxable income to explain the market value of equity. Therefore, I predict that the  $R^2$  of Model (1) is greater than the  $R^2$  of Model (2), i.e., that the ratio of the  $R^2$  of Model (1) to the  $R^2$  of Model (2), hereafter defined as  $RATIO_{MVE}$ , is greater than 100%. Note that since each model has the same dependent variable and uses the same sample of observations, it is possible to test the statistical significance of the difference in the explanatory power of the independent variable(s) in each model by using the Vuong (1989) test of the difference in  $R^2$  between two non-nested models. The Vuong test has been extensively employed in prior accounting research that studies the relative information content of alternative measures of firm performance (e.g., Ayers et al., 2009; Dechow, 1994; Dhaliwal, Subramanyam, & Trezevant, 1999; Hanlon et al., 2005; Subramanyam & Venkatachalam, 2007).

I contend that empirical tests of the relative abilities of book income and taxable income to explain the market value of equity may be inherently biased in favor of book income due to market mispricing arising from investors' fixation on book income and underemphasis on the information contained in taxable income. Thus, it is unclear to what extent book income

possesses superior ability relative to taxable income to explain the market value of equity because of market mispricing rather than due to the superior information content of book income. To examine this issue, I replace the market value of equity with ex-post intrinsic value as the dependent variable in Models (1) and (2), then run a “horse race” between the resulting two regression models:

$$IV_{it} = \gamma_0 + \gamma_1 * PTBI_{it} + \varepsilon_{it} \quad (3)$$

and

$$IV_{it} = \psi_0 + \psi_1 * TI_{it} + \varepsilon_{it} \quad (4)$$

where all variables are as defined earlier and in the Appendix.

As discussed earlier, using ex-post intrinsic value as the dependent variable in place of the market value of equity allows me to conduct empirical tests that are arguably unbiased by investors’ fixation on book income and underemphasis on taxable income. Since I expect that the superior ability of book income relative to taxable income to explain the market value of equity is at least partially attributable to these sources of market mispricing, H1 predicts that book income’s superior ability to explain firm value will decrease when ex-post intrinsic value replaces the market value of equity as the measure of firm value. As such, I expect that the ratio of the  $R^2$  of Model (3) to the  $R^2$  of Model (4), hereafter defined as  $RATIO_{IV}$ , will be less than  $RATIO_{MVE}$ . In an extreme case, this hypothesis implies that the  $R^2$  of Model (4) may even be greater than that of Model (3), i.e., that  $RATIO_{IV}$  will be less than 100%, if the superior ability of book income relative to taxable income to explain the market value of equity is sufficiently attributable to market mispricing.

### 3.4. Cross-Sectional Empirical Tests

In cross-sectional tests, I partition my sample into quintiles based on the absolute value of discretionary accruals and five-year cash ETRs, where greater values of these variables suggest relatively lower degrees of book earnings quality and tax planning, respectively. I then run a “horse race” between Models (1) and (2) above within each quintile. Ayers et al. (2009) show that the ability of taxable income relative to book income to explain contemporaneous stock returns is greatest among firms in the lowest quintiles of book earnings quality and tax planning. Nonetheless, the authors find that book income retains its superior ability relative to taxable income to explain contemporaneous stock returns across all quintiles of book earnings quality and tax planning. Models (1) and (2) are equivalent to those employed by Ayers et al. in their tests, except that I use a levels (price) specification rather than a changes (returns) specification. Consistent with the results reported by Ayers et al., I expect that  $RATIO_{MVE}$  will decrease as book earnings quality and tax planning decrease, but that  $RATIO_{MVE}$  will nonetheless remain greater than 100% in each quintile of book earnings quality and tax planning.

As discussed earlier, the superior ability of book income relative to taxable income to explain the market value of equity (even in the presence of low book earnings quality and low tax planning) may be at least partially due to market mispricing rather than due to book income’s superior information content. As before, to conduct tests that attempt to overcome biases due to market mispricing, I replace the market value of equity with ex-post intrinsic value as the measure of firm value, resulting in Models (3) and (4) above. I then run a “horse race” between these models within each quintile of book earnings quality and tax planning.

I expect that the superior ability of book income relative to taxable income to explain firm value will decrease when ex-post intrinsic value replaces the market value of equity as the

measure of firm value. Further, H2 and H3 predict that the decrease in the superior explanatory power of book income relative to taxable income will intensify as book earnings quality and tax planning, respectively, decrease. Therefore, H2 predicts that  $RATIO_{IV}$  will be less than  $RATIO_{MVE}$  in each quintile of book earnings quality, and that the decrease will intensify as book earnings quality decreases. Similarly, H3 predicts that  $RATIO_{IV}$  will be less than  $RATIO_{MVE}$  in each quintile of tax planning, and that the decrease will intensify as tax planning decreases. Note that these hypotheses imply that, as book earnings quality and tax planning decrease, it is possible that the explanatory power of taxable income may even surpass that of book income once market mispricing is removed from the valuation model. Thus, H2 and H3 suggest that it is possible that  $RATIO_{IV}$  may fall below 100% as book earnings quality and tax planning decrease.

## SECTION 4: RESULTS

### 4.1. Descriptive Statistics and Correlations

Table 2 reports descriptive statistics for the primary variables examined in this study. Mean (median) book income is \$157.89 million (\$19.74 million), while mean (median) taxable income is \$136.36 million (\$16.29 million). Mean (median) market value of equity is \$1,734.44 million (\$195.45 million), while mean (median) ex-post intrinsic value is \$3,119.93 million (\$262.01 million). The mean (median) absolute value of discretionary accruals is 0.08 (0.05). Finally, the mean (median) five-year cash ETR is 0.32 (0.32).

Table 3 presents Pearson (below the diagonal) and Spearman (above the diagonal) correlations among these variables. I note that book income and taxable income are highly correlated, with a Pearson correlation of 0.95. This correlation is consistent with the notion that book income and taxable income are aligned to a large extent. I find a Pearson correlation of 0.73 between the market value of equity and ex-post intrinsic value, suggesting that these two measures are distinct expressions of firm value. Further, book income is more highly correlated with the market value of equity than is taxable income, with Pearson correlations of 0.86 and 0.82, respectively. On the other hand, the Pearson correlations between book income and ex-post intrinsic value and between taxable income and ex-post intrinsic value are 0.68 and 0.67, respectively. These correlations provide initial evidence in support of my hypothesis that the superior ability of book income relative to taxable income to explain firm value will decrease when ex-post intrinsic value replaces the market value of equity as the measure of firm value.

## 4.2 Regression Results: Full Sample Tests

Table 4 reports (and Figure 1 illustrates) results from estimating Models (1) and (2) to test the relative abilities of book income and taxable income, respectively, to explain the market value of equity.<sup>17</sup> I find that the  $R^2$  of Model (1) is 73.15%, while the  $R^2$  of Model (2) is 68.26%. Thus,  $RATIO_{MVE}$  is  $73.15\% / 68.26\% = 107.16\%$  ( $z$ -stat. = 5.63), indicating that, as expected and consistent with Hanlon et al. (2005), book income possesses superior ability relative to taxable income to explain the market value of equity. However, the market value of equity is potentially biased by investors' fixation on book income and underemphasis on the information contained in taxable income when forecasting future earnings and pricing securities. Therefore, it is unclear to what extent the superior ability of book income relative to taxable income to explain the market value of equity is due to these sources of market mispricing rather than book income's superior information content.

