Mispricing of Book-Tax Differences and the Trading Behavior of Short Sellers and Insiders

Sabrina Chi
Sam M. Walton School of Business
University of Arkansas

Morton Pincus
Paul Merage School of Business
University of California, Irvine

Siew Hong Teoh
Paul Merage School of Business
University of California, Irvine

The Accounting Review, forthcoming

Editor's note: Accepted by John Harry Evans III.
Submitted January 2012
Accepted September 2013

We appreciate helpful comments from the Senior Editor (John Harry Evans III) and two anonymous referees, Michael Donohoe (AAA conference discussant), Arthur Francia, Michelle Hanlon, Bob Lipe, Richard Sloan, Bill Schwartz, Jake Thornock, Sam Tiras (FARS conference discussant), Ashley Wang, Frank Zhang, Oklahoma State University Research Conference participants, UCI Accounting Doctoral Seminar participants, and workshop participants at California Polytechnic University-San Luis Obispo, University of Houston, Lehigh University, Nanyang Technological University, National University of Singapore, and Santa Clara University on this version and an earlier version entitled ''Do Short Sellers and Insiders Profit from the Mispricing of Book-Tax Differences?'' We also thank Xuan Huang and Peng-Chia Chiu for expert research assistance.

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Abstract: We find evidence that investors misprice information contained in book-tax differences (BTDs), measured as the ratio of taxable income to book income, *TI/BI*. Low *TI/BI* predicts worse earnings growth and abnormal stock returns than high *TI/BI*. We find that short sellers and insiders arbitrage BTD mispricing, but the arbitrage is imperfect because of constraints on short selling and insider trading. Under SFAS No. 109 the predictability is stronger for *TEMP/BI*, the temporary component of *TI/BI*, which reflects greater managerial discretion. The results are incremental to a large set of known accruals-based anomaly predictors. We suggest that a sunshine policy of disclosing a reconciliation of book and taxable incomes can reduce mispricing of BTDs and improve capital market resource allocation.

Key Words: Book-tax differences, arbitrage, market efficiency, anomalies, mispricing, short selling, insider trading.

Data Availability: Data are obtained from the public sources as indicated in the text.

I. Introduction

Book income (*BI*) as reported in a firm's financial statements generally differs from taxable income (*TI*) as reported to the tax authorities. This difference is commonly referred to as the book-tax difference (BTD). In this study, we provide a comprehensive analysis of the information contained in BTDs for investors. Specifically, we investigate whether *TI/BI*, and particularly its temporary component, denoted *TEMP/BI*, which reflects greater managerial discretion than *TI/BI*, contain useful information about future earnings growth that is mispriced by investors. We find evidence that *TI/BI* and *TEMP/BI* predict future earnings growth and future abnormal returns. We then examine whether short arbitrageurs and firm insiders trade on personal account in a manner consistent with arbitraging the mispricing of *TI/BI* and *TEMP/BI*. We find evidence consistent with short sellers and insiders profiting from unsophisticated investors' mispricing of *TI/BI* and especially *TEMP/BI*.[1] Finally, we discuss how accounting disclosure for income taxes akin to a "sunshine policy" may reduce mispricing of BTDs by less sophisticated investors and improve capital market efficiency.

Our topic is relevant to researchers in three popular areas, namely accounting for income taxes, earnings management, and capital market anomalies. Graham et al. (2012, 412) note that research on the "accounting for income taxes has become the most active area of accounting research in taxation." Earnings management and accounting anomalies continue to be important research areas because of their direct implications for capital market participants, firm decision makers, and accounting rule-setters.

BTD variables may contain information about future firm fundamentals. Dechow et al. (2010) argue that generally accepted accounting principles (GAAP) restrictions on the choice of

1 For practical reasons, we study only short sellers and insiders as representatives of sophisticated investors, and generally ignore trading behavior of more sophisticated institutional investors such as some hedge funds and the firm itself (via repurchases). Throughout we also refer to unsophisticated investors as general, average, or inattentive investors.

accounting standards often result in book income being an imperfect measure of firm performance. Dhaliwal et al. (2012) take a similar perspective and suggest that book income and taxable income, as alternative performance measures, supplement each other so that together they provide more information about future earnings and firm valuation than each does by itself. This is analogous to how accruals contain information that is incremental to future fundamentals when compared with either book income or cash flows from operations individually.[2] In addition, all else equal, we expect managers to minimize *TI* and maximize *BI* (Hanlon et al. 2005; Badertscher et al. 2009).[3] Thus, high *TI/BI* values in the cross-section likely indicate higher future earnings growth whereas relatively low *TI/BI* values indicate lower earnings growth.

Limited attention, arising from information processing costs or limited cognitive power, can cause BTD variables to be mispriced. Investors with limited attention likely use simple heuristics such as a price/earnings ratio to value the firm, and ignore relevant hard-to-estimate or hard-to-process items (Hirshleifer and Teoh 2003). BTDs, in addition to reflecting firm future fundamentals, may also capture earnings management and/or tax management. Valuing BTDs demands considerable cognitive and processing resources to estimate taxable income and isolate unbiased implications of BTDs for future cash flows. Thus, investors with limited attention and processing resources may misestimate future cash flows and discount inappropriately for the agency incentives of managers to behave opportunistically, and so misprice the firm.

Researchers suggest that the temporary component of BTDs reflects greater managerial discretion than the permanent component (Phillips et al. 2003; Hanlon 2005; Blaylock et al.

2 Taxable income uses a hybrid of cash and accrual bases, and is not simply a proxy for cash flows from operations (Lev and Nissim, 2004, 1045, 1070-72; Hanlon et al., 2005, footnote 14 and p. 414). Thus, we expect BTD variables are not simply proxies for accruals, but because BTD variables are related to accruals, we control for all known accrual-related predictors in our tests.

3 We expect *TI/BI* to average less than 1.0. Weber (2009) reports mean *TI/BI* (denoted *TAX*) of 0.893 for 1984–2004. From Lev and Nissim (2004) we estimate a mean *TI/BI* of 0.791 from their Table 1, Panel B for 1993–2000. We report a mean (median) *TI/BI* of 0.659 (0.724) and 0.567 (0.813) for our short interest and insider trading samples, respectively (Table 2, Panel A).

2012).[4] Evidence in Phillips et al. (2003) suggests temporary BTDs are informative about pre-tax earnings management, and Hanlon (2005) finds that earnings, and specifically accruals, are less persistent when firms have large temporary BTDs and she reports some evidence of anomalous pricing for large temporary BTDs. Thus, analogous to the greater mispricing of discretionary accruals than normal accruals (Teoh et al. 1998a; Xie 2001), we hypothesize that *TEMP/BI* rather than *PERM/BI*, the permanent component of *TI/BI*, is more likely to be mispriced.

Our tests of the predictability of earnings growth and of abnormal stock returns improve on past studies in several ways. Lev and Nissim (2004) are the first to report that *TI/BI* predicts future earnings growth and abnormal stock returns in a pre-SFAS No. 109 period of 1973-1992. However, the predictability for stock returns is statistically significant in the post-SFAS No. 109 period, which spanned 1993-2000 in their sample, only after observations for 1998 are removed. Their Table 5 results indicate that temporary BTDs in their sample do not incrementally predict earnings growth nor abnormal stock returns, before or after SFAS No. 109. Weber (2009) reports stock return predictability for *TI/BI* only in the low analyst following sub-sample, and weaker results under SFAS No. 109, which ends in 2004 in his study; he does not consider *TEMP/BI*.

We systematically examine predictability of future earnings growth and future abnormal returns using *TI/BI, TEMP/BI,* and *PERM/BI*. We estimate *TI* as income tax expense grossed up by the corporate income tax rate minus the change in net operating loss carry-forwards and we estimate *TEMP* as the deferred tax expense grossed up by the corporate tax rate. We multiply *TI* and *TEMP* by one minus the corporate tax rate. *PERM* is the residual after subtracting the temporary component from estimated *TI* (see Section III).

4Hanlon and Heitzman (2010, 131) state that since "…accounting accruals reflect more discretion than the tax laws allow, temporary differences between book and tax income reveal something about discretion in non-tax accounting accruals (bad debt accrual, warranty expense, deferred revenue, etc.)," but this generally does not extend to permanent differences, since they are not driven by the accounting accruals process.

Lev and Nissim (2004) argue that SFAS No. 109, instituted in December 1992, affords managers greater discretion in accounting for deferred taxes and permits greater earnings management.[5] Their sample period ends in 2000 when the dot-com bubble burst. Our sample period (1988–2009) has more post-2000 observations, which reduces the impact of the dot-com bubble period on the analysis. Unlike Lev and Nissim (2004), we also include non-December fiscal year-end firms, which comprise 37 percent of our sample.

Our test design improves on past studies by including size, book-to-market, and momentum as risk controls, and by including abnormal accruals, percent operating accruals, total accruals, tax momentum, and Piotroski's (2000) fundamental *F-Score* as controls for other known accounting predictors of future earnings and returns. It is important to investigate incremental earnings and stock return predictability of the BTD variables beyond accrual-related predictors because BTDs are related to accruals, and accrual-related variables are already known predictors of earnings and returns in the literature.

We examine robustness of results for stock return predictability using both the rolling monthly cross-sectional Fama-MacBeth panel regression method and the characteristics-adjusted portfolio hedge return method. In the latter method, we double sort *TI/BI* or *TEMP/BI* with prior known accounting predictors of returns to estimate incremental hedge profits for *TI/BI* and *TEMP/BI*. These extensive controls and robustness test methods provide more conclusive evidence that our BTD measures have incremental predictability. Finally, we also examine return predictability of BTDs in sub-samples grouped by the intensity of analyst following.

We find robust evidence that *TI/BI* incrementally predicts future earnings growth and future abnormal stock returns in both the pre- and post-SFAS No. 109 periods (hereafter pre-109

5 Deferred income taxes under SFAS No. 109 require estimates of future tax rates and adjustments for deferred tax assets that are unlikely to yield future tax benefits. The greater discretion for estimates allowed by SFAS No. 109 likely imposes greater attention demands on investors when evaluating reported earnings, and so we expect a greater possibility of mispricing of BTD information after 1993 under SFAS No. 109.

and post-109, respectively). A *TI/BI* trading strategy earns 72 basis points per month, which is approximately nine percent annualized, adjusted for standard risk characteristics over our sample period. Further, the magnitude of the *TI/BI* hedge profits is substantial, representing approximately two-thirds that of the abnormal accruals hedge profit, and it contributes an incremental 0.5 percent per month or more than six percent annualized hedge profit over abnormal accruals so that a joint abnormal accruals-*TI/BI* trading strategy earns 1.59 percent per month, which exceeds 20 percent annually. The relatively small overlap in the predictability of *TI/BI* with abnormal accruals is consistent with abnormal accruals alone being an insufficient proxy for all earnings management. Most important, the predictability of both future earnings and future stock returns comes from *TEMP/BI*, the higher discretionary component. Unlike prior weak or ambiguous evidence on *TEMP/BI*, we find strong evidence of earnings and returns predictability for *TEMP/BI* post-109. In particular, the magnitude of *TEMP/BI* hedge profits is almost three times that of *PERM/BI*.

The evidence that *TI/BI* (and *TEMP/BI*) is mispriced motivates the next set of tests on the trading behavior of sophisticated investors and insiders. Sophisticated investors are more likely to attend to BTD information contained in financial statements that is ignored by the average less attentive investor. Therefore, sophisticated investors can profit by short selling overpriced stocks, which are firms with low *TI/BI*, and by construction high *TEMP/BI*, to exploit the overpricing. Thus, we test whether short selling is related to BTD variables.

Short selling is the sale of securities that one does not own but borrows from institutional investors, brokerages, or broker-dealers with the intention of buying back at a later date at a lower price to return the shares to the lenders. Critics argue that short selling encourages traders to manipulate the market, leading to price distortions, increased volatility, and a loss of investor

confidence.[6] Proponents, on the other hand, argue that short selling facilitates market efficiency when short arbitrageurs uncover overpriced stocks and help to correct the mispricing through shorting the firms' stocks. For example, James S. Chanos, a known short seller, was among the first to unearth problems in Enron's financial reports.[7]

Our study of the relation between short selling and BTDs contributes to the literature first by providing indirect confirmation of the primary result that BTDs capture predictive information. Second, we add BTD measures to the list of accounting items academic studies report that short arbitrageurs use to detect likely upwards earnings management and overvaluation.[8] Evidence of mispricing of an accounting item can encourage accounting rule setters to evaluate and improve the effectiveness of current reporting rules, managers to evaluate more effective communication methods to investors, analysts to improve investor understanding of the accounting item, and investors to pay greater attention to the accounting item when valuing the firm. Third, our study also contributes to the asset pricing literature debate concerning the appropriate model for expected returns estimation. Market inefficiency skeptics often challenge tests that demonstrate predictability of abnormal returns on the premise that risk premia have been mismeasured. Evidence that short selling is related to *TI/BI* and *TEMP/BI* helps corroborate the claim that *TI/BI* and *TEMP/BI* are mispriced, not that risk is mismeasured.[9]

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6 In 2005 Amr I. Elgindy was convicted of bribing Federal Bureau of Investigation agents to obtain confidential information and then establishing short positions in companies under investigation by the FBI, and was convicted of leaking the information over the Internet to help ensure that prices of those companies' shares fell after he took short positions (USAO EDNY 2006). Some critics blame short selling for driving some of the leading financial institutions to the edge of collapse in the financial crisis of 2008. See Lauricella (2009), Fidler (2010), SEC (2010), and Thomas (2010) for a description of new short sale regulations.

7 See Chanos (2008). Chanos found the problematic "gain on sale" accounting method for long-term energy trades, in which firms recognize gains up front, estimated as the present value of the future profits from the energy trades made today, and various related-party transaction disclosures in Enron's 1999 Form 10-K and 2000 Form 10-Qs, and profited from the information.

