

The Economic Consequences of Tax Disclosure Regulation:  
Evidence from FIN 48

By

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## Abstract

This study investigates how firms respond to the tax disclosure requirements in the Financial Accounting Standards Board's Interpretation No. 48: *Accounting for Uncertainty in Income Taxes* (FIN 48). As a significant change in tax accounting in the United States, FIN 48 drew considerable controversy at the time of its adoption. Due to the concerns that the Internal Revenue Service may use the new disclosure to facilitate tax audits, firms likely reassessed the cost of pursuing aggressive tax policies. This study finds variations among U.S. firms' tax policy changes in response to the new disclosure requirements across several dimensions, such as firms' preexisting tax aggressiveness and geographic proximity to IRS offices, as well as the IRS's continuous monitoring of firms. The magnitude of reactions, which is captured by a spike in cash effective tax rate, and the stickiness of reactions, which is captured by an annual adjustment speed of cash effective tax rate, vary across the three dimensions. The variation in the magnitude and stickiness of reactions suggests a heterogeneous response by U.S. firms to a tax disclosure regulation. The study contributes to the literature on public tax disclosure and the real effects of disclosure regulations.

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## **The Economic Consequences of Tax Disclosure Regulation: Evidence from FIN 48**

To reduce information asymmetry that exists between managers and stakeholders, in the United States, public firms face substantial disclosure obligations. The Securities Acts of 1933 and 1934, the rules of the Securities and Exchange Commission (SEC), and the guidance of the Financial Accounting Standards Board (FASB) are largely disclosure-based (Dalley 2007; Gallagher 2013). The disclosure literature documents extensive evidence on the capital market consequences of implementing disclosure regulations; however, there has been much less attention to the behavior of disclosing firms, the very entities that bear the disclosure costs (Kanodia and Sapa 2016; Leuz and Wysocki 2016). Furthermore, tax disclosure by U.S. firms is limited (Lenter, Slemrod, and Shackelford 2003). This study investigates what real tax actions U.S. firms took in response to the disclosure requirements in a tax accounting standard, FASB Interpretation No. 48, *Accounting for Uncertainty in Income Taxes* (hereafter, FIN 48).<sup>1</sup>

FIN 48 provides an interesting setting to study firms' responses to disclosure requirements for at least two reasons. First, publicly disclosed information regarding U.S. firms' tax attributes is limited. The Internal Revenue Service (IRS) is not allowed to disclose firms' tax returns, because U.S. tax laws protect the confidentiality of tax returns and the information contained in them (Internal Revenue Code § 6103). Except for limited information disclosed via public companies' financial statements (e.g., tax expense per generally accepted accounting principles, cash tax paid, and specific disclosures in tax footnotes), U.S. firms' tax information is

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<sup>1</sup> In theory, disclosure rules in accounting standards can exert pressure on firms to take real actions (Dye 2002; Dye, Glover, and Sunder 2015). In a theoretical model, Kanodia and Sapa (2016) argue that if a disclosure requirement changes how information is measured, aggregated, and disclosed, the new disclosure requirements will affect corporate decision-making and lead to real actions. Similar to the view in Leuz and Wysocki (2016), in this study, real effects refer to the changes in behaviors of reporting entities. In the FIN 48 setting, the real actions are the changes in corporate tax policies in response to the disclosure requirements of FIN 48.

largely unobservable to outsiders (Hanlon and Heitzman 2010). However, due to the complexity of tax laws and the ambiguity in interpretations, firm managers often exercise judgment when making tax decisions. The disclosure requirements in FIN 48 demand firms to assess the uncertainty in their tax positions and make disclosures. Before FIN 48, there is no such specific guidance for the accounting and disclosure of tax uncertainty.<sup>2</sup>

In 2006, aiming to standardize diverse practices and improve disclosure quality, the FASB issued FIN 48. The new rules mandate that firms follow a standardized procedure to assess uncertain tax positions and disclose unrecognized tax benefits (UTB), which account for the potential loss that could result from tax authorities' challenges on firms' uncertain tax positions. Under the new regime, managers assume that tax authorities have full knowledge of all relevant information on tax positions. Managers make the assessment solely based on the technical merits of tax positions and must assume that a tax audit will occur with certainty. Firms also provide enhanced disclosure, including a tabular reconciliation of the beginning and ending UTB balances in financial statements.<sup>3</sup> Such information is not observable by outsiders before FIN 48. Furthermore, firms include FIN 48 disclosures in SEC filings, and independent accountants audit such disclosures. In sum, FIN 48 significantly alters the recognition, measurement, and disclosure of tax uncertainty.

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<sup>2</sup> Prior to FIN 48, U.S. firms relied on limited guidance in FASB Statement of Accounting Standards No. 5, *Accounting for Contingencies* (FAS5; FASB 1975) for both tax and nontax loss contingencies. FAS 5 establishes that two requirements must be met in order to trigger the disclosure of a loss contingency: (a) it is probable that a loss may occur; (b) the amount of loss can be reasonably estimated. However, firm managers exercise considerable discretion in application. Consequently, the disclosure under this old regime for tax contingency is known for its poor quality (Gleason and Mills 2002). FASB Statement of Accounting Standards No. 109, *Accounting for Income Taxes* (FAS 109; FASB 1992), also does not contain specific guidance on how to address the reporting for the uncertainty in tax accounting (FASB 2006). After FIN 48, FAS 5 continues to be applicable for nontax loss contingencies.

<sup>3</sup> Appendix A provides examples of firms' disclosure on tax items in the SEC's 10-K filings before and after FIN 48.

Second, the disclosure requirements in FIN 48 impose a nontrivial cost on disclosing firms because the IRS can use FIN 48 disclosure to identify the existence of questionable tax strategies. While the FASB's original intentions were neither to curb aggressive tax avoidance nor to provide tips to the IRS, FIN 48 attracted significant controversy at the time FIN 48 was proposed and adopted. The SEC and the IRS both exhibited strong enthusiasm for using the new FIN 48 disclosure. Former SEC Chief Economist Chester S. Spatt claims that the FIN 48 information could provide the tax authority with a "road map" to find targets and to conduct tax audits.<sup>4</sup> The IRS's website says, "Tax footnotes included in financial statements, including FIN 48 disclosures, should be carefully reviewed and analyzed as part of the audit planning process.... Revenue agents should not be reluctant to pursue matters mentioned in FIN 48 disclosures."<sup>5</sup> Firm managers and tax practitioners echo this view. In a survey conducted by KPMG in the first quarter after FIN 48 adoption, 52 (37) percent of the responding participants view the implementation of FIN 48 as being highly likely (at least somewhat likely) to increase audits by tax authorities.<sup>6</sup> This anecdotal evidence suggests that FIN 48 arguably has increased managers' uncertainty about their ability to defend tax positions if audited, and increased their assessed probabilities of tax audits.<sup>7</sup>

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<sup>4</sup> For the speech, see <https://www.sec.gov/news/speech/2007/spch030807css.htm>. Furthermore, Bozanic et al. (2017) also document an increasing access of the SEC filings by the IRS-affiliated IP addresses after the FIN 48 disclosures became available.

<sup>5</sup> FIN 48 Implications - LB&I Field Examiners' Guide (<https://www.irs.gov/businesses/corporations/fin-48-implications-lbi-field-examiners-guide>).

<sup>6</sup> The survey was conducted during the KPMG Tax Governance Institute Webcast on May 9, 2007, titled "FIN 48: The First Quarter Experience" (Blouin et al. 2007).

<sup>7</sup> FASB asserts that the additional costs of FIN 48 disclosure to firms is minimal. See FASB board members' statements at [https://www.fasb.org/board\\_meeting\\_minutes/05-10-06\\_utp.pdf](https://www.fasb.org/board_meeting_minutes/05-10-06_utp.pdf). For example, "The IRS has a far more detailed and effective roadmap in its schedule M-3 than it would be provided by any disclosures in the final Interpretation" and "The evidence seems clear that the number is meaningless for companies with permanent establishment or nexus in a variety of jurisdictions." Furthermore, since 2010, the IRS requires large U.S. firms to file a new tax form, Schedule UTP, privately with the IRS. Firms provide a concise description of each uncertain tax position in this tax form. This could suggest that FIN 48 disclosure alone is not helpful enough in the IRS's tax examinations.

Prior research on FIN 48 shows that on average, U.S. firms did become less tax aggressive in the immediate period after FIN 48 adoption (Gupta, Mills, and Towery 2014; Henry, Massel, and Towery 2016; McClure 2019).<sup>8</sup> However, prior tax literature has paid less attention to the differential effects across firms, and no prior study investigates the variation in the stickiness of reactions after the immediate period of FIN 48 adoption. It is plausible to expect different responses across firms. Prior analytical studies suggest that different responses across firms are possible because firm managers have different levels of confidence in tax positions (Mills, Robinson, and Sansing 2010). Firms with weak confidence may refrain from taking tax positions, while firms with strong confidence may continue to take tax positions.<sup>9</sup> Firms with strong beliefs in tax positions can even benefit from voluntarily revealing tax positions to tax authorities (De Simone, Sansing, and Seidman 2013). Because the beliefs of managers are generally not observable, archival-based empirical evidence on this conjecture is limited. Given that many years have passed since FIN 48 adoption, there now exists an opportunity to conduct a long-period, cross-sectional analysis of firms' reactions in response to FIN 48 disclosure requirements.

Using panel regressions, this study first confirms that the disclosure requirements in FIN 48 indeed have chilling effects on firms' tax policies. In the initial three years after FIN 48

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<sup>8</sup> Gupta et al. (2014) report an increase in the state-level tax revenue surrounding the adoption of FIN 48. Henry et al. (2016) find a smaller deviation between the cash tax paid and the product of the pretax income times the statutory tax rate in the post-FIN 48 years. McClure (2019) builds a model to conduct structural estimation on the link between the reported UTB and an unobserved true effective tax rate, and reports that firms would report effective tax rates that are 2.8 percentage points lower had FIN 48 not occurred.

<sup>9</sup> Prior literature shows that firms can adjust tax policy relatively quickly if the situation warrants. For example, Hoopes, Mescall, and Pittman (2012) provide survey evidence that 39.4 (69.2) percent of tax positions can be adjusted within a six-month (one-year) period. Cook, Huston, and Omer (2008) show that firms change tax rates in the last fiscal quarter in achieving an earnings target. However, adjusting tax policy is not costless. There are significant incentives and disincentives of taking tax planning opportunities, as suggested by the survey evidence in Graham, Hanlon, Shevlin, and Shroff (2014). A harmful impact on the firm's reputation, risk of challenge by the IRS, and adverse media attention are among the top reasons for not taking a tax-planning opportunity.

adoption, U.S. firms exhibit an average three-percentage-point spike in cash effective tax rate (Cash ETR).<sup>10</sup> However, significant cross-sectional variations exist in the magnitude of the Cash ETR spikes across firms. In particular, this study explores three dimensions of the cross-sectional variations: (1) firms' preexisting tax aggressiveness, (2) firms' geographic proximity to IRS offices, and (3) the IRS's continuous monitoring of firms. These dimensions broadly capture taxpayers' aggressiveness and compliance, as well as tax authorities' regulatory oversight.

Tax-aggressive firms and firms located closer to IRS offices are potentially subject to more stringent regulatory oversight by the IRS. If this is the case, these firms could have a greater magnitude in their initial reactions to the disclosure requirements in FIN 48. Firms with fewer previous audits or noncontinuous monitoring by the IRS could have heightened concerns that FIN 48 disclosure may reveal the existence of uncovered questionable tax strategies to the IRS. As a result, these firms could have a greater magnitude in their initial reactions to the disclosure requirements in FIN 48. Results from panel regressions confirm these predictions. Firms that are more tax-aggressive than industry peer firms, firms located closer to IRS offices, and firms with a lower probability of the IRS's continuous monitoring report a greater magnitude in their initial reactions to FIN 48, as captured by higher spikes in Cash ETR as they adopt FIN 48.

The economic magnitude of the variation is also significant. For example, on average, tax-aggressive firms report an annual Cash ETR that is 2.9 percentage points higher than that of nonaggressive firms during the first three years after adopting FIN 48 (i.e., Cash ETR spikes).

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<sup>10</sup> The overall spike pattern in Cash ETRs during the first three years after FIN 48 adoption can also be confirmed by the figure presented in Dyreng et al. (2017). The magnitude of spike is also consistent with the structural estimation provided by McClure (2019). In this study, the cash effective tax rate is calculated annually. The spike in Cash ETR is per annum.

An interquartile change in the distance to IRS offices translates to a 0.8 percentage point difference in Cash ETR spikes. Firms guaranteed to be continuously monitored exhibit a spike in Cash ETR that is 1.6 percentage points lower than that of firms that are more likely than not to be continuously monitored. Given the sample firms' average pretax income of \$418 million, the economic differences range from \$3 to \$12 million.