To conduct tests of the relative information content of book income and taxable income that attempt to overcome biases related to market mispricing, I next estimate Models (3) and (4), which replace the market value of equity with ex-post intrinsic value as the dependent variable. The results of these tests are reported in Table 4 (and illustrated in Figure 1). The results indicate that book income possesses superior ability relative to taxable income to explain ex-post intrinsic value, with  $R^2$ 's of 46.62% and 44.29% in Models (3) and (4), respectively. Thus,  $RATIO_{IV}$  is only  $46.62\% / 44.29\% = 105.26\%$  ( $z$ -stat. = 3.53), which is less than  $RATIO_{MVE}$  of 107.16% in both magnitude and statistical significance. This decrease between  $RATIO_{MVE}$  and  $RATIO_{IV}$  represents a 26.54% decrease (calculated as  $(105.26\% - 107.16\%) / (107.16\% - 100\%)$ ) in the superior explanatory power of book income relative to taxable income when ex-post intrinsic

<sup>17</sup> For expositional clarity, I do not report coefficient estimates on the *PTBI* and *TI* variables, since my tests are exclusively concerned with the explanatory power, or  $R^2$ , of each model. I note that the coefficients on *PTBI* and *TI* are positive and highly statistically significant (all  $p < 0.0001$ ) in all models across all tests.

value replaces the market value of equity as the measure of firm value. This finding provides support for H1 and suggests that book income's superior ability relative to taxable income to explain the market value of equity may be at least partially due to the effects of market mispricing and not due to book income's superior information content, as has been previously assumed in the literature.

#### 4.3. Regression Results: Book Earnings Quality Tests

Turning to my cross-sectional analyses, I next test H2, which predicts that when ex-post intrinsic value replaces the market value of equity as the measure of firm value, the decrease in the superior ability of book income relative to taxable income to explain firm value will intensify as book earnings quality decreases. To test this prediction, I first estimate Models (1) and (2) within quintiles partitioned on the absolute value of discretionary accruals, where greater discretionary accruals suggest relatively lower quality book earnings. Table 5 reports (and Figure 2 illustrates) the results of these tests. Consistent with Ayers et al. (2009), I find that although the ability of taxable income relative to book income to explain the market value of equity is greatest among firms in the highest quintile of discretionary accruals (i.e., among firms with the relatively lowest quality book earnings), book income nonetheless retains its superior explanatory power in each quintile of discretionary accruals. Specifically,  $RATIO_{MVE}$  is equal to 107.98% (z-stat. = 3.53), 106.20% (z-stat. = 2.01), 114.12% (z-stat. = 3.09), 110.00% (z-stat. = 3.12), and 104.89% (z-stat. = 1.70), in the first (lowest) through fifth (highest) discretionary accrual quintiles, respectively. However, as argued earlier, book income's superior ability relative to taxable income to explain the market value of equity, even as book earnings quality



decreases, may be at least partially due to the effects of market mispricing and not due to the superior information content of book income.

To conduct tests that are unbiased by market mispricing, I estimate Models (3) and (4), which replace the market value of equity with ex-post intrinsic value as the dependent variable, within each discretionary accruals quintile. Results of these tests are reported in Table 5 (and illustrated in Figure 2). The results indicate that book income remains statistically superior to taxable income only among those observations in the lowest discretionary accruals quintile (i.e., among firms with the relatively highest quality book earnings), with  $RATIO_{IV}$  equal to 109.42% (z-stat. = 3.11) in this quintile. On the other hand, among observations in the middle three discretionary accruals quintiles, book income and taxable income possess statistically equivalent abilities to explain ex-post intrinsic value, with  $RATIO_{IV}$  equal to 105.78% (z-stat. = 1.12), 105.30% (z-stat. = 0.96), and 105.58% (z-stat. = 0.79) in the second through fourth quintiles, respectively. Lastly, among observations in the highest discretionary accruals quintile, I find that the  $R^2$  of Model (4) is actually significantly *greater* than the  $R^2$  of Model (3), with  $RATIO_{IV}$  equal to only 93.97% (z-stat. = -2.46) in this quintile. This result indicates that taxable income actually possesses *superior* ability relative to book income to explain ex-post intrinsic value among firms with the lowest quality book earnings.

Finally, comparing  $RATIO_{MVE}$  and  $RATIO_{IV}$  indicates that, when ex-post intrinsic value replaces the market value of equity as the measure of firm value, the superior ability of book income relative to taxable income to explain firm value decreases (in both magnitude and statistical significance) in each quintile of discretionary accruals except the first. Specifically, I find that the superior explanatory power of book income increases by 18.05% then decreases by 6.77%, 62.46%, 44.20%, and 223.31% in the first through fifth quintiles of discretionary

accruals, respectively (note that as before, these figures are obtained by calculating  $(RATIO_{IV} - RATIO_{MVE}) / (RATIO_{MVE} - 100\%)$  in each quintile). Although somewhat mixed in the middle quintiles, this trend generally provides support for H2 that the decrease in the superior explanatory power of book income relative to taxable income will intensify as book earnings quality decreases. Indeed, these results indicate that once market mispricing of the information contained in book income and taxable income is removed from the valuation model, the explanatory power of taxable income actually *surpasses* that of book income among firms with particularly poor book earnings quality.

#### 4.4. Regression Results: Tax Planning Tests

I now turn to the results of my tests of H3. This hypothesis predicts that, when ex-post intrinsic value replaces the market value of equity as the measure of firm value, the decrease in the superior ability of book income relative to taxable income to explain firm value will intensify as the degree of tax planning in which the firm engages decreases. To test this prediction, I first estimate Models (1) and (2) within quintiles partitioned on the magnitude of cash ETRs, where a greater cash ETR suggests that the firm engages in a relatively lower degree of tax planning.<sup>18</sup> Table 6 reports (and Figure 3 illustrates) the results of these tests. Consistent with Ayers et al. (2009), I find that although the ability of taxable income relative to book income to explain the market value of equity increases monotonically as cash ETRs increase (i.e., as tax planning decreases), book income nonetheless retains its superior explanatory power in each quintile of cash ETRs. Specifically,  $RATIO_{MVE}$  is equal to 134.74% (z-stat. = 3.89), 114.31% (z-stat. =

<sup>18</sup> Note that since observations are ranked by industry-year, quintiles are generally not of equal sizes for this set of tests. For example, when an industry-year contains only two observations, SAS ranks these observations into the second and fourth quintiles. Consequently, this industry-year will not have a first, third, or fifth quintile.

3.11), 111.62% (z-stat. = 1.97), 108.16% (z-stat. = 2.30), and 105.04% (z-stat. = 1.77), in the first (lowest) through fifth (highest) cash ETR quintiles, respectively.

As argued earlier, the superior ability of book income relative to taxable income to explain the market value of equity, even as the degree of tax planning in which the firm engages decreases, may be at least partially due to the effects of market mispricing and not due to the superior information content of book income. As before, to conduct tests that are unbiased by market mispricing, I estimate Models (3) and (4), which replace the market value of equity with ex-post intrinsic value as the dependent variable, within each cash ETR quintile. Results of these tests are reported in Table 6 (and illustrated in Figure 3). I find that book income remains statistically superior to taxable income only among those observations in the lowest two cash ETR quintiles (i.e., among those firms that engage in the relatively highest degree of tax planning), with  $RATIO_{IV}$  equal to 127.66% (z-stat. = 2.23) and 111.85% (z-stat. = 2.22) in the first and second quintiles, respectively. On the other hand, among observations in the highest three cash ETR quintiles,  $RATIO_{IV}$  is equal to only 108.56% (z-stat. = 1.50), 105.10% (z-stat. = 1.02), and 101.14% (z-stat. = 0.11) in the third through fifth quintiles, respectively. These results indicate that book income and taxable income possess statistically equivalent abilities to explain ex-post intrinsic value among firms that engage in a relatively low degree of tax planning.

Lastly, comparing  $RATIO_{MVE}$  and  $RATIO_{IV}$  indicates that, when ex-post intrinsic value replaces the market value of equity as the measure of firm value, the superior ability of book income relative to taxable income to explain firm value decreases (in both magnitude and statistical significance) in each cash ETR quintile. Specifically, I find that the superior explanatory power of book income decreases by 20.38%, 17.19%, 26.33%, 37.50%, and 77.38% in the first through fifth quintiles of cash ETRs, respectively (note that as before, these figures

are obtained by calculating  $(\text{RATIO}_{IV} - \text{RATIO}_{MVE}) / (\text{RATIO}_{MVE} - 100\%)$  in each quintile).