8 Evidence of short arbitrage of accounting-related information includes Dechow et al. (2001) for stocks with low fundamental-to-price ratios; Desai et al. (2006) for restatement announcements; Karpoff and Lou (2010) for SEC enforcement actions; Hirshleifer et al. (2011) for accruals; and Drake et al. (2011) for analyst recommendations.

9 We include all standard asset pricing risk controls in our Fama-MacBeth panel regressions of future returns on the predictor variables, and use alternative test designs, specifically, characteristics-adjusted portfolio hedge profits. We use the standard inference in the large asset pricing literature that the predictor variables are mispriced when we find evidence that the predictor variables incrementally predict future returns with statistical significance. Also see Weber (2009).

We adopt the statistical method in Hirshleifer et al. (2011) who examine short arbitrage of the accrual anomaly using an extensive set of controls for risk and arbitrage costs. We find strong evidence of short arbitrage of *TI/BI* and *TEMP/BI*, consistent with the overpricing of these ratios. Short interest, which measures open short positions of stocks, decreases by an economically large 33 percent moving from the lowest to the highest quintile of *TI/BI*.

A natural question that arises when there is evidence of short arbitrage is how effectively short arbitrage corrects the mispricing of the predictor variables. Hirshleifer et al. (2011) and Stambaugh et al. (2012) view the return difference between the long side and short side of trading strategies as indicative of the severity of short sale constraints. It is harder or more costly to sell a stock short than to go long, so arbitrageurs can more easily exploit underpricing than overpricing. The asymmetry in returns between the long and short sides of an anomaly is therefore a measure of the effectiveness of arbitrage. Following Hirshleifer et al. (2011), we measure the return asymmetry as the negative of the sum of the abnormal returns between the long and short sides of the *TI/BI* and *TEMP/BI* anomalies. We find significantly large return asymmetry for *TI/BI* and *TEMP/BI*, which indicates that mispricing of *TI/BI* and *TEMP/BI* is not fully eliminated because short arbitrage is costly.

Our final set of tests considers insider trading, which has long been a concern to U.S. securities regulators (Pulliam et al. 2010). Insiders are firm employees, such as company officers and directors, and those with privileged access to private information about the firm, including large blockholders, consultants, auditors, and lawyers. Insiders can buy or sell but not short their own firm's stocks on personal account, with some restrictions under federal law to safeguard outside shareholders from unfair advantage because insiders may possess private information about the firm. The prohibitions against insider trading therefore relate to whether insiders trade

on information as yet unknown to outsiders, and past academic studies find that insider trades reflect superior private knowledge.[10]

However, our tests relating BTDs to insider trading are designed to determine whether insider trades take advantage of investors' inability to process the information contained in accounting items related to BTDs efficiently. Since this information is already released to outsiders in the financial reports, we do not test whether insiders trade illegally. Because insiders have private information that substantially resolves uncertainty about future earnings, if the market inefficiently responds to the release of financial statement information, insiders can observe that and profit by trading against the mispricing. We test whether insiders exploit *TI/BI* (*TEMP/BI*) mispricing by net selling firms with low *TI/BI* and high *TEMP/BI* on personal account after financial statements are released. The results are statistically and economically significant and indicate that officers and directors are net sellers of their own firm's equity in firms with low *TI/BI* (high *TEMP/BI*), consistent with managers trading as if to profit from investor mispricing of BTDs. To the best of our knowledge, this is the first study to relate BTD measures to short selling and insider trading.

In sum, our research contributes to research on capital market anomalies, book-tax differences, short selling, and insider trading. Collectively, our evidence suggests that *TI/BI* estimated from reported accounting numbers contains information about future firm performance that general investors do not appear to understand and that short arbitrageurs and managers appear to exploit. A sunshine policy that increases transparency by requiring firms to disclose a reconciliation of book and taxable incomes may, subject to costs and other considerations, benefit the average investor by reducing mispricing of BTD information and so improve resource

10 Research has found persistent evidence of profitable insider trades. Insider trades appear to reflect superior knowledge of future earnings and returns (Piotroski and Roulstone 2005), occur in strategic settings such as following the analyst walk-down of forecasts to beatable levels (Richardson et al. 2004), and occur as early as three-to-nine quarters in advance of breaks in a string of consecutive earnings increases (Ke et al. 2003).

allocation in the capital market. Furthermore, past studies argue that temporary BTDs reflect greater managerial discretion and opportunistic behavior. Showing that predictability of future fundamentals and stock returns are greatest and short arbitrage and insider net sales are highest for *TEMP/BI* is thus consistent with the presence of greater managerial discretion. Further, this raises the possibility that managers may choose financial and tax reporting opportunistically and trade on personal account to profit from the mispricing of BTD information. A sunshine policy as we described would also help constrain such an agency problem.

Section II discusses institutional features of BTDs, short interest, and insider trades. Section III describes data and variable measurement and Section IV reports the research design and results on earnings growth and stock return predictability. Section V presents our short interest analyses, and Section VI reports our insider trading analyses. We discuss additional sensitivity checks on the results in Section VII, and Section VIII concludes.

II. Institutional Features of Book-Tax Differences, Short Interest, and Insider Trading

Book-Tax Differences (BTDs)

Book income is determined by GAAP, whereas taxable income is governed by the Internal Revenue Code, and Section 446(a) states, “taxable income shall be computed under the method of accounting on the basis of which the taxpayer regularly computes his income in keeping his books.” While both book and taxable incomes typically reflect accrual accounting, they are computed for different purposes and therefore there are differences in their respective accounting standards and rules. Financial accounting seeks to provide investors and other stakeholders with information useful for assessing firm value and managerial stewardship whereas taxable income is computed primarily to determine firms’ tax liabilities, with some tax rules serving as incentives for certain types of investments and activities.

Differences between book and tax accounting for various transactions give rise to either permanent or temporary differences. Permanent differences occur when an item affects taxable

income but never affects book income, or vice versa, such as interest revenue on municipal bonds, which increases book income but never affects taxable income. Temporary differences arise when the book and tax treatments for a transaction differ in a given year, but have the same cumulative effect over the life of the firm (ignoring the time value of money). For example, book depreciation is calculated based on the estimated service life of a fixed asset, whereas tax depreciation follows specified depreciation rates.

Temporary BTDs reflect future taxable and deductible amounts. Future taxable amounts create (or increase) deferred tax liabilities and require recognition of deferred tax expense. In contrast, future deductible amounts create (or increase) deferred tax assets and thereby recognize deferred tax benefits; they also reduce deferred tax expense. All else equal, an increase in net deferred tax liabilities is consistent with a firm currently recognizing revenue and/or deferring expense for book purposes relative to its tax reporting such that $BI > TI$. Similarly, an increase in net deferred tax assets, or equivalently, a decrease in net deferred tax liabilities, is consistent with a firm currently recognizing expense and/or deferring revenue for book relative to taxable income so that $BI < TI$. Because temporary BTDs generally reflect greater discretion to manage *BI* relative to *TI*, temporary BTDs are an indicator of earnings management (Phillips et al. 2003). Permanent BTDs are generally less common and less subject to discretion. Because they are unlikely to be driven by the accrual process, they are less likely to reflect significant earnings management (Hanlon and Heitzman 2010). This reasoning leads us to predict that a *TI/BI* pricing anomaly is more likely a result of mispricing of *TEMP/BI*.

Short Selling

Rule 3b-3 of the Securities Exchange Act of 1934 defines a short sale as "any sale of a security which the seller does not own or any sale, which is consummated by the delivery of a security borrowed by, or for the account of, the seller." Thus, to sell short, an investor must borrow shares from another investor who owns them and is willing to lend. Short arbitrage is

risky and costly. The short seller typically leaves cash collateral, equal to 102 percent of the market value of the borrowed shares, with the lender. The lender pays the short seller interest, referred to as the rebate rate, on the collateral. The spread between the rebate rate and the market interest rate on cash funds, referred to as the loan fee, is a direct cost to the short seller. Current regulations allow the lender to recall a loan. If recalled, the borrower covers the short by buying back the shares and returning them to the lender, or reestablishes the short at a higher loan fee. An additional source of risk is a rapid increase in stock price, a 'short squeeze', that can occur when short sellers cover their positions. As this involves buying shares, a short squeeze can cause a further rise in the stock's price and trigger additional margin calls and short covering.[11]

While controversial, short selling is in principle a legitimate trading strategy. It is a way to trade on bad news about a firm, which should help stock prices more fully reflect value-relevant information. As such, it can serve to make share prices more efficient. Short sellers assume the risk that they will be able to buy the stock at a more favorable price than the price at which they sold short, just as investors on the long side risk being able to sell their shares later at a more favorable price than what they paid to purchase them. However, while the maximum loss from going long is the amount invested, the loss is unbounded when shorting a stock.

To test if there is short arbitrage of *TI/BI*, we examine whether short interest is high for firms with low *TI/BI*. Since arbitrage is easier when the supply of loanable shares proxied by institutional ownership is greater, we also test whether the expected negative relation between short interest and *TI/BI* is stronger in high institutional ownership firms. Finally, since temporary BTDs typically reflect more discretion and reverse over time, in contrast to permanent BTDs, we expect greater short arbitrage when *TEMP/BI* is large than when *PERM/BI* is large.

Insider Trading

The U.S. Supreme Court ruled in 1909 that a director who buys his firm's stock when he

11 NASDAQ's short sale rule prohibits members from selling a NASDAQ National Market stock at or below the inside best bid when that price is lower than the previous inside best bid in that stock. The inside best bid is the highest bid price among all competing market makers in a NASDAQ security.

knows the price is about to jump and does not disclose his private information has committed fraud by buying. In 1912–1913, the Pujo Committee failed to regulate insider trading but noted, "the scandalous practices of officers and directors in speculating upon inside and advance information as to the action of their corporations may be curtailed if not stopped" (Dolgopolov 2008). The 1933–34 Securities Acts prohibit short-swing profits by insiders and S.E.C. Rule 10b-5 prohibits fraud related to securities trading. The Insider Trading Sanctions Act of 1984 and the Insider Trading and Securities Fraud Enforcement Act of 1988 provide for penalties for illegal insider trading as high as three times the profit gained/loss avoided from such trading.[12]

In response to the insider trading laws, corporations have voluntarily established guidelines of behavior to safeguard the manager when he trades his firm's stock. These voluntary restrictions often take the form of explicit blackout periods, such as periods prior to earnings announcement dates when insiders are not permitted to trade (Richardson et al. 2004). As a result, insider trades are often concentrated in the several weeks immediately after an earnings announcement when there is no blackout period and information asymmetry between insiders and outsiders is minimized. We thus examine insider trading in the 20-trading day window immediately following earnings releases.

III. Data and Variable Measurement

Measurement of BTD Variables

Following Lev and Nissim (2004), we estimate *TI/BI*, the tax fundamental variable that captures total BTDs, as follows:

$$\frac{TI_{\text{After-tax Taxable Income}}}{BI_{\text{After-tax Book Income}}},$$

where Table 2 summarizes all variable definitions and data sources. After tax book income is measured as net income before extraordinary items. We restrict the sample to include only positive *BI* observations. We estimate after tax taxable income by first grossing up the current

12 Recent high profile criminal convictions of insider trading cases include Martha Stewart in 2003 and Raj Rajaratnam in 2011, who was sentenced to 11 years in jail, the longest term in the history of insider trading convictions (Pulliam and Bray 2011).

portion of the reported income tax expense using *tx*, the top statutory corporate tax rate (i.e., current tax expense / *tx*), subtracting the change in net operating loss carryforwards (Hanlon et al. 2012), and then multiplying by (1 - *tx*):

As in previous research (Gleason and Mills 2002), the current portion of income tax expense is the sum of current federal and foreign income tax expenses, but when either of these amounts is missing, it is the difference between total income tax expense and the deferred portion of the income tax expense. From 1993 onward *tx* equals 35 percent (34 percent for 1988–1992). *TI/BI* ratio values less than one imply that current *TI* is less than current *BI*, and relatively low *TI/BI* values suggest that current *BI* is unlikely to be sustainable.

BTD, the difference between *BI* and *TI*, has a permanent and temporary component:

Following Hanlon (2005), we estimate *TEMP* as:

Deferred tax expense (DTE) is the sum of deferred federal and foreign tax expenses, but when either of these amounts is missing, DTE is the deferred portion of total income tax expense. Under SFAS No. 109, DTE is the change of firms' deferred tax assets and liabilities during the current year. Consistent with the calculation of *TI/BI* on an after tax basis, we multiply by *(1 - tx)* to express *TEMP* on an after-tax basis. We calculate the permanent component as the difference between total BTDs and temporary differences, *PERM = [BI - TI] - TEMP*. By construction, decreases in *TI/BI* reflect increases in *TEMP/BI* and/or *PERM/BI*.[13]

Measurement of Previously Known Accounting Predictors and Other Key Variables

We control for these previously known accounting predictors: abnormal accruals (Teoh et al. 1998a, 1998b), percent operating accruals (Hatzalla et al. 2011), and tax momentum (Thomas

13 Lev and Nissim (2004, 1042) state that "while most previous studies focus on a single tax-related component – temporary differences, permanent differences, or tax accruals –…our tax fundamental captures…all three tax components, creating a potentially powerful earnings quality indicator." Lev and Nissim (2004) also note that Compustat does not provide sufficient information to allow for the estimation of tax accruals. Tax accruals include changes in the deferred tax asset valuation allowance account, tax cushion reserves, and foreign income permanently reinvested. Hence, by construction tax accruals are included in *PERM/BI*. If tax accruals are non-trivial in amount and reflect strategic managerial discretion that investors are unable to discount appropriately, then our *PERM/BI* variable would also predict stock returns from the presence of tax accruals.

and Zhang 2011), in addition to fundamentals-related variables reflected in Piotroski's *F-Score* (Piotroski 2000), and earnings persistence-related variables linked to BTDs (Guenther 2011). First, we compute abnormal accruals using the cross-sectional modified Jones model (Jones 1991; Dechow et al. 1995). Using cash flow statement data we estimate accruals as the difference between income from continuing operations and cash flows from operations (Hribar and Collins 2002), $TAcc_{jt} = EBEI_{jt} - (CFO_{jt} - EIDO_{jt})$, where *TAcc* is total accruals, *EBEI* is income before extraordinary items, *CFO* is cash flows from operations, and *EIDO* is extraordinary items and discontinued operations included in *CFO*. We then estimate the following regression for each two-digit SIC-year combination having at least 15 observations:

$$TAcc_{jt} = \beta_0(1/Assets_{j,t-1}) + \beta_1(\Delta Sales_{jt} - \Delta AR_{jt}) + \beta_2 PPE_{jt} + \nu_{jt} \quad (1)$$

where *Assets* is total assets, *ΔSales* is the change in sales, *ΔAR* is the change in accounts receivable from operating activities, and *PPE* is gross property, plant, and equipment. All variables are scaled by beginning-of-year total assets. Normal accruals and abnormal accruals (*AbnAcc*) are respectively the fitted values and residuals from regression (1).