Next, this study examines the stickiness of reactions by measuring the annual adjustment speed in Cash ETR since FIN 48 adoption. The initial spikes in Cash ETR as firms adopt FIN 48 arguably reflect firm managers' beliefs that FIN 48 disclosures may reveal proprietary information and provide auditing tips to tax authorities. As a result, firms may have had temporarily altered prior aggressive tax strategies. However, due to a persistent decrease in its enforcement budget, the IRS is unlikely to audit every tax position in all years (Hoopes, Mescall, and Pittman 2012; Nessa, Schwab, Stomberg, and Towery 2020), hindering FIN 48's assumption that a tax audit will occur with certainty.<sup>11</sup> The introduction of Schedule UTP three years after FIN 48 adoption also raises the intriguing question of how useful FIN 48 disclosure alone is in facilitating IRS's tax examinations. Indeed, one study reports that only 24 cents of every dollar in FIN 48 UTB reserves are eventually paid as tax settlements (Robinson, Stomberg, and Towery 2016). As managers began to realize that many components of disclosed FIN 48 reserves do not translate into ex-post unfavorable tax settlements, they may have considered their initial post-FIN 48 tax policy adjustment as an overreaction. The variations in taxpayers' aggressiveness and compliance, as well as tax authorities' regulatory oversight (as captured by firms' preexisting tax aggressiveness, geographic proximity to IRS offices, and the likelihood of continuous

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<sup>11</sup> From 2011 to 2015, the IRS suffered five consecutive annual budget cuts. The cumulative budget cuts reached 14.7 percent. In the same period, the average government revenue recovered by IRS audits also decreased by 15.6 percent. Source: IRS Data Book. Available at <https://www.irs.gov/statistics/irs-budget-and-workforce>.

monitoring by the IRS), will likely introduce different frictions to firms' subsequent tax policy adjustments after adopting FIN 48.

This study utilizes a partial adjustment model developed in the corporate finance literature to estimate the adjustment speed in tax policy (Flannery and Rangan 2006; Huang and Ritter 2009; Kim, McGuire, Savoy, and Wilson 2019). The model provides a mean estimate of the year-over-year adjustment speed among sample firms. The estimated speed parameter represents the average fraction of policy change a firm achieves per year. Another way to interpret the speed is half-life, the amount of time it takes a firm to achieve halfway toward a policy target. A slower speed of adjustment (i.e., longer half-life) indicates a stickier reaction as firms take longer to move to a revised post-FIN 48 tax policy target. It is arguable that tax-aggressive firms, firms located closer to IRS offices, and firms that are more likely to be continuously monitored by the IRS are subject to a higher level of regulatory scrutiny. The slower adjustment speed (i.e., longer half-life) by these firms would indicate that they face more significant friction when moving toward a revised tax policy target, thus having a stickier reaction to FIN 48.

Using a system generalized-method-of-moment (system GMM) estimation approach (Blundell and Bond 1998), this study finds that U.S. firms exhibit significant variation in the stickiness of the reactions after adopting FIN 48, as measured by the annual adjustment speed in cash ETR. Specifically, the annual adjustment speed is slower (i.e., the reaction is stickier) for tax-aggressive firms, firms located closer to IRS offices, and firms with a high probability of being continuously monitored by the IRS. In terms of half-life, it takes aggressive firms three times longer (7 months) than nonaggressive firms (2 months) to adjust halfway toward a targeted level. Firms located close to IRS offices take ten times longer (23 months) to adjust Cash ETR

than the firms located farther away from IRS offices (2 months). Firms with a high probability of being continuously monitored take four times longer (13 months) than the firms with a low probability of being continuously monitored to adjust Cash ETR (3 months).<sup>12</sup>

Subsample analyses suggest that two variations in response (i.e., by proximity to the IRS and by the IRS's continuous monitoring of firms) mainly come from a subsample of firms that are more aggressive than industry peers before adopting FIN 48. In additional analyses, this study also explores the specific tax policies that firms alter in response to FIN 48. Results suggest that there is a temporary reduction in the tax services fees paid to external financial auditors and in the number of foreign subsidiaries reported in Exhibit 21 of the SEC's Form 10-K during the first three years after FIN 48 adoption. Furthermore, pretax earnings management is higher during the same period. Collectively, results suggest that while FIN 48 temporarily constrained firms' aggressive tax avoidance, firms were pursuing alternative means to compensate for the loss in tax savings.

There is no conclusive evidence that auditor characteristics explain the variation in firms' responses to FIN 48, although firms with a financial auditor that has tax expertise seem to take less time to adjust tax policy after FIN 48. Untabulated robustness checks confirm that the results hold if controlling for auditors' characteristics (e.g., Big N membership and tax specialists). Furthermore, controlling for the existence of an internal tax department within a firm or firms' networks does not affect the inference. Additional analyses also reveal that the magnitude of

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<sup>12</sup> Firms with greater initial reactions may not necessarily take a longer adjustment time in achieving their revised tax rate target. Among the three variations, tax-aggressive firms and firms located closer to IRS offices do have both larger initial reactions and longer adjustment time. However, firms less likely to be continuously monitored by the IRS report a greater initial reaction and a shorter adjustment time. The difference in the relation between the magnitude of initial reactions and the length of subsequent adjustment suggests that Coordinated Industry Case (CIC) assignment likelihood captures a different aspect of IRS monitoring than geographic proximity to IRS offices. In particular, CIC assignment affects the perceived likelihood of continuous tax audits (i.e., tax audit certainty), whereas distance to IRS offices affects the information asymmetry between taxpayers and regulator.

Cash ETR spikes varies with the CEO's risk incentive, the length of income tax footnotes, and firms' relative tax aggressiveness within the industry.

In comparison with firms' responses to the IRS's Schedule UTP (Uncertain Tax Position Statement), additional analyses suggest tax-aggressive firms respond to a greater magnitude to FIN 48 than to Schedule UTP. Although Schedule UTP does require more content in tax disclosure than FIN 48, the information contained in Schedule UTP is private between the IRS and taxpayers. Furthermore, by the time Schedule UTP is required, firms have had at least three years of experience disclosing tax information per FIN 48 and interacting with the IRS if their FIN 48 disclosures lead to tax audits.

This study contributes to the literature in the following ways. First and most broadly, this study contributes to the disclosure literature by providing evidence on the real effects of disclosure regulations. Kanodia and Sapra (2016) mention that empirical studies on how firms' behavior changes after new disclosure mandates are scarce. They ask for investigations of associations between "*specific* disclosure/accounting rules and *specific* corporate decisions that are predicted to be affected." In a similar vein, Leuz and Wysocki (2016) encourage more studies on firms' behavior changes (i.e., real effects) following new disclosure and reporting regulations. Some of the prior studies provide evidence for the immediate effects of nontax disclosure regulations, such as pension accounting, share-repurchase policy disclosure, mandatory quarterly reporting, and governance policy disclosure settings (e.g., Boland, Hogan, and Johnson 2018; Bonaimé 2015; Chuk 2013; Ernstberger, Link, Stich, and Vogler 2017; Shroff 2017). Besides expanding the evidence to tax disclosure, this study also explores a long-term policy adjustment following an immediate effect.

Second, this study extends the tax literature by revisiting a significant tax accounting standard regarding tax disclosure. The documented variations in the magnitude and the stickiness of reactions provide evidence on U.S. firms' heterogeneous responses to tax-related disclosure regulations. Due to the scarce nature of publicly disclosed tax information, U.S.-based evidence on the effects of public tax disclosure rules is limited (Lenter et al. 2003). In this vein, this study extends an emerging body of research on firms' responses to tax disclosure mandates (e.g., Hoopes, Robinson, and Slemrod 2018; Kubick, Lynch, Mayberry, and Omer 2016) by providing U.S.-based evidence that firms' tax policies change in response to a tax-related disclosure requirement.

Finally, this study also adds evidence to the tax literature on FIN 48. Although FIN 48 studies have used the setting to test whether it has achieved the FASB's intended goals (see Blouin and Robinson 2014 for a comprehensive review), few empirical studies have tested heterogeneous responses across firms (e.g., Gupta et al. 2014; Henry et al. 2016; Robinson and Schmidt 2013). The variation in the magnitude of initial reactions provides empirical support for Mills, Robinson, and Sansing's (2010) argument that firms would have heterogeneous responses to FIN 48. They also encourage empirical investigations into whether FIN 48 reduces some firms' tax-planning activities. Evidence suggests that pre-FIN 48 tax-aggressive firms, firms located close to IRS offices, and firms with lower continuous monitoring likelihood are examples of such firms. Furthermore, investigating the variation in the speed of tax policy adjustment after FIN 48 adoption answers a call in Blouin and Robinson (2014) to study the long-term effects of FIN 48 disclosure regulation.

An outline of this paper is the following: Section 2 introduces the institutional background, reviews relevant literature, and motivates hypotheses. Section 3 describes the data,

sample, and research design. Section 4 shows primary analyses. Section 5 presents additional analyses. Section 6 concludes the study and states its limitations.

## **Institutional Background, Literature Review, and Hypotheses Development**

### **Institutional Background**

FIN 48 is a significant accounting standard intervention in the accounting and reporting for income tax. In June 2006, the FASB issued FIN 48 and mandated public companies to comply for fiscal periods beginning after December 15, 2006. The primary purpose of FIN 48 is to address the diverse practices in accounting for income tax uncertainty (FASB 2006). Before the adoption of FIN 48, the accounting for the uncertainty in income tax relies on minimal guidance from Statement of Financial Accounting Standards No. 5, *Accounting for Contingencies* (FAS 5, FASB 1975). Under this old regime, the disclosure and accounting for income tax contingencies often lacked transparency and consistency. Statement of Financial Accounting Standards No. 109, *Accounting for Income Taxes*, issued by the FASB in 1992, also does not contain specific guidance on how to address the uncertainty in tax accounting (FAS 109, FASB 2006). Gleason and Mills (2002) report that firms often failed to disclose material tax contingent liabilities under the old regime before FIN 48. Appendix A contains examples of disclosure before the FIN 48 regime.

FIN 48 requires firms to disclose more information on income tax uncertainty. FIN 48 requires all firms to follow a standardized two-step process to evaluate their uncertain tax positions. In the first step, firms need to assume that tax authorities have full knowledge and all relevant facts on uncertain tax positions. Furthermore, firms need to assume that tax audits will occur with certainty. Firms can only recognize tax benefits if they believe their uncertain tax

positions meet the more-likely-than-not threshold to be sustained upon examinations by tax authorities. The determination is solely based on the technical merits of tax positions. In the second step, companies follow a cumulative probability approach to assign probabilities and rank the outcomes from the most favorable to the least favorable, and then to measure the amount of the recognized benefits when the cumulative likelihood reaches 50 percent. This approach lets companies recognize the largest amount of tax benefit that is more likely than not to be sustained upon audits. The remaining tax benefits become the unrecognized tax benefits (UTB), a liability item in financial statements. In addition to reporting the amount of UTB, firms are also required to include a tabulated reconciliation of the beginning and ending balances of UTB in their financial statements. Information disclosed as required by FIN 48 also includes the total amount of UTB that, if recognized, would affect the effective tax rate; the total amount of interest and penalties recognized in the income statement and balance sheet; description of tax years that remain subject to examination by major jurisdictions; positions where it is reasonably possible that the total amounts of UTB will significantly increase or decrease within one year of the reporting date (BDO Seidman 2007). Appendix A also contains examples of disclosure in the post-FIN 48 regime.

FIN 48 disclosures could reveal proprietary information about managers' assessment of firms' uncertain tax positions. The disclosure has been audited by independent accountants and is subject to the scrutiny of the SEC and investors. Therefore, FIN 48 disclosure can be a reliable source for the IRS to identify the existence of aggressive tax strategies, which is consistent with the road-map view. A corporate tax lawyer states that despite an assurance made by top IRS officials on restraint in using public disclosure to guide examinations, IRS agents often request documentation for uncertain tax positions included in the FIN 48 UTB disclosures early in their

examination process.<sup>13, 14</sup> Using a dataset on the access to the SEC’s EDGAR system, Bozanic, Hoopes, Thornock, and Williams (2017) document a sharp increase in the downloads of SEC filings by IRS-affiliated IP addresses after FIN 48 disclosure became available. However, it should be noted that the disclosed UTB amount per FIN 48 is only a firm-level aggregate. There is no requirement in FIN 48 to disaggregate the amount of uncertain tax positions by jurisdiction or by position. Therefore, the usefulness of FIN 48 disclosure to the IRS to identify new audit targets may be limited, especially for a subset of firms that are regularly examined by the IRS.

Since 2010, the IRS requires some U.S. corporate taxpayers to file a new Schedule UTP in their tax filings. According to the instruction to Schedule UTP, U.S. corporate taxpayers provide information about tax positions that would affect their federal income tax. Schedule UTP contains three parts: uncertain tax positions in the current year, uncertain tax positions in the prior years, and a concise description of each uncertain tax position reported. There is more information content in Schedule UTP than in FIN 48 disclosures. For example, in Schedule UTP, taxpayers rank uncertain tax positions by the size of each tax position, identify relevant Internal Revenue Code sections, and provide relevant facts and natures of the tax issues in a few sentences for each tax position. Unlike FIN 48 disclosure that is publicly available for public companies, the information contained in Schedule UTP is private between the IRS and taxpayers, which benefits from the confidentiality protection provided by I.R.C. § 6103.

## **Literature Review**

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<sup>13</sup> The IRS has determined that documents produced by a taxpayer and/or its auditors to substantiate the taxpayer’s uncertain tax positions in compliance with FIN 48 are included within the IRS’s interpretation of Tax Accrual Workpapers and are therefore subject to the applicable policy of restraint. (From the IRS website, accessed on September 9, 2019, available at <https://www.irs.gov/businesses/corporations/fasb-interpretation-no-48-accounting-for-uncertainty-in-income-taxes/>.)

<sup>14</sup> David Katz, “Uncertain Tax Positions Lure IRS Agents, Lawyer Claims,” CFO.com, October 23, 2014, accessed on May 9, 2020, available at <https://www.cfo.com/tax/2014/10/uncertain-tax-positions-lure-irs-agents-lawyer-claims/>.

### *FIN 48 Studies Related to Firms' Response*

Since the implementation of FIN 48, there has been an active literature stream studying different aspects of the FIN 48 standard. Blouin and Robinson (2014) provide a comprehensive review of the existing FIN 48 literature. This section focuses on prior studies that have implications for firms' responses to FIN 48 disclosure requirements.