Although this trend is not as pronounced as that of the book earnings quality test results, it generally supports H3 that the decrease in the superior explanatory power of book income relative to taxable income will intensify as tax planning decreases. In fact, these results indicate that once market mispricing of the information contained in book income and taxable income is removed from the valuation model, taxable income and book income possess statistically equivalent abilities to explain firm value among firms that engage in a relatively low degree of tax planning.

## SECTION 5: ADDITIONAL ANALYSES

### 5.1 Analysis of Observations in Extreme Quintiles of Book Earnings Quality and Tax Planning

My first set of additional analyses examines only those observations in *both* the lowest quintile of discretionary accruals and lowest quintile of cash ETRs (i.e., those firms with the relatively highest quality book earnings *and* highest degree of tax planning) and those observations in *both* the highest quintile of discretionary accruals and highest quintile of cash ETRs (i.e., those firms with the relatively lowest quality book earnings *and* lowest degree of tax planning). My earlier predictions imply that when ex-post intrinsic value replaces the market value of equity as the measure of firm value, the decrease in the superior explanatory power of book income relative to taxable income will be especially muted in the first set of firms, since I expect that the results of my tests will be tempered as book earnings quality and tax planning increase. Conversely, my earlier predictions imply that when ex-post intrinsic value replaces the market value of equity as the measure of firm value, the decrease in the superior explanatory power of book income relative to taxable income will be especially pronounced in the second set of firms, since I expect that the results of my tests will be intensified as book earnings quality and tax planning decrease.

Table 7 reports results of estimating Models (1) – (4) within the low discretionary accruals / low cash ETR subsample. I find that  $RATIO_{MVE}$  is 121.37% (z-stat = 2.79), while  $RATIO_{IV}$  is 118.34% (z-stat = 2.15). Comparing these ratios indicates that when ex-post intrinsic value replaces the market value of equity as the measure of firm value, the decrease in the superior explanatory power of book income relative to taxable income is only 11.84% in this

subsample, compared to a 26.54% decrease in my full sample (reported in Table 4). This finding is consistent with my prediction that the results of this study will be muted among firms with both relatively high quality book earnings and a relatively high degree of tax planning.

Next, Table 8 reports results of estimating Models (1) – (4) within the high discretionary accruals / high cash ETR subsample. I find that  $RATIO_{MVE}$  is 122.52% (z-stat = 2.86) while  $RATIO_{IV}$  is 80.89% (z-stat = -2.30). The latter ratio indicates that the ability of taxable income to explain ex-post intrinsic value actually surpasses that of book income among firms in this subsample, consistent with the results reported in Table 5, which show that taxable income possesses superior ability relative to book income to explain ex-post intrinsic value among firms with particularly low quality book earnings. Finally, comparing these ratios indicates that when ex-post intrinsic value replaces the market value of equity as the measure of firm value, the decrease in the superior explanatory power of book income relative to taxable income is 184.86% in this subsample, compared to a decrease of only 26.54% in my full sample (reported in Table 4). This finding is consistent with my prediction that the results of this study will be especially pronounced among firms with both relatively low quality book earnings and a relatively low degree of tax planning.

## 5.2. Taxable Income vs. Cash Flows from Operations

As noted earlier, taxable income is calculated pursuant to a method of accounting that resembles the cash method of accounting in many respects. Therefore, the question remains whether taxable income is merely a proxy for cash flows from operations and, consequently, whether the results of this study are similar whether taxable income or cash flows from

operations is used as an alternative to book income as a summary measure of firm performance. To address this concern, I run a number of supplementary analyses discussed below.

First, in untabulated robustness tests, I find that taxable income and pretax cash flows from operations (calculated as cash flows from operations plus cash taxes paid, defined as *CFO*) are correlated at 0.68 ( $p < .0001$ ), indicating that taxable income and cash flows from operations are not merely interchangeable. Further, in additional untabulated robustness tests, in regressions of firm value on book income, pretax cash flows from operations, and taxable income, I find that taxable income provides incremental explanatory power to book income and cash flows from operations in explaining both the market value of equity and ex-post intrinsic value. This result demonstrates that taxable income contains information separate from the information contained in both book income and cash flows from operations in explaining firm value.

Next, I rerun my primary tests using pretax cash flows from operations instead of book income in order to examine the relative abilities of cash flows from operations and taxable income to explain firm value. The results of these tests are reported in Table 9. The results indicate that taxable income is statistically superior to cash flows from operations in explaining both the market value of equity and ex-post intrinsic value for the full sample. Further, the results indicate that taxable income and cash flows from operations possess statistically different abilities to explain the market value of equity and ex-post intrinsic value in all but three (out of 10) of the quintiles of discretionary accruals and cash ETRs. Since taxable income and cash flows from operations possess statistically different explanatory powers across a variety of specifications and samples of observations, these results again suggest that taxable income and cash flows from operations are not interchangeable.

Lastly, I rerun my primary tests using pretax cash flows from operations instead of taxable income as an alternative to book income as a summary measure of firm performance in order to examine whether and how the results differ from those of my primary analyses (note that these tests are similar in spirit to those performed by Subramanyam and Venkatachalam, 2007). The results of these tests are reported in Table 10. The results indicate that, consistent with Subramanyam and Venkatachalam and with my primary tests using taxable income instead of cash flows from operations, book income is superior to cash flows from operations in explaining both the market value of equity and ex-post intrinsic value, although book income's superiority declines when ex-post intrinsic value is used as the measure of firm value. This result is consistent with the fact that one of the arguments made in this study with respect to taxable income also applies to cash flows from operations – namely, that investors fixate on book income and underemphasize cash flows when forecasting future earnings and pricing securities (Sloan, 1996). Next, in cross-sectional tests using the market value of equity as the measure of firm value, again the results are similar to those of my primary tests. Specifically, I find that book income is superior to cash flows from operations in explaining the market value of equity, regardless of the degree of book earnings quality or the degree of tax planning in which the firm engages. However, this difference is not statistically significant among firms in the highest quintile of cash ETRs, unlike in my primary tests, in which all differences were statistically different.

The results of cross-sectional tests using ex-post intrinsic value as the dependent variable differ considerably from those of my primary tests. Specifically, I find that book income remains superior to cash flows from operations in explaining ex-post intrinsic value, regardless of the degree of book earnings quality or the degree of tax planning in which the firm engages



(although this difference is not statistically significant among firms in the fourth quintile of discretionary accruals or cash ETRs). This is in contrast to my primary test results, which show that taxable income possesses superior ability relative to book income to explain ex-post intrinsic value among firms with particularly low book earnings quality. Further, in my primary tests I find that the decrease in book income's superiority to taxable income generally intensifies as book earnings quality and tax planning decrease. In contrast, I find no such pattern when cash flows from operations is used in place of taxable income. To summarize, the results discussed in this section are inconsistent with the notion that taxable income and cash flows from operations are merely proxies for one another.

### 5.3. Untabulated Robustness Tests

Finally, I conduct a number of additional tests to ensure that the results reported in this study are robust to a battery of alternative specifications. In particular, these robustness tests at least partially address concerns regarding the use of tax net operating loss data reported in Compustat; concerns regarding potential measurement error in estimated taxable income; concerns regarding estimates of the discount rate used in the calculation of ex-post intrinsic value; and alternative expressions of ex-post intrinsic value.