Second, following Hatzalla et al. (2011), we compute percent operating accruals as the difference between net income and cash from operations, scaled by the absolute value of net income. Third, Thomas and Zhang (2011) find that quarterly tax momentum is associated with anomalous pricing. We modify their *TaxMom* variable to annual data as the difference between tax expense per share in year *t* and year *t-1* scaled by assets per share in year *t-1*.

Fourth, Piotroski's (2000) annual *F-Score* measures a firm's financial condition from a combination of firm fundamental variables, and is estimated as the sum of nine binary indicators:

$$F\text{-}Score = \sum (\text{positive return of assets (ROA), positive CFO, positive change in ROA, negative accruals, negative change in leverage (or no long term debt), positive change in current ratio, no issuance of common equity, positive change in gross margin, positive change in asset turnover}).$$

F-Score ranges from zero to nine and high values indicate superior financial condition. Finally, following Guenther (2011), we control for age, special items, non-operating income, gain or loss reported on the income statement and on the statement of cash flows for the most recent fiscal

year since these variables help explain links between large BTDs and earnings persistence.

Measurement of Short Interest

Short interest reflects the open short positions of stocks with settlements on the last business day on or before the 15th of each month for both NYSE and NASDAQ-listed companies. It normally takes several days to settle a short sale, and the last date when a short sale trade occurs for a monthly record is called the trade date. Prior to June 1995, it was five days before the settlement date; it then became three days. To calculate short interest, for example, for NASDAQ stocks, member firms report monthly to the National Association of Securities Dealers Regulation, Inc.'s (NASDR) Customer Advocacy and Quality Management Department their short positions for all accounts, in shares, warrants, units, ADRs, and convertible preferred stocks. NASDR compiles short interest data for each security and publishes the data on the eighth business day after the reporting settlement date.

Monthly short interest data from NYSE and NASDAQ are available for the period 1988 through 2009. We calculate short interest, *SI%*, in a given firm-year as the short position reported by the NYSE or NASDAQ in the fifth month after the fiscal year-end divided by the number of shares the firm has outstanding as reported on CRSP for the same month, and then multiplied by 100 (Asquith at el. 2005; Hirshleifer et al. 2011). The four-month gap between the fiscal year-end and the short position date ensures that short sellers have the financial report information available to them prior to taking short positions.[14]

Estimation of the Effectiveness of Short Arbitrage Using Return Asymmetry

Short arbitrage is risky, and the cost of a short position is higher than the cost of taking a long position in a stock. The higher constraints to short arbitrage reduce an arbitrageur's ability to correct overpricing relative to underpricing, and therefore create an asymmetry in returns between the long and short sides of an anomaly-related trading position. Following Hirshleifer et

14 Following Hirshleifer et al. (2011), we select the short interest observation in the fifth month only to relate to each firm-year predictor observation (e.g., *TI/BI* in our study). Including all 12 monthly short interest observations induces serial correlation, and averaging across the future 12-month short interest observations imposes an unnecessary assumption that short arbitrageurs maintain their positions for 12-months. When we select the short interest observation in the fourth (sixth) month after the fiscal year-end as alternative time windows, the results remain robust in all of the tests.

al. (2011), we estimate the effectiveness of short arbitrage related to an anomaly using the abnormal return asymmetry, calculated as $-(R_H + R_L)$, which is the negative of the sum of the returns of the top and bottom anomaly quintiles, R_H and R_L, respectively. The return $-(R_H + R_L)$ is interpreted as the mean return on a portfolio that is short on the highest and lowest anomaly quintiles. In the case of *TI/BI*, a larger absolute value of the abnormal returns of the low *TI/BI* portfolio (L) compared with those of the high *TI/BI* portfolio (H) increases $-(R_H + R_L)$. A larger asymmetry is therefore consistent with greater constraints on short selling and therefore less effective short arbitrage. We also control for other costs of arbitrage, as described in Section V.

Measurement of Insider Trading

The insider trading data are from Thompson Financial and contain all insiders' stock purchases, sales, and option exercises reported in Forms 3, 4, and 5 as required by the S.E.C. We only include officers' and directors' stock sales and purchases transaction data.[15] Following Richardson et al. (2004), we measure insider trading activities using *IT%*, a continuous variable computed as the number of shares sold net of purchases by insiders in the 20 trading days after earnings announcements scaled by the number of shares outstanding at fiscal year-end and then multiplied by 100 to express as a percentage.

Sample Selection

We select the sample by first merging the monthly CRSP stock returns file with the monthly short interest file from the NYSE or NASDAQ according to stock ticker and calendar month. We exclude: (1) foreign firms since they likely follow different accounting standards and tax laws; (2) financial services and utility industry firms, which have different reporting requirements; (3) mutual funds, trusts, real estate investment trusts, limited partnerships, and other flow through entities, since these enterprises do not report income taxes; and (4) loss firms, because computing and interpreting *TI/BI* for loss firms is problematic.[16] The sample is then

15 Transaction codes must be "S" or "P" and relationship codes are "CB," "D," "DO," "H," "OD," "VC," "AV," "CEO," "CFO," "CI," "CO," "CT," "EVP," "O," "OB," "OP," "OS," "OT," "OX," "P," "S," "SVP," and "VP."

16 We explore estimating a regression separately for loss firms using the following technique to rescale book income. We add the absolute magnitude of the largest loss observation *c* in each year plus one to the reported book income; i.e., $BI^* = BI + c + 1$. We

matched with the annual Compustat file, where firms must have sufficient Compustat data to compute regression variables, as explained below, and must also have necessary stock returns and volume data from CRSP. As noted above, Thompson Financial is the source for the insider trading data and we obtain data for the same period, 1988–2009, as for our short sales sample.

Descriptive Statistics

The sample selection process is summarized in Table 1, Panel A for the short interest sample, and in Panel B for the insider trading sample. There are 78,320 firm-year observations for the analysis on short interest; a firm-year observation is drawn from the fifth month in the fiscal year. The insider trading sample is comprised of 47,291 observations.

[Insert Table 1]

Table 2, Panel A presents descriptive statistics for the main variables in each sample. The mean (median) *TI/BI* is 0.659 (0.724) for the short interest sample and 0.567 (0.813) for the insider trading sample. The mean (median) *TEMP/BI* for the short interest sample is 0.097 (0.013) and for the insider trading sample is 0.079 (0.012). The mean *PERM/BI* for the short interest (insider trading) sample is 0.201 (0.297) and its median is 0.070 (0.076).[17] These variables thus reflect skewness, which in part motivates our use of ranks as discussed below.

Summary statistics for the control variables are reported in Table 2, Panel B. Both samples are represented by fairly large firms with the insider trading sample (median market cap $839 million) being somewhat larger than the short interest sample (median market cap $579 million). Both samples are generally widely followed with a median of 5.5 analysts for the short interest sample and six for the insider trading sample, and are predominantly held by large institutions with median holdings of 57.8 percent in the short interest sample and 56.5 percent in the insider trading sample. Mean and median percent operating accruals (*%OAcc*) are negative whereas they are positive for abnormal accruals (*AbnAcc*) and approximate about one percent of

use *BI** to form new variables *TI/BI**, *TEMP/BI**, and *PERM /BI** and then use their rank values in the regressions. There is no predictability for earnings growth or for returns, similar to prior literature finding an absence of the accrual anomaly and tax momentum anomaly for the sample of loss firms. Also see Hayn (1995).

17 Using unwinzorized data, [1 - the mean of *TI/BI*] equals [mean of *TEMP/BI* + mean of *PERM/BI*].

average total assets, where the latter is consistent with the average firm managing earnings upwards. *F-Score*, which ranges from zero to nine, averages about five in both samples, which indicates that our samples are representative of the general population of firms where the mid-range of *F-Score* lies between four and six. The mean (median) book-to-market ratio is somewhat higher in the short interest sample, 0.53 (0.44), vis-à-vis the insider trading sample, 0.47 (0.40), suggesting a greater presence of value firms in the short interest sample and higher growth opportunities in the insider trading sample. All financial statement variables are winzorized at the 1st and 99th percentiles.

[Insert Table 2]

IV. Earnings and Stock Return Predictability

Predicting Earnings Growth

We initially test whether BTD variables contain information about future earnings performance in our sample before evaluating whether investors understand this information and value the firm accordingly. We regress earnings growth *G* on *TI/BI*, accruals, and other determinants of earnings growth in the following regression:

$$G_t = a_0 + a_1 R\_TI/BI_{t-1} + a_2 X_{t-1} + a_3 TaxMom_{t-1} + a_4 BM_{t-1} + a_5 E/P_{t-1} + a_6 E_{t-1} + a_7 Div_{t-1} + a_8 RDCAPEX_{t-1} + a_9 LnSize_{t-1} + a_{10} Guenther_{t-1} + \varepsilon_t \quad (2)$$

The dependent variable *G* is measured as the annual change in earnings scaled by the lagged total assets. The key explanatory variable, *R_TI/BI*, is the quintile rank of *TI/BI*. *X* represents the key control variables and contains the set of accrual-related predictor variables, namely abnormal accrual rank *R_AbnAcc*, percent operating accrual rank *R_%OAcc*, and *F-Score* to test for incremental predictability of *TI/BI*. Following Lev and Nissim (2004), we use quintile ranks sorted by industry and year instead of the continuous values for *TI/BI* because the earnings growth relation with BTD variables may be non-linear. A positive a_1 coefficient implies that higher *TI/BI* ranks predict higher future earnings.

We control for other determinants of earnings growth, including size, book-to-market and

earnings-price ratios, prior earnings level, dividends, and *RDCAPEX* (sum of R&D and capital expenditures) from Lev and Nissim (2004), tax momentum from Thomas and Zhang (2011), and persistence-related variables that Guenther (2011) links to BTDs, as detailed in Table 2.[18]

An important extension of our tests is that we separate the effects of temporary versus permanent components of *TI/BI*, *TEMP/BI* and *PERM/BI*, respectively, for the predictability of earnings growth and use their quintiles rank as shown in regression (3):

$$G_t = a_0 + a_1 R\_TEMP/BI_{t-1} + a_2 R\_PERM/BI_{t-1} + a_3 X_{t-1} + a_4 TaxMom_{t-1} + a_5 BM_{t-1} + a_6 E/P_{t-1} + a_7 E_{t-1} + a_8 Div_{t-1} + a_9 RDCAPEX_{t-1} + a_{10} lnSize_{t-1} + a_{11} Guenther_{t-1} + \varepsilon_t \quad (3)$$

The key control variable *X* and all other control variables are defined as before.

For models (2) and (3), we run pooled OLS regressions with year fixed effects and estimate standard errors clustered by firm (Petersen 2009; Gow et al. 2010). Because of important changes in the accounting for income taxes under SFAS No. 109, we include an interaction variable between the BTD variables and an indicator variable *Post109* for 1993 onwards.[19]

Table 3, Panel A reports results from model (2). Consistent with Lev and Nissim (2004), *R_TI/BI* is significantly positive at the $p < 0.01$ level ($t = 10.42$), indicating that a higher *TI/BI* ratio predicts higher future earnings growth. Economically, one-year-ahead earnings growth increases 50 percent from the lowest quintile to the highest quintile of *R_TI/BI*, simultaneously controlling for *AbnAcc*, *%OAcc*, and *F-Score*.[20] Our contribution is that we show that *TI/BI* incrementally predicts earnings growth beyond other accounting-based return predictors (*AbnAcc*, *%OAcc*, and *F-Score*), *TaxMom*, and the Guenther (2011) persistence-related variables. The results also show that the *Post109* interaction variable is insignificant, which suggests that the relation between earnings growth and *TI/BI* is not different pre- and post-109.

Turning to the distinction between temporary and permanent BTDs, Table 3, Panel B shows that *R_TEMP/BI* is significantly negative, whereas *R_PERM/BI* is insignificant, where

18 Hanlon (2005) finds that firms with large temporary BTDs have lower persistence of earnings and accruals.

19 During our pre-109 sample, accounting standards for income taxes were in flux and two different standards (APBO No. 11 (APB 1967) and SFAS No. 96 (FASB 1987)) were permitted.

