

# **Economic Consequences of Increasing the Conformity in Accounting for Uncertain Tax Benefits**

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December 28, 2007

## **Abstract**

This study examines the stock price reaction to pronouncements associated with changing the accounting for uncertain tax positions. On July 13, 2006 the FASB issued Interpretation No. 48, Accounting for Uncertainty in Income Taxes: An Interpretation of FASB Statement No.109, proposing a more restrictive approach to recognizing benefits associated with uncertain tax positions. Commentary on the proposed interpretation suggests that it could be costly for firms because disclosures made as a result of applying the new interpretation could be used by the IRS to more effectively identify and challenge uncertain tax positions. We test whether investors believed firms would incur significant costs associated with FIN 48 by examining the stock price reaction around key pronouncement dates. We document significant negative abnormal returns for firms associated with key event dates related to Interpretation No. 48. Furthermore, we find returns around certain key dates are more pronounced for firms identified as aggressive corporate taxpayers using two alternative measures of tax aggressiveness. We also examine the market response to the initial disclosures of uncertain tax benefits required by FIN 48 in the first quarter of 2007. Our results are consistent with these disclosures providing new information to investors regarding the extent of firms' uncertain tax benefits and with investors responding positively to news of tax aggressiveness and/or revising downward (and thus upward) their estimates of firms effective tax rates (after-tax net income).

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We thank Cristi Gleason, Linda Krull, Lillian Mills, John Robinson, Casey Schwab, Stephanie Sikes, and workshop participants at Michigan State University for helpful comments. Shevlin acknowledges financial support from his Paul Pigott/PACCAR Professorship.

## **I. Introduction**

Tax law is often subject to varied interpretation, and many firms take positions on their income tax returns that might not be fully sustained under audit. Pursuant to SFAS No. 5 (FASB 1975) firms must accrue a loss contingency for uncertain tax positions if the loss is probable and reasonably estimable.<sup>1</sup> Accordingly, under SFAS No. 5 managers have to exercise discretion in assessing both the materiality and the probability of a loss associated with these contingencies. The application of this discretion led the Financial Accounting Standards Board (FASB) to become concerned that “diverse accounting practices had developed resulting in inconsistency in the criteria used to recognize, derecognize, and measure benefits related to income taxes” (FIN 48). For this reason, on July 13, 2006 the FASB issued Interpretation No. 48, Accounting for Uncertainty in Income Taxes: An Interpretation of FASB Statement No.109 (FIN 48). The purpose of FIN 48 is to improve the quality of financial reporting by reducing the significant diversity in practice associated with recognition and measurement in accounting for income taxes.

FIN 48 requires firms to evaluate a tax position using a two-step process. First, a firm should recognize the financial statement benefit of a tax position only after determining that it is more-likely-than-not that the relevant tax authority will sustain the position following an audit.<sup>2</sup> Second, the amount recognized should be the largest benefit that has a greater than 50 percent likelihood of being realized upon ultimate settlement with the relevant tax authority. FIN 48 also

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<sup>1</sup> Gleason and Mills (2002) find that for a sample of 100 large manufacturing firms over the nine year period from 1987-1995 only 27 percent of the firms disclose any contingent tax liability and only 30 percent of those firms provide all the disclosures required by SFAS No. 5. These findings suggest that not all firms were using the guidance provided by SFAS No. 5 in determining whether to disclose contingencies associated with income taxes.

<sup>2</sup> Recognizing means recording a financial statement benefit and could involve, among other items, recording a smaller current tax expense or reducing an existing tax related liability.

contains significant disclosure requirements including a tabular reconciliation of the beginning and ending balances of unrecognized tax benefits.

On July 14, 2005 the FASB issued an exposure draft (ED) on accounting for uncertain tax benefits which preceded the adoption of FIN 48. The responses by tax executives to the ED were generally negative for two reasons. First, the ED proposed that firms must assume a tax position will be challenged by the relevant tax authority and should not factor the likelihood that a given position will be audited into the determination of whether to recognize the tax benefit. Critics argued this new requirement would result in firms increasing their provision for income taxes leading to an overstatement of tax liabilities. Second, critics expressed concern that the new disclosure requirement would provide the IRS with a roadmap to better identify and examine their firm's most controversial tax positions.

In this study we examine whether investors believed these concerns of increased costs associated with greater transparency for uncertain tax benefits were credible. To investigate investor perceptions of the costs associated with the adoption of FIN 48 we examine whether stock prices react to important pronouncements from the FASB associated with the development and implementation of this new interpretation. Robert Willens, a tax analyst at Lehman Brothers, noted that firms will "virtually be holding an arrow, pointing the IRS toward controversial tax benefits it might audit" (Yoon 2006). Willens speculated that the new rule would cost U.S. firms billions of dollars in charges to earnings and additional taxes. Uncertain tax positions represent an economically significant contingency for many firms. For example, prior to the adoption of FIN 48 Microsoft discloses in their 2006 Annual Report to Shareholders a long-term liability of \$4.194 billion for tax contingencies. This amount is nearly as large as their 2006 net deferred tax assets of \$4.551 billion and their 2006 tax expense of \$5.663 billion. If tax agencies are able to

utilize the disclosures required by FIN 48 to more effectively audit firms this would result in an increased tax burden for firms. If investors believe the tax burden of firms will increase as a result of FIN 48 then we expect to find a negative market reaction to key pronouncements associated with the development and implementation of FIN 48. Extending this argument, investors might anticipate that the additional disclosures required by FIN 48 would increase the likelihood that tax authorities or Congress would demand audit work papers detailing the determinants of the tax contingency. These supporting work papers would likely provide even more detailed information concerning the nature of firms' tax contingencies than the actual FIN 48 disclosures. On August 23, 2007 Senate investigators added credence to this concern by sending letters to 30 companies that disclosed significant tax contingencies seeking to obtain additional details about the underlying transactions in their FIN 48 disclosures (Drucker 2007). This line of reasoning falls under the rubric of political costs (Watts and Zimmerman 1986).

Consistent with these arguments predicting a negative market reaction to the passage of FIN 48, we find significant negative abnormal returns for events associated with FIN 48 that lead to increased disclosure requirements. As expected, we find the reaction is most pronounced around key dates which received extensive press coverage including the issuance of FASB's initial exposure draft and the final standard.

Our analysis differs from traditional studies examining the market reaction to FASB pronouncements which focus primarily on the contracting implications of those pronouncements and utilize the size and debt hypotheses developed by Watts and Zimmerman (1986) (e.g. Dechow et al. 1996, Espahbodi et al. 2002). In contrast, we propose that the primary determinant of cross-sectional differences in the market reaction to key pronouncements associated with FIN 48 is the level of a firm's prior tax aggressiveness. Firms that are aggressive in their tax reporting

are likely to incur the highest costs associated with FIN 48. These firms are most likely to have significant uncertain tax benefits that would have to be disclosed under FIN 48. Further, aggressive tax reporting firms would be the firms for which the Internal Revenue Service (IRS) is most likely to utilize the additional disclosures required by FIN 48 to more effectively identify and audit uncertain tax positions. Therefore, these firms are likely to incur the greatest costs as a result of the new interpretation.

Consistent with expectations, we find the market reaction to certain key pronouncements is cross-sectionally associated with our measures of tax aggressiveness. Specifically, we find that the long-run cash effective tax rate and book-tax differences, our two proxies for tax aggressiveness, are associated with the market reaction to the issuance of FASB's initial exposure draft on uncertain tax contingencies. The issuance of the initial exposure draft in July of 2005 provided the first look at the proposed guidelines for accounting for uncertain tax benefits and received significant press coverage including an article in the *Wall Street Journal* (Gullapalli 2005). Our results suggest that at the time the exposure draft was released investors believed that aggressive tax reporting firms would incur the most significant costs as a result of the proposed guidelines.

In addition to examining the market reaction to key pronouncements leading to the implementation of FIN 48, we also examine the reaction to the initial disclosure of uncertain tax benefits required by FIN 48 in the first quarter of 2007. The purpose of these tests is twofold. First, the tests provide insight into whether these disclosures provide any new information to investors. Gleason and Mills (2002) find that only 27 percent of firms make any disclosure associated with contingent tax liabilities. Therefore, it is not clear prior to the adoption of FIN 48 whether investors were able to assess the magnitude of firms' uncertain tax benefits. Second,

to the extent these disclosures provide new information to investors, our tests show whether investors reacted negatively (as predicted by the increased tax and political scrutiny argument above) or positively (investors responding positively to news of tax aggressiveness<sup>3</sup> and/or revising downward (and thus upward) their estimates of firms effective tax rates (after-tax net income)).

We hand collect data on uncertain tax benefits from the 2007 first quarter reports for a sample of 361 firms in the S&P 500 with calendar year-ends. Controlling for the level of unexpected earnings, we find that uncertain tax benefits are positively associated with returns in the three-day window surrounding the release of the firms' first quarter 2007 reports. This finding suggests these disclosures provide investors with new information about the level of firms' tax aggressiveness and/or revising downward (and thus upward) their estimates of firms effective tax rates (after-tax net income).