Mills, Robinson, and Sansing (2010) use an analytical model to show the heterogeneous effects of FIN 48 disclosure requirements on different taxpayers. Specifically, taxpayers with strong support for their uncertain tax positions will not change their tax behaviors and continue to pursue tax positions after adopting FIN 48. This is because their expected payoffs from taking uncertain tax positions after FIN 48 adoption could increase. On the other hand, for taxpayers without sufficient support for their uncertain tax positions, FIN 48 may deter them from entering uncertain tax positions. They recommend future studies to investigate whether FIN 48 reduces some firms' tax planning. This study has motivated a limited number of archival studies investigating firms' responses to FIN 48.

Blouin, Gleason, Mills, and Sikes (2010) study U.S. firms' settlement behaviors with the IRS before the adoption of FIN 48. They report that during the two quarters preceding the adoption of FIN 48, firms settle with the IRS more often and release more tax reserves to boost earnings.<sup>15</sup> This pattern is consistent with the belief that firms consider the disclosure requirement in FIN 48 as a significant threat and take real actions, such as opportunistically timing tax settlements and managing tax reserves. Robinson and Schmidt (2013) study how firms

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<sup>15</sup> Prior to FIN 48, FAS 5 required firms to record tax reserves for the potential loss from tax settlements if the loss is probable and its amount is estimable. Blouin et al. (2010) study the tax reserves disclosed by the 100 largest companies and find firms released tax reserves, which has a positive effect on earnings, before FIN 48 adoptions. Nearly an equal amount of the released reserves were rebooked as direct adjustments to retained earnings at the adoption of FIN 48.

respond to FIN 48 in disclosure practices, as well as investors' responses to the quality of FIN 48 disclosures. They find an inverse relation between firms' proprietary costs of disclosure and FIN 48 disclosure quality. They also find that the capital market rewards the low-quality FIN 48 disclosures.<sup>16</sup> Gupta, Mills, and Towery (2014) find that firms pay more state taxes surrounding the adoption of FIN 48. They report the effect is stronger among the firms with preexisting uncertain tax positions before FIN 48. Henry, Massel, and Towery (2016) study the effects of three tax disclosure requirements, including FIN 48, on firms' tax avoidance. They find that U.S. firms become less tax aggressive after FIN 48. They also find that domestic firms have a greater reduction in the level of tax avoidance than multinational firms. Most recently, McClure (2019) develops a structural model and estimates that U.S. firms would report an effective tax rate that is 2.8 percentage points lower than if the FIN 48 disclosure had not occurred.

Consistent with the review by Blouin and Robinson (2014), prior and recent studies offer consistent evidence that U.S. firms do respond to FIN 48 in tax policies, reflected by the pre-FIN 48 settlements with the IRS, tax reserve management, state-level tax payments, and tax-related disclosure. Evidence suggests that, on average, U.S. firms refrain from aggressive tax avoidance in the immediate period following FIN 48 adoption. These studies also explore dimensions of cross-sectional variation, such as the variation in proprietary disclosure cost and multinationality.

### ***Firms' Response to Tax Disclosure Regulations***

The public disclosure of tax-related information can have real effects on firm behaviors, especially on corporate tax decision-making. Lenter, Slemrod, and Shackelford (2003) survey the

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<sup>16</sup> Consistent with the proprietary cost theory of disclosure, Robinson and Schmidt (2013) also find evidence that the capital market penalizes firms that make high-quality FIN 48 disclosures. Relatedly, Frischmann, Shevlin, and Wilson (2008) study the capital market reactions to various FASB pronouncements leading to FIN 48 and fail to find significant stock market reactions.

perspectives in the accounting, economics, and law literatures on public tax return disclosure. They argue that public tax return disclosure could potentially lead to firms' responses, such as changing organizational forms, going private, building cushions in earnings, and altering tax policies. However, empirical studies on firms' behaviors to public tax return disclosure are sparse and are mostly using international evidence. Hasegawa, Hoopes, Ishida, and Slemrod (2013) find that Japanese firms underreport taxable income to avoid meeting the public tax return disclosure threshold. Dyreng, Hoopes, and Wilde (2016) study an unexpected event in which a nonprofit organization revealed the lists of UK firms that failed to comply with the UK foreign subsidiary disclosure requirements. They find that after the noncompliant lists were revealed to the public, the noncompliant firms started to comply with the subsidiary disclosure requirements, report higher effective tax rates, and reduce their presence in tax havens. Hoopes, Robinson, and Slemrod (2018) study the public tax return disclosure in Australia and find private firms respond to public tax return disclosure by increasing tax payments to the government. However, the magnitude of the increase is small. Furthermore, they find public firms respond to public tax return disclosure by decreasing tax payments to the government.

Public tax disclosure by U.S. firms is very limited other than the information provided in the financial statements. In the United States, public tax return disclosure only existed briefly during the Civil War, in the 1920s, and in the 1930s (Lenter et al. 2003). Some studies utilize instances when financial regulators request that firms disclose additional tax information. For example, Kubick et al. (2016) study how firms change tax policy after receiving tax-related SEC comment letters, which request additional disclosures of tax-related information. They find firms that receive such letters exhibit a subsequent decrease in tax avoidance. Interestingly, they also report that the level of tax avoidance also decreases for firms that do not receive such letters

from the SEC but that have multiple industry peer firms receiving such letters. This finding suggests that both the firms directly involved in the comment letter process and their industry peer firms respond to regulatory scrutiny in tax decision-making.

Since the introduction of Schedule UTP, firms need to provide disclosure on the facts and natures privately with the IRS. Towery (2017) uses confidential IRS data and studies the consequences of requiring U.S. companies to file Schedule UTP. The availability of Schedule UTP and FIN 48 disclosure enable the IRS to link the two disclosures together in its tax examinations. However, Towery (2017) reports that there was no significant increase in tax collection by the IRS after Schedule UTP is required. Instead, firms who are required to file Schedule UTP report lower FIN 48 UTB reserves. Towery (2017) concludes that firms strategically change financial reporting behaviors without changing underlying tax behaviors when the IRS requires them to file Schedule UTP.

### **Hypotheses Development**

FIN 48 likely altered firms' behavior in tax decision-making, at least temporarily. Anecdotal evidence from the practice supports this conjecture. The new recognition and measurement rules regarding tax uncertainty and the enhanced disclosure requirements in FIN 48 created significant controversy at the time when FIN 48 was proposed and adopted. Tax practitioners and firm managers believe that FIN 48 disclosures could potentially reveal proprietary information to tax authorities. Statements from the SEC and the IRS also show regulators' enthusiasm to use FIN 48 disclosures to facilitate tax audits. Furthermore, prior academic evidence suggests the conjecture is plausible. For instance, Kanodia and Sapra (2016) point out that the FASB and the SEC often request that firms disclose firm-specific information that is generated within firms during internal operations, observed by the managers, and not

easily accessible by outsiders. The disclosure of such information can often lead to real changes in firm managers' decision-making. FIN 48 disclosures contain firms' internal assessments of tax uncertainty and are precisely this type of information. Therefore, it is plausible that firms would respond to FIN 48 disclosures with real actions, especially in corporate tax policies.<sup>17</sup>

If firms' managers were concerned that the FIN 48 disclosure might serve as a road map to tax authorities, they would take actions to minimize the potential that their firms may get unwanted regulatory attention due to their tax positions. However, firms did not start at the same level of tax aggressiveness when they adopted FIN 48, and the preexisting tax aggressiveness could affect how firms' managers perceived the threat of FIN 48 disclosure requirements. Prior tax literature demonstrates a trade-off view of tax avoidance in which each firm pursues optimal tax policies, depending on the tax benefits and nontax costs that it faces (Chen, Chen, Cheng, and Shevlin 2010; Hanlon and Heitzman 2010; Kim et al. 2019). As a result, wide variation in the level of tax avoidance exists across firms (Dyreng, Hanlon, and Maydew 2008). Because FIN 48 may provide additional information to the IRS in identifying the existence of uncertain tax positions, managers of tax-aggressive firms could be more concerned that the FIN 48 disclosures may point the IRS in the right direction in its tax audits. In contrast, managers of nonaggressive firms may have had little fear that FIN 48 disclosures reveal useful information on their nonaggressive tax positions. There also exists an argument that aggressive firms may not make any adjustments at all in their tax policy in response to the FIN 48 disclosure requirements due to their aggressiveness. However, this argument is inconsistent with the anecdotal evidence on firm managers' belief that the audit likelihood would increase significantly after FIN 48. Therefore,

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<sup>17</sup> One tax director at a company expressed confidentially that “[it is] amazing how an accounting pronouncement [FIN 48] can impact cash taxes paid; how it can affect the policing of tax expenses and payments” (Gupta, Mills, and Towery, 2014).

H1a states in a directional form: tax-aggressive firms have a stronger initial response to FIN 48 disclosure requirements.

The adoption of FIN 48 can be viewed as a shock to the preexisting equilibrium of firms' optimal tax policies, one that shifted the optimal tax policy to a revised level, which is consistent with practitioners' view that accounting for income taxes is substantially different after FIN 48. However, the assumption of the 100 percent likelihood of tax audits in FIN 48 is not consistent with the actual tax audit coverage (Hoopes et al. 2012; Nessa et al. 2020). The IRS also experienced significant budget cuts after the adoption of FIN 48. One study estimates that only 24 cents of every dollar in FIN 48 UTB reserves are eventually paid as tax settlements (Robinson, Stomberg, and Towery 2016). If firms' managers gradually realize the disclosed UTB does not always translate into actual tax settlements, firm managers could reevaluate the initial adjustments in tax policies, and some managers may even view the initial adjustments as overreactions. Because a deviation from an optimal tax policy is costly, firms will adjust their tax policies toward their targets over time (Kim et al. 2019).

Firms' tax aggressiveness can affect how quickly firms make the subsequent adjustments in tax policy toward their revised targets after FIN 48 adoptions. The speed of such adjustment can reflect the stickiness of firms' responses to FIN 48 disclosure requirements. For example, for a tax-aggressive firm that became temporarily less aggressive at FIN 48 adoption, a quick post-FIN 48 tax policy adjustment could attract attention from the IRS. This scenario is most plausible if the firms are known to the IRS to be aggressive. As a result, these firms may want to take a slower adjustment speed in changing tax policy toward their revised targets, reflecting a stickier reaction. There also exists an argument that tax-aggressive firms take aggressive actions in reverting to the previous aggressive tax positions by taking a quicker speed. However, given the

costs of pursuing such aggressive actions (e.g., heightened scrutiny from the IRS and reputational cost), it is less likely that firms would do so. Therefore, H1b states in its directional form: firms' reaction to FIN 48 disclosure requirements is stickier if the firms were tax-aggressive firms before FIN 48 adoptions. In other words, the adjustment speed in tax policies is slower by firms that were aggressive before FIN 48 adoptions.

**H1a:** Tax-aggressive firms have stronger initial reactions to FIN 48 disclosure requirements (i.e., Cash ETR spikes) than non-tax-aggressive firms.

**H1b:** Tax-aggressive firms have stickier reactions to FIN 48 disclosure requirements (i.e., a slower speed of adjustment) than non-tax-aggressive firms.

The geographic proximity between the supervising and supervised entities can affect the behaviors of the supervised entities. One study in the economics literature suggests that the deterrent effect of policing is strongest among the local areas in which police are deployed (Di Tella and Schargrodsky 2004). In general, regulatory oversight is more effective if the supervised entities are located closer to the regulators. An argument for such a phenomenon is that the perceived cost of committing noncompliant or illicit activities increases with the proximity to supervising entities.

In the context of financial regulators, prior studies document a localized enforcement behavior by the SEC, the IRS, and the European Union's bank regulators (e.g., Berninger, Kiesel, and Schiereck 2018; Kedia and Rajgopal 2011; Kubick, Lockhart, Mills, and Robinson 2017). One explanation for this behavior is the availability of soft information provided by the spatial proximity between regulators and firms. In the age of modern communication, technology may have diminished the value of spatial proximity. However, certain types of information, such as soft information, still require face-to-face interaction and only travel within spatial proximity (e.g.,

Coval and Moskowitz 2001; Maskell and Malmberg 1999). As argued in this literature, firms located near regulators have better access to soft information on regulatory activities and are aware of the presence of regulators. Regulators located near firms also have better access to soft information on firms' illicit activities.<sup>18</sup> Both mechanisms can heighten the perceived cost of committing noncompliant or illicit activities.

Firms located closer to IRS offices could be more sensitive to the threat that the IRS may use FIN 48 disclosures in its examinations and target local firms first because firms located near IRS offices receive a higher level of regulatory scrutiny. Kubick et al. (2017) find that firms located closer to IRS offices are more likely to be audited. The tax audit productivity (defined as tax assessments generated per examination hour) is also higher for the firms located closer to IRS offices. Practitioners also argue that the aggregated FIN 48 disclosures can help the IRS to identify the existence of uncertain positions. Furthermore, the proximity also enables the IRS to gather information via alternative means, including soft information channels, to correlate the aggregated FIN 48 disclosures with the information collected via other means. Therefore, managers of firms located closer to IRS offices can perceive a higher cost of making FIN 48 disclosures, due to the fear that the IRS may target them first in using FIN 48 disclosures to conduct tax audits. As a result, firms located closer to IRS offices can have a stronger initial response to FIN 48.