20 50% = 0.125*(5-1) from the coefficients in Table 3, Panel A.

larger *TEMP/BI* represents smaller *TI/BI*. The absolute magnitude of the coefficient on *TEMP/BI* clearly dominates that for *PERM/BI*. The results also show that the interaction variables with *Post109* are significantly negative only for *TEMP/BI*.[21] Hence, the predictive power of *TI/BI* derives primarily from *TEMP/BI* rather than *PERM/BI* and the predictive power of *TEMP/BI* for future earnings growth is especially strong under SFAS No. 109. Economically, *R_TEMP/BI* gains an additional 26.6 percent predictability of earnings growth in the post-109 period controlling for *AbnAcc*, *%OAcc*, *F-Score*, *TaxMom*, and the Guenther (2011) variables.[22]

[Insert Table 3]

Trading Strategy Profits from Characteristics-Adjusted Hedge Returns

Next, we investigate whether *TI/BI* and *TEMP/BI* predict stock returns in two ways. First, we compute characteristics-adjusted hedge portfolio returns and second, we estimate Fama-MacBeth panel regressions.

We calculate trading strategy profits to long-short portfolios that are sorted based on *TI/BI* and *TEMP/BI* as estimates of the economic significance of the *TI/BI* and *TEMP/BI* anomalies. We form quintile portfolios monthly based on the industry-ranked values of *TI/BI* of the most recent available fiscal year, allowing for a four-month lag between fiscal year-end and the portfolio formation month. We estimate equal-weighted monthly excess returns in the top and bottom quintiles using the portfolio characteristics-adjusted approach in Daniel et al. (1997) to control for firm size, *BM*, and momentum (*MOM*). The excess returns for firms in the long and short quintiles are obtained by subtracting returns to benchmark portfolios in the same size, *BM*, and *MOM* quintiles that the stock belongs to from the firm's returns. We form benchmark portfolios by sequential sorts, first by size quintiles, then within each size quintile further sort into *BM* quintiles, and finally sort within each of the 25 size and *BM* portfolios into quintiles

21 An untabulated F-test (p-value < 0.001) shows the sum of coefficients on *R_TEMP/BI* and *R_TEMP/BI*Post109* (-0.278) is significantly more negative than that for *R_PERM/BI* and *R_PERM/BI*Post109* (-0.012).

22 We calculate this from the coefficients in Table 3, Panel B. For *R_TEMP/BI* = 1, the coefficient in the pre-109 period is (-0.204*1) - (0.074*1*0) = -0.204, in the post-109 period it is (-0.204*1) - (0.074*1*1) = -0.278. Therefore, the percentage change is (post-109 coefficient – pre-109 coefficient) / post-109 coefficient, which is -0.074/-0.278 = 26.62%.

based on firms' past 12-month returns (skipping the most recent month). This yields 125 benchmark portfolios, and the benchmark portfolio returns are calculated by equally weighting returns of the individual firm members in the portfolios.

The *TI/BI* trading strategy is long in the highest *TI/BI* quintile and shorts the lowest *TI/BI* quintile, so the hedge return is quintile five excess returns (R_H) minus quintile one excess returns (R_L). The t-statistics for the hedge returns are based on the time-series of the monthly mean hedge portfolio excess returns. We also compute trading strategy hedge profits based on sorting singly by *AbnAcc*, *%OAcc*, *F-Score*, and *TaxMom* for comparison (untabulated). As in prior literature, the *AbnAcc* (*%OAcc*) hedge profits are earned by going long in the lowest *AbnAcc* (*%OAcc*) portfolio and shorting the highest *AbnAcc* (*%OAcc*) portfolio. Conversely, the *F-Score* (*TaxMom*) hedge profits are earned by going long in the highest *F-Score* (*TaxMom*) portfolio and shorting the lowest *F-Score* (*TaxMom*) portfolio.

Firms are then double-sorted into *TI/BI* quintiles and each of the four alternative accounting predictor (*AbnAcc*, *%OAcc*, *F-Score*, and *TaxMom*) quintiles. For example, the hedge profits are calculated as the excess returns for the portfolio of firms that belong jointly to the bottom *AbnAcc* (*%OAcc*) quintile and the top *TI/BI* quintile minus the excess returns for the portfolio of firms that belong jointly to the top *AbnAcc* (*%OAcc*) quintile and the bottom *TI/BI* quintile. We repeat these hedge profit calculations for *TEMP/BI*, where the hedge strategy is long in the lowest *TEMP/BI* quintile and short in the highest *TEMP/BI* quintile. Given the weak predictability of *PERM/BI*, we do not tabulate the results for *PERM/BI*.

Our hedge portfolio analysis involves monthly rebalancing over the 260 months in the full sample period after allowing for a four-month lag and 72 (188) months in the pre- (post-) 109 sub-period.[23] Table 4, Panel A shows that over the full sample period the hedge profit for *TI/BI* is 72 basis points per month (t = 8.11), or almost nine percent annualized, which is

23 SFAS No. 109 was effective for fiscal years beginning after mid-December 1992. For our pre-109 sample period, we measure hedge returns for the fifth month after the fiscal year-end, beginning with May 1988 and ending with April 1994; for the post-109 period we begin with May 1994 and end with December 2009.

economically significant. The hedge returns for a *TEMP/BI* strategy are also statistically and economically significant, and larger under post-109 at 55 basis points per month (t = 5.21).

Untabulated results show that the single-sort trading strategies for the four alternative predictors are statistically significant and similar in magnitudes to those reported in prior studies. For example, for the full sample period 1988 to 2009 a strategy of going long in the lowest *AbnAcc* quintile and short in the highest *AbnAcc* quintile yields positive average monthly hedge portfolio excess returns of 1.07 percent (t = 7.43). As a basis for comparison, our *TI/BI* hedge strategy of 0.72 percent per month is approximately 67 percent as large as the accruals anomaly.

More relevant for our study, Table 4, Panel B reports the joint sort hedge profits for either *TI/BI* or *TEMP/BI* with abnormal accruals, one of the alternative accounting predictors. A joint strategy sorted on *AbnAcc* and *TI/BI* earns a substantial 1.59 percent per month (t = 5.12). This amount is equivalent to 89 percent of the summed hedge profits (0.72 + 1.07 = 1.79 percent) that could be earned if there were no overlap in the rankings of firms sorted separately by *TI/BI* and by *AbnAcc*. These results, which are qualitatively similar in the pre- and post-109 periods, indicate that the *TI/BI* anomaly is largely distinct and incremental to the accruals anomaly by 52 (i.e., Difference = 159 − 107 = 52 basis points per month or 6.4 percent year, t = 2.29, and p < 0.05 level).[24] This method of estimating incremental hedge profits to a *TI/BI* or *TEMP/BI* strategy over another predictor is conservative because any correlated effects of *TI/BI* or *TEMP/BI* with the *AbnAcc* are ascribed to *AbnAcc* rather than to *TI/BI* or *TEMP/BI*.

The limited overlap between *AbnAcc* and *TI/BI* suggests that abnormal accruals is an insufficient proxy for earnings management. Since *TI/BI* also arises from an accruals process, the results suggest that it is an incremental proxy for earnings management as well. Consistent with Weber (2009), we find in untabulated results that joint *TI/BI* and *AbnAcc* hedge portfolio returns are greater in the presence of no or low analyst following relative to high analysts following

24 The sub-period hedge returns are as follows: for *TI/BI*, 0.75 percent per month pre- and 0.64 percent per month post-109; for *AbnAcc*, 1.14 and 1.03 percent per month, respectively, in the pre- and post-109 periods; and for the joint *AbnAcc* and *TI/BI* portfolio, 1.65 and 1.51 percent per month, respectively, in the pre- and post-109 periods.

(1.74 versus 1.28 percent per month), and the results are qualitatively the same in both the pre- and post-109 periods.

In the post-109 period, the joint strategy for *TEMP/BI* with *AbnAcc* (Table 4, Panel B) yields a monthly return spread of 134 basis points (t = 7.99), which significantly exceeds the hedge returns of 103 basis points from sorting on *AbnAcc* alone by 31 basis points per month. Consistently, the untabulated monthly hedge returns of 87, 90, and 153 basis points, respectively, from the joint strategy for *TEMP/BI* with *%OAcc*, *F-Score*, or *TaxMom* are significantly higher than the untabulated hedge returns from sorting on *%OAcc*, *F-Score*, or *TaxMom* alone, which are 56, 51, and 83 basis points, respectively. Hedge returns are also greater for low or no analyst following vis-à-vis high analyst following (untabulated).[25]

[Insert Table 4]

Figures 1 and 2, respectively, show histograms of average monthly incremental hedge returns aggregated to an annual basis for *TI/BI* over the 22 years of our full sample and for *TEMP/BI* over the 16 years in our post-109 period. The hedge returns are incremental beyond each of the three accounting-based return predictor variables, *AbnAcc*, *%OAcc*, and *F-Score*. For the 22 annual hedge returns for *TI/BI* incremental to *AbnAcc*, 17, or 77 percent are positive; for the *TI/BI* hedge returns incremental to *%OAcc*, 77 percent are positive, and for *F-Score* 86 percent are positive. With respect to *TEMP/BI*, hedge returns are positive and incremental to *AbnAcc* in 13 of the 16 years or 81 percent of the cases in the post-109 period, and 75 percent and 69 percent, respectively, are incrementally positive beyond *%OAcc* and *F-Score*. Hence, the hedge profits are not limited to a small number of years but rather span a significant majority of the sample periods examined. We suggest a limited attention explanation for why the *TI/BI* and *TEMP/BI* anomalies exist in the Introduction and in the Conclusion sections. One explanation of

25 A joint *%OAcc* (*F-Score*; *TaxMom*) and *TI/BI* (*TEMP/BI*) strategy does not change our inferences. Regarding *PERM/BI*, untabulated results indicate small and insignificant excess monthly returns (0.19%, t = 0.94). A joint *AbnAcc* and *PERM/BI* hedge portfolio earns only 0.70 percent, which is less than the 1.03 percent monthly return the accrual anomaly-based hedge earns by itself. Hence, including *PERM/BI* has the effect of lowering the joint hedge return and thus the *PERM/BI* effect is not incremental to the accruals anomaly. A joint *%OAcc (F-Score*; *TaxMom)* and *PERM/BI* strategy does not change our inferences.

why the anomaly persists is that during our sample period there are mandated changes on accounting policies, including the accounting for income taxes, affecting book income as well as changes in tax policies affecting taxable income, along with non-disclosure of taxable income. Learning by investors is difficult with a changing landscape for interpreting the information contained in BTDs about future fundamentals, and so BTD mispricing continues to occur.

[Insert Figures 1 and 2]

Regression Analyses Predicting Stock Returns

The Fama-MacBeth cross-sectional regressions are performed monthly between May 1988 and December 2009. Following Hirshleifer et al. (2011), we allow a minimum four-month lag between the fiscal year-end, to measure the accounting predictor variables, and the start of the predictive return month, and a one-month lag between the measurement of the standard risk control proxies and the return month. Thus, the panel regressions roll forward monthly for 12 months before the annual accounting predictor variables are updated. For example, raw returns, *Ret*, for April 2001 is regressed on *R_TI/BI* measured for the fiscal year ending December 2000, along with the set of control variables that are also for the fiscal year ending December 2000, and the standard asset pricing risk proxies, *LnSize*, *BM*, and 12-month stock return momentum, are updated monthly. Since the dependent variable is monthly returns, there are no overlapping returns across the monthly regressions. We report the time-series average of the monthly coefficient estimates, and use the time-series standard deviations of the coefficients as standard errors to obtain the Fama-MacBeth *t*-statistics. High quintile *R_TI/BI* and low quintile *R_TEMP/BI* are expected to predict positive future returns. The regressions are:

$$Ret_t = a_0 + a_1 R\_TI/BI_{t-1} + a_2 X_{t-1} + a_3 TaxMom_{t-1} + a_4 Guenther_{t-1} + Asset\ Pricing\ Risk\ Controls + \varepsilon_t \quad (4)$$

$$Ret_t = a_0 + a_1 R\_TEMP/BI_{t-1} + a_2 R\_PERM/BI_{t-1} + a_3 X_{t-1} + a_4 TaxMom_{t-1} + a_5 Guenther_{t-1} + Asset\ Pricing\ Risk\ Controls + \varepsilon_t \quad (5)$$

TI/BI Anomaly

Table 5, Panel A presents the results of stock return predictability by *TI/BI* from Fama-MacBeth regressions in model (4). Results are shown for the full sample period and the pre-and

post-109 sub-periods. The results for *TEMP/BI* and *PERM/BI* are in Table 5, Panel B.

R_TI/BI is significantly positive at the $p < 0.01$ level in all three panels of Table 5, Panel A, so *TI/BI* strongly predicts abnormal stock returns incrementally to other accounting predictors and controls, and it does so both pre- and post-109. The proportions of months with positive coefficients are significantly greater than 50 percent at the $p < 0.05$ level or better. Also, the coefficients on *TaxMom* continue to predict stock returns, consistent with past studies.[26, 27]

Our contributions from this table are that we show incremental return predictability over other known return predictors, and that the evidence is unambiguous unlike in Lev and Nissim (2004). Moreover, these results confirm our earlier hedge portfolio results. Both our longer post-109 period, which covers 16 years instead of the seven years in the Lev and Nissim (2004) study that included the dot-com bubble, and the broader sample that includes non-December fiscal year-end firms likely contribute to the more conclusive evidence.

[Insert Table 5]

<u>*TEMP/BI* Anomaly</u>

Based on model (5), Table 5, Panel B shows that the *TI/BI* anomaly is derived from *TEMP/BI*, not *PERM/BI*. *R_TEMP/BI* is negative at the $p < 0.01$ level overall and in the post-109 period, and the proportion of months with negative coefficients on *TEMP/BI* is significantly greater than 50 percent ($p < 0.05$). The market appears to overvalue firms with high *TEMP/BI* and undervalues firms with low *TEMP/BI*. These findings are consistent with *TEMP/BI* being more able to capture managerial discretion and so is a less noisy proxy for both earnings and tax management than *PERM/BI*. A possible explanation for the return predictability of *R_TEMP/BI* being present only post-109 is the use of more forward-looking information under SFAS No. 109. However, we note that we have relatively fewer observations, and therefore a lower power test, for the pre- relative to the post-109 period. As before, *TaxMom* and the accounting-related

26 Thomas and Zhang (2011) show that tax expense momentum and *TI/BI* are only weakly related and that each is incremental to the other in predicting future stock returns.