While our finding of a positive market reaction to initial FIN 48 disclosures might appear inconsistent with our tests of key FASB pronouncements, the two tests actually examine the market reaction to very different types of new information concerning the tax burden of firms. In the case of the pronouncements leading to the implementation of FIN 48, the market reaction is consistent with the conjecture that FIN 48 disclosures would lead to improved audit effectiveness for the IRS and therefore increase the tax burden of firms. In contrast, the results of our second set of tests examining the market reaction to the disclosure of the magnitude of firms' uncertain tax benefits are consistent with investors revising their estimate of firms' tax burdens downward. FIN 48 requires firms to disregard the probability of audit detection in recording their

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<sup>3</sup> While aggressive tax reporting strategies can help maximize shareholder value through reducing the tax burden of the firm, recent research suggests aggressive tax reporting might also be associated with opportunistic behavior on the part of managers (Desai and Dharmapala 2006). As a result, it is not clear whether investors will react positively to news that firms are engaged in aggressive tax reporting.

contingency for uncertain tax benefits. As a result, this contingency is likely to overstate the actual amount of uncertain tax benefits that are likely to be challenged and reversed under audit by the relevant tax authority. Consequently, the firm's effective tax rate is also likely to be overstated (and net income understated) and estimates of book-tax differences based on financial statement information are likely to be understated. To the extent investors relied on these measures to form their expectations about a firm's tax burden their estimates would have been overstated prior to the FIN 48 disclosures. Our results suggest investors are aware the tax contingencies disclosed under FIN 48 are overstated and revise their tax burden estimates downward accordingly.

In supplemental analysis we also evaluate the association between the new disclosures for uncertain tax benefits and traditional measures of tax aggressiveness. Uncertain tax benefits provide an excellent measure of a firm's tax aggressiveness because they represent management's beliefs about which tax positions are most likely to be challenged. We find that both the cash effective tax rate and book-tax differences are significantly associated with the portion of the contingency for uncertain tax benefits that management indicates will impact the effective tax rate. However, we find no association between total uncertain tax benefits and these traditional measures of tax aggressiveness. These findings provide some support for studies that have relied on variations of these measures to assess tax aggressiveness (e.g., Desai and Dharmapala 2006; Dyreng, Hanlon, and Maydew 2008; Wilson 2007).

The remainder of the paper is organized as follows. The next section reviews the implications of FIN 48 and presents our hypotheses on the capital market effects of key pronouncements and the initial firm disclosures. Section III describes the key pronouncements. Section IV describes our sample selection procedure and provides descriptive statistics. Section V details our

methodology and test results. Section VI examines the market reaction to initial FIN 48 disclosures. Section VII examines the association between uncertain tax benefits and traditional measures of tax aggressiveness and the final section concludes.

## **II. Summary of FIN 48 and Hypothesis Development**

### *Summary of FIN 48*

Financial Accounting Standards No. 109 (FAS 109) ushered in an asset and liability approach for financial accounting and reporting for income taxes (FASB 1992). However, these principles do not adequately address the complexities of uncertain tax positions. Firms instead referred to SFAS 5, *Accounting for Contingencies*, to provide the primary guidance concerning the recognition and disclosure of uncertain tax benefits. SFAS No. 5 requires firms to accrue a loss contingency for uncertain tax positions if the loss is probable and reasonably estimable. SFAS No. 5 does not specifically allow firms to consider the probability of audit detection when assessing the probability of a loss, however Blouin et al. (2007) note that many firms considered the probability of audit and detection in determining the likelihood and amount of potential losses. In contrast to SFAS No. 5, FIN 48 explicitly prohibits the consideration of audit detection risk in determining whether to recognize uncertain tax benefits. Providing explicit guidance on the consideration of audit risk in assessing the probability of loss is consistent with the FASB's goal of reducing the diversity of practice in accounting for uncertain tax benefits.

In developing FIN 48, FASB considered the qualitative characteristics discussed in Concept Statement No. 2 emphasizing that providing users with comparable information allows them to better detect similarities and differences between two economic events. FIN 48 provides a recognition threshold and a measurement attribute for the financial statement recognition and

measurement of a tax position. The recognition threshold requires that it is more-likely-than-not that a tax position will be sustained upon audit. The threshold is based solely on the position's technical merits assuming the tax authority has all relevant information and ignores the probability of audit. The measurement attribute is the largest amount of benefit that has a greater than 50 percent likelihood of being realized upon settlement. A liability for unrecognized tax benefits should be classified as current to the extent that payment is anticipated within one year or the operating cycle of the firm, if longer.<sup>4</sup> It should not be classified as a deferred tax liability unless it results from a taxable temporary difference. FIN 48 only addresses uncertain tax positions and does not change other FAS 109 deferred tax accounting and the use of the valuation allowance account for deferred tax assets.

Disclosure includes a tabular roll-forward of the total amounts of unrecognized tax benefits from the beginning to the end of the period and the total amount of unrecognized tax benefits that, if recognized, would affect the effective tax rate. This disclosure also includes the total amount of interest and penalties recognized in the income statement and balance sheet and, for positions for which it is reasonably possible that unrecognized benefits will significantly change within 12 months, the nature of the uncertainty, the event that would cause the change, and an estimate of the range of the change, if possible. The pronouncement is effective for fiscal years beginning after December 15, 2006.

### **Hypotheses development for events surrounding passage of FIN 48**

Primarily, FIN 48 has two key objectives. First, it is intended to reduce the diversity in practice associated with accounting for uncertain tax positions. Second, it is intended to provide

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<sup>4</sup> See Dunbar, Kolbasovsky, and Phillips (2007) for examples of the specific journal entries necessary to record contingencies for uncertain tax benefits associated with both temporary and permanent book-tax differences.

investors with additional information as to changes in and the amount of uncertain tax positions taken on existing tax returns. The adoption of FIN 48 could have an income statement and balance sheet effect; however the direction of the effect depends on the pre-FIN 48 accounting practices of the firm.<sup>5</sup>

Because FIN 48 has an income effect, the direction of which will differ by firm, we look to the disclosure characteristics of the pronouncement for directional predictions during its passage. To the extent investors believe that increased disclosure will lead to an increased tax burden for firms we expect that events increasing the probability of passage and events requiring disclosure of additional information to governmental authorities, will elicit a negative market reaction. We classify the events leading up to the final issuance of FIN 48 as either positive or negative depending on this criterion.<sup>6</sup> Our first hypothesis in the alternative form is:

**H1:** There will be a negative (positive) market reaction to pronouncements which increase (decrease) the probability of passage and extent of disclosure requirements in accounting for uncertain tax positions.

Firms engaged in aggressive tax reporting are likely to incur the most significant costs associated with FIN 48. If the concern that the IRS will utilize the additional disclosures required by FIN 48 to more effectively audit firms is valid or that Congress will act to increase the tax burdens of the most aggressive firms (by curtailing tax laws that allow the tax aggressive firms to save taxes), then this will have the greatest impact on the most aggressive corporate taxpayers.<sup>7</sup>

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<sup>5</sup> Blouin et al. (2007) examine FIN 48 disclosures for 200 firms and report that 80 of those firms increased reserves for uncertain tax benefits as a result of adopting FIN 48, 44 firms decreased their reserves, and 76 firms recorded no change as a result of adopting FIN 48.

<sup>6</sup> All of the events examined in this study associated with FIN 48 are FASB meetings and pronouncements which were made leading up to the passage of FIN 48. See Table 1 for a complete listing and description of these events.

<sup>7</sup> This political cost argument is similar to that surrounding the passage of the Tax Reform Act of 1986 which although it reduced corporate tax rates widened the tax base (by for example restricting deductions) in response to a

Even if those firms were conservative in recognizing the benefit for uncertain tax positions prior to adopting FIN 48, they are still likely to incur costs associated with the increase in disclosure associated with the new accounting standard which will allow the IRS to more effectively audit their uncertain tax positions. As a result, we predict that firm-specific variation in aggressive tax reporting behavior will lead to cross-sectional differences in the market reaction to events leading up to FIN 48. This prediction leads to our second hypothesis:

**H2:** The stock price reaction to pronouncements which increase (decrease) disclosure requirements for uncertain tax positions will be more negative (positive) for firms that are more tax aggressive.

An alternative prediction is that increased disclosures under FIN 48 would lead to a reduction in managerial opportunism, benefiting shareholders and resulting in a positive stock market reaction. Desai and Dharmapala (2006) suggest that in some contexts managers use tax shelters opportunistically in an effort to extract rents from the firm. To the extent investors believed the new disclosures under FIN 48 would mitigate this type of managerial opportunism we would expect to see a positive stock market reaction around key pronouncements.<sup>8</sup>

### **Hypotheses development for initial FIN 48 disclosures**

In a second set of tests we examine the stock market reaction to firms' first disclosures of the unrecognized tax benefits (UTB). In the unlikely event that investors are somehow able to

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series of reports by the Citizens of Tax Justice identifying many large profitable U.S. corporations not paying any U.S. taxes. Shevlin and Porter (1992) examine the effect of TRA 86 on corporate tax burdens.

<sup>8</sup> In some targeted tax rule changes from which some firms benefit, other firms might be losers as the beneficiaries bid up prices of the now to them tax-favored assets. For an example, see Berger's (1993) analysis of the corporate R&D tax credit. Our setting differs because FIN 48 does not lead to some firms losing while others win – however, we do partition firms below based on proxies of their tax aggressiveness.

estimate the extent of UTBs prior to the adoption of FIN 48 and the filing date for the first quarter of 2007 10-Q then the disclosure will not present new information to investors. In contrast, to the extent the UTB disclosures provide new information to the market about the magnitude of firms' UTBs then we expect a market reaction. Building on the increased tax (and political) costs argument above, firms reporting large UTBs are most likely to receive the closest scrutiny by the IRS and Congress. As previously noted, on August 23, 2007 Senate investigators added credence to this concern by sending letters to 30 companies that disclosed large UTBs seeking to obtain additional details about the underlying transactions in their FIN 48 disclosures (Drucker 2007).