Firms' geographic proximity to IRS offices can also affect how quickly firms make subsequent tax policy adjustments after FIN 48, reflecting variation in the stickiness of firms'

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<sup>18</sup> Other explanations could exist: It is plausible that under budgetary constraints, regulators will allocate limited resources to firms in the local area to lower the cost of regulatory supervision. This explanation is still consistent with the predictions for H2a and H2b that proximity to IRS offices increases initial reactions and prolongs subsequent adjustments. Alternatively, firms' and IRS offices' locations are not random. Both types of locations may cluster at metropolitan areas. An argument exists that the communication among taxpayers in metropolitan areas may explain the reactions to FIN 48, rather than the proximity to IRS offices per se. To address this concern, additional analyses explore the roles of firms' network ties in explaining firms' reactions. Untabulated results confirm that the results hold after controlling for firms' network ties.

reactions to FIN 48 disclosure requirements. To the extent that firms located closer to IRS offices receive a higher level of regulatory scrutiny, it is reasonable to expect these firms to face greater friction and to behave more cautiously in subsequent tax policy adjustments than firms located away from IRS offices. A quick adjustment by local firms, if revealed to the IRS via soft information channels, could alert local IRS offices.<sup>19</sup> In contrast, the IRS may not notice a quick adjustment made by a remote firm until receiving its tax filings, if no other soft information channel exists. These arguments lead to the second set of hypotheses.

**H2a:** Firms located closer to IRS offices have stronger initial reactions (i.e., Cash ETR spikes) to FIN 48 disclosure requirements.

**H2b:** Firms located closer to IRS offices have stickier reactions (i.e., a slower speed of adjustment) to FIN 48 disclosure requirements.

The frequency of regulators' monitoring could affect supervisees' behaviors. For example, in the U.S. audit market, the PCAOB conducts risk-based inspections on audit firms and their engagements. Audit firms with more than 100 issuers are inspected annually (smaller audit firms are inspected at least triennially). A body of research shows that the behavior of annually inspected firms and that of triennially inspected firms are different (e.g., Church and Shefchik 2011; Hermanson, Houston, and Rice 2007). Furthermore, even among frequently inspected audit firms, Aobdia (2018) finds that both auditors' effort and clients' financial reporting quality of inspected engagements deteriorate following a recent inspection without a Part I finding, as the audit firms

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<sup>19</sup> Kubick et al. (2017) show that firms located closer to IRS offices have better information on the IRS's enforcement priorities. Given the IRS's strong enthusiasm in using the new FIN 48 disclosure in its enforcement activities, it is also likely local firms have an awareness of IRS enforcement priorities (i.e., utilizing FIN 48 disclosures). Therefore, local firms would take a more cautious approach in making post-FIN 48 tax policy adjustments.

believe that the PCAOB is less likely to inspect these engagements again in the near term.<sup>20</sup> This evidence indicates that the frequency of regulators' monitoring activities can affect supervisees' behaviors.

In the context of the IRS's supervision on taxpayers, due to constraints on its resources, the IRS is unlikely to audit all firms in all years, thus paying an unequal amount of attention to firms (Hoopes et al. 2012; Nessa et al. 2020). For example, in 2017, overall, less than 1 percent of corporate tax returns were examined by the IRS. However, for the largest corporations with more than \$20 million in total assets, the IRS examined over 58 percent of their tax returns. The economics literature on tax enforcement suggests that taxpayers strategically adjust their behaviors based on a continuously updated perceived likelihood of tax audits (Allingham and Sandmo 1972; Becker 1968; DeBacker, Heim, Tran, and Yuskavage 2015, 2018). Immediately after a recent tax audit, taxpayers believe that they are less likely to receive another audit, and therefore become more aggressive in their tax avoidance. As time goes by, taxpayers become less aggressive when they anticipate receiving another tax audit.

In addition to the regular examination process by the IRS (i.e., tax audits), some firms have pursued an enhanced relationship with tax authorities that may be beneficial to both parties (Beck and Lisowsky 2014; De Simone, Sansing, and Seidman 2013). At the time of FIN 48 adoption, at least two programs existed that allowed incremental information revelation by taxpayers to the IRS: the Compliance Assurance Program (CAP) and the Coordinated Industry Case (CIC). In the CAP program, the IRS and taxpayers sign a Memorandum of Understanding, which commits each

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<sup>20</sup> The PCAOB's inspection report consists of two parts. Part I contains audit deficiencies where the financial auditors fail to obtain sufficient audit evidence to support their opinions on clients' financial reports. Part II contains financial auditors' overall quality control deficiencies. These deficiencies are widespread issues that affect multiple clients' audit engagements. For a detailed description of the PCAOB's inspection process, see [https://pcaobus.org/Inspections/Documents/Inspection\\_Information\\_for\\_Audit\\_Committees.pdf](https://pcaobus.org/Inspections/Documents/Inspection_Information_for_Audit_Committees.pdf).

party to adequately sharing information in exchange for an expedited tax audit. Participation in the CAP program is a voluntary choice by both parties.<sup>21</sup> In contrast, the CIC cases are assigned by the IRS's Large Business and International (LB&I) Division following established criteria (Ayers, Seidman, and Towery 2019). Firms in the CIC program are guaranteed to receive an annual tax audit by a team of specialists and subject matter experts. IRS staffs are often assigned at taxpayers' primary place of business, and work with the firms' tax department side-by-side. A CFO at one of the largest U.S. pharmaceutical companies claims that the IRS has "permanent establishment" at its workplace and that the company has been "fully transparent" with the IRS.<sup>22</sup>

The continuous monitoring nature of the CIC program and enhanced information sharing can affect how firms view the threats posed by FIN 48 disclosures. If a firm is under continuous monitoring, the information exchanged between taxpayers and the IRS via the CIC program can be more useful to the IRS than FIN 48 disclosures.<sup>23</sup> The firm-level aggregated UTB amount may provide little information beyond what the IRS already has (e.g., information gathered from day-to-day interactions with taxpayers, prior examinations, and tax filings). This view is anecdotally consistent with a member's statement at the FASB board meeting that the aggregated UTB could be meaningless for large multinational corporations.<sup>24</sup> On the contrary, in an extreme case where the IRS has never audited a firm, the publicly disclosed FIN 48 information might be the first time for this firm to reveal the existence of risky tax positions. Stated differently, firms under continuous

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<sup>21</sup> For more details on the CAP program, and the determinants and consequences of participating in the CAP program, see Beck and Lisowsky (2014). I choose to study the CIC program because it is not a voluntary decision made by firms.

<sup>22</sup> Statements made by a panelist at the 2015 Tax Council Policy Institute Annual Symposium, "How Taxes Matter: The Globalization of Tax Policy and Implications for US Economic Growth and Investment" (February 12–13, 2005, Washington, D.C.).

<sup>23</sup> The IRS introduced the CIC program (formerly known as the Coordinated Examination Program) in the 1960s. In untabulated analyses, I also explore whether the absolute change and large change (>5%) in CIC assignment probability affect firms' reactions to FIN 48; however, there is no significant variation in firms' reactions.

<sup>24</sup> See FASB board members' statements at [https://www.fasb.org/board\\_meeting\\_minutes/05-10-06\\_utp.pdf](https://www.fasb.org/board_meeting_minutes/05-10-06_utp.pdf).

monitoring may not be very concerned about FIN 48, while firms without continuous monitoring could be more sensitive to the threat that FIN 48 disclosures may somehow provide the IRS with useful information.

The continuous monitoring nature of the CIC program can also affect how firms make subsequent adjustments in tax policies post-FIN 48. Continuously monitored firms could be reluctant to make a quick adjustment due to the regular presence of IRS staff at their workplace. Furthermore, as continuously monitored firms are guaranteed to receive annual tax audits, any sudden move might be noticed by the IRS quickly and could attract even more unwanted scrutiny from the IRS. In contrast, firms that are not in a continuous monitoring program could strategically adjust their behavior. Managers could choose to adjust tax policies faster if the IRS is not continuously monitoring them. As a result, continuously monitored firms will behave differently in the post-FIN 48 tax policy adjustment from firms without continuous monitoring. To state these hypotheses formally,

**H3a:** Firms continuously monitored by the IRS have smaller initial reactions (i.e., cash ETR spikes) to FIN 48 disclosure requirements than firms not continuously monitored by the IRS.

**H3b:** Firms continuously monitored by the IRS have stickier reactions (i.e., a slower speed of adjustment) than firms not continuously monitored by the IRS.

In the first and second sets of predictions, firms with greater magnitude in initial reactions (i.e., higher cash ETR spikes) take a longer time in adjusting tax policy after adopting FIN 48. An argument exists that a higher cash ETR spike naturally requires longer response time in post-FIN 48 tax policy adjustments. However, this is not the case for the third set of predictions, where firms with smaller initial reactions (i.e., continuously monitored firms) take

the longest time in post-FIN 48 tax policy adjustments toward target levels. It is not necessarily the case that firms would always require more extended time to correct a larger policy deviation from desirable levels, as any deviation from the desirable levels would be costly to the firm. Instead, firms would weigh the benefits and costs of adjusting quicker and deviating from a desirable level longer when making adjustment decisions, which is reflected as differences in the friction of adjustments. It is an empirical question of how the magnitude of initial reactions relates to the stickiness of responses in each of the three scenarios.

## **Data, Sample, and Research Design**

### **Data and Sample**

The sample collection starts with all public firms that are incorporated in the United States and have financial data coverage in the Compustat database. The sample period is from 2002 to 2016, covering five pre-FIN 48 years and ten post-FIN 48 years. The sample ends in 2016 since the Tax Cuts and Jobs Act (2017) affects U.S. firms' effective tax rates significantly.<sup>25</sup> Following the standard practice in the prior tax literature, the sample includes only firm-years with positive pretax income. Firms included in the sample have total assets no less than \$10 million, the minimum threshold to be subject to the oversight by the IRS's Large Business and International (LB&I) Division. Doing so also ensures that sample firms are subject to the same enforcement standards by the IRS. Regulated utility firms (SIC: 4900–4999), banks, and financial firms (SIC: 6000–6999) are excluded. Table 1 summarizes the sample collection process. The tests for H1a,

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<sup>25</sup> The Tax Cuts and Jobs Act (2017) reduces the corporate income tax rate from 35 percent to 21 percent. Furthermore, U.S. corporate income tax rate structure is progressive before 2017 and flat since 2017.

H2a, and H3a use all years (2002–2016), while the tests for H1b, H2b, and H3b use only post–FIN 48 years (2007–2016).<sup>26</sup>

## Research Design

In this study, the measure of firms' tax policy is the cash effective tax rate (*Cash ETR*) reported in financial statements, which is an outcome-based measure of corporate tax policies. Hanlon and Heitzman (2010) recommend that researchers choose a tax policy measure that fits their specific research context. Since this study focuses on firms' reactions to disclosure requirements and adjustments in real tax actions, using an annual Cash ETR is appropriate. An annually based Cash ETR measure allows capturing the year-over-year tax policy changes. Furthermore, unlike GAAP ETR, the Cash ETR measure is not susceptible to the changes in tax accounting accruals, but it can capture the outcomes of tax deferral strategies. This choice is also consistent with studies in the economics literature on taxpayers' behavioral responses following IRS enforcement (e.g., DeBacker et al. 2015).

UTB disclosed by firms per FIN 48 is another candidate to measure the aggressiveness of corporate tax policy (De Waegenare, Sansing, and Wielhouwer 2015). However, this measure is not available for the pre–FIN 48 years, which prevents capturing a change from the pre-disclosure level. Furthermore, UTB is also influenced by financial reporting incentives, which hinders the quality of UTB in capturing the real changes in corporate tax policies. Recent studies suggest that wide latitude exists in the applications of FIN 48 by managers in determining UTB (e.g., De

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<sup>26</sup> When including all years, both the pre–FIN 48 years (2002–2006) and the post–Schedule UTP years (2010–2016) serve as benchmark years to estimate the spikes in Cash ETR during the first three years of adopting FIN 48. An alternative way is only using the pre–Schedule UTP years (2002–2009) in the tests for H1a, H2a, and H3a, which would lead to a smaller test sample. Untabulated robustness checks confirm that all inferences are unchanged if this alternative test sample period is taken.

Simone, Robinson, and Stomberg 2014). Therefore, this study uses Cash ETR as the measure of firms' tax policy.

This study shows firms' tax policy responses in two ways. First, in OLS regressions, the interaction terms between the first three years after FIN 48 adoption and three cross-sectional variables (i.e., pre-FIN 48 tax aggressiveness, geographic proximity to IRS offices, and continuous monitoring probability) capture the variations in the spikes in Cash ETR in the three-year window following FIN 48 adoption. An indicator variable, *FIN 48*, takes the value of one for the first three fiscal years after FIN 48 adoption (2007, 2008, and 2009).<sup>27</sup> The regression models for H1a, H2a, and H3a are presented below.

$$\begin{aligned} \text{Cash ETR} = \alpha + \beta_1 \text{FIN 48} + \beta_2 \text{TAG} + \beta_3 \text{FIN 48} \times \text{TAG} + \gamma \text{Controls} + \\ \text{Fixed Effects} + \varepsilon \end{aligned} \quad (1)$$

$$\begin{aligned} \text{Cash ETR} = \alpha + \beta_1 \text{FIN 48} + \beta_2 \text{DIST} + \beta_3 \text{FIN 48} \times \text{DIST} + \gamma \text{Controls} + \\ \text{Fixed Effects} + \varepsilon \end{aligned} \quad (2)$$

$$\begin{aligned} \text{Cash ETR} = \alpha + \beta_1 \text{FIN 48} + \beta_2 \text{CIC} + \beta_3 \text{FIN 48} \times \text{CIC} + \gamma \text{Control} + \\ \text{Fixed Effects} + \varepsilon \end{aligned} \quad (3)$$

*TAG* is an indicator for firms that were tax aggressive in the pre-FIN 48 years. To identify these firms, this study broadly follows Balakrishnan, Blouin, and Guay (2019) to calculate an industry size-adjusted tax rate measure, which captures a firm's level of tax avoidance relative to its industry peer firms of a similar size. Specifically, in each year and for each industry group (2-digit SIC), I rank all firms into five groups based on their total assets and calculate the mean Cash

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<sup>27</sup> A firm's tax year generally conforms to its accounting period for financial accounting purposes (I.R.C. §441). FIN 48 became effective for the first fiscal period beginning after December 15, 2006. The window of interest ends at 2009, because certain U.S. companies are required to file a new Schedule UTP confidentially with the IRS to report uncertain tax positions since 2010.