First, Mills et al. (2003) identify a number of issues with using tax net operating loss data reported in Compustat. More specifically, these issues generally relate to Compustat reporting that a firm has a U.S. tax net operating loss carryforward when, in fact, it does not, and alternatively, Compustat reporting that a firm does not have a U.S. tax net operating loss carryforward when, in fact, it does. Mills et al. note that these issues generally concern the use of Compustat data to estimate *U.S.* taxable income, in contrast to this study, in which I estimate

*worldwide* taxable income. Nonetheless, in untabulated robustness tests, I rerun all of the primary analyses conducted in this study after dropping observations with tax net operating loss carryforwards reported in Compustat and find that my results are qualitatively unchanged. I also rerun all of my primary tests using an estimate of taxable income omitting the change in tax net operating loss carryforwards from the calculation, and again find that my results are qualitatively unchanged.

Next, as noted earlier, Hanlon (2003) identifies a number of potential sources of measurement error in the estimate of taxable income used in this study. Two of these issues are the existence of tax credits and the fact that multinational firms may have a large amount of income taxed at rates other than the top U.S. statutory corporate tax rate. Although it is generally not possible to correct for these issues in a large-sample study such as this one, I at least partially address these concerns by re-running the primary tests performed in this study after dropping observations with high research and development expense (which I define as firms in the top quartile of research and development expense scaled by pretax book income), because these firms are likely to have high research and development tax credits. I also re-run my primary tests after dropping firms with high foreign income (which I define as firms whose ratio of foreign income to total income is greater than 50%), because these firms are likely to have high foreign tax credits and/or a significant amount of income taxed at rates different from the top U.S. statutory corporate tax rate. The results of these analyses are qualitatively unchanged from the results of my primary tests.

Third, I conduct additional tests to ensure that my results are robust to alternative discount rate measurements in the calculation of ex-post intrinsic value. Specifically, I use the monthly risk-free (t-bill) rate plus a flat 6% risk premium and a flat discount rate of 10% as

alternative discount rate measurements, and find results that are qualitatively similar to those of my primary tests. The results of these robustness tests are consistent with the results reported by Penman and Sougiannis (1998), who find that the relative accuracy of alternative valuation models is not sensitive to the choice of discount rate, and Subramanyam and Venkatachalam (2007), who likewise find that their results are robust to a variety of alternative discount rate measurements.

Finally, as noted earlier, in my primary tests I calculate ex-post intrinsic value pursuant to the residual income model expressed over a five year finite time horizon. In my last set of untabulated robustness tests, I follow Subramanyam and Venkatachalam (2007) and re-run my primary tests using three alternative expressions of ex-post intrinsic value. Specifically, I confirm that my results are qualitatively unchanged when I calculate ex-post intrinsic value pursuant to the residual income model expressed over a three year finite time horizon. I also confirm that my results are qualitatively unchanged when I calculate ex-post intrinsic value pursuant to the classic dividend discount model expressed over both three year and five year finite time horizons. Lastly, I find that Pearson correlations among the four measures of ex-post intrinsic value employed in this study are all greater than 0.90 ( $p < .0001$ ). These results are consistent with those reported by Subramanyam and Venkatachalam, who find that their conclusions are qualitatively unchanged when alternative expressions of ex-post intrinsic value are employed.

## SECTION 6: CONCLUSIONS AND AVENUES FOR FUTURE RESEARCH

In this study, I conduct tests of the relative information content of book income and taxable income that are arguably unbiased by the effects of market mispricing arising from investors' fixation on book income and underemphasis on the information contained in taxable income. I report three primary findings. First, I find that the ability of book income relative to taxable income to explain firm value decreases when investors' potentially-biased expectations of future earnings and stock price are removed from the valuation model. Second, I document that this result generally intensifies as book earnings quality and tax planning decrease. Third, I find that once market mispricing is removed from the valuation model, taxable income actually possesses statistically equivalent or even *superior* ability relative to book income to explain firm value among firms with particularly low book earnings quality and firms that engage in a relatively low degree of tax planning.

This study contributes to the literature on the information content of firms' tax-related financial statement disclosures. Using contemporaneous stock returns as the performance criterion, prior studies generally conclude that book income is superior to taxable income as a summary measure of firm performance, even in the presence of low book earnings quality and low tax planning. By conducting tests that overcome biases related to market mispricing, I am able to show that the information content of taxable income relative to book income may be greater than prior studies suggest and, in some cases, that the ability of taxable income to explain firm value actually surpasses that of book income once market mispricing is removed from the valuation model. These findings also inform the policy debate on whether book income and taxable income should be conformed to one measure. By demonstrating that the information

content of taxable income may have been understated by prior research, my results indicate that conforming taxable income to book income could result in a more significant loss of information to the market than originally believed.

There are a number of potential avenues for future research related to the findings reported in this study. One possible extension of the current study would be to examine whether the empirical evidence is consistent with investors underweighting the information contained in taxable income because the information is difficult to gather and understand — an assertion that has been previously assumed, but not empirically tested, in the literature. To do this, future research could examine whether abnormal returns associated with the information contained in taxable income are concentrated in small firms, firms with relatively low analyst following, and firms with relatively low levels of institutional ownership. One would expect that abnormal returns would be concentrated in these firms because they have relatively less sophisticated investors than do other firms, and less sophisticated investors would be more likely to ignore or misunderstand the complex information reported in firms' tax footnotes. Firm characteristics, such as tax aggressiveness or the opacity of the firm's information environment, could also impact shareholders' abilities to comprehend firms' tax disclosures.

Another possible avenue for future study is to examine why, if the information contained in taxable income provides information that is useful to investors, firms do not choose to disclose their taxable income or, at least, more information about their tax activities in the footnotes to their financial statements. One way that future work may be able to study this issue is to empirically examine the characteristics of firms whose shareholders have called for increased disclosure of the firm's tax-related information via proxy proposals, in the spirit of work by Ferri and Sandino (2009) who conduct a similar analysis in the context of firms voluntarily expensing

employee stock options. It may be interesting to study whether and how firm characteristics, such as tax aggressiveness and corporate governance, differ between these “shareholder activist” firms and other firms, and whether such firms’ tax-related behavior (such as becoming more or less tax aggressive) changes following shareholder calls for increased tax disclosures.

Finally, future research related to this study could more directly examine the association of book income and taxable income with future accounting attributes. For example, similar to Dechow (1994) who studies the relative abilities of book income and cash flows from operations to predict future earnings and future cash flows, future research could examine whether book income or taxable income better predicts future earnings and future cash flows. Further research could also examine in what settings taxable income may be superior to book income in predicting future accounting attributes. Although this research design would be quite similar to the one employed in this study, the benefit of this alternative design is that it overcomes potential criticisms of the ex-post intrinsic value model and, instead, more directly tests the predictive abilities of book income and taxable income for future earnings and cash flows.

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**TABLE 1****Sample Selection****Panel A: Full Sample**

	<u>Firm-Years</u>	<u>Distinct Firms</u>
All U.S.-incorporated, nonfinancial/nonutility firm-years with five-year-ahead data available on Compustat, 1983-2005	47,366	5,579
Less: missing data necessary to calculate book income, taxable income, market value of equity, or ex-post intrinsic value	(20,669)	(1,350)
Less: negative market value of equity or ex-post intrinsic value	(1,375)	(137)
Less: negative book income or taxable income	(6,470)	(666)
<b>Final Sample for Full Sample Tests</b>	<b>18,852</b>	<b>3,426</b>

**Panel B: Earnings Quality Tests Subsample**

	<u>Firm-Years</u>	<u>Distinct Firms</u>
Full Sample	18,852	3,426
Less: missing data necessary to calculate discretionary accruals	(2,676)	(667)
<b>Final Sample for Earnings Quality Tests</b>	<b>16,176</b>	<b>2,759</b>

Notes: this table reports the sample selection procedure followed in this study.

TABLE 1, CONT.

## Sample Selection

## Panel C: Tax Planning Tests Subsample

	<u>Firm-Years</u>	<u>Distinct Firms</u>
Full Sample	18,852	3,426
Less: missing data necessary to calculate the five-year cash effective tax rate	(9,087)	(1,153)
Less: negative numerator or denominator in the five-year cash effective tax rate calculation	(613)	(167)
Less: five-year cash effective tax rate greater than 100%	(206)	(83)
<b>Final Sample for Tax Planning Tests</b>	<b>8,946</b>	<b>2,023</b>

Notes: this table reports the sample selection procedure followed in this study.