Another argument supporting a negative association between returns and the initial UTB disclosures is that investors will respond negatively to news that firms are more tax aggressive than they previously thought. Desai and Dharmapala (2006) examine the issue of aggressive tax reporting within the context of the agency problems faced by public corporations. They argue that because tax shelters are designed to obscure the underlying purpose of a transaction they represent a potential vehicle for rent extraction on the part of management. To the extent investors perceive this to be the case, and the UTB disclosures cause them to reassess their beliefs about the level of firms' tax aggressiveness, then we would expect a negative association between UTBs and abnormal returns.

Hanlon and Slemrod (2007) also investigate the market reaction to news of tax aggressiveness by examining the stock price reaction to news that a firm participated in a tax shelter. They find that, on average, a company's stock price declines on news of tax shelter participation, but that the price decline is smaller than the reaction to major accounting mishaps. While these results suggest the market reacts negatively to tax sheltering it is not clear whether

this reaction is driven by news that a firm is more tax aggressive than previously thought or whether it is a reaction to news that a firm's aggressive tax planning is subject to IRS and public scrutiny that could result in additional penalties and legal costs. Examining the initial UTB disclosures under FIN 48 allows us to investigate the market reaction to news of tax aggressiveness without having to disentangle the effects of news of additional penalties and legal costs.<sup>9</sup>

The above arguments lead us to predict a negative reaction to firm-specific UTB disclosures:

**H3a:** The stock market reaction will be negatively associated with firm's first disclosures of their unrecognized tax benefits.

On the other hand, it is possible that investors will react positively to the first disclosures. If investors view tax aggressiveness as a firm value maximizing activity, and if large UTB's reflect tax aggressiveness, then investors could react positively to UTB disclosures. Additionally, if investors previously relied on disclosed effective tax rates or book-tax differences to estimate a firm's tax burden, then their estimate of the tax burden would likely be overstated in the presence of significant UTBs. UTBs represent tax benefits that firms have taken on their income tax returns, but that have not been recognized in the financial statements. If these tax benefits had been recognized it is likely they would have resulted in greater BTDs and lower

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<sup>9</sup> If investors believe managers have not sufficiently reserved for uncertain tax positions and that firms with significant UTB disclosures actually have even greater uncertain tax positions that could be reversed under audit then we would expect a negative reaction by investors. Anecdotal evidence suggests this is unlikely to be the case because firms rarely appear to be under-reserved at the time disputes concerning uncertain tax positions are resolved with the relevant tax authorities. In fact, recent research suggests firms have an incentive to be over-reserved for uncertain tax positions, because firms use discretion in accounting for these reserves to meet analyst forecasts (Dhaliwal et al. 2004 and Gupta and Laux 2007).

effective tax rates.<sup>10</sup> If investors believe that some percentage of these UTBs will eventually be sustained then this should lead to a downward revision in their estimate of firms' true tax burden. These arguments lead us to predict a positive reaction to firm-specific UTB disclosures

**H3b:** The stock market reaction will be positively associated with firm's first disclosures of their unrecognized tax benefits.

Because H3a and H3b lead to opposite predictions it is an empirical question as to how the stock market will react to the initial FIN 48 disclosures of firms' UTBs.

### **III. Development of the Exposure Draft and Identification of Event Dates**

Table 1 provides a listing of each pronouncement associated with the passage of FIN 48 which is examined in our study, and our ex ante prediction regarding whether the event will elicit either a positive or negative market reaction. The discretion allowed under SFAS No. 5 related to the accounting for uncertain tax positions led regulators to become concerned that firms were not being consistent in their accounting for these uncertain tax positions. Highlighting this issue at a December 11, 2003 address for the AICPA Conference on SEC Developments, Randolph Green, Professional Accounting Fellow, Office of the Chief Accountant at the SEC, stated that the SEC was concerned about the application of FASB 109 to tax advantaged transactions and that it was not appropriate to recognize tax assets when it was not probable that the registrant would realize the related tax benefit.

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<sup>10</sup> In the above discussion, BTDS refer to total BTDS which are a function of both permanent and temporary book-tax differences. Effective tax rates refer to the traditional effective tax rate measured as the total income tax expense divided by pre-tax net income.

Partly in response to these comments, on March 3, 2004, FASB board members, members of the FASB staff, representatives of the SEC, and major public accounting firms met to discuss practice issues related to uncertain tax positions. Significant diversity in practice was noted and on July 27, 2004, the Board decided to add the uncertain tax position project to its agenda as a proposed Interpretation to Statement 109. The July 27, 2004 formalization of this process, with its potential to require additional disclosures for uncertain tax positions, is predicted to elicit a negative stock market reaction. A search of press articles in the Factiva Database revealed limited press coverage associated with the July 27, 2004 meeting. There were several articles published during the remainder of 2004 that mentioned the meeting and noted that companies were critical of the “probable” criteria proposed by FASB. However, because the press coverage of this meeting was limited we are uncertain of the extent to which investors were aware of the meeting and factored it into prices at that time.

On November 17, 2004, the Board again deliberated uncertain tax positions and decided that the financial statement benefit of an uncertain tax position should be based on the best estimate of the amount that will ultimately be sustained and that the proposed interpretation should be effective for the first annual period ending after December 15, 2005. The Board next addressed uncertain tax positions on February 16, 2005, instructing the staff to prepare the ED for a written vote. The ED contained the following: (1) benefits are to be recognized based on the SFAS No. 5 probable standard, (2) risk of detection by tax authority is inappropriate to consider, (3) derecognition of benefits is based on a more-likely-than-not standard, (4) financial statement benefit is a best estimate, (5) the resulting liability is to be classified based on the expected timing of the cash flows, (6) interest is to be accrued, (7) disclosure is to be made in accordance with SFAS No. 5, and (8) adoption is a cumulative effect of a change in accounting principle.

The ED was issued on July 14, 2005. The November 17, 2004 and the February 16, 2005 meetings did not generate significant press coverage, however the issuance of the ED on July 14, 2005 did result in significant coverage. Both *The Wall Street Journal* and *The New York Times* printed articles discussing the July 14, 2005 ED. The articles consistently noted that the requirements proposed in the ED would require firms to adopt a higher standard for recognizing tax benefits. Several articles about the ED also noted the new disclosure requirements could provide the IRS with a red flag to more effectively identify and audit aggressive corporate taxpayers. As such, we expect a negative market reaction around the issuance of the ED.

Of the additional meetings throughout the Fall of 2005, the November 22, 2005 meeting established that the risk of audit was not relevant, a more-likely-than-not standard would be used for recognition, and a best-estimate measurement would be made of the attribute. Eliminating the relevancy of the risk of audit is likely an important negative event. However, the more-likely-than-not standard is likely to be more income increasing than the previously considered probable standard and as a result could be viewed as a positive event. There was limited press coverage of the November 22, 2005 meeting.

The January 11, 2006 Board meeting established that, (1) the effective date would be for years beginning after December 15, 2006, (2) subsequent recognition/derecognition and measurement changes should be based on new information, (3) APB 28 and FASB Interpretation 18 apply to interim periods, (4) interest and penalties will be accrued (5) the accrued liability will be classified as current if it is to be paid within 12 months or the current operating cycle, and (6) the initial recognition will be a change in accounting principle with the cumulative effect going to retained earnings. Most significantly, this event established a one year delay in implementation, which we predict to have a positive stock price reaction. The press coverage of this meeting was limited however; some published articles did note the one-year delay by FASB.

The March 1, 2006 Board meeting adopted the more-likely-than-not standard for measurement, having already accepted that standard for recognition. This measurement attribute is the largest amount of benefit with a greater than 50 percent likelihood of being realized upon settlement. The recommended option before this meeting was the best estimate, as used in Concepts Statement No. 7 (to mean the single most likely amount). The adopted standard is more flexible than the point estimate recommended before the meeting, but we do not have a clear prediction for how stock prices will react to this event. Limited press coverage of this event noted the measures adopted in this meeting represented a compromise by FASB on the best estimate approach.

On May 10, 2006, the Board agreed to draft the final interpretation. The final interpretation was to remove recognition and measurement guidance taken from SFAS No. 5 and the “Guide to Implementation of Statement 109” and replace it with FIN 48, as previously described. This meeting added the requirement of a tabular reconciliation of beginning and ending balances of unrecognized tax benefits, disclosure of items in which there is a reasonable possibility that the estimate of the realized benefit will change in the next 12 months (including the nature of the uncertainty and the event and an estimate of the range or a statement that such estimate cannot be made), and a description of open tax years by major jurisdictions. We predict that these newly required disclosures of unrecognized tax benefits could be seen as giving tax authorities additional audit information. Such a requirement is predicted to have a negative stock price reaction. There was limited press coverage at the time of this meeting, however subsequent articles noted the tabular roll-forward could be useful to both the IRS and credit rating agencies.

FIN 48 was issued on July 13, 2006. The finality of the event coupled with the additional press generated from its issuance is predicted to have a negative stock price reaction. There was

extensive press coverage surrounding the issuance of FIN 48 with numerous articles mentioning that these new requirements could provide the IRS with an audit roadmap. Our final event date is for the FASB board meeting on January 17, 2007 where the board unanimously rejected appeals for a one-year delay in the implementation of FIN 48. According to CFO.com, FASB received “some 400 corporate comment letters, most of them calling for a delay” in implementing FIN 48 (Leone and Shaw 2007). Regarding the FASB’s decision to reject calls for a delay, Lehman Brothers tax expert Robert Willens was quoted as saying “I was flabbergasted, shocked, by the decision” (Leone and Shaw 2007). Because the decision to reject calls for a delay appears to have been a surprise and would effectively accelerate any costs associated with the additional disclosures required by FIN 48 we expect a negative stock price reaction around this date. This decision also received considerable press coverage including an article in the *Wall Street Journal*.