27 When we control *AbnAcc*, *%OAcc*, and *F-Score* simultaneously, *%OAcc* significantly predicts stock returns but not *AbnAcc* and *F-Score* because of multicolinearity. We also control *AbnAcc*, *%OAcc*, and *F-Score* individually in untabulated robust tests. Each of them continues to predict stock returns, consistent with past studies.

predictors continue to predict returns. Our contribution over past studies is that we provide strong evidence of a *TEMP/BI* anomaly that is incremental to prior accounting-based anomalies under the current accounting standard for income taxes.

Together, the results support the conclusion that there is a *TI/BI* anomaly, and the source of the anomaly is primarily due to *TEMP/BI.* Temporary BTDs reflect less persistent accruals because of likely opportunistic managerial decisions enabled by the generally greater discretion that managers have in reporting book income relative to taxable income. *TEMP/BI*'s information regarding future earnings is therefore commonly not well understood by the general investor.

V. Short Arbitrage of *TI/BI* (and *TEMP/BI*) Anomaly

Empirical Models

We turn now to our analysis of short selling and total BTD-related pricing anomalies. Short sellers are described as sophisticated investors (Diamond and Verrecchia 1987), and short arbitrage of overpriced stocks can be viewed as a response by these sophisticated investors to overoptimistic beliefs of other investors (Drake et al. 2011).

Short sellers are expected to use all available information, including sell-side financial analysts' information in their trades. It is possible that sell-side analysts reflect the market's information about the stock, with short sellers taking the opposite position from the rest of the market. If so, when market expectations are very positive, as reflected in very high forecasts, stock price will be too high, and low *TI/BI* values would be especially good indicators of profit opportunities for short sellers, so we would expect to observe high short interest. Evidence of a relation between short interest and *TI/BI* as well as *TEMP/BI* serve to triangulate our results and represent strong evidence that BTDs are mispriced by investors and are not a proxy for risk. The overpricing of BTDs may be from investors overestimating future cash flows implied by BTDs or underestimating the riskiness of future cash flows implied by BTDs.[28]

28 Note that higher risk tolerance of short sellers does not lead to greater shorting of firms with high *TI/BI* and low *TEMP/BI*. Consider the Sharpe CAPM world. More risk tolerant investors move up the market line and so will weight their portfolio towards a greater proportion of the assets in positive net supply, that is the market portfolio, and less in the risk-free asset. Hence,

Based on prior research, we estimate regression (6) to test the relation between short interest and *TI/BI* as to whether short sellers arbitrage the book-tax anomalies:

$$SI\%_t = a_0 + a_1 R\_TI/BI_{t-1} + a_2 HighAbnAcc_{t-1} + a_3 High\%OAcc_{t-1} + a_4 LowF_{t-1} + a_5 TaxMom_{t-1} + a_6 BM_t + a_7 Turnover_t + a_8 lnIO_t + a_9 MOM_t + a_{10} STD_t + a_{11} Exchg_t + a_{12} lnAF_t + a_{13} Leverage_t + a_{14} lnSize_t + a_{15} Guenther_{t-1} + \varepsilon_t \quad (6)$$

SI% is defined in Section III. If short sellers understand and use *R_TI/BI* as an indicator of future earnings, then short interest in a firm's shares should decrease with *R_TI/BI*. Hence, we expect that $a_1 < 0$ in regression (6). To test for short arbitrage of the BTD components, we replace *R_TI/BI* with *R_TEMP/BI* and *R_PERM/BI* and expect a positive coefficient on *R_TEMP/BI*.

As before, we simultaneously control for *TaxMom* and the set of accrual-related predictors, *AbnAcc*, *%OAcc*, and *F-Score*. Since short sellers accumulate positions in firms with high levels of accruals and low fundamentals (Hirshleifer et al. 2011; Dechow et al. 2001), we define *HighAbnAcc* and *High%OAcc*, respectively, as indicator variables that equal one if a firm-year is in the highest *AbnAcc* or *%OAcc* quintile. Following Piotroski and So (2012), we define *LowF* as an indicator variable that equals one if a firm-year *F-Score* is between zero and three.[29]

We control for other determinants and costs of short selling in the short interest regression based on previous research (Dechow et al. 2001; Jones and Lamont 2002; D'Avolio 2002; Asquith et al. 2005; Nagel 2005; Ali and Trombley 2006; Desai et al. 2006; Cohen et al. 2007; Karpoff and Lou 2010; Hirshleifer et al. 2011). A key control variable is institutional ownership, since institutions are the main source of supply of loanable shares to short arbitrageurs. Hence the level of institutional holdings, *IO*, is an important proxy for ease of short selling, and short selling is positively associated with *IO*. We obtain the institutional ownership data from the CDA/Spectrum database, and as in prior research compute *IO* as the total number of a firm's shares held by institutions divided by the total number of shares outstanding at the end of a quarter and multiplied by 100 to express as a percentage. We match monthly *SI%* with

they actually will not go short on the positive net supply of assets that have high risk just to bear more risk. They would go short on high-risk assets only if they think these assets are overpriced.

29 Because the accrual-related predictors are highly correlated, we do not interpret the coefficients on these variables for whether there is short arbitrage of these predictors, and they are included only as controls.

IO of the latest available quarter, and use log of *IO* in the multivariate analysis.

Institutional ownership is an imperfect measure of the arbitrage costs. A better measure would be the rebate rate that shorts have to pay, but such data are unavailable. Therefore, we further control for ease of short selling using two other proxies, which are the number of analysts following a firm, *AF*, and a firm's financial leverage, *Leverage*. We compute *AF* and *Leverage*, respectively, as the log of (*1 + AF*) and total long-term debt divided by total assets. In addition, short arbitrage is more active among liquid and volatile stocks. We use firm size and share turnover to proxy for liquidity. *Size* is previously explained, and *Turnover* is monthly stock trading volume in millions of dollars divided by firm size. We measure volatility as the standard deviation of residuals for daily market-adjusted returns, *STD*, estimated over a one-year window ending one-month prior to the month of the reported short position. High short interest is also expected to be associated with low *BM* firms and in stocks with low *MOM*. We also include a 0/1 indicator variable for stock exchange, where *Exchg* = one for NYSE, to further control for any factors associated with ease or constraints on short arbitrage that are not picked up by the included controls. For model (6), we run pooled OLS regressions with year fixed effects and estimate standard errors clustered by firm (Petersen 2009; Gow et al. 2010).[30]

Multivariate Analyses of Short Interest on *TI/BI*, *TEMP/BI*, and *PERM/BI*

Table 6, Panel A presents the regression results of model (6) for short arbitrage of *TI/BI*. First, consistent with prior literature, *SI*, the dependent variable, is positively and significantly related to *Leverage*, *lnAF*, *lnIO*, *lnSize*, *Turnover*, and *STD* (untabulated). These results are consistent with greater short interest when the supply of loanable shares is more ample, among more liquid stocks, and among more volatile stocks. Short selling is also more active among low momentum and low book-to-market stocks and firms with high abnormal accruals.

30 Table 2, Panel A indicates that mean monthly short interest (*SI%*) is 3.025 (median = 1.107) percent of shares outstanding, similar in magnitude to evidence in prior literature (e.g., Hirshleifer et al. 2011). Untabulated results indicate that mean (median) *SI%* is 0.963 (0.248) percent in the pre-109 period and grows to 3.147 (1.281) percent post-109; correspondingly, there is significant growth in other *SI%* determinants (untabulated), including *IO*, firm size, analyst following, *Leverage*, *STD*, and *Turnover*, and declines in *BM* and *MOM*, as expected.

With regard to *R_TI/BI*, as predicted the results in Table 6, Panel A reveal that its coefficients are negative and significant at the $p < 0.01$ level controlling for *AbnAcc*, %OAcc, *F-Score*, and *TaxMom*. On average, short interest increases 32.8 percent from the highest to the lowest *R_TI/BI* quintile, which is economically significant when compared to the mean, 3.03 percent, or median, 1.11 percent, for short interest in the sample.[31] Hence, the effect of *R_TI/BI* on *SI%* is incremental to the effects documented in prior literature (Dechow et al. 2001; Jones and Lamont 2002; D'Avolio 2002; Asquith et al. 2005; Nagel 2005; Hirshleifer et al. 2011).[32] The results suggest that short sellers appear to exploit information in the tax fundamental and accumulate larger positions when the firms' *TI/BI* values are lower. The lower the *TI/BI* ratio, the more likely a firm's current earnings will not persist into the future but rather will fall. Hence, as expected, low *R_TI/BI* firms are attractive to short sellers who seek to exploit the slow impounding of *TI/BI* information into share prices.

In Table 6, Panel B we examine whether short interest is more strongly related to *R_TEMP/BI* or *R_PERM/BI*. The coefficients of *R_TEMP/BI* are positive and significant ($p < 0.05$ level or better), while the coefficients of *R_PERM/BI* are insignificant. The coefficient on the interaction of *R_TEMP/BI* and *Post109* is also significantly positive. Overall, the results are consistent with *TEMP/BI* being the main driver of the relation between *SI%* and *TI/BI*.

[Insert Table 6]

Evidence that there is short arbitrage of *TI/BI* does not necessarily imply that the arbitrage eliminates the *TI/BI* anomaly. Short arbitrage is costly and risky, as explained in Section II, and therefore short sellers will arbitrage to the point where the expected profits equal the costs. We evaluate whether short arbitrage of *TI/BI* is greater when there is greater ease of arbitrage, such as where the supply of loanable shares is greater, by interacting *TI/BI* with *IO*. Untabulated results indicate that the coefficient on *R_TI/BI* is -0.089 ($t = -3.58$, $p < 0.01$),

31 The 32.8 percent is calculated as follows: 0.082*(5-1) = 0.328.

32 We find in untabulated results that including analyst forecast errors in the *SI%* regression does not change our inferences. We also use a change regression specification and our results are robust to potential missing variable bias.

indicating that when institutional ownership is as low as one percent, which is *lnIO* = 0, there is still evidence of short sellers exploiting BTDs. Thus, the effect of *TI/BI* on short interest is significantly greater when shares are more easily borrowed, as proxied by institutional shareholding. Moreover, the coefficient on *R_TI/BI*lnIO* is a significant -0.006 ($t = -2.07$, $p < 0.05$), as predicted, implying that as the constraint on loanable shares is relaxed, there is an increase in short selling targeting low *TI/BI*. In addition, the interactive variable *R_TEMP/BI*lnIO* also indicates that there is significantly greater short selling of temporary BTDs when there is higher availability of loanable shares.

Return Asymmetry for *TI/BI* and *TEMP/BI* Anomalies

As discussed earlier, we examine the effectiveness of short arbitrage in correcting mispricing by estimating the return asymmetry measure, $-(R_H + R_L)$, between the short and long sides of the *TI/BI* and *TEMP/BI* anomalies. A larger absolute value of the excess returns of the short portfolio, compared to that of the long portfolio, will increase the magnitude of $-(R_H + R_L)$. For *TI/BI*, Table 4, Panel A indicates the return asymmetry in the full sample is an economically significant 42 basis points per month ($t = 4.05$, $p < 0.01$). That is, the negative mean abnormal return of -57 basis points per month in the lowest *TI/BI* quintile is almost four times as large in absolute value as the positive mean return of 15 basis points per month among firms in the highest *TI/BI* quintile. For comparison, the accruals anomaly in our sample presents a returns asymmetry of 49 basis points per month, similar to Hirshleifer et al. (2011).

The return asymmetry for the joint *AbnAcc* and *TI/BI* trading strategy in Table 4, Panel B is significant and even larger, 71 basis points per month ($t = 3.58$, $p < 0.01$). The negative mean abnormal return of -115 basis points per month for firms in quintile one of *TI/BI* and quintile five of *AbnAcc* is 2.6 times larger in absolute value than the mean return of 44 basis points per month for the portfolio of firms in the top quintile of *TI/BI* and bottom quintile of *AbnAcc*.

Regarding *TEMP/BI*, Table 4, Panel A indicates that the return asymmetry is a substantial

17 basis points per month, which is significant at the $p < 0.01$ level ($t = 2.74$). The negative mean abnormal return of -32 basis points per month in the high *TEMP/BI* quintile is more than twice as large in absolute value as the mean return of 15 basis points per month among firms in the lowest *TEMP/BI* quintile. The return asymmetry for the joint *AbnAcc* and *TEMP/BI* strategy in Table 4, Panel B is 50 basis points per month, which is significant at the $p < 0.01$ level ($t = 2.98$). In sum, the evidence suggests that while *TI/BI* and *TEMP/BI* mispricing effects are arbitraged, substantial mispricing of these variables remains, likely due to high costs of arbitrage.[33]

VI. Insider Trading Analyses

Empirical Models

Based on prior research, we estimate regression (7) to test the relation between insider trading and *TI/BI* as to whether insiders exploit the BTD anomalies:

$$IT\%_t = a_0 + a_1 R\_TI/BI_{t-1} + a_2 X_{t-1} + a_3 TaxMom_{t-1} + a_4 lnSize_{t-1} + a_5 RDCAPEX_{t-1} + a_6 G_{t-1} + a_7 Litigation_t + a_8 lnAF_{t-1} + a_9 lnIO_{t-1} + a_{10} STD_{t-1} + a_{11} MOM_t + a_{12} BM_{t-1} + a_{13} Guenther_{t-1} + \varepsilon \quad (7)$$

If insiders use *R_TI/BI* as an indicator of future earnings, their net sales of their firms' shares should decrease with *R_TI/BI* and increase with *R_TEMP/BI*. We use *IT%* as defined in Section III and expect that $a_1 < 0$ in regression (7). To test for insider trading on the BTD components, we replace focus on *R_TEMP/BI* and *R_PERM/BI* and expect a positive coefficient on *R_TEMP/BI*. In addition to other accounting-based predictor variables, *X* and *TaxMom*, and the Guenther variables, we control for other factors affecting insider trading (Thevenot 2011; Huddart and Ke 2007; Richardson et al. 2004; Roulstone 2003). *Litigation* is an indicator variable that equals one if a firm is in industries with high litigation risks,[34] and *RDCAPEX*, our investment variable, and *G*, earnings growth, are as previously defined. We also include controls from the short interest model, size, *BM*, *IO*, *STD*, and *MOM*. We estimate model (7) as a pooled OLS regression with year fixed effects, and standard errors are clustered by firm to address potential

33 Return asymmetry analyses using joint sorts with *%OAcc*, *F-Score*, and *TaxMom* do not change our inferences.

34 High litigation risk 4-digit SIC industries are 2833, 2836, 3570, 3577, 3600–3674, 5200–5961, and 7370–7374.

serial correlation problems (Petersen 2009; Gow et al. 2010).