ETRs in each year-industry-size group. If a firm reports a lower Cash ETR than its peer firms in any of the three years before FIN 48 adoption, the firm is designated as a pre-FIN 48 tax-aggressive firm ( $TAG = 1$ ; otherwise = 0).

*DIST* is the geographic proximity between firms' headquarters and the nearest IRS offices. Firms' locations are collected from their historical SEC filings.<sup>28</sup> Locations of IRS offices are collected from the list in Kubick et al. (2017, pp.449–450).<sup>29</sup> Unless the firms have changed headquarters locations, this geographic-based measure does not vary by year. In the main analysis, *DIST* is the natural logarithm of one plus the number of miles of the distance. Sensitivity analyses using an indicator for firms with high *DIST* confirm that results are similar.

*CIC* is the predicted probability of inclusion in the IRS Large Business and International (LB&I) Division's Coordinated Industry Case (CIC) Program. The actual inclusion in the IRS's CIC program is not publicly available. However, Ayers et al. (2019) develop and validate prediction models for researchers to calculate the probability of inclusion in the CIC program. Unlike the geographic distance measure that rarely changes, the CIC probability varies by both firm and time. The inputs to these prediction models include firm size, gross receipts, business and geographic segments, foreign operations, foreign taxes, leverage, R&D activities, capital intensity, stock options, and net operating loss.<sup>30</sup> Sensitivity analysis using an indicator for firm-year observations with high *CIC* confirms that results are similar.

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<sup>28</sup> The Augmented 10-X Header Data is provided by the Software Repository for Accounting and Finance at the University of Notre Dame (<https://sraf.nd.edu/data/augmented-10-x-header-data/>).

<sup>29</sup> It is plausible that multinational companies may be subject to the scrutiny of both domestic and foreign tax authorities. In addition, U.S. firms also pay state-level taxes. Studying the interplays of domestic and foreign tax authorities goes beyond the scope of this study, and remains a limitation.

<sup>30</sup> These factors are also mentioned in the Internal Revenue Manuals Exhibit 4.46.2-2, Criteria for the Identification of Coordinated Industry Case Program, available at [https://www.irs.gov/irm/part4/irm\\_04-046-002](https://www.irs.gov/irm/part4/irm_04-046-002). Ayers et al. (2019) find that firm size and complexity are major considerations for the IRS to assign firms to the CIC program. The area under the receiver operating characteristic (ROC) curve statistics of the prediction models are above 0.80, which suggests relatively good predictive power.

In equations 1, 2 and 3, the variable of interest is  $\beta_3$ . If hypothesis 1a is valid, I expect to observe a significant positive coefficient on  $\beta_3$  in equation 1, which means pre-FIN 48 tax-aggressive firms have greater spikes in *Cash ETR*. If hypothesis 2a is valid, I expect to observe a significant negative coefficient on  $\beta_3$  in equation 2, which suggests firms located farther from IRS offices have smaller spikes in *Cash ETR*. Lastly, if hypothesis 3a is valid, I expect to observe a significant negative coefficient on  $\beta_3$  in equation 3, which suggests firms under continuous monitoring have smaller spikes in *Cash ETR*.

The regression models include a comprehensive list of the firm-level determinants of tax avoidance documented in the prior tax literature (e.g., Dyreng, Hanlon, Maydew, and Thornock 2017; Jiang, Kubick, Miletkov, and Winotki 2017; Kubick et al. 2017; Wilde and Wilson 2018). The control variables include firm size (*SIZE*), market-to-book ratio (*MTB*), leverage (*LEV*), firm performance (*ROA*), discretionary accruals (*ACC*), foreign income (*FI*), equity income (*EQINC*), intangible assets (*INTAN*), capital assets (*PPE*), the level of and the change in net operating loss (*NOL*,  $\Delta$ *NOL*), free cash flow (*FCF*), and research and development expense (*R&D*). Appendix B defines the variables in detail.<sup>31</sup>

Prior tax literature suggests that the included control variables are important attributes that may directly or indirectly affect corporate tax policies. For example, Zimmerman (1983) suggests

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<sup>31</sup> The control variables are not an exhaustive list of the determinants of tax avoidance. Consistent with the arguments in Chen et al. (2010), including a comprehensive list of control variables for the firm characteristics that are related to tax planning does not “throw the baby out with the bath water.” Doing so helps to account for the average effects of firm characteristics on tax outcomes, while still allowing me to detect the temporary effects of FIN 48 on firms’ tax policies. However, Swanquist and Whited (2018) suggest that including more controls is not always better. Consistent with Dyreng et al. (2017), the current model only includes firm attributes that are commonly controlled for in tax avoidance studies. I acknowledge that recent tax literature has documented that characteristics beyond firm attributes (e.g., compensation incentives, managerial innate characteristics) may also influence corporate tax policies (e.g., Armstrong, Blouin, and Larcker 2012; Chyz 2013; Francis, Hasan, Wu, and Yan 2014; Olsen and Stekelberg 2016; Powers, Robinson, and Stomberg 2016; Law and Mills 2017; Koester, Shevlin, and Wangerin 2017).

that firm size may capture the political costs of tax avoidance and can affect tax outcomes. Rego (2003) finds that foreign operations and profitability can capture the economies of scale of tax planning and are correlated with tax-planning outcomes. Frank, Lynch, and Rego (2009) report a positive correlation between financial reporting aggressiveness and tax planning aggressiveness. Graham and Tucker (2006) find that corporate debt policy interacts with corporate tax policy. Gupta and Newberry (1997) investigate the cross-sectional determinants of the variation in corporate tax rates and find firms' capital structure, asset mix, and performance are associated with effective tax rates. Following Kubick et al. (2017), I also include net operating loss and R&D expense as control variables, since there are significant provisions in tax laws for NOL deductions and R&D tax credits that may directly affect tax outcomes. The regressions include industry fixed effects (two-digit SIC code) to account for the time-invariant unobservable heterogeneity across industries. The regressions also include year fixed effects to account for changes in the macro-economy and industry fixed effects to account for the variation in tax rates across industries.<sup>32</sup> Standard errors are clustered by firms (Petersen 2009).

The second approach to show firms' response is the stickiness of post-FIN 48 tax policy adjustment. A partial adjustment model in the corporate finance literature (e.g., Flannery and Rangan 2006; Huang and Ritter 2009) is employed to estimate how quickly firms adjust toward an annually revised target level of tax avoidance. In Model 4, the value of  $1 - \beta$  captures the speed of adjustment in *Cash ETR*. A faster annual adjustment speed indicates a less sticky post-FIN 48 tax policy adjustment. The sample is split by the pre-FIN 48 tax aggressiveness, the geographic proximity to IRS offices, and the predicted continuous monitoring probability. Once the average

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<sup>32</sup> Given that *FIN 48* captures a three-year window, the year fixed effects would not subsume the coefficient of *FIN 48*. I also confirm the results are quantitatively similar if I omit the year fixed effects.

speed of adjustment is calculated for each subgroup, I compare the speeds across different subsamples and test for significant differences.<sup>33</sup> To estimate the speed of adjustment, I follow the recommendation in Flannery and Hankins (2013) to use the Blundell and Bond (1998) estimation approach.<sup>34</sup>

$$\text{Cash ETR}_{t+1} = \alpha + \beta \text{Cash ETR}_t + \gamma \text{Controls}_t + \text{Fixed Effects} + \varepsilon \quad (4)$$

Hypothesis 1b, if valid, predicts a slower speed of adjustment (i.e., stickier reactions) by firms that were tax aggressive in the pre-FIN 48 period. Hypothesis 2b predicts a significant difference in the speed of adjustment between the firms located farther away from the IRS offices (i.e., top tercile in *DIST*) and the firms located close by the IRS offices (i.e., bottom tercile in *DIST*). The close-by firms should have a slower speed of adjustment (i.e., stickier reactions). Lastly, if hypothesis 3b is valid, it is expected that we would observe a significant difference in the speed of adjustment between the firms with a high continuous monitoring likelihood (i.e., top tercile in *CIC*) and the firms with a low continuous monitoring likelihood (i.e., bottom tercile in *CIC*). The firms with a high continuous monitoring likelihood should have a slower speed of adjustment (i.e., stickier reactions).

## Results

### Figures

Figure 1 shows the yearly means of the *Cash ETR* of sample firms and the aggregate corporate income tax collection by the IRS. The vertical line approximately indicates when FIN

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<sup>33</sup> Note the estimated annual adjustment speed in each subsample is the cross-sectional mean of all firms' adjustment speeds, rather than a firm-specific adjustment speed.

<sup>34</sup> Appendix C provides a derivation that explains how  $1 - \beta$  captures the speed of adjustment. Appendix C also provides methodological discussion on why the Blundell and Bond (1998) approach is necessary to estimate the speed of adjustment, instead of the OLS estimation.

48 became effective. During the first three years of FIN 48 adoption, there is a spike in the mean of the U.S. firms' *Cash ETR*. This pattern is consistent with the figure in Dyreng et al. (2017). The pattern in the collection of corporate income tax by the IRS mostly follows the pattern of firms' *Cash ETR*. The IRS's corporate income tax collections dipped after the 2008 financial crisis and increased after 2011.<sup>35</sup>

Figure 2 splits the sample firms into pre-FIN 48 tax-aggressive firms and nonaggressive firms and shows the yearly means of *Cash ETR* separately. As expected, in the years before FIN 48, the mean *Cash ETR* of pre-FIN 48 tax-aggressive firms are lower than for nonaggressive firms. The differences in *Cash ETR* by aggressive and nonaggressive firms are less pronounced after the adoption of FIN 48 than before. An explanation could be that other previously nonaggressive firms may learn some information regarding aggressive firms' tax strategies from FIN 48 disclosures. Furthermore, only the pre-FIN 48 tax-aggressive firms exhibit a positive spike pattern similar to the full sample.

Figure 3 plots the annual mean of *Cash ETR* of firms with the closest and longest geographic distance to an IRS office. Firms with the shortest geographic distance to an IRS office have a greater spike around 2007–2009. The line for the firms with the longest geographic distance to an IRS office exhibits a flat and decreasing trend from 2007 to 2009.

Figure 4 plots the annual mean of *Cash ETR* of firms with the low and high predicted probability being assigned to the IRS's CIC program. Firms with a high probability of being assigned to the IRS's CIC program tend to have a smaller spike in *Cash ETR*, while the low-probability firms have a greater spike in *Cash ETR* around 2007.

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<sup>35</sup> The spikes in *Cash ETR* in the test sample are not attributed to the 2008 financial crisis, because loss firm-years are excluded from the sample. Furthermore, prior to the Tax Cuts and Jobs Act (2017), U.S. corporations are subject to a progressive tax rate structure. A less profitable firm would pay taxes at a lower marginal and average tax rate.

## **Descriptive Statistics**

Table 2, Panels A and B present the summary statistics. On average, the sample firms report a 24.7 percent *Cash ETR*. The nearest IRS office is located within 50 miles (average pre-logged miles) for an average firm. The average probability of being assigned to the CIC program is 15.8 percent. Forty-seven percent of firms (60.7 percent of observations) are classified as pre-FIN 48 tax-aggressive firms. Panel B provides distributions of mean *Cash ETR*, distance to IRS offices, and predicted CIC probability by industry. Construction firms are among the closest firms to IRS offices, while air and water transportation firms are among the farthest. Petroleum refining and related industries have a high predicted probability of being continuously audited by the IRS. Services industries have a low predicted probability of being continuously audited by the IRS.

Table 3 presents the Pearson and Spearman correlations among key variables. As expected, pre-FIN 48 tax aggressiveness (*TAG*) is negatively associated with *Cash ETR*. Firms' geographic distance to IRS offices (*DIST*) is positively associated with *Cash ETR*, which is consistent with the findings in Kubick et al. (2017). The Spearman correlation between firms' predicted probability of continuous monitoring (*CIC*) and *Cash ETR* is negative, which suggests that the IRS is targeting tax-aggressive firms in its continuous monitoring. The Pearson correlation between *TAG* and the firms' geographic distance to IRS offices (*DIST*) is negative, suggesting firms located closer to IRS offices are more likely to be tax aggressive in the pre-FIN 48 period. Lastly, pre-FIN 48 tax-aggressive firms and firms located closer to IRS offices are more likely to be continuously monitored by the IRS.

## **Variation in the Reactions by Pre-FIN 48 Tax Aggressiveness**

Table 4 presents the regressions for H1a, the cross-sectional variation in Cash ETR spikes based on firms' pre-FIN 48 tax aggressiveness. To enable interpretation of the stand-alone

coefficients for TAG and FIN 48 more easily, Column (1) presents the regression without interacting TAG and FIN 48. Pre-FIN 48 tax-aggressive firms report a Cash ETR that is 4.7 percentage points lower than that of other firms during the sample period, after controlling for the common determinants of tax avoidance. In the first three years after FIN 48 adoption, sample firms report a Cash ETR that is 3.1 percentage points higher, which is very close to the estimate made by McClure (2019).

The interaction term between TAG and FIN 48 in Table 4, Column (2) is the variable of interest for H1a. The coefficient estimate is positive and statistically significant, which suggests that pre-FIN 48 tax-aggressive firms exhibit a spike in Cash ETR that is 2.9 percentage points higher than that of nonaggressive firms. Given that the pre-FIN 48 tax-aggressive firms reported a pretax income of \$486 million in the first three years after FIN 48 adoption, the difference in spikes translates into a \$14 million difference in cash tax paid.