In summary, the three dates which received the most extensive press coverage were July 14, 2005 when the ED was issued, July 13, 2006 when the final interpretation was issued, and January 17, 2007 when the FASB rejected calls for a delay in implementation. The press coverage surrounding these events suggested the new requirements would result in more restrictive accounting for uncertain tax benefits for most firms and could provide the IRS with additional information to more effectively identify and audit uncertain tax positions.

#### **IV. Sample Selection and Descriptive Statistics**

We conduct our analysis on a sample firms that meet the following criteria: (1) they are listed on the CRSP daily returns and the Compustat Annual Industrial files; (2) they have daily stock return data available from January 1, 2004 through March 31, 2007; (3) they have the necessary

Compustat data available to calculate our two aggressive tax reporting proxies described below ending in the 2004 fiscal year; (4) they have positive cumulative pretax income over the five-year period ending with the 2004 fiscal year; (5) have a cash ETR between plus and minus 1.

Criteria (1) through (3) are employed to ensure we have data available to test hypotheses 1 and 2. Criteria (4) is included to ensure our tests focus on firms that will be significantly impacted by FIN 48. Firms that have not been profitable over a sustained period of five years are unlikely to have a significant tax burden and therefore unlikely to face increased costs as a result of FIN 48 (unless their losses are due to aggressive tax planning). Criteria (5) is adopted to eliminate extreme and unusual observations as it is not clear what these extreme Cash ETRs signal to investors about the level of a firm's tax aggressiveness. Application of these selection criteria resulted in a final sample of 1,381 firms.

In order for the market reaction to vary as a function of a firm's tax aggressiveness investors must be able to identify which firms are the most aggressive taxpayers. Because it is not clear which characteristics investors rely on to identify tax aggressive firms we perform our analysis using two alternative measures proposed in recent research as proxies for tax aggressiveness. Specifically, we examine whether the market reaction to key FIN 48 pronouncements varies as a function of the long-run cash effective tax rate developed by Dyreng et al. (2008), and as a function of aggregate book-tax differences. To the extent the assumption that investors believe aggressive tax reporting firms will incur the greatest costs associated with FIN 48 is valid; these tests provides direct insight into how investors identify aggressive corporate taxpayers.

#### *a. The Cash Effective Tax Rate*

Our first tax aggressiveness measure is the long-run cash effective tax rate (Cash ETR), which was introduced by Dyreng et al. (2008) and is the ratio of the five-year sum of cash taxes

paid to the five year sum of pretax financial accounting income. As discussed in Dyreng et al. (2008), this measure of tax aggressiveness has several advantages over the traditional ETR measure. First, the Cash ETR measure is not affected by changes in the firm's tax contingency. Regardless of whether a firm records the benefit associated with an aggressive tax position in its financial statements, the reduced cash tax payments that result from that aggressive position will be reflected in a lower Cash ETR for the firm. Second, to the extent firms are aggressively accelerating expenses or deferring income for tax purposes this will be reflected in a lower Cash ETR provided that those timing differences do not reverse within the five-year period over which Cash ETR is measured. Finally, the Cash ETR measure will be reduced by the tax benefit associated with employee stock options and therefore provides a better measure of the firm's true tax burden than the traditional ETR measure. Of course, if Cash ETR is low due mostly to ESO tax benefits, this lowers the power of our tests using this proxy.

Following Dyreng et al. (2008) we calculate Cash ETR as the five-year sum of taxes paid (data 317) divided by the corresponding five-year sum of pre-tax book income (data 170) minus special items (data 17). For firms with missing data on cash taxes paid, cash taxes paid are estimated by current tax expense. Although not without problems, this measure overcomes many of the shortcomings associated with ETR.<sup>11</sup> It is unaffected by valuation and contingency estimates, and takes into account the tax benefits of employee stock options.

#### *b. Book-tax differences*

Our second proxy for tax aggressiveness is an estimate of the difference between pretax book income and taxable income (BTDs). There is some previous research that suggests BTDs

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<sup>11</sup> Cash taxes paid represents the actual taxes paid by the firm during a given year, and as a result could include estimated tax payments associated with the prior year's income. However, because we utilize a five-year measure of Cash ETR we expect the affect of the timing of estimated tax payments will add only a limited amount of noise to our measure of the Cash ETR.

could be an effective signal of tax aggressiveness. Desai (2003) posits that the growing difference between book and taxable income during the 1990's was caused by increased levels of tax sheltering. Wilson (2007) finds that BTDs are positively associated with actual incidence of tax sheltering. Further, Mills (1998) finds that IRS adjustments are positively related to large BTDs. Despite evidence that large positive BTDs are associated with aggressive tax reporting this measure also has limitations. Hanlon (2003) and Manzon and Plesko (2002) identify firm specific characteristics that are determinants of BTDs, but not necessarily reflective of aggressive tax reporting. For example, firms with large capital expenditures could have significant book-tax differences associated with depreciation, but this would not be reflective of an aggressive tax reporting strategy. To the extent that innate firm characteristics unrelated to aggressive tax reporting are the primary determinants of BTDs this could limit the usefulness of BTDs as a proxy for tax aggressiveness.

BTDs are computed as pre-tax book income less an estimate of taxable income. Taxable income is calculated by grossing up the sum of the current federal tax expense (data 63) and the current foreign tax expense (data 64) and subtracting the change in NOL Carryforward (data 52). If the current federal tax expense is missing, total current tax expense is calculated by subtracting deferred taxes (data 50), state income taxes (data 173) and other income taxes (data 211) from total income taxes (data 16). Book income is calculated as pre-tax book income (data 170) less minority interest (data 49). If our estimate of BTDs is associated with the type of firm that investors identify as tax aggressive then we expect the stock price reaction to key pronouncement associated with FIN 48 to be greater for firms with large BTDs.

Descriptive statistics for the samples and variables of interest appear in Panel A of Table 2.<sup>12</sup> Column (1) of Table 2 indicates the median sample firm has a cash effective tax rate of 25% and positive book-tax differences. Table 2 also reports descriptive statistics for the firms categorized into the most aggressive tax quintiles according to both measures of tax aggressiveness. The firms in the lowest Cash ETR quintiles are larger than the median firm from the entire sample and report larger book-tax differences. Firms in the highest book-tax difference quintile are smaller than the median firm from the full sample and report lower cash effective tax rates than the entire sample of firms.

Panel B of Table 2 presents the Pearson and Spearman correlation coefficients between the variables of interest. As expected, we observe a significant negative Pearson and Spearman correlation between the Cash ETR measure of tax aggressiveness and BTDs. The significant negative correlation between the tax aggressiveness measures is consistent with these proxies both capturing to some extent the same underlying construct of tax aggressiveness. The industry distribution of the sample firms is presented in Panel C of Table 2. Of the 1,381 sample firms, the largest concentration of firms is 631 in the manufacturing industry followed by 185 in the wholesale industry.

## **V. Research Design and Test Results**

### *a. Market response to key pronouncements*

Our first hypothesis examines the impact of 11 events associated with FIN 48 on stock prices. We examine hypothesis 1 using a Multivariate Regression Model (MVRM) proposed by Schipper and Thompson (1983). The MVRM model conditions the return generating process on

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<sup>12</sup> To ensure that our results are not driven by outliers, each of the tax aggressiveness variables are winsorized at the 1 and 99 percent level.

the occurrence or nonoccurrence of an event by adding a dummy variable to the market model for each event (Espahbodi et al. 2002). Each dummy variable is set equal to 1 for key event dates and zero otherwise. The coefficient on each dummy variable measures the impact of each respective event on stock returns. Because the exact timing of the information release associated with each pronouncement is not clear we use a three-day window corresponding to the days  $t = -1, 0, +1$  associated with each announcement date described in Table 1.

We estimate the stock market reaction using the following regression model:

$$R_{pt} = \alpha_p + \beta_p R_{mt} + \sum_{k=1}^K g_{pk} D_{kt} + e_{pt}, \quad (1)$$

$R_{pt}$  = the return on portfolio p on day t ( $t = 1, 2, \dots, T$ ). T is the total number of daily return observations from the beginning of 2004 through March of 2007.

$R_{mt}$  = the return on the CRSP value-weighted portfolio on day t;

$\alpha_p$  = intercept coefficient for portfolio p;

$\beta_p$  = risk coefficient for portfolio p;

$g_{pk}$  = the effect of event k ( $k = 1, 2, \dots, K$ ) on portfolio p's return. That is, g is an estimate of the abnormal return on the portfolio on event date k. K is the total number of events examined, which is 11 in this study;

$D_{kt}$  = dummy variable for the kth event which equals 1 during the 3-day period ( $t = -1, +1$  relative to the announcement date); and

$e_{pt}$  = random disturbance which is assumed to be both normal and independent of the explanatory variables.

We estimate the regression for three portfolios: all sample firms, and two portfolios comprising the firms categorized in the top quintile of aggressive tax reporting firms using each of the two measures of tax aggressiveness. Within each portfolio, firm returns are equally-weighted. Equation (1) measures the impact of the key pronouncements associated with FIN 48 on the sample firms in each portfolio. The estimation of the model in equation (1) assumes that the residuals are independently and identically distributed. Because returns are assumed to be

serially independent and the unit of analysis is portfolio returns we are not concerned with either cross-sectional heteroscedasticity or time-series dependence. However, to correct for possible time-series heteroscedasticity we use a procedure developed by White (1980) which allows the variance-covariance matrix of the residuals to vary across observations.