**TABLE 2**  
**Descriptive Statistics**

<b>Variable</b>	<b>n</b>	<b>Mean</b>	<b>Median</b>	<b>Std Dev</b>	<b>Min</b>	<b>P25</b>	<b>P75</b>	<b>Max</b>
<i><b>PTBI</b></i>	18,852	157.89	19.74	488.74	0.12	4.68	80.75	3,654.00
<i><b>TI</b></i>	18,852	136.36	16.29	420.26	0.00	3.88	67.64	3,065.71
<i><b>MVE</b></i>	18,852	1,734.44	195.45	5,539.77	3.28	46.85	878.61	42,275.28
<i><b>IV</b></i>	18,852	3,119.93	262.01	10,797.01	1.01	47.82	1,301.92	82,239.01
<i><b>DACC</b></i>	16,176	0.08	0.05	0.08	0.00	0.02	0.10	0.47
<i><b>CETR</b></i>	8,946	0.32	0.32	0.13	0.01	0.25	0.39	0.75

Notes: this table reports descriptive statistics for the primary variables examined in this study. All variables are as defined in Appendix A. Variables are winsorized at the 1% and 99% levels.

**TABLE 3**  
**Correlations**

Variable	n	<i>PTBI</i>	<i>TI</i>	<i>MVE</i>	<i>IV</i>	<i>DACC</i>	<i>CETR</i>
<i>PTBI</i>	18,852	-	0.93***	0.93***	0.80***	-0.15***	-0.13***
<i>TI</i>	18,852	0.95***	-	0.89***	0.76***	-0.14***	-0.04***
<i>MVE</i>	18,852	0.86***	0.82***	-	0.81***	-0.13***	-0.15***
<i>IV</i>	18,852	0.68***	0.67***	0.73***	-	-0.11***	-0.13***
<i>DACC</i>	16,176	-0.07***	-0.06***	-0.05***	-0.05***	-	-0.02*
<i>CETR</i>	8,946	-0.09***	-0.06***	-0.10***	-0.09***	-0.02**	-

Notes: this table reports Pearson (below the diagonal) and Spearman (above the diagonal) correlations for the primary variables examined in this study. All variables are as defined in Appendix A. For clarity, p-values are omitted. The symbols \*, \*\*, and \*\*\* indicate correlation coefficients significant at the 10%, 5%, and 1% levels, respectively. Variables are winsorized at the 1% and 99% levels.

TABLE 4

## Relative Explanatory Power of Book Income and Taxable Income: Full Sample

	<i>MVE</i>	<i>IV</i>
<i>PTBI</i>	$R^2 (1) = 73.15\%$	$R^2 (3) = 46.62\%$
<i>TI</i>	$R^2 (2) = 68.26\%$	$R^2 (4) = 44.29\%$
<b>R<sup>2</sup> RATIO</b> <i>z-stat.</i>	$\text{RATIO}_{MVE} = R^2 (1) / R^2 (2) =$ 107.16% 5.63***	$\text{RATIO}_{IV} = R^2 (3) / R^2 (4) =$ 105.26% 3.53***
<b>PERCENTAGE CHANGE IN THE SUPERIORITY OF BOOK INCOME</b>	$(\text{RATIO}_{IV} - \text{RATIO}_{MVE}) / (\text{RATIO}_{MVE} - 100\%) = -26.54\%$	
<b>n = 18,852</b>		

Notes: this table reports the explanatory power, or  $R^2$ , of separate regressions of book income (*PTBI*) and taxable income (*TI*) on the market value of equity (*MVE*) and ex-post intrinsic value of equity (*IV*). Detailed variable definitions are provided in Appendix A. Regression coefficients and t-statistics are omitted for clarity. Results of Vuong (1989) tests of the difference in explanatory power

between two non-nested models are reported in italics. The symbols \*, \*\*, and \*\*\* indicate z-statistics significant at the 10%, 5%, and 1% levels, respectively. Variables are winsorized at the 1% and 99% levels.



TABLE 5

## Relative Explanatory Power of Book Income and Taxable Income by Discretionary Accruals Quintile

Quintile	n	MVE				IV				PERCENTAGE CHANGE IN THE SUPERIORITY OF BOOK INCOME
		PTBI R <sup>2</sup> (1)	TI R <sup>2</sup> (2)	RATIO <sub>MVE</sub> R <sup>2</sup> (1) / R <sup>2</sup> (2)	z-stat.	PTBI R <sup>2</sup> (3)	TI R <sup>2</sup> (4)	RATIO <sub>IV</sub> R <sup>2</sup> (3) / R <sup>2</sup> (4)	z-stat.	(RATIO <sub>IV</sub> - RATIO <sub>MVE</sub> ) / (RATIO <sub>MVE</sub> - 100%)
Q1 (Low DACC)	3,235	79.18%	73.33%	107.98%	3.53***	52.50%	47.98%	109.42%	3.11***	18.05%
Q2	3,235	76.03%	71.59%	106.20%	2.01**	45.37%	42.89%	105.78%	1.12	-6.77%
Q3	3,236	74.82%	65.56%	114.12%	3.09***	44.31%	42.08%	105.30%	0.96	-62.46%
Q4	3,235	68.72%	62.47%	110.00%	3.12***	44.69%	42.33%	105.58%	0.79	-44.20%
Q5 (High DACC)	3,235	68.90%	65.69%	104.89%	1.70*	37.22%	39.61%	93.97%	-2.46**	-223.31%

This table reports the explanatory power, or R<sup>2</sup>, of separate regressions of book income (PTBI) and taxable income (TI) on the market value of equity (MVE) and ex-post intrinsic value of equity (IV) within discretionary accrual (DACC) quintiles, where a higher quintile indicates a lower degree of book earnings quality. Detailed variable definitions are provided in Appendix A. Regression coefficients

and t-statistics are omitted for clarity. Results of Vuong (1989) tests of the difference in explanatory power between two non-nested models are reported in italics. The symbols \*, \*\*, and \*\*\* indicate z-statistics significant at the 10%, 5%, and 1% levels, respectively. Variables are winsorized at the 1% and 99% levels.

TABLE 6

## Relative Explanatory Power of Book Income and Taxable Income by Cash Effective Tax Rate Quintile

Quintile	n	MVE				IV				PERCENTAGE CHANGE IN THE SUPERIORITY OF BOOK INCOME
		PTBI R <sup>2</sup> (1)	TI R <sup>2</sup> (2)	RATIO <sub>MVE</sub> R <sup>2</sup> (1) / R <sup>2</sup> (2)	z-stat.	PTBI R <sup>2</sup> (3)	TI R <sup>2</sup> (4)	RATIO <sub>IV</sub> R <sup>2</sup> (3) / R <sup>2</sup> (4)	z-stat.	(RATIO <sub>IV</sub> - RATIO <sub>MVE</sub> ) / (RATIO <sub>MVE</sub> - 100%)
Q1 (Low CETR)	1,540	69.62%	51.67%	134.74%	3.89***	28.11%	22.02%	127.66%	2.23**	-20.38%
Q2	1,917	67.41%	58.97%	114.31%	3.11***	26.33%	23.54%	111.85%	2.22**	-17.19%
Q3	1,918	74.25%	66.52%	111.62%	1.97**	32.58%	30.01%	108.56%	1.50	-26.33%
Q4	1,917	76.10%	70.36%	108.16%	2.30**	30.10%	28.64%	105.10%	1.02	-37.50%
Q5 (High CETR)	1,654	70.92%	67.52%	105.04%	1.77*	38.07%	37.64%	101.14%	0.11	-77.38%

Notes: this table reports the explanatory power, or R<sup>2</sup>, of separate regressions of book income (PTBI) and taxable income (TI) on the market value of equity (MVE) and ex-post intrinsic value of equity (IV) within five-year cash effective tax rate (CETR) quintiles, where a higher quintile indicates that the firm engages in a relatively lower degree of tax planning. Detailed variable definitions are provided in Appendix A. Regression coefficients and t-statistics are omitted for clarity. Results of Vuong (1989) tests of the difference

in explanatory power between two non-nested models are reported in italics. The symbols \*, \*\*, and \*\*\* indicate z-statistics significant at the 10%, 5%, and 1% levels, respectively. Variables are winsorized at the 1% and 99% levels.