Insider Trading Results

Table 7 displays the insider trading results. As predicted, the coefficients on *R_TI/BI* in Panel A are negative and significant at the $p < 0.01$ level for *IT%* in both regressions. The magnitude is also economically significant. Net insider sales scaled by total shares outstanding of low *R_TI/BI* firms are 1.476 times higher controlling for other accounting predictors than that for high *R_TI/BI* firms.[35] The results suggest that insiders also exploit information in the tax fundamental and sell larger positions when their firms' *TI/BI* values are lower. Hence, as expected, low *R_TI/BI* firms are attractive to insider net selling, and thus it appears that insiders act as if they exploit the slow impounding of *TI/BI* information into share prices.

[Insert Table 7]

Decomposing *TI/BI* into its temporary and permanent BTD components reveals, in Table 7, Panel B, that the coefficients on *R_TEMP/BI* are positive and significant at the $p < 0.05$ level or better, but not the permanent component. Consistent with the short interest results, the positive relation between *IT%* and *TEMP/BI* is significantly stronger under SFAS No. 109.[36]

VII. Additional Sensitivity Analysis

In this section, we summarize untabulated results for additional sensitivity checks of our main results. We initially relax the assumption of using the highest U.S. corporate income tax rate for all firms. First, we drop observations having a ratio of foreign income-to-domestic plus foreign income greater than 50 percent, since firms with extensive foreign operations could imply differing tax rates, and also drop observations having a ratio of R&D expenditures-to-total sales in the upper quartile, which implies a high likelihood of R&D tax credits (Ayres et al. 2009). All results are qualitatively similar, except *PERM/BI* is significant ($p < 0.1$). Second, we

35 The spread of 1.476 is between the lowest quintile *TI/BI*, -0.369*1, and the highest quintile of *TI/BI*, -0.369*5 from Table 7, Panel A of insider net sales of their firms' own stock as a fraction of total shares outstanding, equivalent to one standard deviation (1.3458) of scaled insider net sales.

36 Using a 0/1 indicator that equals 1 if insiders are net sellers within 20 days after earnings announcements, instead of *IT%*, yields the same inferences in the *TI/BI* and component analyses (untabulated). The results are also robust using change in *IT%*.

compute *TI* and *BI* on a pre-tax basis (Hanlon et al. 2012), and our inferences are unchanged. We also exclude observations from 2007–2009 when FASB Interpretation No. 48, FIN 48, *Accounting for Uncertainty in Income Taxes* (2006), was in effect during our sample period. In cases where it is unlikely aggressive tax positions will be upheld, the firm's reported current tax expense will not be reduced by the uncertain tax benefits. If so, our estimate of *TI* from the reported current tax expense will overstate *TI*.[37] Our inferences are unaffected.

Rather than using the ratio forms for BTD variables, we compute the difference, *BI-TI*, and scale total, temporary, and permanent BTDs by lagged total assets as alternative measures of *TI/BI, TEMP/BI* and *PERM/BI*. The results largely support our inferences.[38]

We investigate the robustness of our results to controlling for asset-scaled total accruals or cash flows from operations instead of abnormal accruals. Replacing *R_AbnAcc* with the ranks of total accruals does not qualitatively impact our results except the coefficient on *R_PERM/BI* in the short interest regression becomes marginally significant when we substitute high ranked total accruals for *HighAbnAcc*. Controlling for cash flows from operations also does not affect any of our inferences regarding *TI/BI* or *TEMP/BI* but we obtain a significant result for the coefficients on *PERM/BI* in the earnings growth, short interest, and insider trading regressions.

In the short interest regression, we replace the accounting-based predictors with the 11 short interest determinants used by Drake et al. (2011). Our results for *R_TI/BI*, *R_TEMP/BI*, and *R_PERM/BI* are unaffected.[39] Finally, we consider institutional investors as another group of sophisticated investors. We replace *IT%* with the change in institutional holdings from the end of the quarter preceding an annual earnings announcement to the end of the quarter following the annual earnings announcement. The results are qualitatively identical to those in Table 7.

VIII. Summary and Conclusions

37 We thank Bob Lipe for providing us with a detailed example illustrating possible increased measurement error.

38 We also calculate these asset-scaled BTD measures on a pre-tax basis instead of an after-tax basis.

39 We also augment the insider trading regression with the Drake et al. (2011) variables and again our key variable results are unchanged.

In this study, we provide a comprehensive analysis of the predictability of future earnings growth and future abnormal returns by the BTD ratio *TI/BI* (as in Lev and Nissim 2004) and its temporary and permanent components. Hanlon and Heitzman (2010) and Graham et al. (2012) view the results in Lev and Nissim (2004) as mixed or weak. We improve on past studies in various ways. We use a larger sample that covers a longer time period post-109 so that our sample period is not dominated by the dot-com bubble years. We also include firms with non-December year-ends. Our improved test designs feature rolling monthly cross-sectional Fama-MacBeth panel regressions, joint sorts to estimate conservative *incremental* hedge profits from other accounting predictors, and extensive risk controls. By employing an extensive set of known accruals-related predictors, including abnormal accruals, percent operating accruals, *F-Score*, tax momentum, and Guenther variables as controls we demonstrate *incremental* predictability of BTDs. Our results provide strong evidence of a *TI/BI* pricing anomaly and that the temporary BTD component, *TEMP/BI*, is the primary source; the latter is a new result in the literature.

In addition, we provide new evidence from short selling and insider trading that suggests that sophisticated investors and managers exploit their superior knowledge of BTD information about future cash flows. To our knowledge, this is the first study to relate BTDs to short selling and insider trading. The evidence of short arbitrage presents additional direct evidence for BTD mispricing. Extending Weber's (2009) finding for *TI/BI*, we find that the *TEMP/BI* anomaly is also stronger when fewer financial analysts follow a firm.

Investor mispricing of BTDs can be explained by the limited attention theory for accounting anomalies (Hirshleifer and Teoh, 2003). Investors with limited attention may ignore value-relevant information contained in BTDs, are unlikely to discount appropriately for agency incentives, and so are likely to misvalue the firm. Investor limited attention can derive either from limited information processing resources or from limited cognitive power. Taxable income

item is not directly reported in the financial statements and requires investor time and effort to obtain and process. Inattentive investors therefore may miss the incremental insight about future fundamentals that can be inferred by considering both taxable income and book income together, beyond what can be learned by observing only book income. In addition to firm future fundamentals, temporary BTDs particularly can contain information about agency issues related to earnings management and/or tax management that are missed by inattentive investors. In sum, valuing BTDs, either overall or separately for the temporary and permanent components, demands considerable cognition and processing resources.

We provide strong evidence that the capital market misvalues *TI/BI* and *TEMP/BI*. Disclosure of a reconciliation of taxable income to book income, similar to one that is included in the corporate income tax return (Mills and Plesko 2003), may increase salience of BTD information and reduce uncertainty about the estimates of total BTDs and its major components. Since investors with limited attention are less likely to overlook salient information, they would be less likely to ignore BTD information about future fundamentals. A big benefit of such a "sunshine policy" would likely be reduced BTD mispricing and improved capital market resource allocation. Of course, we recommend further study of the costs and unintended consequences of such a sunshine policy before recommending it to policy makers for adoption.

REFERENCES

Accounting Principles Board (APB). 1967. *Accounting for Income Taxes.* Opinions of the Accounting Principles Board No. 11. American Institute of Certified Public Accountants. New York, NY: AICPA.

Ali, A., and M. Trombley. 2006. Short sales constraints and momentum in stock returns. *Journal of Business, Finance, and Accounting* 33: 587–615.

Asquith, P., P. Pathak, and J. Ritter. 2005. Short interest, institutional ownership, and stock returns. *Journal of Financial Economics* 78: 243–276.

Ayres, B., X. Jiang, and S. LaPlante. 2009. Taxable income as a performance measure: The effects of tax planning and earnings quality. *Contemporary Accounting Research* 26 (1): 15–54.

Badertscher, B., J. Phillips, M. Pincus, and S. Rego. 2009. Earnings management strategies and the trade-off between tax benefits and detection risk: To conform or not to conform? *The Accounting Review* 84 (1): 63–97.

Blaylock, B., T. Shevlin, and R. Wilson. 2012. Tax avoidance, large positive book-tax differences, and earnings persistence. *The Accounting Review* 87 (1): 91–120.

Chanos, J. 2008. Short sellers keep the market honest. Wall Street Journal (September 22).

Cohen, L., K. Diether, and C. Malloy. 2007. Supply and demand shifts in the shorting market. *Journal of Finance* 62 (5): 2061–2096.

D'Avolio, G. 2002. The market for borrowing stock. *Journal of Financial Economics* 66: 271–306.

Daniel, K., M. Grinblatt, S. Titman, and R. Wermers. 1997. Measuring mutual fund performance with characteristic-based benchmarks. *Journal of Finance* 52 (3): 1035–1058.

Dechow, P., R. Sloan, and A. Sweeney. 1995. Detecting earnings management. *The Accounting Review* 70 (2): 193–225.

———, A. Hutton, L. Meulbroek, and R. Sloan. 2001. Short-sellers, fundamental analysis and stock returns. *Journal of Financial Economics* 61: 77–106.

———, W. Ge, and C. Schrand. 2010. Understanding earnings quality: A review of the proxies, their determinants and their consequences. *Journal of Accounting and Economics* 50: 344–401.

Desai, H., S. Krishnamurthy, and K. Venkataraman. 2006. Do short sellers target firms with poor earnings quality? Evidence from earnings restatements. *Review of Accounting Studies,* 11: 71–90.

Dhaliwal, D., H. Lee, M. Pincus, and L. Steele. 2012. Taxable Income Properties, predictability of book income, and firm risk. Working paper, University of Arizona, Lehigh University, University of California, Irvine, and University of Connecticut.

Diamond, D., and R. Verrecchia. 1987. Constraints on short-selling and asset price adjustment to private information. *Journal of Financial Economics* 18: 277–311.

Dolgopolov, S. 2008. Insider trading. *The Concise Encyclopedia of Economics.* Library of Economics and Liberty, http://www.econlib.org/library/Enc/InsiderTrading.html.

Drake, M., L. Rees, and E. Swanson. 2011. Should investors follow prophets or bears? Evidence on the use of public information by analysts and short sellers. *The Accounting Review* 86: 101–130.

Fama, E., and J. MacBeth. 1973. Risk, return and equilibrium: Empirical tests. *Journal of Political Economy* 81: 607–636.

Fidler, S. 2010. EU draft rules target short selling. *Wall Street Journal* (September 15).

Financial Accounting Standards Board (FASB). 1987. *Accounting for Income Taxes.* Statement of Financial Accounting Standards No. 96. Financial Accounting Standards Board. Norwalk, CT: FASB.

———, 1992. *Accounting for Income Taxes*. Statement of Financial Accounting Standards No. 109. Financial Accounting Standards Board. Norwalk, CT: FASB.

———, 2006. *Accounting for Uncertainty in Income Taxes, and Interpretation of FASB Statement No. 109.* FASB Interpretation No. 48. Financial Accounting Series. Norwalk, CT: FASB.

Gleason, C., and L. Mills. 2002. Materiality and contingent tax liability reporting. *The Accounting Review* 11 (2): 317–342.

Gow, I., G. Ormazabal, and D. Taylor. 2010. Correcting for cross-sectional and time-series dependence in accounting research. *The Accounting Review* 85 (2): 483–512.

Graham, J., J. Raedy, and D. Shackelford. 2012. Research in accounting for income taxes. *Journal of Accounting and Economics* 53: 412–434.

Guenther, D. 2011. What do we learn from large book-tax differences? Working paper, University of Oregon.

Hanlon, M. 2005. The persistence and pricing of earnings, accruals, and cash flows when firms have large book-tax differences. *The Accounting Review* 80 (1): 137–166.

———, S. LaPlante, and T. Shevlin. 2005. Evidence for the possible information loss of conforming book income and taxable income. *Journal of Law and Economics* 48 (2): 407–442.

———, and S. Heitzman. 2010. A review of tax research. *Journal of Accounting & Economics* 50: 127–178.

———, G. Krishnan, and L. Mills. 2012. Audit fees and book-tax differences. *Journal of the American Taxation Association* 34: 55–86.

Hatzalla, N., R. Lundholm, and E. Van Winkle. 2011. Percent accruals. *The Accounting Review* 86: 209–236.

Hayn, C. 1995. The information content of losses. *Journal of Accounting & Economics* 20: 125–153.