Table 3 reports the portfolio abnormal returns and the t-statistics for the full sample as well as the two portfolios containing the top quintile of each tax aggressiveness proxy for the 3-day period around each of the 11 key pronouncement dates. The portfolio abnormal returns reported in Table 3 are the coefficient estimates on the dummy variables in equation (1). The results in Column (1) of Table 3 indicate significant negative abnormal returns (at the .10 level or higher) for the entire sample around two of the three events (numbers 5 and 10) receiving the most significant press coverage; the issuance of the ED on July 14, 2005, and the issuance of the final interpretation on July 13, 2006. In addition, we observe significant negative abnormal returns on May 10, 2006, (event 9) the date of the FASB meeting where the disclosure of a tabular rollforward for uncertain tax positions was adopted. This result is consistent with the tabular rollforward being viewed by investors as a potential instrument for the IRS to better identify and audit aggressive taxpayers.

The remaining columns in Table 3 present the abnormal returns for the two portfolios of aggressive tax reporting firms. Note, that these columns do not present a direct test of whether the returns are associated with tax aggressiveness characteristics (those tests are presented in Table 4). Rather, these columns simply present the equally-weighted abnormal returns for these two alternative sub-samples of aggressive tax reporting firms. The results for the two sub-samples of aggressive tax reporting firms are generally consistent with the results for the full sample of firms. Notably, the low Cash ETR and high BTM portfolios both experienced

significant negative abnormal returns around the issuance of both the exposure draft and the final interpretation (events 5 And 10). In addition, the low Cash ETR sub-sample experienced significant positive returns on January 11, 2006 (event 7) the date FASB announced a delay in the effective date of the interpretation. This finding is consistent with investors reacting positively to news that any costs associated with implementing FIN 48 would be deferred as a result of the delay in implementing FIN 48. Further, the results in Column (3) indicate the high BTD sub-sample experienced significant negative returns on May 10, 2006 (event 9) the date FASB adopted the tabular rollforward disclosure for uncertain tax positions. Finally, we find a significant negative reaction for the high BTD sub-sample on November 22, 2005 (event 6) the date FASB decided to disregard audit risk in assessing uncertain tax benefits.

Table 3 also reports an F-statistic for each sub-sample of firms testing whether the cumulative total returns across the key dates are significantly less than zero. The results indicate that the cumulative market response across the pronouncement dates is significant for the complete sample of firms and for both sub-samples of tax aggressive firms. Specifically, for the complete sample we find a cumulative market reaction to all of the events of .77 of 1% which translates into a decline of \$43.11 million ( $.0077 \times \$5,599$  million average MVE) or \$5.46 billion of market value for the entire sample of firms. In general, the results in Table 3 are consistent with hypothesis 1.<sup>13</sup>

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<sup>13</sup> In supplemental tests (not tabulated) we also examined the market reaction to key pronouncements for portfolios of the least tax aggressive quintiles of firms (lowest BTD and highest Cash ETR). In contrast to the most aggressive quintile portfolios, we found no significant stock market reactions for these portfolios of firms to any of the key pronouncement dates. This result is consistent with investors being less concerned about the impact of FIN 48 on firms that appear to be conservative in their tax planning strategies. We also examined (not tabulated) the market reaction for the 93 firms in both the low Cash ETR and high BTD quintile portfolios. We observed significant negative stock price reactions for this subset of firms around the issuance of both the exposure draft and the final pronouncement.

*b. Examining cross-sectional variation in the market response to key pronouncements*

Hypothesis 2 examines whether the impact of key FIN 48 pronouncements is a function of firm characteristics associated with tax aggressiveness. To test the effects of these firm characteristics on the stock price reaction to our key event dates we use the portfolio weighting procedure developed by Sefcik and Thompson (1986). The Sefcik and Thompson (1986) method is used to account for cross-sectional heteroscedasticity and cross-correlation of the residuals which is likely to occur in the presence of common event dates. Under this estimation approach, the information pertaining to the full covariance matrix of the residuals is included by creating separate portfolios for P types of tax aggressiveness proxies. Each portfolio is then used to re-estimate equation (1) above. The estimates of  $g_{pk}$  reflect the effect of the pth tax aggressiveness proxy on the stock-price reaction to the kth event.<sup>14</sup>

Consistent with Espahbodi et al. (2002), we implement the Sefcik and Thompson (1986) procedure using the following approach. The first step in this procedure is the formation of an N x 2 matrix X having a column of ones and a column containing each firm's tax aggressiveness characteristic, namely either Cash ETRs or BTDs. The next step is to create portfolio weights (W) and compute the portfolio returns ( $R_{pt}$ ) as follows:

$$(X'X)^{-1}X' = W$$
$$R_{pt} = W_p'R_{it}, p = 1,2 t = 1,2,\dots,T, i = 1,2,\dots,N, \quad (2)$$

where:

W = P × N matrix of portfolio weights (P = 2 and N = 1,446 firms). Column 1 contains a column of 1s', column 2 contains the tax aggressiveness characteristic for each firm;

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<sup>14</sup> The Sefcik and Thompson (1986) approach is similar to a cross-sectional regression of abnormal returns on firms' tax aggressiveness characteristic at each event date:  $AR_{it} = \alpha_0 + \alpha_1 \text{Tax Agg}_{it} + \varepsilon$ . In this equation the coefficient  $\alpha_1$  is an estimate of the tax aggressiveness measure on the market reaction to a key FIN 48 pronouncement. This estimate,  $\alpha_1$ , is identical to the estimate,  $g_{pk}$ , produced by the Sefcik and Thompson (1986) weighted return approach. However, the Sefcik and Thompson (1986) approach accounts for cross-sectional heteroscedasticity and cross-correlation of the residuals providing a correct estimate of the standard error.

$R_{pt}$  = the portfolio return on day t; and  
 $R_{it}$  =  $N \times 1$  vector of individual firms' security returns on day t.

Using the weighted portfolio returns (where the weight is based on the firm's tax aggressiveness measure), we re-estimate equation 1. We form weighted portfolio returns separately for each measure of tax aggressiveness because we are interested in testing the association between returns and the construct of tax aggressiveness rather than the incremental effect of each measure of tax aggressiveness.

Table 4 presents the results of our tests of hypothesis 2. In interpreting the results presented in Table 4 it is important to note that all of the firms in our sample were profitable during the five-year period leading up to these key pronouncements. It is therefore likely that most of the firms in our sample would have an incentive to take some aggressive tax positions and would all be impacted to some degree by the implementation of FIN 48. This fact could limit our ability to detect cross-sectional differences in the market response to key events based on measures of tax aggressiveness.

The results in Column (1) of Table 4 are consistent with the market reaction around key FIN 48 pronouncements being associated with long-run cash effective tax rates. Most notably, we observe the market reaction on July 14, 2005, (event 5) the date the initial exposure draft was released, was positively associated with the level of Cash ETR. The positive association indicates that the lower the Cash ETR (the more tax aggressive the firm) the more negative the stock return. The significant positive association between the level of Cash ETR and this pronouncement, which received significant press coverage, is consistent with the conjecture that investors believed that aggressive tax reporting firms would incur the greatest costs as a result of implementing FIN 48. We also observe a positive association between the level of Cash ETR and

the market reaction on March 3, 2004 (event 1) the date FASB met with representatives from major public accounting firms to discuss the diversity in practice associated with accounting for uncertain tax benefits.

The results in Column (2) of Table 4 indicate a significant association between BTDs and the market reaction to several key pronouncements. Specifically, consistent with the results for the Cash ETR measure of tax aggressiveness we observe a significant negative association between BTDs and the market reaction to the issuance of the exposure draft (event 5). Note that the association between the market reaction and BTDs is negative because, consistent with hypothesis 2, we expect firms with larger BTDs to experience significantly more negative returns around key pronouncements. This expectation is in contrast to our tests of the Cash ETR measure where lower values of Cash ETR are hypothesized to be associated with more aggressive tax reporting. Inconsistent with our expectations, we observe a positive association between BTDs and the market reaction to pronouncements on July 24, 2004 and November 17, 2004, and January 11, 2006 (events 2, 3 and 7). However, as noted above, pronouncements on these dates received limited press coverage and we are uncertain as to what is driving this association.