TABLE 7

**Relative Explanatory Power of Book Income and Taxable Income: Low Discretionary Accruals / Low Cash Effective Tax Rate Subsample**

	<i>MVE</i>	<i>IV</i>
<i>PTBI</i>	$R^2 (1) = 78.66\%$	$R^2 (3) = 42.13\%$
<i>TI</i>	$R^2 (2) = 64.81\%$	$R^2 (4) = 35.45\%$
<b>R<sup>2</sup> RATIO</b> <i>z-stat.</i>	$\text{RATIO}_{MVE} = R^2 (1) / R^2 (2) =$ 121.37% 2.79***	$\text{RATIO}_{IV} = R^2 (3) / R^2 (4) =$ 118.84% 2.15**
<b>PERCENTAGE CHANGE IN THE SUPERIORITY OF BOOK INCOME</b>	$(\text{RATIO}_{IV} - \text{RATIO}_{MVE}) / (\text{RATIO}_{MVE} - 100\%) = -11.84\%$	
<b>n = 296</b>		

Notes: this table reports the explanatory power, or  $R^2$ , of separate regressions of book income (*PTBI*) and taxable income (*TI*) on the market value of equity (*MVE*) and ex-post intrinsic value of equity (*IV*) for those observations in both the lowest quintile of discretionary accruals (*DACC*) and lowest quintile of cash effective tax rates (*CETR*). Detailed variable definitions are provided in

Appendix A. Regression coefficients and t-statistics are omitted for clarity. Results of Vuong (1989) tests of the difference in explanatory power between two non-nested models are reported in italics. The symbols \*, \*\*, and \*\*\* indicate z-statistics significant at the 10%, 5%, and 1% levels, respectively. Variables are winsorized at the 1% and 99% levels.

TABLE 8

**Relative Explanatory Power of Book Income and Taxable Income: High Discretionary Accruals / High Cash Effective Tax Rate Subsample**

	<i>MVE</i>	<i>IV</i>
<i>PTBI</i>	$R^2 (1) = 77.30\%$	$R^2 (3) = 41.82\%$
<i>TI</i>	$R^2 (2) = 63.09\%$	$R^2 (4) = 51.70\%$
<b>R<sup>2</sup> RATIO</b>	$\text{RATIO}_{MVE} = R^2 (1) / R^2 (2) =$	$\text{RATIO}_{IV} = R^2 (3) / R^2 (4) =$
<i>z-stat.</i>	122.52% 2.86***	80.89% -2.30**
<b>PERCENTAGE CHANGE IN THE SUPERIORITY OF BOOK INCOME</b>	$(\text{RATIO}_{IV} - \text{RATIO}_{MVE}) / (\text{RATIO}_{MVE} - 100\%) = -184.86\%$	
<b>n = 318</b>		

Notes: this table reports the explanatory power, or  $R^2$ , of separate regressions of book income (*PTBI*) and taxable income (*TI*) on the market value of equity (*MVE*) and ex-post intrinsic value of equity (*IV*) for those observations in both the highest quintile of discretionary accruals (*DACC*) and highest quintile of cash effective tax rates (*CETR*). Detailed variable definitions are provided in

Appendix A. Regression coefficients and t-statistics are omitted for clarity. Results of Vuong (1989) tests of the difference in explanatory power between two non-nested models are reported in italics. The symbols \*, \*\*, and \*\*\* indicate z-statistics significant at the 10%, 5%, and 1% levels, respectively. Variables are winsorized at the 1% and 99% levels.



TABLE 9

**Relative Explanatory Power of Taxable Income and Cash Flows from Operations: Full Sample and by Discretionary Accruals and Cash Effective Tax Rate Quintiles**

Quintile	n	MVE				IV			
		TI	CFO	RATIO <sub>MVE</sub>	z-stat.	TI	CFO	RATIO <sub>IV</sub>	z-stat.
		R <sup>2</sup> (1)	R <sup>2</sup> (2)	R <sup>2</sup> (1) / R <sup>2</sup> (2)		R <sup>2</sup> (3)	R <sup>2</sup> (4)	R <sup>2</sup> (3) / R <sup>2</sup> (4)	
<b>Full Sample</b>	14,147	67.81%	55.38%	122.44%	12.39***	39.71%	34.66%	114.57%	7.23***
<b>Q1 (Low DACC)</b>	2,759	74.02%	56.25%	131.59%	5.49***	42.58%	41.26%	103.20%	1.09
<b>Q2</b>	2,760	69.37%	53.90%	128.70%	5.11***	35.30%	31.89%	110.69%	3.38***
<b>Q3</b>	2,760	70.56%	65.68%	107.43%	3.56***	41.50%	38.41%	108.04%	2.50**
<b>Q4</b>	2,760	59.96%	67.34%	89.04%	-2.57**	31.94%	43.57%	73.31%	-4.09***
<b>Q5 (High DACC)</b>	2,759	54.21%	62.00%	87.44%	-2.82***	31.74%	36.71%	86.46%	-3.99***
<b>Q1 (Low CETR)</b>	1,491	50.23%	45.03%	111.55%	1.90*	22.56%	20.43%	110.43%	1.38
<b>Q2</b>	1,855	60.11%	66.62%	90.23%	-1.77*	24.02%	42.37%	56.70%	-6.43***
<b>Q3</b>	1,834	65.75%	58.25%	112.88%	2.12**	30.23%	46.14%	65.52%	-4.39***
<b>Q4</b>	1,855	69.06%	63.29%	109.16%	1.71*	27.31%	39.51%	69.12%	-3.12***
<b>Q5 (High CETR)</b>	1,597	68.23%	73.91%	92.31%	-0.97	37.47%	33.51%	111.82%	1.88*

Notes: this table reports the explanatory power, or R<sup>2</sup>, of separate regressions of taxable income (TI) and pretax cash flows from operations (CFO) on the market value of equity (MVE) and ex-post intrinsic value of equity (IV) for the full sample, within

discretionary accrual (*DACC*) quintiles, and within five-year cash effective tax rate (*CETR*) quintiles. *CFO* is calculated as cash flows from operations plus cash taxes paid. Detailed definitions of other variables are provided in Appendix A. Regression coefficients and t-statistics are omitted for clarity. Results of Vuong (1989) tests of the difference in explanatory power between two non-nested models are reported in italics. The symbols \*, \*\*, and \*\*\* indicate z-statistics significant at the 10%, 5%, and 1% levels, respectively. Variables are winsorized at the 1% and 99% levels.