The coefficient estimates on control variables are consistent with prior studies in tax literature (e.g., Dyreng et al. 2017; Kubick et al. 2017; Wilde and Wilson 2018). For example, larger firms (*SIZE*), firms with less leverage (*LEV*), and firms with better operating performance (*ROA*) report higher *Cash ETR*. Firms that are more aggressive in financial reporting and firms with more foreign operations report lower *Cash ETR*. The existence of operating loss carryforward is negatively associated with *Cash ETR*, while the change in net operating loss carryforward is positively associated with *Cash ETR*. Firms with higher free cash flow (*FCF*) and higher research and development expenditure (*R&D*) also report lower *Cash ETR*.

Table 5 presents the regressions for H1b, the variation in the speed of adjustments in *Cash ETR* toward target levels based on pre-FIN 48 tax aggressiveness. Pre-FIN 48 tax-aggressive firms report an average adjustment speed of 71.3 percent, while nonaggressive firms report an

average adjustment speed of 98.4 percent. The difference is statistically significant at the 1 percent level. In terms of half-life, the aggressive firms, on average, take seven months to adjust halfway toward a target, while the nonaggressive firms take two months to adjust halfway toward a target.<sup>36</sup> The difference in half-life terms suggests that the annual adjustment by aggressive firms is three times slower than that by nonaggressive firms.

### **Variation in the Reactions by Firms' Proximity to IRS Offices**

Table 6 presents the regressions for H2a, the cross-sectional variation in *Cash ETR* spikes based on firms' geographic distance to IRS offices (*DIST*). Column (1) presents a regression without interacting *FIN 48* and *DIST*. After controlling for the geographic distance to IRS offices and common determinants of tax avoidance, sample firms report a Cash ETR that is 3.3 percentage points higher during the first three years after FIN 48 adoption. The estimate for *DIST* is positive, suggesting firms located closer to IRS offices are more aggressive than others, which is consistent with the findings in Kubick et al. (2017).

The interaction term between *FIN 48* and *DIST* in Table 6, Column (2) is the variable of interest for H2a. The coefficient estimate on the interaction term  $FIN\ 48 \times DIST$  is significantly negative, suggesting that firms located closer to IRS offices have a greater spike in *Cash ETR*. An interquartile change in the distance to IRS offices means a 0.8 percentage point difference in the spike in *Cash ETR*.

In Table 6, Column (3), an indicator variable (*HIGH DIST*) replaces the continuous measure of the geographic proximity to IRS offices. In this regression, the interaction term between *FIN 48* and *HIGH DIST* is the variable of interest for H2a, which captures the attenuated spikes in Cash ETR (3.8 percentage points) by firms with a higher *DIST* than its sample median.

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<sup>36</sup> Half-life is calculated as  $\ln(0.5) \div \ln(1 - \text{speed of adjustment}) \times 12$  months.

The spike in Cash ETR by firms with a lower *DIST* than its sample median is 4.9 percentage points. The 1.1 percentage point difference in the spikes in Cash ETR approximately translates to \$4.6 million, for a sample firm with an average size of pretax income.

Table 7 presents the regressions for H2b, the variation in the speed of adjustments in *Cash ETR* toward target levels based on firms' distance to the nearest IRS offices. The sample is split by the terciles of distance to the nearest IRS office. Results suggest a monotonic decrease in the speed of adjustments as the distance to IRS offices becomes closer. Firms located close to IRS offices report an average adjustment speed of 30.4 percent, while firms located away from IRS offices report an average adjustment speed of 97.3 percent. The difference is statistically significant at the 1 percent level. In the half-life term, firms located close to IRS offices use 23 months to adjust halfway toward target levels, while firms located away from IRS offices use two months to adjust halfway toward target levels. The difference in half-life terms suggests that it takes the firms located close to IRS offices almost ten times longer to adjust *Cash ETR* than the firms located farther away from IRS offices.

### **Variation in the Reactions by the IRS's Continuous Monitoring on Firms**

Table 8 presents the regressions for H3a, the cross-sectional variation in *Cash ETR* spikes based on firms' predicted probability of being continuously monitored by the IRS's CIC program (*CIC*). Column (1) presents a regression without interacting *FIN 48* and *CIC*. The estimate on *FIN 48* is similar to the coefficient estimates in Tables 4 and 6. Firms with a higher likelihood of being continuously monitored by the IRS report a lower *Cash ETR*. This could suggest that continuously monitored firms are generally more tax aggressive.

The interaction term between *FIN 48* and *CIC* in Table 8, Column (2), is the variable of interest for H3a. The coefficient estimate on the interaction term  $FIN\ 48 \times CIC$  is significantly

negative, suggesting that firms with a high probability of being continuously monitored have a lower spike in *Cash ETR*. A hypothetical firm being continuously monitored by the IRS would have a *Cash ETR* spike 1.6 percentage points lower during the first three years after FIN 48 adoption than a control firm that is more likely than not to be continuously monitored.<sup>37</sup>

Given the skewness of *CIC*, in Table 8, Column (3), an indicator variable (*HIGH CIC*) replaces the continuous measure of *CIC*. In this regression, the interaction term between *FIN 48* and *HIGH CIC* is the variable of interest for H3a, which captures the attenuated spikes in Cash ETR (3.5 percentage points) by firms with a higher *CIC* than its sample median. The spike in Cash ETR by firms with a lower *CIC* than its sample median is 4.5 percentage points. The one percentage point difference in the spikes in Cash ETR approximately translates to \$4.2 million, for a sample firm with an average size of pretax income.

Table 9 presents the regressions for H3b, the variation in the speed of adjustments in *Cash ETR* toward target levels based on firms' predicted probability of being included in the *CIC* program (a form of continuous monitoring by the IRS). Similar to Table 7, the sample split is by the terciles of the predicted probability of *CIC* inclusion. Results suggest a monotonic decrease in the speed of adjustments as the predicted probability of continuous monitoring becomes larger. Firms with a high probability of being included in the continuous monitoring program report an average adjustment speed of 46.9 percent, while firms with a low probability of being included report an average adjustment speed of 93.9 percent. The difference is statistically significant at the 10 percent level. In half-life terms, firms with a high probability of being included in the continuous monitoring program take 13 months to adjust halfway toward target levels, while firms with a low probability of being included take only three months. The

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<sup>37</sup> The difference is calculated as  $(100\% - 50\%) \times 0.032 = 1.6\%$ .

difference in half-life terms suggests that it takes the firms with a high probability of being continuously monitored four times longer than the firms with a low probability of being continuously monitored to adjust *Cash ETR*.

### **Subsample Analyses**

In the previous sections, this study examines the variation in firms' reactions to FIN 48 disclosure requirements based on firms' tax aggressiveness, proximity to IRS offices, and continuous monitoring by the IRS individually. This section explores the joint effects (e.g., tax-aggressive firms close to IRS offices, tax-aggressive firms with a high probability of being continuously monitored by the IRS) in various subsamples. Table 10 summarizes the results. For brevity, the coefficient estimates for control variables are omitted from this table.

Panel A shows the variation in the spike in Cash ETR by the distance to IRS offices in tax-aggressive firms (Column 1) and nonaggressive firms (Column 2). Results indicate that the cross-sectional variation in the *Cash ETR* spikes is concentrated in the subsample of pre-FIN 48 tax-aggressive firms. An interquartile change in the distance to IRS offices means a 1.1 percentage point difference in the spike in *Cash ETR*. The estimate on *FIN 48* for the nonaggressive firm subsample (Column 2), is not statistically different from zero and is statistically different from its estimate in the aggressive firm subsample (Column 1), suggesting nonaggressive firms located near IRS offices do not observe a significant spike in *Cash ETR* due to FIN 48 adoptions. The coefficient estimates on the interaction term ( $FIN\ 48 \times DIST$ ) are not statistically different between the two subsamples and have the same sign, suggesting the moderating effect of *DIST* on *Cash ETR* spikes due to FIN 48 adoptions is not statistically different between the two subsamples.

Panel B shows the variation in the speed of adjustment in Cash ETR since FIN 48 adoptions by tax-aggressive firms with a short *DIST* (Column 1), tax-aggressive firms with a

long *DIST* (Column 2), nonaggressive firms with a short *DIST* (Column 3), and nonaggressive firms with a long *DIST* (Column 4). Results indicate that the variation in the speed of adjustment in Cash ETR by the proximity to IRS offices mainly comes from tax-aggressive firm subsamples. The difference between the speed of adjustments in Column (1) and Column (2) is statistically significant, while the difference between Column (3) and Column (4) is not.

Panel C shows the variation in the spike in Cash ETR by the IRS's continuous monitoring of tax-aggressive firms (Column 1) and nonaggressive firms (Column 2). Similar to the findings in Panel A, separate regressions indicate that the cross-sectional variation in the *Cash ETR* spikes is concentrated in the subsample of pre-FIN 48 tax-aggressive firms. In this subsample, the cross-sectional difference in *Cash ETR* spikes between the two hypothetical firms (i.e., one firm with absolute certainty of being continuously monitored and another firm with that is more likely than not to be continuously monitored) is approximately \$10 million. The estimate on *FIN 48* for the nonaggressive firm subsample (Column 2), is not statistically different from zero and is statistically different from its estimate in the aggressive firm subsample (Column 1), suggesting nonaggressive firms with virtually zero likelihood of being continuously monitored do not observe a significant spike in *Cash ETR* due to FIN 48 adoptions. The coefficient estimates on the interaction term ( $FIN\ 48 \times CIC$ ) are not statistically different between the two subsamples and have consistent signs, suggesting the moderating effect of *CIC* on *Cash ETR* spikes due to FIN 48 adoptions is not statistically different between the two subsamples.

Lastly, Panel D shows the variation in the speed of adjustment in Cash ETR since FIN 48 adoptions by tax-aggressive firms with a low *CIC* (Column 1), tax-aggressive firms with a high *CIC* (Column 2), nonaggressive firms with a low *CIC* (Column 3), and nonaggressive firms with a high *CIC* (Column 4). Results indicate that the variation in the speed of adjustment in Cash

ETR by the IRS's continuous monitoring of firms mainly comes from tax-aggressive firm subsamples. The difference between the speed of adjustments in Column (1) and Column (2) is statistically significant, while the difference between Column (3) and Column (4) is not. Nevertheless, the pattern that a firm with a high *CIC* adjusts Cash ETR slower (i.e., has a stickier adjustment) than a firm with a low *CIC* exists in both tax-aggressive and nonaggressive firms.

### **Additional Analyses**

#### **Mechanisms Through Which Tax Policies Are Changed**

Caskey (2019) encourages future studies to explore what specific actions firms take to achieve target effective tax rates. While the detailed tax policies are unobservable to outsiders, firms disclose information on the extent of foreign operations (e.g., the number of foreign subsidiaries in Exhibit 21) and on the purchase of auditor-provided tax service (e.g., tax service fees reported by Audit Analytics). Table 11, Panel A shows evidence that in the first three years after FIN 48 adoption, firms temporarily report fewer foreign subsidiaries and pay lower fees for auditor-provided tax services. Furthermore, pretax earnings management, measured per Frank et al. (2009), is also higher during the first three years after FIN 48 adoption. These results indicate that while FIN 48 did temporarily restrain firms from pursuing aggressive tax planning, firms were searching for alternative means to manage earnings to compensate for the loss in tax savings.

#### **CEO Risk Incentive**

Prior research finds that the CEO's equity risk incentives can affect tax policies (Rego and Wilson 2012). In the context of FIN 48, firms' responses to FIN 48 can also reflect the CEO's risk appetite. Rego and Wilson (2012) argue that there is a risk incentive effect such that managers with higher equity risk incentives will pursue more aggressive tax policies. Analysis in Table 11,

Panel B suggests that the *Cash ETR* spike in the first three years of FIN 48 adoption is an increasing function of the compensation *Vega*, the sensitivity of managers' wealth to stock return volatility. The estimation of *Vega* follows the procedures in Core and Guay (2002). This pattern could suggest CEOs whose personal wealth is more closely tied to firms' uncertainty in the capital market are more concerned about the threat posed by FIN 48 disclosure requirements and thus made a greater response. It could also be consistent with the prior findings that highly incentivized CEOs were pursuing more aggressive tax policies (Rego and Wilson 2012).

### **Tax Disclosure Complexity**

Robinson and Schmidt (2013) study the variation in the disclosure quality of FIN 48 information. Using the proprietary cost of disclosure theory, they argue that there are incentives for firms to provide poor-quality FIN 48 disclosure. They also find that the capital market rewards poor-quality FIN 48 disclosure and penalizes high-quality FIN 48 disclosure. Disclosure examples in Appendix A show that there is variation in the length of tax disclosure in the SEC's Form 10-K across firms.<sup>38</sup>

Table 11, Panel C explores whether variation in Cash ETR spikes is associated with the complexity of tax footnote disclosures. Using the number of sentences in Form 10-K income tax footnotes as a measure of tax disclosure complexity, analysis in Table 11, Panel C suggests that firms with longer tax footnotes are generally associated with lower *Cash ETR*.<sup>39</sup> Furthermore, the *Cash ETR* spikes in the first three years after FIN 48 adoption are higher for the firms with lengthier tax footnotes. To the extent that firms with lengthier tax footnotes are more aggressive in tax

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<sup>38</sup> Untabulated results show that after FIN 48 adoptions, the length of the income tax footnotes in SEC Form 10-K increases. On average, tax-aggressive firms have a lengthier income tax footnote. Nonaggressive firms increased the length of income tax footnotes more during the first three years after FIN 48 adoptions.

<sup>39</sup> Untabulated robustness checks using the word counts (with numbers included or not) in income tax footnotes confirm a similar inference.

planning, this analysis confirms that aggressive firms have a greater response in changing tax policies in response to FIN 48 disclosures requirements.