## **VI. Examining the market reaction to the initial FIN 48 disclosures**

Our next set of tests examines the market reaction to the initial disclosure of unrecognized tax benefits (UTBs) under FIN 48. Our analysis focuses on the 3-day period around the filing date of Form 10-Q for the first quarter of 2007. FIN 48 is effective for fiscal years beginning after December 15, 2006; for companies on a calendar year, the rule goes into effect during the first quarter of 2007. If, prior to the implementation of FIN 48, investors were unable to accurately estimate the extent of unrecognized tax benefits then this disclosure will provide

investors with new information regarding the extent of a firm's tax aggressiveness.<sup>15</sup> To test for an association between unrecognized tax benefits disclosed under FIN 48 and abnormal stock returns we employ the following model:

$$CAR_i = \alpha_0 + \alpha_1 UTB_i + \alpha_2 UE + \varepsilon_i \quad (3)$$

where CAR is the cumulative abnormal return for firm *i* over a 3-day window (-1, 0, +1), where day 0 is the filing date of Form 10-Q with the SEC, and UTB is the total unrecognized tax benefit reported for the first quarter ended 2007 scaled by the market value of equity. UE is the earnings forecast error computed as the reported EPS less the mean IBES analyst forecast for the first quarter of 2007 (scaled by beginning of quarter price per share) and is included to account for the security price consequences of unexpected earnings. CAR is computed using a market model estimated from 170 to 21 days prior to the filing date and using the parameter estimates to compute risk-adjusted abnormal returns. We require a minimum of 36 daily return observations prior to the filing date to calculate the market model. H3a (based on increased tax and political costs facing firms with larger UTBs) predicts a negative association between UTBs and CAR ( $\alpha_1 < 0$ ) while H3b (based on investors revising downward firms reported effective tax rates) predicts a positive association ( $\alpha_1 > 0$ ). We conduct two-tailed tests of significance on  $\alpha_1$  and because we use a narrow event window around each firms filing date, event time does not overlap with calendar time mitigating concerns with cross-sectional correlation (which was a

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<sup>15</sup> Firms with calendar year-ends were required to disclose the anticipated impact of adopting FIN 48 in their 2006 annual report. While the disclosure of the anticipated impact of adopting FIN 48 (via an estimated amount that would be credited/debited to retained earnings to reflect the cumulative adjustment to the firms contingent tax liability, the expected balance in the contingent tax liability was not disclosed) is interesting and provides information on whether a firm was over or under reserved prior to adopting FIN 48, these annual report (or 10K) disclosures do not provide information on the actual magnitude of the contingency for UTBs which is the focus of our tests. However, to the extent investors were able to make inferences about the magnitude of UTBs from the 2006 10-Ks this would limit our ability to detect an association between the initial UTB disclosures and abnormal returns.

concern in the tests of H2 where the event date was common for all sample firms and which lead to our use of the Sefcik and Thompson procedure).

Panel A of Table 5 describes the sample selection process for our final set of tests. We begin with all S&P 500 firms with a calendar year-end and match those firms to IBES for calculation of unexpected earnings using the mean analyst forecast. We remove 8 firms that did not disclose UTB data for either the beginning or the end of the period and an additional 7 firms without sufficient stock return data to calculate the market model. Our final sample consists of 334 observations with complete data. If a firm only discloses the amount of UTBs for the beginning of the quarter and not for the end of the quarter we assume there has been no change in their UTBs during the quarter and utilize the amount disclosed for the beginning of the quarter in our tests.

Panel B of Table 5 reports the descriptive statistics for the S&P 500 firms used in our initial UTB disclosure analysis. Not surprisingly, these firms are large and profitable with median total assets of \$15,967 million and median after-tax net income of \$179 million. The median contingency for uncertain tax benefits is \$120 million and the median portion of the total contingency that managers indicate will impact the effective tax rate if recognized is \$72 million. General Electric reported the largest contingency for uncertain tax benefits, \$6.8 billion, in this sample. Panel B also presents the scaled variables that are used in equation (3). All of the independent variables in this analysis are winsorized at the 1 and 99 percent level to ensure our results are not driven by outliers.

Panel C of Table 5 presents the results of our tests of the market reaction around the initial UTB disclosures required by FIN 48. Consistent with H3b we observe a significant positive association between abnormal returns around the filing date and UTBs. This association does not

change when we add our measure of unexpected earnings, UE, to the regression. This finding is consistent with the conjecture that investors react positively to disclosures of uncertain tax benefits because those disclosures lead to a downward revision in investor beliefs about the firm's true tax burden and/or react positively to news of corporate tax aggressiveness. In Columns (3) and (4) of Panel B we limit the sample to firms that reported earnings at least 5 days prior to the filing of their quarterly report in an effort to minimize the security price response to the earnings release. The results for this limited sample are consistent with those reported for the entire sample of firms.

In Panel D of Table 5 we examine the security price reaction to the disclosure of the portion of UTBs that firms indicate would impact their effective tax rate if the tax benefit is recognized. The complete UTB contingency is a function of two types of uncertain tax positions. The first type of tax position is where the timing of the deduction, but not the ultimate deduction itself is at issue. The second type of tax position is one where the ultimate deductibility is at issue (Nichols et al. 2007). Adjustment to the portion of UTB associated with the timing of a deduction will affect the UTB and deferred taxes, but would not impact the total tax expense or the firm's effective tax rate. While the penalties and interest imposed by the IRS associated with the timing of a deduction can be significant, issues associated with the ultimate deductibility of an item are likely to be most costly and are the only tax positions that will have an effect on financial reporting income. Because this component of the UTB is likely to be of more interest to investors in evaluating the tax burden of firms we replicate our tests from Panel B of Table 5 examining only this component. Consistent with our tests examining the full UTB, the results in Panel D of Table 5 indicate a significant positive association between abnormal returns around the quarterly filing date and the component of UTB that firms indicate would impact their

effective tax rates.<sup>16</sup> The remaining component of the contingency (UTB NON-ETR) exhibits a negative coefficient in this regression which is significant at conventional levels when there is at least a 5-day window between the earnings release and quarterly filing date. These findings suggests the positive association between the initial UTB disclosures and abnormal returns is driven by the component of UTB management indicates will impact their effective tax rate (and hence earnings) if recognized.

## **VII. Supplemental Tests**

In our tests examining the market reaction to key FIN 48 pronouncement we assume investors form their beliefs about the level of firms tax aggressiveness by using traditional measures of tax aggressiveness such as book-tax differences and the cash effective tax rate. Variations of these measures have been used in a number of prior studies examining tax aggressiveness. For example, Desai and Dharmapala (2006) use a measure based on BTDs as a proxy for tax sheltering. Frank, Lynch, and Rego (2007) also use a measure derived from BTDs to proxy for aggressive tax reporting and Dyreng et al. (2008) use their measure of Cash ETR to examine long-run tax avoidance by firms. As discussed previously each of these measures has limitations and the extent to which they capture actual tax aggressiveness on the part of firms is not clear. We take advantage of the new disclosures required under FIN 48 to examine the association between these measures and contingencies for uncertain tax benefits. The contingencies for uncertain tax benefits are a direct measure of the tax positions management is concerned would be challenged if examined by the relevant tax authority. As a result, these contingencies provide an excellent new measure of the level of a firm's tax aggressiveness. To

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<sup>16</sup> In cases where the firm does not indicate the portion of UTB that will impact their effective tax rate if recognized we use the full amount of UTB as our measure of UTB(ETR).

test for an association between unrecognized tax benefits disclosed under FIN 48 and the traditional measures of tax aggressiveness we estimate the following model:

$$UTB_i = \beta_0 + \beta_1 BTD_i + \beta_2 CASH ETR_i + \varepsilon_i \quad (4)$$

where both UTB and BTD are scaled by beginning total assets and all variables are calculated as described in the previous sections. It should be noted, that if a firm records a contingency for an uncertain tax position that if recognized would result in a permanent book-tax difference, recording the contingency for that position will eliminate the creation of a BTD. As a result, if an aggressive tax reporting firm is recording contingencies for each of their aggressive tax positions then a measure of BTDs based on financial reporting information would be unlikely to detect any tax aggressiveness and we would not expect to find a relationship between the level of contingencies and BTDs. However, if firms are only partially reserving for their aggressive tax positions then it is possible a firm with large tax contingencies might also have significant BTDs. This limitation is not a concern with the Cash ETR measure because cash taxes paid will be reduced when a firm engages in an aggressive tax positions regardless of whether a contingency is recorded.

The results in Panel A of Table 6 indicate that there is not a significant association between either BTDs or the Cash ETR measure and UTBs. This finding suggests both BTDs and Cash ETR might have limitations as measures of tax aggressiveness and indicates that investors would have had difficulty using these measures to accurately form expectations about the extent of firms' tax contingencies prior to the adoption of FIN 48. However, the total UTB measure includes uncertain tax positions associated with temporary book-tax differences. While timing differences can lead to significant savings through the deferral of tax payments, the cost of having these positions reversed upon audit is unlikely to be as significant as having a permanent

book-tax difference reversed. Consequently, we also examine whether there is an association between the two traditional measures of tax aggressiveness and the portion of UTBs managers indicate will impact their effective tax rate if recognized. The results in Panel B of Table 6 indicate a significant positive association between BTDs and this component of UTB. The results in Column (2) of Panel B indicate a significant negative association between the Cash ETR measure and this component of UTB. The results in Panel B are consistent with expectations and suggest that these two traditional measures do capture to some extent variation in tax aggressiveness between firms.

## **VIII. Conclusion**

The purpose of FIN 48 is to reduce the significant diversity in practice associated with the accounting for uncertain tax positions. However, this interpretation raised concerns that the new disclosure requirements could actually lead to an increase in tax costs for firms. Specifically, concern was expressed that the additional disclosure requirements associated with FIN 48 would provide a “road-map” for the IRS to more effectively identify and audit uncertain tax positions. Examining the capital market reaction to key pronouncements associated with the passage of FIN 48 provides direct insight into the market’s assessment of the economic significance of the costs associated with FIN 48. To the extent the conjecture that investors believe aggressive tax reporting firms will incur the greatest costs associated with FIN 48 is valid; these tests also provide insight into how investors identify tax aggressive firms by examining how returns vary around key FIN 48 pronouncements as a function of alternative measures for tax aggressiveness.

Our results indicate that firms did exhibit significant abnormal returns around several key pronouncements associated with FIN 48. These returns were most significant for events

associated with FIN 48 that received the greatest amount of press coverage such as the issuance of the initial exposure draft and the final issuance of the interpretation. This finding is consistent with investors believing that these additional disclosures will be a useful tool for the IRS or other relevant tax authority to more effectively audit firms. Investors could also believe the implementation of FIN 48 will result in increased scrutiny of uncertain tax positions and lead to pressure on the IRS to abandon its current policy of restraint with regards to requesting audit workpapers supporting the calculation of the tax contingency. These tax accrual workpapers would then lead to improved audit effectiveness for the IRS and an increased tax burden for firms.