Hirshleifer, D., and S. Teoh. 2003. Limited attention, information disclosure, and financial reporting. *Journal of Accounting & Economics* 36: 337–386.

Hirshleifer, D., S. H. Teoh, and J. Yu. 2011. Short arbitrage, return asymmetry and the accrual anomaly. *Review of Financial Studies* 24 (7): 2429–2461.

Hribar, P., and D. Collins. 2002. Errors in estimating accruals: Implications for empirical research. *Journal of Accounting Research* 40 (1): 105–134.

Huddart, S., and B. Ke. 2007. Information asymmetry and cross-sectional determinants of insider trading. *Contemporary Accounting Research* 24 (1): 195–232.

Jones, J. 1991. Earnings management during import relief investigation. *Journal of Accounting Research* 29 (2): 193–228.

Jones, C., and O. Lamont. 2002. Short sale constraints and stock returns. *Journal of Financial Economics* 66: 207–239.

Karpoff, J., and X. Lou. 2010. Short sellers and financial misconduct. *Journal of Finance* 40 (1): 1879–1913.

Ke, B., S. Huddart, and K. Petroni. 2003. What insiders know about future earnings and how they use it: Evidence from insider trades. *Journal of Accounting and Economics* 35 (3): 315–346.

Lev, B., and D. Nissim. 2004. Taxable income, future earnings, and equity values. *The Accounting Review* 79 (4): 1039–1074.
Lauricella, T. 2009. Lehman Legacy Alters Global Markets. *Wall Street Journal* (September 14).
Mills, L., and G. Plesko. 2003. Bridging the reporting gap: A proposal for more informative reconciling of book and tax income. *National Tax Journal* 56 (4): 865–894.
Nagel, S. 2005. Short sales, institutional investors and the cross-section of stock returns. *Journal of Financial Economics* 78: 277–309.
Petersen, M. 2009. Estimating standard errors in finance panel data sets: comparing approaches. *Review of Financial Studies* 22 (1): 435–480.
Phillips, J., M. Pincus, and S. Rego. 2003. Earnings management: New evidence based on deferred tax expense. *The Accounting Review* 78 (2): 491–521.
Piotroski, J. 2000. Value investing: The use of historical financial statement information to separate winners from losers. *Journal of Accounting Research* 38 (Supplement): 1–41.
———, and D. Roulstone. 2005. Do insider trades reflect both contrarian beliefs and superior knowledge about future cash-flow realizations? *Journal of Accounting & Economics* 39 (1): 55–82.
———, and E. So. 2012. Identifying expectation errors in value/glamour strategies: A fundamental analysis approach. *Review of Financial Studies* 25 (9): 2841–2875.
Pulliam, S., M. Rothfeld, J. Strasbur, and G. Zuckerman. 2010. U.S. in vast insider trading probe. *Wall Street Journal* (November 20).
———, and C. Bray. 2011. Trader draws record sentence. *Wall Street Journal* (October 13).
Richardson, S., S. H. Teoh, and P. Wysocki. 2004. The walkdown to beatable analyst forecasts: The roles of equity issuance and insider trading incentives. *Contemporary Accounting Research* 21 (4): 885–924.
Roulstone, D. 2003. The relation between insider-trading restrictions and executive compensation. *Journal of Accounting Research* 41 (3): 525–553.
Securities and Exchange Commission (SEC). 2010. SEC Approves short selling restrictions. Press release (February 24), http://www.sec.gov/news/press/2010/2010-26.htm.
Stambaugh, R., J. Yu, and Y. Yuan. 2012. The short of it: Investor sentiment and anomalies. *Journal of Financial Economics* 104: 288–302.
Teoh, S. H., I. Welch, and T. Wong. 1998a. Earnings management and the long-run market performance of the initial public offering. *Journal of Finance* 53 (6): 1935–1974.
———, ———, and ———. 1998b. Earnings management and the underperformance of seasoned equity offerings. *Journal of Financial Economics* 50: 63–99.
Thevenot, M. 2011. The factors affecting illegal insider trading in firms with violations of GAAP. *Journal of Accounting & Economics* 53: 375–390.
Thomas, A. 2010. Germany passes diluted 'naked' ban. *Wall Street Journal* (July 2).
Thomas, J., and F. Zhang. 2011. Tax expense momentum. *Journal of Accounting Research* 49 (3): 791–821.
United States Attorney's Office, Eastern District of New York (USAO EDNY). 2006. Former FBI agent sentenced to six years of imprisonment for racketeering and securities fraud. Press release (October 2), http://www.justice.gov/usao/nye/pr/2006/2006Oct02.html.
Weber, D. 2009. Do analysts and investors fully appreciate the implications of book-tax differences for future earnings? *Contemporary Accounting Research* 26 (4): 1175–1206.
Xie, H. 2001. The mispricing of abnormal accruals. *The Accounting Review* 76 (31): 357–373.

Figure 1 represents the annual incremental hedge returns (vertical axis). The horizontal axis represents years from 1988 to 2009 for *TI/BI*. In Figure 1, the monthly incremental hedge returns are calculated as the monthly hedge return from the joint strategy sorted on the accounting-based predictor (*AbnAcc*, *%OAcc*, or *F-Score*) and *TI/BI* minus the monthly hedge return from the strategy sorted on the accounting-based predictor (*AbnAcc*, *%OAcc*, or *F-Score*) alone. We then aggregate the incremental monthly hedge returns to an annual basis. The incremental hedge returns are shown as "*AbnAcc* (*%OAcc* or *F-Score*) & *TI/BI – AbnAcc* (*%OAcc* or *F-Score*)" in Figure 1.

Figure 2 represents the annual incremental hedge returns (vertical axis). The horizontal axis represents years from 1994 to 2009 for *TEMP/BI* (post-109 in Figure 2). In Figure 2, the monthly incremental hedge returns are calculated as the monthly hedge return from the joint strategy sorted on the accounting-based predictor (*AbnAcc*, *%OAcc*, or *F-Score*) and *TEMP/BI* minus the monthly hedge return from the strategy sorted on the accounting-based predictor (*AbnAcc*, *%OAcc*, or *F-Score*) alone. We then aggregate the incremental monthly hedge returns to an annual basis. The incremental hedge returns are shown as "*AbnAcc* (*%OAcc* or *F-score*) & *TEMP/BI – AbnAcc* (*%OAcc* or *F-score*)" in Figure 2.

TABLE 1 Sample Selection
(NYSE and NASDAQ Firms from 1988 to 2009)

Panel A. Short Interest Sample Selection Process	
Fifth month short interest after firms' fiscal year-ends	118,129
Deleting negative book income	(27,800)
Missing Compustat and CRSP data	(12,009)
Number of observations for analysis	78,320
Number of unique firms	5,819
Stock Exchange	
NYSE	40,746
NASDAQ	37,574
SFAS No. 109 Period	
Pre	16,849
Post	61,471
Panel B. Insider Trading Sample Selection Process	
Insider trading within 20 days annual earnings announcement windows	70,147
Deleting negative book income	(12,184)
Missing Compustat and CRSP data	(10,672)
Number of observations for analysis	47,291
Number of unique firms	4,761
Stock Exchange	
NYSE	22,574
NASDAQ	24,717
SFAS No. 109 Period	
Pre	9,723
Post	37,568

TABLE 2 Descriptive Statistics and Variable Definitions

Panel A. Main Variables

	Short Interest Sample					*Insider Trading Sample*			
	Mean	Q1	Median	Q3		Mean	Q1	Median	Q3
I %	3.0247	0.1979	1.1074	3.6665	*IT%*	0.7217	(0.0002)	0.1228	0.5023
I/BI	0.6590	0.1144	0.7235	1.0148	*TI/BI*	0.5674	0.2855	0.8132	1.0654
EMP/BI	0.0968	-0.0722	0.0132	0.2656	*TEMP/BI*	0.0793	-0.0864	0.0119	0.2340
ERM/BI	0.2013	-0.0890	0.0703	0.4758	*PERM/BI*	0.2966	-0.0642	0.0762	0.4577
I	78320				*N*	47291			

Variable Definitions

I/BI	Taxable income*(1-tx) / Book income. Book income is income before extraordinary items. The current portion of the income tax expense is the sum of current federal and foreign income taxes, or, when either amounts is missing, the difference between total income tax expense and the deferred portion of the income tax expense (Compustat). *R_TI/BI* is quintile rank of *TI/BI*.
EMP/BI	{(DTE / *tx*)*(*1 - tx*)} / Book Income; DTE Deferred tax expense is the sum of deferred federal and foreign tax expense, or, when either o these amounts is missing, as the deferred portion of the income tax expense (Compustat). *R_TEMP/BI* is quintile rank of *TEMP/BI*.
ERM/BI	([Book Income - {Taxable Income * (*1 - tx*)}] - *TEMP*) / Book Income (Compustat). *R_PERM/BI* is quintile rank of *PERM/BI*.
I %	Short interest position four months after the fiscal year-end (as reported on NASDAQ or NYSE monthly short interest files) divided by the number of shares outstanding in the same month as reported by CRSP, then multiplied by 100 to express as a percentage (NASDAQ and NYSE).
T%	Number of shares sold net of purchases by insiders in the 20-trading days after earnings announcements / number of shares outstanding a fiscal year-end, then multiply by 100 (Thomson Reuters Insider Trading database).

Panel B. Control Variables

Variable Definitions *Cont'd.*

	Short Interest Sample		*Insider Trading Sample*		
	Mean	Median	Mean	Median	
OAcc (High OAcc)	-1.751	-0.722	-1.574	-0.655	Difference between net income and cash from operation, scaled by the absolute value of net income (Compustat). (1 if the firm-year ranks among the highest percent accruals quintile; 0 otherwise.)
bnAcc HighAbnAcc	0.013	0.010	0.012	0.009	The residual from cross-sectional modified Jones model (Compustat). (1 if the firm-year ranks among the highest abnormal accruals quintile; 0 otherwise.)
F	7.933	5.5	8.268	6	Number of analysts following a firm (IBES). *lnAF* is Log of 1 + *AF*.
M	0.525	0.439	0.473	0.399	Book-to-Market ratio: Book value of common equity / Size (Compustat). *lnBM* Log of *BM*.
iv	0.012	0.000	NA	NA	Dividends / Total asset (Compustat).
	0.079	0.063	NA	NA	Earnings before extraordinary items / Total assets (Compustat).
/P	0.068	0.057	NA	NA	E: Earnings before extraordinary items; P: Number of shares outstanding × Price per share at fiscal year-end (Compustat
xchg	0.518	1	NA	NA	1 for NYSE firms; 0 for NASDAQ firms (Compustat).
-Score LowF)	5.100	5	5.182	5	The sum of nine binary indicators: ∑ (positive return of assets (ROA), positive CFO, positive change in ROA, negative accruals, negative change in leverage (c no long term debt), positive change in current ratio, no issuance of common equity, positive change in gross margin, positive change in asset turnover) (Compustat). (1 if a firm-year *F-Score* is between 0 and 3; 0 otherwise.)
O (%)	0.560	0.578	0.548	0.565	Percent of shares owned by institutions at end of the most recent calendar quarte (Thomson Reuters 13F database). *lnIO* is Log of *IO*.
everage	0.194	0.150	NA	NA	Total long-term debt / Total assets (Compustat).

itigation	NA	NA	0.039	0	1 for SIC industries 2833, 2836, 3570, 3577, 3600–3674, 5200–5961, and 7370-7374; 0 otherwise (Compustat).
IOM	0.228	0.097	0.257	0.150	Momentum: the compounded monthly return for the window (-12, -2) from the short position report month (CRSP).
et	0.018	0.009	NA	NA	Monthly raw returns (CRSP).
DCAPEX	0.161	0.086	0.125	0.090	Sum of R&D expenses and capital expenditures total sales (Compustat).
ize ($$M)	4310.291	579.498	5183.861	838.670	Number of shares outstanding multiplied by the fiscal year-end price (Compustat). *lnSize* is Log of *Size*.
TD	0.122	0.102	0.114	0.097	Standard deviation of the residuals for daily market adjusted returns over a one-year window ending one month prior to the month of reported short position (CRSP).
axMom	0.002	0.001	0.007	0.003	Difference between tax expense per share in year t and year *t-1* scaled by assets per share in year *t-1* (Compustat).
urnover	0.016	0.009	NA	NA	Monthly stock trading volume in millions of dollars divided by *Size* (CRSP and Compustat).
	78320		47291		

Additional Variable Definitions used in tests: *X* refers to quintile ranks of *AbnAcc* and *%OAcc* and discrete values of *F-Score*. *G* is the earnings growth is the difference between earnings in year *t* and earnings in year *t-1*, scaled by total asset in year *t* (Compustat). Guenther (2011) Set of Variables are (1) firm age; (2) highSPI1=1 if special items / average total assets > 0.07; (3) lowSPI1 =1 if special items / average total assets < -0.07; (4) highSPI2=1 if non-operating income / average total assets > 0.1; (5) lowSPI2=1 if non-operating income / average total assets < -0.1; (6) highSPI3 = 1 if gain or loss reported on the income statement / average total asset > 0; (7) lowSPI3 = 1 if gain or loss reported on the income statement / average total asset < 0; (8) highSPI4 = 1 if gain or loss reported on the statement of cash flows / average total assets > 0.07; (9) lowSPI4 = 1 if gain or loss reported on the statement of cash flows / average total assets < -0.07 (Compustat).