TABLE 10

Relative Explanatory Power of Book Income and Cash Flows from Operations: Full Sample and by Discretionary Accruals and Cash Effective Tax Rate Quintiles

Quintile	n	MVE				IV				PERCENT CHANGE IN THE SUPERIORITY OF BOOK INCOME
		PTBI R <sup>2</sup> (1)	CFO R <sup>2</sup> (2)	RATIO <sub>MVE</sub> R <sup>2</sup> (1) / R <sup>2</sup> (2)	z-stat.	PTBI R <sup>2</sup> (3)	CFO R <sup>2</sup> (4)	RATIO <sub>IV</sub> R <sup>2</sup> (3) / R <sup>2</sup> (4)	z-stat.	(RATIO <sub>IV</sub> - RATIO <sub>MVE</sub> ) / (RATIO <sub>MVE</sub> - 100%)
Full Sample	14,147	79.96%	55.38%	144.38%	15.27***	46.57%	34.66%	134.36%	11.12***	-22.58%
Q1 (Low <i>DACC</i> )	2,759	84.28%	56.25%	149.83%	7.41***	53.12%	41.26%	128.74%	4.99***	-42.32%
Q2	2,760	80.26%	53.90%	148.91%	7.21***	42.62%	31.89%	133.65%	5.67***	-31.20%
Q3	2,760	83.44%	65.68%	127.04%	5.72***	46.41%	38.41%	120.83%	4.42***	-22.97%
Q4	2,760	75.51%	67.34%	112.13%	2.49**	45.38%	43.57%	104.15%	1.36	-65.76%
Q5 (High <i>DACC</i> )	2,759	70.85%	62.00%	114.27%	2.77***	41.38%	36.71%	112.72%	3.54***	-10.88%
Q1 (Low <i>CETR</i> )	1,491	75.88%	45.03%	168.51%	6.25***	39.20%	20.43%	191.87%	9.78***	34.10%
Q2	1,855	88.65%	66.62%	133.07%	3.92***	55.66%	42.37%	131.37%	3.32***	-5.15%
Q3	1,834	87.92%	58.25%	150.94%	5.43***	55.52%	46.14%	120.33%	2.02**	-60.09%
Q4	1,855	70.63%	63.29%	111.60%	1.80*	41.63%	39.51%	105.37%	1.10	-53.73%
Q5 (High <i>CETR</i> )	1,597	75.73%	73.91%	102.46%	0.29	36.13%	33.51%	107.82%	1.66*	217.51%

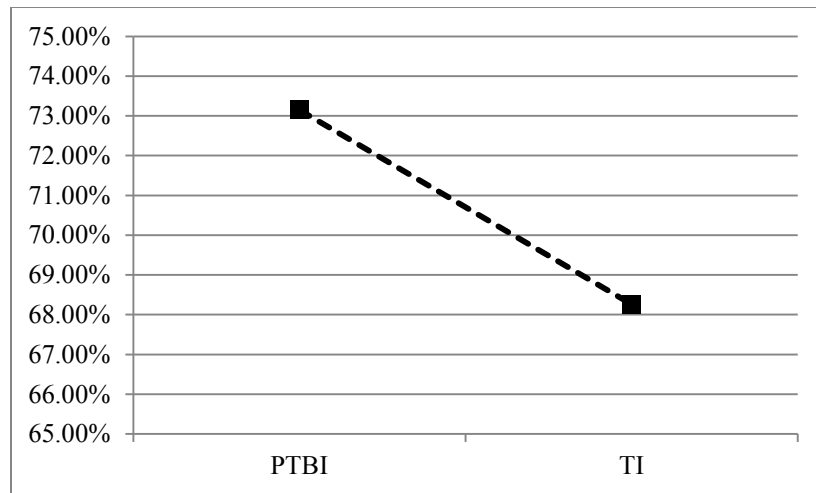
Notes: this table reports the explanatory power, or R<sup>2</sup>, of separate regressions of book income (*PTBI*) and pretax cash flows from operations (*CFO*) on the market value of equity (*MVE*) and ex-post intrinsic value of equity (*IV*) for the full sample, within discretionary accrual (*DACC*) quintiles, and within five-year cash effective tax rate (*CETR*) quintiles. *CFO* is calculated as cash flows

from operations plus cash taxes paid. Detailed definitions of other variables are provided in Appendix A. Regression coefficients and t-statistics are omitted for clarity. Results of Vuong (1989) tests of the difference in explanatory power between two non-nested models are reported in italics. The symbols \*, \*\*, and \*\*\* indicate z-statistics significant at the 10%, 5%, and 1% levels, respectively. Variables are winsorized at the 1% and 99% levels.

FIGURE 1

## Graphical Illustration of Table 4

**Panel A: Relative Abilities of Book Income (*PTBI*) and Taxable Income (*TI*) to Explain the Market Value of Equity (*MVE*)**



**Panel B: Relative Abilities of Book Income (*PTBI*) and Taxable Income (*TI*) to Explain Ex-Post Intrinsic Value (*IV*)**

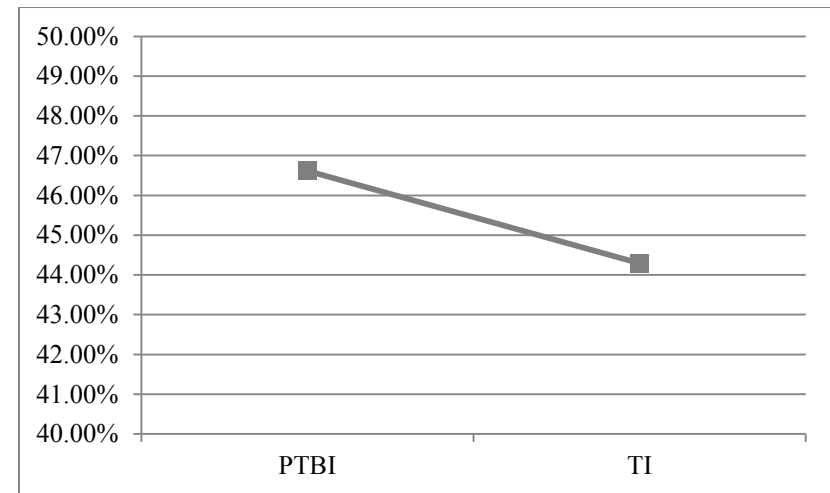
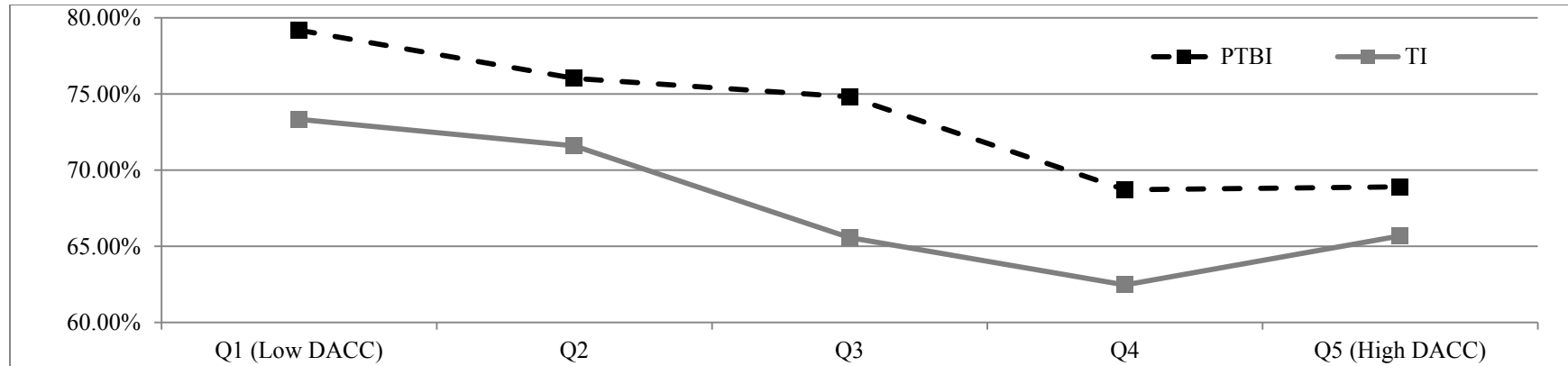


FIGURE 2

## Graphical Illustration of Table 5

**Panel A: Relative Abilities of Book Income (*PTBI*) and Taxable Income (*TI*) to Explain the Market Value of Equity (*MVE*), by Discretionary Accruals (*DACC*) Quintile**



**Panel B: Relative Abilities of Book Income (*PTBI*) and Taxable Income (*TI*) to Explain Ex-Post Intrinsic Value (*IV*), by Discretionary Accruals (*DACC*) Quintile**