### **The Roles of Independent Accountants, Internal Tax Departments, and Firm Networks**

Prior tax literature documents several factors that shape corporate tax policies, such as auditor-provided tax services, internal tax departments, and firms' network ties (e.g., Brown and Drake 2014; Klassen, Lisowsky, and Mescall 2016; McGuire, Omer, and Wang 2012). Untabulated regressions confirm that the main results hold after including indicators for Big N auditors (Arthur Andersen, Deloitte, EY, KPMG, and PwC) and auditors with tax industry expertise (following the identification strategy in McGuire, Omer, and Wang 2012) as additional control variables. Similarly, using the number of individuals with tax-related titles reported in the BoardEx database as a proxy for the size of internal tax departments, untabulated regressions confirm that the main results also hold after controlling for the existence or the size of internal tax departments. Lastly, using the number of firm connections formed by firm executives and board members' concurrent positions reported in the BoardEx database as a proxy for firms' network ties, untabulated regressions confirm that the main results held with this additional control.

Table 11, Panels D and E further explore whether some auditor characteristics (e.g., Big N auditors, auditors' tax-industry expertise) explain firms' reactions to FIN 48 disclosure requirements. Results in Panel D do not show significant variation in the spike in Cash ETR by auditor characteristics during the first three years of FIN 48 adoptions. Similarly, results in Panel E, Columns 1 and 2, do not show significant variation in the speed of adjustment in Cash ETR by Big N auditors since FIN 48 adoptions. However, the speed of adjustment in Cash ETR for firms with a tax-expert auditor is faster than that of firms without a tax-expert auditor. The lack of consistent variation in firms' response by auditor characteristics does not necessarily mean

auditors play no role in firms' response to FIN 48. Instead, the measures for auditor characteristics explored in these additional tests (e.g., Big N membership and auditors' tax-industry expertise) could be noisy and might not capture auditors' expertise and input in helping clients form their response to FIN 48.

### **Firms' Tax Aggressiveness after Adopting FIN 48**

Because firms make continuous tax policy adjustments after adopting FIN 48, an interesting question is whether firms can revert to the level of tax aggressiveness before adopting FIN 48. Comparing the level of Cash ETR before and after adopting FIN 48 suggests that about 36.6 percent of the sample firms did revert to a level of Cash ETR that is not greater than their pre-FIN 48 levels.

Firms' tax aggressiveness can also be measured as the relative position of tax aggressiveness within industries, rather than a ratio. Firm managers could be more concerned about the relative position within industries than about a ratio. In another analysis, all firms are ranked into ten groups within each year and industry based on the *Cash ETR*. Higher-ranked firms (i.e., lower *Cash ETR*) are more tax aggressive in respective industries. Then, firms' relative tax positions in the post-FIN 48 period are compared with their relative tax positions in the pre-FIN 48 period. Firms are classified into three categories: (1) firms that become more aggressive in the post-FIN 48 period; (2) firms with an equally aggressive tax position in the pre- and post-FIN 48 periods; and (3) firms that become less aggressive in the post-FIN 48 period.

Results in Table 11, Panel F suggest that both group 2 firms and group 3 firms have spikes in *Cash ETR* during the first three years after FIN 48 adoption, while group 1 firms have statistically greater spikes in *Cash ETR*. Group 1 firms report no spike in *Cash ETR* when adopting FIN 48. This analysis supports the notion that firms' responses to FIN 48 disclosure requirements

are not homogenous. A subset of firms become less aggressive not only in absolute terms (i.e., paying higher tax rates) but also in the position ranks within the respective industry.

### **Comparing the Effects of FIN 48 and Schedule UTP**

Lastly, after U.S. firms adopted FIN 48 and starting from 2010, the IRS requires some large U.S. corporate taxpayers to include a new Schedule UTP in their tax returns. Although the new schedule is not available to the public, there is more information content in this new tax form than FIN 48 disclosures, such as a ranking of the size of UTB, relevant tax laws, and a concise description of each tax position. The IRS indicates that there should be consistency between the Schedule UTP filings and the financial statement reporting per FIN 48. Towery (2017) notes that the IRS also uses the absence of Schedule UTP filings, while a large FIN 48 UTB reserve exists, as a red flag.

Table 11, Panel G explores whether firms have a greater or lesser response to Schedule UTP filing requirements compared with their responses to FIN 48. An indicator variable, *Schedule UTP*, indicates the firm-year observations when the firm is subject to Schedule UTP filing requirements. The IRS uses a five-year phase-in period when implementing Schedule UTP, which requires larger firms to file earlier than smaller firms.<sup>40</sup> Therefore, *Schedule UTP* captures staggered changes in *Cash ETR*. Results in column (1) suggest that firms have a visible larger reaction to the disclosure requirements in FIN 48 than Schedule UTP. In column (2), tax-aggressive firms' reactions to FIN 48 are statistically greater than Schedule UTP. Lastly, nonaggressive firms' reactions to Schedule UTP are marginally significant, while their reactions to FIN 48 are insignificant. This finding that tax-aggressive firms respond more to FIN 48 than

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<sup>40</sup> Corporate taxpayers with total assets that equal or exceed \$100 million, \$50 million, and \$10 million are required to file a new form Schedule UTP with the IRS starting from 2010, 2012, and 2014, respectively.

Schedule UTP is consistent with Towery (2017), which reports strategic behaviors in tax reporting. The Schedule UTP filing requirement does not deter some U.S. firms from continuing to take aggressive tax positions. Instead, they try to avoid recording it in FIN 48 UTB reserves. The attenuated response to Schedule UTP could also imply that firms have become more experienced in making tax disclosures (in both financial statements per FIN 48 and Schedule UTP) and navigating the new tax disclosure regime.

### **Conclusion**

This study revisits a tax accounting standard regarding U.S. firms' tax disclosure. Significant cross-sectional variation exists in U.S. firms' reactions to FIN 48 disclosure requirements in terms of the magnitude (i.e., cash ETR spikes) and the stickiness (i.e., speed of adjustment). Tax aggressiveness in the pre-disclosure period, geographic proximity to IRS offices, and the likelihood of the IRS's continuous monitoring are three dimensions that significantly affect the magnitude of firm reactions and the speed of post-FIN 48 tax policy adjustments. These findings expand the understanding of how U.S. firms respond to tax disclosure requirements. In particular, firms do not react equally to tax disclosure regulations, and there is a long-term tax policy adjustment after an initial reaction. Documenting the heterogeneous responses contributes to tax and financial reporting literature regarding public tax disclosure and the real effects of disclosure regulations.

Further analyses also reveal variations in reactions among subsamples, especially in the tax-aggressive firms, where most of the cross-sectional variation lies. Robustness checks confirm that the results are robust to controlling for auditor characteristics, firms' internal tax departments, and network ties. Additional analyses attempt to explore the mechanisms through which firms

adjust their tax policies, such as a temporary reduction in foreign operation and the purchase of auditor-provided tax services, and an increase in pretax earnings management. The magnitude in the initial Cash ETR spikes also varies with the length of income tax footnotes and the CEO's risk incentive. For tax-aggressive firms, their reactions to FIN 48 are more significant than their reactions to Schedule UTP filing requirements.

This study is subject to limitations, and its results should be viewed with caveats. First, in this paper, the focal taxing authority is the IRS. For firms with multinational operations, both domestic (federal and state) and foreign taxing authorities may have jurisdictions over firms. While the proximity to the federal taxing authority and its continuous monitoring could be the most concerning ones for most U.S. firms, assuming the IRS is the only taxing authority that matters might not be true for all U.S. companies. Some U.S. multinational firms might be more concerned about their foreign taxing authorities. Second, there could be confounding events around the adoption of FIN 48 that affect firms' actions and in the long term after FIN 48 adoption. While the method choices can alleviate the concern, the possibility of having a confounding event cannot be ruled out completely. However, to the extent that the confounding events do not affect firm reactions to FIN 48 in the same way as the cross-sectional variation (i.e., preexisting tax aggressiveness, proximity to the IRS, and the IRS's continuous monitoring on firms), the existence of a concurrent event does not automatically invalidate the inferences. Nevertheless, the results should be interpreted in light of these limitations.

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## Appendix A: Examples of Tax Uncertainty Disclosure in Form 10-K

### 3M's Disclosure on Tax Contingencies prior to FIN 48

[From Form 10-K filed for Fiscal Year Ended December 31, 2005, word count = 0]

No mention of “tax contingencies” and/or “uncertain tax positions.”

### Daktronics Inc.'s Disclosure on Tax Contingencies prior to FIN 48

[From Form 10-K filed for Fiscal Year Ended April 29, 2006, word count = 194]

We record our income tax provision based on our knowledge of all relevant facts and circumstances, including the existing tax laws, the status of current IRS examinations and our understanding of how the tax authorities view certain relevant industry and commercial matters. In evaluating the exposures associated with our various tax filing positions, we record reserves for probable exposures. A number of years may elapse before a particular matter for which we have established a reserve is audited and fully resolved or clarified. We adjust our tax contingencies reserve and income tax provision in the period in which actual results of a settlement with tax authorities differs from our established reserve, the statute of limitations expires for the relevant taxing authority to examine the tax position, or when more information become available. Our tax contingencies reserve contains uncertainties because management is required to make assumptions and to apply judgment to estimate the exposure associated with our various filing positions. We believe that any potential tax assessments from various tax authorities that are not covered by our income tax provision will not have a material adverse impact on our consolidated financial position or cash flow.

### Microsoft's Disclosure on Tax Contingencies prior to FIN 48

[From Form 10-K filed for Fiscal Year Ended June 30, 2006, word count = 427]

**Tax Contingencies.** We are subject to income taxes in the United States and numerous foreign jurisdictions. Significant judgment is required in determining our worldwide provision for income taxes and recording the related assets and liabilities. In the ordinary course of our business, there are many transactions and calculations where the ultimate tax determination is uncertain. We are regularly under audit by tax authorities. Accruals for tax contingencies are provided for in accordance with the requirements of SFAS No. 5, *Accounting for Contingencies*.

Although we believe we have appropriate support for the positions taken on our tax returns, we have recorded a liability for our best estimate of the probable loss on certain of these positions, the non-current portion of which is included in other long-term liabilities. We believe that our accruals for tax liabilities are adequate for all open years, based on our assessment of many factors including past experience and interpretations of tax law applied to the facts of each matter, which matters result primarily from inter-company transfer pricing, restructuring of foreign operations, tax benefits from the Foreign Sales Corporation and Extra Territorial Income tax rules, the amount of research and experimentation tax credits claimed, state income taxes, and certain other matters. Although we believe our recorded assets and liabilities are reasonable, tax regulations are subject to interpretation and tax litigation is inherently uncertain; therefore our assessments can involve both a series of complex judgments about future events

and rely heavily on estimates and assumptions. Although we believe that the estimates and assumptions supporting our assessments are reasonable, the final determination of tax audit settlements and any related litigation could be materially different than that which is reflected in historical income tax provisions and recorded assets and liabilities. If we were to settle an audit or a matter under litigation, it could have a material effect on our income tax provision, net income, or cash flows in the period or periods for which that determination is made. Due to the complexity involved we are not able to estimate the range of reasonably possible losses in excess of amounts recorded.

The Internal Revenue Service (“IRS”) has completed and closed its audits of our consolidated federal income tax returns through 1999. The IRS is currently conducting an audit of our consolidated federal income tax return for tax years 2000 through 2003.

#### NOTE 11 OTHER LONG-TERM LIABILITIES

**(In millions)**

<b>June 30</b>	<b>2006</b>	<b>2005</b>
Tax contingencies	<b>\$4,194</b>	\$3,066
Legal contingencies	<b>1,022</b>	961
Employee stock option transfer program	–	48
Other	<b>71</b>	<b>83</b>
Other long-term liabilities	<b>\$5,287</b>	<b>\$4,158</b>

#### **3M’s Disclosure on Unrecognized Tax Benefits after FIN 48**

[From Form 10-K filed for Fiscal Year Ended December 31, 2007, word count = 558]

The Company adopted the provisions of FASB Interpretation No. 48, “Accounting for Uncertainty in Income Taxes,” on January 1, 2007. As a result of the implementation of Interpretation 48, the Company recognized an immaterial increase in the liability for unrecognized tax benefits, which was accounted for as a reduction to the January 1, 2007, balance of retained earnings. A reconciliation of the beginning and ending amount of gross unrecognized tax benefits (“UTB”) is as follows:

<b>(Millions)</b>	<b>Federal, State, and Foreign Tax</b>
Gross UTB Balance at January 1, 2007	\$ 691
Additions based on tax positions related to the current year	79
Additions for tax positions of prior years	143
Reductions for tax positions of prior years	(189)
Settlements	(24)
Reductions due to lapse of applicable statute of limitations	(20)
Gross UTB Balance at December 31, 2007	\$ 680
Net UTB impacting the effective tax rate at December 31, 2007	\$ 334

The total amount of unrecognized tax benefits that, if recognized, would affect the effective tax rate as of January 1, 2007 and December 31, 2007, respectively, are \$261 million and \$334 million. The ending net UTB results from adjusting the gross balance at December 31, 2007 for items such as Federal, State, and non-U.S. deferred items, interest and penalties, and deductible taxes. The net UTB is included as components of Accrued Income Taxes and Other Liabilities within the Consolidated Balance Sheet.

The Company recognizes interest and penalties accrued related to unrecognized tax benefits in tax expense. At January 1, 2007 and December 31, 2007, accrued interest and penalties on a gross basis were \$65 million and \$69 million, respectively. Included in these interest and penalty amounts is interest and penalties related to tax positions for which the ultimate deductibility is highly certain but for which there is uncertainty about the timing of such deductibility. Because of the impact of deferred tax accounting, other than interest and penalties, the disallowance of the shorter deductibility period would not affect the annual effective tax rate but would accelerate the payment of cash to the taxing authority to an earlier period.