Our second set of tests examines the market response to the initial disclosure of uncertain tax benefits required by FIN 48 in the first quarter of 2007. We find a positive association between abnormal returns around the first quarter report filing date and the amounts firms disclose as total uncertain tax benefits. These results are consistent with investors revising their assessment of firms' tax burdens downward in response to new information provided by FIN 48 regarding the magnitude of uncertain tax benefits and/or investors reacting positively to news of tax aggressiveness. These findings suggest that limited disclosures of tax contingencies prior to the adoption of FIN 48 made it difficult for investors to estimate firms' tax contingencies and that the disclosures provided by FIN 48 during the first quarter of 2007 provided new information to market participants. We also use these new disclosures to examine the association between two traditional measures of tax aggressiveness, BTDs and Cash ETR, and the magnitude of uncertain tax benefits. We find no association between the total contingency for uncertain tax benefits and either of these measures. This finding suggest it would have been difficult for investors to form accurate expectations about the magnitude of these contingencies using traditional measures of

tax aggressiveness. However, we do find some association between these measures and the component of the contingency for uncertain tax benefits that would impact the effective tax rate if recognized. This finding indicates that despite their limitations, these measures do capture to some degree variation in the level of tax aggressiveness between firms.

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**Table 1**

## Important pronouncements leading to the issuance of FIN 48 and their expected market reaction

Event Number	Event Date	Description	Expected market reaction
1	3/3/2004	FASB board members meet with representatives from the SEC and major public accounting firms. Significant diversity in practice associated with uncertain tax benefits is noted.	Negative
2	7/27/2004	Board decides to add uncertain tax benefits to its agenda. Require adoption of probable standard to record benefits and SFAS No. 5 disclosure for recognized liabilities	Negative
3	11/17/2004	Board decides uncertain tax benefit should be based on best estimate of amount that will ultimately be sustained under audit. Proposed interpretation will be effective for periods ending after December 15, 2005.	Negative
4	2/16/2005	Board instructs staff to prepare exposure draft for written vote.	Negative
5	7/14/2005	FASB issues exposure draft. Press coverage noting new requirements for recognizing tax benefits would be more restrictive. Additional disclosures could be useful to tax authorities in auditing firms.	Negative*
6	11/22/2005	Board adopts two-step approach, more likely than-not recognition, and best estimate measurement attribute. Risk of audit is not relevant.	Neutral
7	1/11/2006	FASB announces effective date of interpretation will begin after Dec. 15, 2006. Represents delay in effective date of interpretation.	Positive
8	3/1/2006	FASB reaches small compromise on best estimate measurement attribute	Neutral
9	5/10/2006	FASB announces disclosure requirements will include a tabular schedule of uncertain tax positions	Negative
10	7/13/2006	Issue final standard. Increased press coverage discussing possibility that FIN 48 disclosures will provide an audit roadmap for the IRS	Negative*
11	1/17/2007	Board unanimously rejects calls for a one-year delay in the Implementation of FIN 48.	Negative*

Pronouncements on these dates received coverage in either or both the *Wall Street Journal* and the *New York Times*. We expect a significant market reaction to these pronouncements due, in-part, to the relatively extensive press coverage on these dates.

**Table 2**  
Descriptive statistics

Panel A: Means (Medians) for available observations

Column Number	(1)	(2)	(3)
Category	All Firms	Low Cash_ETR Quintile	High BTD Quintile
N	1,381	277	276
Total Assets (\$millions)	9,190.65 (870.91)	9,145.61 (1,223.61)	3,576.90 (749.02)
MV (\$millions)	5,599.06 (837.81)	4,235.82 (774.73)	6,027.16 (893.79)
ROA	0.08 (0.06)	0.07 (0.04)	0.12 (0.09)
Cash_ETR	0.23 (0.25)	0.03 (0.03)	0.18 (0.16)
BTB	0.04 (0.03)	0.06 (0.04)	0.12 (0.09)

Panel B: Pearson and Spearman Correlation Coefficients

	<u>SIZE</u>	<u>ROA</u>	<u>Cash_ETR</u>	<u>BTB</u>
SIZE		<b>-0.16</b>	<b>-0.20</b>	-0.04
ROA	<b>-0.12</b>		-0.02	<b>0.38</b>
Cash_ETR	<b>-0.21</b>	<b>0.10</b>		<b>-0.26</b>
BTB	0.01	<b>0.33</b>	<b>-0.31</b>	

Panel C: Industry Distribution of Sample Firms

SIC Code	Industry Type	Observations
1-1499	Agriculture, Forestry, and Mining	35
1500-1999	Construction	26
2000-3999	Manufacturing	631
4000-4999	Transportation and Communication	133
5000-5999	Wholesale	185
6000-6999	Financial Services	173
7000-7999	Hotels, Services	136
8000-8999	Services	62
<b>Total</b>		<b>1,381</b>

## Table 2 (Continued)

Assets	= total assets.
MV	= market value of equity.
SIZE	= log of total assets.
ROA	= income from continuing operations (data 18) divided by lagged total assets (data 6).
Cash_ETR	= the five-year average cash effective tax rate calculated as the five-year sum of cash taxes paid divided by the five-year sum of pre-tax book income less special items. If cash taxes paid is missing then we use the current tax expense.
BTD	= the sum of book income less taxable income scaled by lagged total assets (data 6).

In Panel B, upper (lower) diagonal reports Pearson (Spearman) correlations and all reported correlations that are significant at  $p < 0.05$ , two tailed, are bolded.

**Table 3**

Market response to events affecting adoption of FIN 48 – equally-weighted portfolio returns

Column Number			(1)	(2)	(3)
			<i>All Firms</i>	<i>Low Cash ETR Quintile</i>	<i>High BTD Quintile</i>
			CAR	CAR	CAR
Event <sup>a</sup>	Event	Predicted	(t-stat)	(t-stat)	(t-stat)
Number	Date	Sign	(N = 1,381)	(N = 277)	(N = 276)
1	3/3/2004	-	0.16 (1.22)	0.10 (0.63)	0.18 (1.13)
2	7/27/2004	-	-0.12 (-0.92)	-0.03 (-0.18)	-0.14 (-0.91)
3	11/17/2004	-	0.01 (0.12)	-0.12 (-0.73)	0.29 <b>(1.85)</b>
4	2/16/2005	-	-0.04 (-0.30)	0.05 (0.27)	0.00 (0.02)
5	7/14/2005	-	-0.18 <b>(-1.40)</b>	-0.49 <b>(-2.95)</b>	-0.30 <b>(-1.90)</b>
6	11/22/2005	?	-0.10 (-0.79)	-0.11 (-0.66)	-0.23 <b>(-1.46)</b>
7	1/11/2006	+	0.07 (0.55)	0.22 <b>(1.31)</b>	0.01 (0.07)
8	3/1/2006	?	-0.05 (-0.39)	-0.05 (-0.27)	-0.02 (-0.15)
9	5/10/2006	-	-0.22 <b>(-1.76)</b>	-0.15 (-0.90)	-0.30 <b>(-1.89)</b>
10	7/13/2006	-	-0.29 <b>(-1.82)</b>	-0.31 <b>(-1.52)</b>	-0.29 <b>(-1.53)</b>
11	1/17/2007	-	-0.01 (-0.10)	-0.09 (-0.54)	-0.07 (-0.43)
TOTAL			-0.77	-0.98	-0.87
F-statistic			<b>3.14</b>	<b>3.03</b>	<b>2.91</b>

The above results relate to the following equation which is run for each portfolio:

$$R_{pt} = \alpha_p + \beta_p R_{mt} + \sum_{k=1}^K g_{pk} D_{kt} + e_{pt}, \quad (1)$$

$R_{pt}$  = the return on portfolio p on day t ( $t = 1, 2, \dots, T$ ). T is the total number of daily return observations from the beginning of 2004 through March of 2007;  $R_{mt}$  = the return on the CRSP value-weighted portfolio on day t,  $\alpha_p$  = intercept coefficient for portfolio p;  $\beta_p$  = risk coefficient for portfolio p;  $g_{pk}$  = the effect of event k ( $k = 1, 2, \dots, K$ ) on portfolio p's return. K is the total number of events examined, which is 11 in this study;  $D_{kt}$  = dummy variable for the kth event which equals one during the 3-day period ( $t = -1, +1$  relative to the announcement date) surrounding event k and zero otherwise; and  $e_{pt}$  = random disturbance which is assumed to be both normal and independent of the explanatory variables. The full sample portfolio is composed of all firms in the sample. Other samples are subsets of these firms. This table provides portfolio abnormal returns (the estimated coefficients  $g_{pk}$  from (1) in %) and White (1980) adjusted t-statistics (in parentheses) for the full sample and the two sub-samples around each of the 11 events. Coefficients that are significant at the 0.10 level, one-tailed, are bolded. The F-statistic tests whether the sum of the estimated coefficient on the dummy variables across all event dates is significantly different than 0. Event numbers and dates are described in Table 1. The boxed event dates are the those that received coverage in either or both the *Wall Street Journal* and the *New York Times*. We expect a significant market reaction to these pronouncements due, in-part, to the relatively extensive press coverage on these dates.