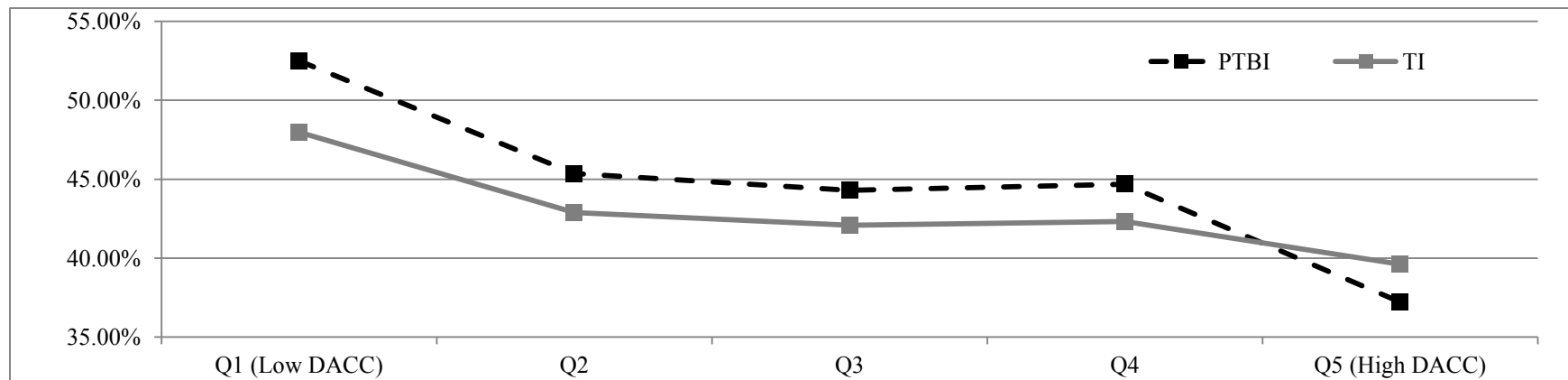
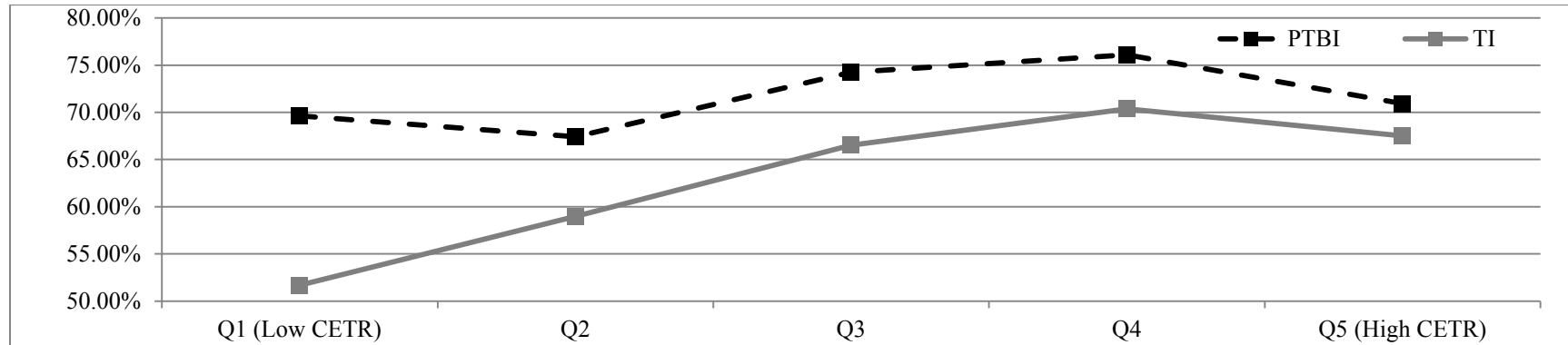


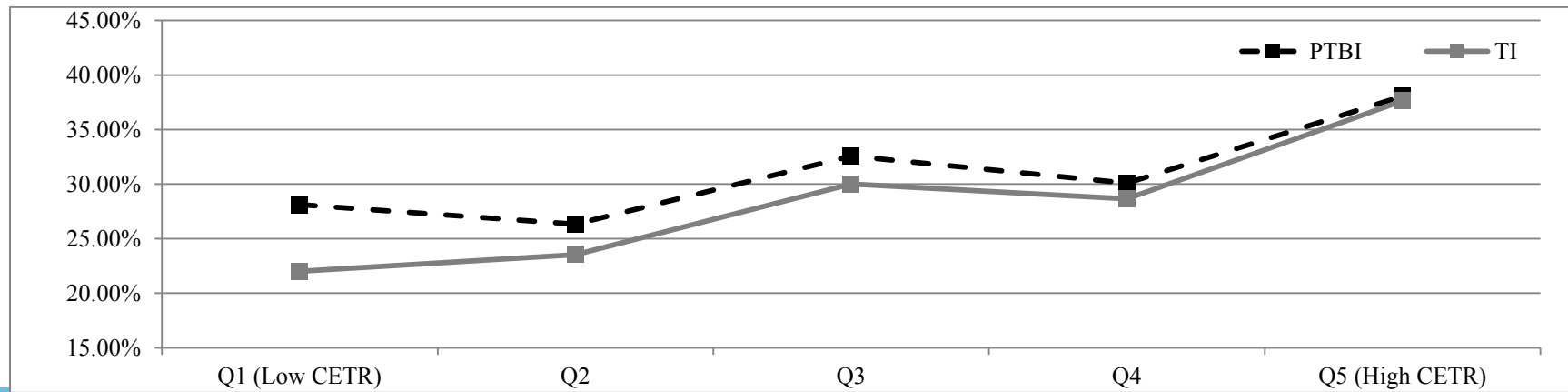
FIGURE 3

## Graphical Illustration of Table 6

**Panel A: Relative Abilities of Book Income (*PTBI*) and Taxable Income (*TI*) to Explain the Market Value of Equity (*MVE*), by Cash Effective Tax Rate (*CETR*) Quintile**



**Panel B: Relative Abilities of Book Income (*PTBI*) and Taxable Income (*TI*) to Explain Ex-Post Intrinsic Value (*IV*), by Cash Effective Tax Rate (*CETR*) Quintile**



## APPENDIX

### Variable Definitions

Variable	Definition
<i>PTBI</i>	Book income, calculated as pretax book income less minority interest.
<i>TI</i>	Taxable income as estimated from firms' financial statement data, calculated as worldwide current tax expense (the sum of current federal tax expense and current foreign tax expense, or total tax expense less deferred tax expense if either current federal or current foreign tax expense is missing) grossed- up (divided) by the applicable top annual U.S. statutory corporate tax rate, all less the change in tax net operating loss carryforwards.
<i>MVE</i>	Market value of equity, calculated as share price three months after the end of the fiscal year multiplied by the number of common shares outstanding on the same date.
<i>IV</i>	Ex-post intrinsic value determined pursuant to the residual income model expressed over a five-year finite time horizon. Ex-post intrinsic value is calculated by replacing expectations of future earnings, book value, and terminal stock price in the residual income model with five years or their ex-post realizations.
<i>DACC</i>	The absolute value of discretionary accruals, calculated using the Jones (1991) model of accruals as modified by Dechow et al. (1995), run cross-sectionally by each industry- (two digit SIC code) year with at least 10 observations, including an intercept and scaling all variables by lagged total assets as in Kothari et al. (2005). A higher value of <i>DACC</i> indicates relatively lower book earnings quality.



## APPENDIX, CONT.

## Variable Definitions

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Variable	Definition
<i>CETR</i>	The five-year “long-run” cash effective tax rate developed by Dyreng et al. (2008), calculated as the sum of cash taxes paid in the current plus four prior years divided by the sum of pretax book income ( <i>PTBI</i> as defined above) less special items in the current plus four prior years. A higher value of <i>CETR</i> indicates that the firm engages in a relatively lower degree of tax planning.

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