TABLE 3 Multivariate Analysis of One-Year Ahead Earnings Growth and Book-Tax Difference Measures

Panel A. TI/BI		***Overall Effect***			***Incremental SFAS No. 109 Effect***		
Variables	Prediction	Coeff.		t-stat	Coeff.		t-stat
Intercept		-0.174	***	-13.69	-0.155	***	-13.02
R_TI/BI	+	0.125	***	10.42	0.127	***	8.77
*R_TI/BI*Post109*					0.006		1.63
Post109					0.078		1.22
TaxMom		1.384	**	1.99	1.511	**	2.16
R_AbnAcc, R_%OAcc, F-Score, & Guenther Variables		Yes			Yes		
Other Controls		Yes			Yes		
Regression		OLS			OLS		
Year Fixed Effects		Yes			No		
Standard Errors		Clustered by Firm			Clustered by Year*Firm		
N		78320			78320		
Adjusted R^2		16.81%			16.76%		

Panel B. TEMP/BI and PERM/BI		***Overall Effect***			***Incremental SFAS No. 109 Effect***		
Variables	Prediction	Coeff.		t-stat	Coeff.		t-stat
Intercept		-0.754	***	-5.95	-0.428	***	-3.54
R_TEMP/BI	-	-0.112	***	-10.07	-0.204	***	-9.47
R_PERM/BI	?	-0.009		-0.75	-0.010		-1.09
*R_TEMP/BI*Post109*	-				-0.074	***	-2.82
*R_PERM/BI*Post109*	?				-0.002		-1.49
Post109					0.184	*	1.93
TaxMom		1.167	*	1.67	1.328	*	1.89
R_AbnAcc, R_%OAcc, F-Score, & Guenther Variables		Yes			Yes		
Other Controls		Yes			Yes		
Regression		OLS			OLS		
Year Fixed Effects		Yes			No		
Standard Errors		Clustered by Firm			Clustered by Year*Firm		
N		78320			78320		
Adjusted R^2		18.01%			17.89%		

Table 3 presents the results of model (2) and (3), *TI/BI*, *TEMP/BI*, and *PERM/BI* predictability of future earnings growth. The dependent variable is the one-year ahead earnings growth. *R_TI/BI*, *R_TEMP/BI*, *R_PERM/BI* are the industry-year quintile ranks of *TI/BI*, *TEMP/BI*, and *PERM/BI*. *R_AbnAcc*, *R_%OAcc*, and *F-Score* are simultaneously controlled. Other Controls include LnSize, BM, E/P, E, Div, RDCAPEX, and Guenther (2010) variables. The sample consists of NYSE and NASDAQ firms from 1988 to 2009. Variable definitions are in Table 2. ***, **, * denote significance at the 0.01, 0.05 and 0.10 levels (one-tailed for signed predictions; two-tailed for all else), respectively.

TABLE 4 Monthly Hedge Returns, Return Asymmetries, and Book-Tax Difference Measures

Panel A. Hedge Portfolio on TI/BI or TEMP/BI

TI/BI				*TEMP/BI*			
	Full Period	Pre-109 Period	Post-109 Period		Full Period	Pre-109 Period	Post-109 Period
L_TI/BI	*-0.0057*	*-0.0061*	*-0.0051*	L_TEMP/BI	0.0015	0.0007	0.0017
H_TI/BI	0.0015	0.0014	0.0013	H_TEMP/BI	*-0.0032*	-0.0025	*-0.0038*
Hedge Return	*0.0072*	*0.0075*	*0.0064*	Hedge Return	*0.0047*	*0.0032*	*0.0055*
	(8.11)***	(7.16)***	(6.36)***		(7.81)***	(2.69)***	(5.21)***
Return Asymmetry	*0.0042*	*0.0047*	*0.0038*	Return Asymmetry	*0.0017*	0.0018	0.0021
	(4.05)***	(4.49)***	(3.78)***		(2.74)***	(1.53)	(1.99)**

Panel B. Hedge Portfolio on Joint TI/BI or TEMP/BI and AbnAcc

AbnAcc and TI/BI				*AbnAcc and TEMP/BI*			
	Full Period	Pre-109 Period	Post-109 Period		Full Period	Pre-109 Period	Post-109 Period
L_AbnAcc & H_TI/BI	0.0044	0.0042	0.0046	L_AbnAcc & L_TEMP/BI	0.0042	0.0034	0.0045
H_AbnAcc & L_TI/BI	-0.0115	-0.0123	-0.0105	H_AbnAcc & H_TEMP/BI	*-0.0092*	*-0.0080*	*-0.0101*
Hedge Return	0.0159	0.0165	0.0151	Hedge Return	0.0134	0.0114	0.0146
	(5.12)***	(4.33)***	(5.14)***		(7.99)***	(3.59)***	(7.93)***
Return Asymmetry	0.0071	0.0081	0.0059	Return Asymmetry	0.0050	0.0046	*0.0056*
	(3.58)***	(2.19)**	(2.09)**		(2.98)***	(1.45)	(3.13)***

The time-series averages of the monthly hedge returns and return asymmetries based on TI/BI (TEMP/BI) are reported along with their t-statistics over the periods shown. The t-statistics reported in parentheses are calculated based on a time-series of 260 month portfolio abnormal stock returns (Fama and MacBeth 1973) in the full sample, 72 month in the pre-109 period (May 1988 to April 1994) and 188 month in the post-109 period (May 1994 to December 2009). Benchmark portfolio returns are calculated as equal-weighted size-BM-momentum adjusted based on Daniel et al. (1997). Hedge returns are the difference between long and short positions. Return asymmetries are the absolute value of short plus long positions. Returns in italics are significant at the 1% level. Numbers in ( ) are t-statistics. *, **, *** denote significance at the 10%, 5% and 1% level, respectively (two-tailed). Variable definitions are in Table 2.

TABLE 5 Fama-MacBeth Monthly Stock Return Regressions on Book-Tax Difference Measures

Panel A. TI/BI

		Full Period			***Pre-109 Period***			***Post-109 Period***		
Variables	Prediction	Coeff.		t-stat	Coeff.		t-stat	Coeff.		t-stat
Intercept		3.136	***	6.20	3.182	***	4.03	3.165	***	4.56
R_TI/BI	+	0.038	***	2.53	0.044	***	2.64	0.035	***	2.57
TaxMom		1.247	***	7.49	1.991	***	8.11	1.366	***	8.48
R_AbnAcc, R_%OAcc, F-Score, & Guenther Variables		Yes			Yes			Yes		
Asset Pricing Risk Controls		Yes			Yes			Yes		
Regression		FM			FM			FM		
Standard Errors		FM			FM			FM		
N (Months)		260			72			188		
Adjusted R^2		6.56%			5.69%			6.46%		
# of Months: Positive Returns from R_TI/BI		146**			45**			104***		

Panel B. TEMP/BI and PERM/BI

		Full Period			***Pre-109 Period***			***Post-109 Period***		
Variables	Prediction	Coeff.		t-stat	Coeff.		t-stat	Coeff.		t-stat
Intercept		2.998	***	6.07	3.606	***	4.66	2.785	***	4.56
R_TEMP/BI	-	-0.048	***	-3.25	-0.053		-1.39	-0.037	***	-3.57
R_PERM/BI	?	-0.008		-0.52	-0.002		-0.80	-0.008		-0.47
TaxMom		1.763	***	7.48	1.783	***	7.65	1.747	***	7.15
R_AbnAcc, R_%OAcc, F-Score, & Guenther Variables		Yes			Yes			Yes		
Asset Pricing Risk Controls		Yes			Yes			Yes		
Regression		FM			FM			FM		
Standard Errors		FM			FM			FM		
N (Months)		260			72			188		
Adjusted R^2		6.91%			5.89%			6.77%		
# of Months: Negative Returns from R_TEMP/BI		142**			32			113***		

This table presents the results of models (4) and (5), *TI/BI*, *TEMP/BI*, and *PERM/BI* predictability of future returns.
The dependent variable is the monthly raw returns starting month 5 following the fiscal year-end. *R_TI/BI*, *R_TEMP/BI*, *R_PERM/BI* are the industry-year quintile ranks of *TI/BI*, *TEMP/BI*, and *PERM/BI*. *R_AbnAcc*, *R_%OAcc*, and *F-Score* are simultaneously controlled. Asset pricing

risk controls are *LnSize*, *LnBM*, and *MOM*. The accounting annual variables are from the most recent fiscal year. Monthly average coefficients and Fama-MacBeth adjusted standard errors are reported. The full sample consists of NYSE and NASDAQ firms from May 1988 to December 2009 (260 months). The pre-109 period is from May 1988 to April 1994 (72 months). The post-109 period is from May 1994 to December 2009 (188 months). Variable definitions are in Table 2. ***, **, * denote significance at the 0.01, 0.05 and 0.10 levels (one-tailed for signed predictions; two-tailed for all else), respectively.

TABLE 6 Multivariate Analysis of Short Interest on Book-Tax Measures

Panel A. TI/BI		***Overall Effect***			***Incremental SFAS No. 109 Effect***		
Variables	Prediction	Coeff.		t-stat	Coeff.		t-stat
Intercept		4.464		1.56	2.158		0.71
R_TI/BI	-	-0.082	***	-4.16	-0.096	***	-3.31
*R_TI/BI*Post109*					0.039		1.34
Post109					0.739	***	5.27
TaxMom		-6.397	***	-4.60	-5.465	***	-3.51
HighAbnAcc, LowF, and High%OAcc		Yes			Yes		
Other Controls		Yes			Yes		
Regression		OLS			OLS		
Year Fixed Effects		Yes			No		
Standard Errors		Clustered by Firm			Clustered by Year*Firm		
N		78320			78320		
Adjusted R^2		12.37%			12.01%		
Panel B. TEMP/BI & PERM/BI		***Overall Effect***			***Incremental SFAS No. 109 Effect***		
Variables	Prediction	Coeff.		t-stat	Coeff.		t-stat
Intercept		1.909		0.67	5.788		0.14
R_TEMP/BI	+	0.101	***	4.59	0.038	**	2.04
R_PERM/BI	?	0.018		0.69	0.014		0.60
Post109					0.677	***	3.64
*R_TEMP/BI*Post109*	+				0.062	***	2.36
*R_PERM/BI*Post109*	?				0.028		1.32
TaxMom		-6.366	***	-4.35	-5.051	***	-3.37
HighAbnAcc, LowF, and High%OAcc		Yes			Yes		
Other Controls		Yes			Yes		
Regression		OLS			OLS		
Year Fixed Effects		Yes			No		
Standard Errors		Clustered by Firm			Clustered by Year*Firm		
N		78320			78320		
Adjusted R^2		12.65%			12.29%		

Table 6 presents the results of model (6) on the short arbitrage of *TI/BI* and *TEMP/BI*. The dependent variable is short position 5 months after the fiscal year-end scaled by the number of shares outstanding in the same month. *R_TI/BI*, *R_TEMP/BI*, and *R_PERM/BI* are the industry-year quintile ranks of *TI/BI*, *TEMP/BI*, and *PERM/BI*. *HighAbnAcc*, *High%OAcc*, and *LowF* are simultaneously controlled. Other Controls include lnSize, BM, Turnover, lnIO, MOM, STD, Exchg, lnAF, Leverage, and Guenther (2010) variables. The sample consists of NYSE and NASDAQ firms from 1988 to 2009. Variable definitions are in

Table 2. ***, **, * denote significance at the 0.01, 0.05 and 0.10 levels (one-tailed for signed predictions; two-tailed for all else), respectively.

TABLE 7 Multivariate Analysis of Insider Trading on Book-Tax Measures

Panel A. TI/BI		***Overall Effect***			***Incremental SFAS No. 109 Effect***		
Variables	Prediction	Coeff.		t-stat	Coeff.		t-stat
Intercept		1.402	***	8.34	1.419	***	8.55
R_TI/BI	-	-0.369	***	-2.92	-0.273	***	-4.09
*R_TI/BI*Post109*					-0.076		-0.75
Post109					0.027	***	4.02
TaxMom		-2.672	***	-3.01	-2.985	***	-3.24
R_AbnAcc, R_ %OAcc, and F-Score		Yes			Yes		
Other Controls		Yes			Yes		
Regression		OLS			OLS		
Year Fixed Effects		Yes			No		
Standard Errors		Clustered by Firm			Clustered by Year*Firm		
N		47291			47291		
Adjusted R^2		4.27%			3.84%		
Panel B. TEMP/BI & PERM/BI		***Overall Effect***			***Incremental SFAS No. 109 Effect***		
Variables	Prediction	Coeff.		t-stat	Coeff.		t-stat
Intercept		1.496	***	11.5	1.397	***	11.59
R_TEMP/BI	+	0.269	**	2.04	0.536	**	2.31
R_PERM/BI	?	0.004		0.13	0.006		0.25
Post109					0.053	**	2.30
*R_TEMP/BI*Post109*	+				0.103	***	8.04
*R_PERM/BI*Post109*	?				0.003		0.63
TaxMom		-2.971	***	-3.33	-2.976	***	-3.33
R_AbnAcc, R_ %OAcc, and F-Score		Yes			Yes		
Other Controls		Yes			Yes		
Regression		OLS			OLS		
Year Fixed Effects		Yes			No		
Standard Errors		Clustered by Firm			Clustered by Year*Firm		
N		47291			47291		
Adjusted R^2		4.52%			4.36%		

Table 7 presents the results of model (7), insider trading on *TI/BI* and *TEMP/BI*. The dependent variable is the net number of shares sold by insiders within 20 days after earnings announcements scaled by the number of shares outstanding at the fiscal year-end. *R_TI/BI*, *R_TEMP/BI*, *R_PERM/BI* are the industry-year quintile ranks of *TI/BI*, *TEMP/BI*, and *PERM/BI*. *R_AbnAcc*, *R_%OAcc*, and *F-Score* are simultaneously controlled. Other Controls include lnSize, BM, RDCAPEX, G, Litigation, lnIO, MOM, STD, lnAF, and Guenther (2010) variables. The sample consists of NYSE and NASDAQ firms from 1988 to 2009. Variable definitions are in Table 2. ***, **, * denote significance at the 0.01, 0.05 and 0.10 levels (one-tailed for signed predictions; two-tailed for all else), respectively.

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