**Table 4**

Tests of hypothesis 2 for the 11 events – weighted portfolio returns

Column Number			(1)		(2)
Event <sup>a</sup> Number	Event Date	Predicted Sign	<i>Cash_ETR</i> <i>Portfolio Wts</i> (t-stat)	Predicted Sign	<i>BTD</i> <i>Portfolio Wts</i> (t-stat)
1	3/3/2004	+	0.59 <b>(1.52)</b>	-	-0.29 (-0.43)
2	7/27/2004	+	-0.03 (-0.07)	-	1.07 <b>(1.55)</b>
3	11/17/2004	+	0.42 (1.09)	-	1.75 <b>(2.55)</b>
4	2/16/2005	+	-0.29 (-0.74)	-	1.75 (0.22)
5	7/14/2005	+	1.14 <b>(2.92)</b>	-	-2.82 <b>(-4.10)</b>
6	11/22/2005	?	-0.01 (-0.04)	?	-0.53 (-0.76)
7	1/11/2006	-	-0.20 (-0.52)	+	-0.98 <b>(-1.43)</b>
8	3/1/2006	?	-0.18 (-0.46)	?	-0.05 (-0.07)
9	5/10/2006	+	-0.38 (-0.98)	-	-0.54 (-0.79)
10	7/13/2006	+	-0.16 (-0.34)	-	0.16 (0.19)
11	1/17/2007	+	0.12 (0.31)	-	-0.25 (-0.36)
Observations			1,381		1,381

The above results relate to the following equation which is run for each portfolio:

$$R_{pt} = \alpha_p + \beta_p R_{mt} + \sum_{k=1}^K g_{pk} D_{kt} + e_{pt}, \quad (1)$$

$R_{pt}$  = the weighted return on portfolio p on day t ( $t = 1, 2, \dots, T$ ) where the weight is the tax aggressiveness measure indicated in the column heading. T is the total number of daily return observations from the beginning of 2004 through March of 2007;  $R_{mt}$  = the return on the CRSP value-weighted portfolio on day t,  $\alpha_p$  = intercept coefficient for portfolio p;  $\beta_p$  = risk coefficient for portfolio p;  $g_{pk}$  = the effect of event k ( $k = 1, 2, \dots, K$ ) on portfolio p's return.  $g_{pk}$  for each portfolio measures the effect of the corresponding tax aggressiveness characteristics on the stock price reaction to event k and is the coefficient reported in the table. K is the total number of events examined, which is 11 in this study;  $D_{kt}$  = dummy variable for the kth event which equals one during the 3-day period ( $t = -1, +1$  relative to the announcement date) surrounding event k and zero otherwise; and  $e_{pt}$  = random disturbance which is assumed to be both normal and independent of the explanatory variables. Coefficients that are significant at the 0.10 level, one-tailed, are bolded. Event numbers and dates are described in Table 1. The boxed event dates are those that received coverage in either or both the *Wall Street Journal* and the *New York Times*. We expect a significant market reaction to these pronouncements due, in-part, to the relatively extensive press coverage on these dates.

**Table 5**

## Market reaction to new uncertain tax benefit disclosures

## Panel A: Sample selection process

S&P 500 firms with a calendar year-end	361
less firms that could not be matched to IBES for calculation of unexpected earnings	(12)
less firms that did not disclose either beginning or end of the quarter values for unrecognized tax benefits	(8)
less firms without sufficient stock return data*	(7)
firms with complete data	334

\* Require a minimum of 36 days of returns prior to the filing of quarterly earnings to calculate the market model.

## Panel B: Descriptive Statistics

Category	Obs	Mean	Median	Stddev	Min	Max
<u>Variables in \$ Millions</u>						
Total Assets - TA	334	61,732.35	15,966.50	189,925.42	798.87	2,020,966.00
Market Value of Equity - MV	334	29,975.53	15,349.27	49,882.97	1,484.59	468,519.06
After-Tax Net Income - NI	334	442.88	178.88	918.05	-611.00	9,280.00
Total Unrecognized Tax Benefit - UTB	334	384.16	120.00	787.60	1.30	6,806.00
Unrecognized Tax Benefits Impacting ETR	334	225.12	71.90	472.13	0.00	4302.00
<u>Variables Scaled by Market Value of Equity</u>						
UTB / MV	334	0.014	0.009	0.018	0.000	0.156
UTB(ETR) / MV	334	0.008	0.006	0.011	0.000	0.121
UTB (Non ETR) / MV	334	0.005	0.002	0.012	-0.001	0.133
UE / MV	334	0.001	0.001	0.005	-0.043	0.071

UTB is the total contingency for uncertain tax benefits at the end of the quarter.

UTB (ETR) is the portion of the contingency for uncertain tax benefits the firm indicates would impact the effective tax rate if the benefits were recognized.

UTB (Non ETR) is the total contingency for uncertain tax benefits less the portion the firm indicates would impact their ETR if recognized.

UE is unexpected earnings (actual EPS less the mean IBES analyst forecast)

**Table 5 (Continued)**

Panel C: Cumulative abnormal returns around disclosure of unrecognized tax benefit

Column Number		(1)	(2)	(3)	(4)
	Pred. Sign	Full Sample	Full Sample	5-day window between earnings release and quarterly filing date	5-day window between earnings release and quarterly filing date
		CAR(-1,+1)	CAR(-1,+1)	CAR(-1,+1)	CAR(-1,+1)
INTERCEPT	?	0.05 (6.10) <sup>***</sup>	0.05 (5.85) <sup>***</sup>	0.05 (5.25) <sup>***</sup>	0.05 (5.27) <sup>***</sup>
UTB / MV	?	0.62 (2.23) <sup>**</sup>	0.51 (1.43) <sup>*</sup>	0.74 (1.71) <sup>*</sup>	0.65 (1.48) <sup>*</sup>
UE / MV	+		2.96 (2.02) <sup>**</sup>		1.88 (1.47) <sup>*</sup>
Adjusted R <sup>2</sup>		0.89%	2.77%	0.87%	1.40%
N		334	334	226	226

Panel D: Cumulative abnormal returns around disclosure of unrecognized tax benefit – decomposing UTB into benefits that impact (do not impact) the firm's ETR

	Pred. Sign	Full Sample	5-day window between earnings release and quarterly filing date
		CAR(-1,+1)	CAR(-1,+1)
INTERCEPT	?	0.04 (5.47) <sup>***</sup>	0.05 (5.32) <sup>***</sup>
UTB(ETR)/MV	?	1.56 (3.21) <sup>***</sup>	1.65 (3.08) <sup>**</sup>
UTB (NON-ETR) / MV	?	-0.56 (-1.18)	-1.02 (-1.38) <sup>*</sup>
UE / MV	+	3.51 (2.33) <sup>**</sup>	2.83 (1.92) <sup>**</sup>
Adjusted R <sup>2</sup>		4.56%	4.26%
N		334	226

CAR is the cumulative abnormal return over a 3-day window (-1, +1), where day 0 is the filing date of Form 10-Q with the SEC. UTB is the total unrecognized tax benefit at the end of the first quarter. If this number is not disclosed in the footnotes of the quarterly earnings report then we use the amount of unrecognized tax benefit disclosed for the beginning of the quarter. UE is unexpected earnings (actual EPS less the mean IBES analyst forecast). MV is the market value of equity at the end of the first quarter. Values in parentheses are White adjusted t-statistics. Asterisks \*, \*\*, and \*\*\* denote two-tailed (one-tailed when there is a predicted sign) statistical significance at 10%, 5%, and 1% respectively.

**Table 6**

Examining the association between tax aggressiveness measures and uncertain tax benefits

$$UTB_i = \beta_0 + \beta_1 BTD_i + \beta_2 CASH\_ETR_i + \varepsilon_i \quad (4)$$

## Panel A: Total uncertain tax benefits

	Expected Sign	(1)	(2)	(3)
INTERCEPT	?	0.02 (15.79) <sup>***</sup>	0.01 (11.44) <sup>***</sup>	0.02 (10.00) <sup>***</sup>
BTD	+	0.02 (1.13)		0.01 (0.61)
CASH_ETR	-		0.01 (1.03)	0.00 (0.35)
Adjusted R <sup>2</sup>		0.36%	0.28%	0.39%
N		354	354	354

## Panel B: Decomposing UTB into benefits that impact the firm's ETR

	Expected Sign	(1)	(2)	(3)
INTERCEPT	?	0.02 (11.97) <sup>***</sup>	0.02 (8.29) <sup>***</sup>	0.02 (8.55) <sup>***</sup>
BTD	+	0.06 (3.10) <sup>**</sup>		0.06 (2.84) <sup>**</sup>
CASH_ETR	-		-0.01 (-1.82) <sup>**</sup>	-0.01 (-1.31) <sup>*</sup>
Adjusted R <sup>2</sup>		2.70%	1.74%	2.55%
N		354	354	354

In Panel A the dependent variable is the total contingency for uncertain tax benefits at the end of the quarter scaled by beginning of the period total assets. In Panel B the dependent variable is the portion of the contingency for uncertain tax benefits the firm indicates would impact their effective tax rate if recognized scaled by beginning of the period total assets. CASH\_ETR is the five-year average cash effective tax rate calculated as the five-year sum of cash taxes paid (data 317) divided by the five-year sum of pre-tax book income (data 170) less special items (data 17). If cash taxes paid is missing then we use the current tax expense.

BTD is the sum of book income less taxable income scaled by beginning total assets (data 6).

Values in parenthesis represent White adjusted t-statistics. Asterisks \*, \*\*, and \*\*\* denote two-tailed (one-tailed when there is a predicted sign) statistical significance at 10%, 5%, and 1% respectively.