In 2007, the Company completed the preparation and filing of its 2006 U.S. federal and state income tax returns, which did not result in any material changes to the Company's financial position. In 2006, an audit of the Company's U.S. tax returns for years through 2001 was completed. The Company and the Internal Revenue Service reached a final settlement for these years, including an agreement on the amount of a refund claim to be filed by the Company. The Company also substantially resolved audits in certain European countries. In addition, the Company completed the preparation and filing of its 2005 U.S. federal income tax return and the corresponding 2005 state income tax returns. The adjustments from amounts previously estimated in the U.S. federal and state income tax returns (both positive and negative) included lower U.S. taxes on dividends received from the Company's foreign subsidiaries. The Company also made quarterly adjustments (both positive and negative) to its reserves for tax contingencies. Considering the developments noted above and other factors, including the impact on open audit years of the recent resolution of issues in various audits, these reassessments resulted in a reduction of the reserves in 2006 by \$149 million, inclusive of the expected amount of certain refund claims.

### **Daktronics Inc.'s Disclosure on Unrecognized Tax Benefits after FIN 48**

[From Form 10-K filed for Fiscal Year Ended April 26, 2008, word count = 285]

We adopted the provisions of Financial Accounting Standards Board Interpretation No. 48, "Accounting for Uncertainty in Income Taxes, an Interpretation of SFAS No. 109" (FIN 48) on April 29, 2007. FIN 48 creates a single model to address uncertainty in tax positions and clarifies the accounting for income taxes by prescribing the minimum recognition threshold a tax position is required to meet before being recognized in the financial statements. FIN 48 also provides guidance on derecognition, measurement, classification, interest and penalties, accounting in interim periods, disclosure and transition. At the adoption date, April 29, 2007, we did not have a material impact under FIN 48 on our Consolidated Financial Statements or retained earnings as a result of the implementation of FIN 48 and we did not have a material adjustment in the liability for unrecognized income tax benefits or related effect to our effective tax rate. As of April 26, 2008 we did not have any material unrecognized tax benefits.

To the extent interest and penalties are not assessed with respect to uncertain tax positions, amounts accrued will be reduced and reflected as a reduction of the overall income tax provision. We recorded \$5 in interest and penalties during the year ended April 26, 2008 and had \$18 accrued interest and penalties as of that date. We are subject to U.S. Federal income tax as well as the income taxes of multiple state

jurisdictions. As a result of the completion of IRS exams on prior years, fiscal years 2006, 2007 and 2008 are the only years remaining open under statutes of limitations. Certain subsidiaries are also subject to income tax in several foreign jurisdictions which have open tax years varying by jurisdiction back to 2003.

## Microsoft's Disclosure on Unrecognized Tax Benefits after FIN 48

[From Form 10-K filed for Fiscal Year Ended June 30, 2008, word count = 383]

On July 1, 2007, we adopted the provisions of FIN 48 which had the following impact on our financial statements: increased current assets by \$228 million, long-term assets by \$1.1 billion, long-term liabilities by \$2.1 billion, and retained deficit by \$395 million; and decreased income taxes payable by \$394 million. As of June 30, 2008, we had \$3.2 billion of unrecognized tax benefits of which \$2.3 billion, if recognized, would affect our effective tax rate. As of July 1, 2007, we had \$7.1 billion of unrecognized tax benefits of which \$5.3 billion, if recognized, would affect our effective tax rate. Our policy is to include interest and penalties related to unrecognized tax benefits in income tax expense. Interest totaled \$121 million in fiscal year 2008. As of June 30, 2008 and July 1, 2007, we had accrued interest related to uncertain tax positions of \$324 million and \$863 million, respectively, net of federal income tax benefits, on our balance sheets.

The aggregate changes in the balance of unrecognized tax benefits were as follows:

**(In millions)**

<b>Year Ended June 30,</b>	<b>2008</b>
Balance, beginning of year	<b>\$ 7,076</b>
Decreases related to settlements	<b>(4,787)</b>
Increases for tax positions related to the current year	<b>934</b>
Increases for tax positions related to prior years	<b>66</b>
Decreases for tax positions related to prior years	<b>(80)</b>
Reductions due to lapsed statute of limitations	<b>(14)</b>
<b>Balance, end of year</b>	<b><u>\$ 3,195</u></b>

During fiscal year 2008, we reached a settlement with the Internal Revenue Service ("IRS") on its 2000-2003 examination. As a result, we reduced our unrecognized tax benefits by \$4.8 billion and recognized a tax provision reduction of \$1.2 billion. We are under audit by the IRS for the tax years 2004-2006. We do not believe it is reasonably possible that the total amount of unrecognized tax benefits will significantly increase or decrease within the next 12 months as we do not believe the examination will be concluded within the next 12 months. As a result of our settlement related to the 2000-2003 examination, we paid the IRS approximately \$3.1 billion during the first quarter of fiscal year 2009.

We are subject to income tax in many jurisdictions outside the United States, none of which are individually material to our financial position, cash flows, or results of operations.

## Appendix B: Variable Definitions

Variable	Definition
<i>Cash ETR</i>	Cash effective tax rate, calculated as cash tax paid (Compustat item: TXPD) divided by pretax income (Compustat item: PI)
<i>FIN 48</i>	An indicator for the first three-year window since FIN 48 implementation (2007–2009)
<i>TAG</i>	An indicator for the firms that are deemed to be tax-aggressive before the adoption of FIN 48. Tax-aggressive firms are identified as firms reporting lower <i>Cash ETR</i> than industry-size peers prior to FIN 48 adoptions
<i>DIST</i>	Natural log of the distance (in miles) between firms' headquarters and the nearest IRS offices
<i>HIGH DIST</i>	Indicators for observations with a higher value than the sample median of <i>DIST</i>
<i>CIC</i>	Firms' predicted probability of being assigned to the IRS Coordinated Industry Case Program, following the estimation in Ayers, Seidman, and Towery (2019)
<i>HIGH CIC</i>	Indicators for observations with a higher value than the sample median <i>CIC</i> .
<i>SIZE</i>	Natural log of total assets (Compustat item: AT)
<i>MTB</i>	Market-to-book ratio, calculated as Compustat items: PRCC_F×CSHO/CEQ
<i>LEV</i>	Long-term debt (Compustat item: DLTT) divided by lagged total assets (Compustat item: AT)
<i>ROA</i>	Pretax book income (Compustat item: PI) divided by lagged total assets (Compustat item: AT)
<i>ACC</i>	Performance-matched discretionary accruals, following Frank et al. (2009)
<i>FI</i>	Pretax foreign income (Compustat item: PIFO) divided by lagged total assets (Compustat item: AT)
<i>EQINC</i>	Unconsolidated earnings (Compustat item: ESUB) divided by lagged total assets (Compustat item: AT)
<i>INTAN</i>	Intangible assets (Compustat item: INTAN) divided by lagged total assets (Compustat item: AT)
<i>PPE</i>	Net property, plant, and equipment (Compustat item: PPENT) divided by lagged total assets (Compustat item: AT)
<i>NOL</i>	Indicator for the existence of tax loss carryforward (Compustat item: TLCF)
<i>ΔNOL</i>	Change in tax loss carryforward (Compustat item: TLCF) divided by lagged total assets (Compustat item: AT)
<i>FCF</i>	Free cash flow, calculated as Compustat items: (OANCF-CAPX)/AT
<i>R&amp;D</i>	Research and development expense (Compustat item: XRD) divided by lagged total assets (Compustat item: AT)
<i>Foreign Subs</i>	The number of foreign subsidiaries reported in the SEC's Form 10-K, Exhibit 21
<i>Tax Fees</i>	The natural log of the tax service fees paid to financial auditors as reported in the Audit Analytics database
<i>Vega</i>	The sensitivity of CEO wealth (captured by option holdings) to a 0.01 increase in stock volatility, following the estimation procedure in Core and Guay (2002)
<i>Tax Footnotes</i>	The number of sentences in Form 10-K's income tax footnotes
<i>Big N Auditor</i>	An indicator for firms with Arthur Andersen, Deloitte, EY, KPMG, and PwC as the financial statement auditor
<i>Tax Specialist</i>	An indicator for firms having tax-specialized auditors, defined as the audit office with the largest market share in a given industry (2-digit SIC), metropolitan statistical area, and year
<i>Schedule UTP</i>	An indicator for firm-years when the firms are subject to Schedule UTP filing requirements

## Appendix C: A Derivation of the Speed of Adjustment in Cash ETR

This section illustrates how to derive the speed of adjustment in *Cash ETR* from the coefficient estimate in the model (4). For simplicity, the subscript for firms ( $i$ ) is omitted in the main text.

$$Cash\ ETR_{i,t+1} = \alpha + \beta Cash\ ETR_{i,t} + \gamma Controls_{i,t} + Fixed\ Effects_i + \varepsilon_{i,t+1} \quad (4)$$

Let  $Cash\ ETR_{i,t+1}$  and  $Cash\ ETR_{i,t}$  denote the actual cash effective tax rates for firm  $i$  at time  $t+1$  and  $t$ , respectively. Let  $Cash\ ETR_{i,t+1}^*$  denote the target *Cash ETR* for firm  $i$  at time  $t+1$ , which is determined by a vector of observable characteristics related to the tax benefit and nontax cost of tax avoidance ( $X_{i,t}$ ). To account for unobservable characteristics, fixed effects estimators ( $F_i$ ) are also included. Thus,

$$Cash\ ETR_{i,t+1}^* = \gamma X_{i,t} + F_i$$

Let  $\lambda$  denote the speed of adjustment toward the target. Because of the friction in adjusting tax policies, in each period, firms are only able to partially adjust to their target effective tax rates. A partial adjustment model of *Cash ETR* is presented as,

$$Cash\ ETR_{i,t+1} - Cash\ ETR_{i,t} = \lambda (Cash\ ETR_{i,t+1}^* - Cash\ ETR_{i,t}) + \varepsilon_{i,t+1}$$

Substituting  $Cash\ ETR_{i,t+1}^*$  gives

$$Cash\ ETR_{i,t+1} - Cash\ ETR_{i,t} = \lambda (\gamma X_{i,t} + F_i - Cash\ ETR_{i,t}) + \varepsilon_{i,t+1}$$

Rearranging the equation gives

$$Cash\ ETR_{i,t+1} = (1 - \lambda) Cash\ ETR_{i,t} + \lambda (\gamma X_{i,t} + F_i) + \varepsilon_{i,t+1}$$

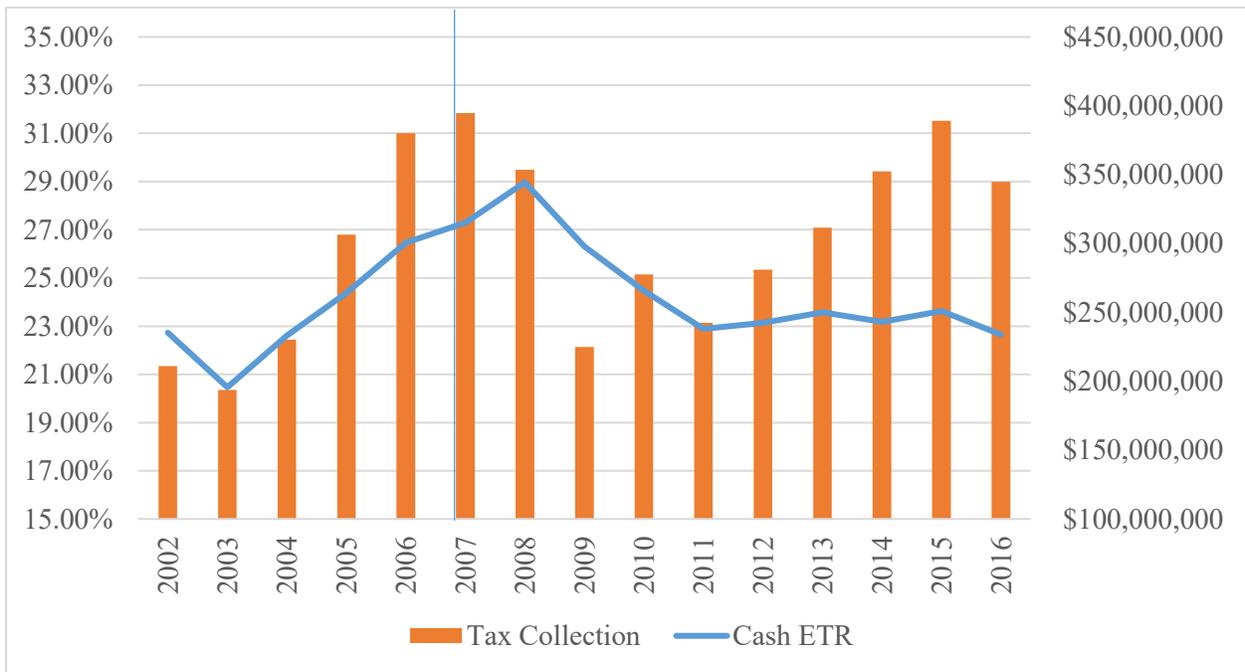
Thus, the coefficient estimate on  $Cash\ ETR_t$  ( $\beta$  in model 4) equals  $1 - \lambda$ . The speed of adjustment in *Cash ETR* ( $\lambda$ ) equals  $1 - \beta$ .

Because of the inclusion of the lagged dependent variable, unlike models (1)–(3), model (4) is a dynamic model. OLS coefficient estimates on the lagged dependent variable in a dynamic panel, if not considering the unobserved heterogeneity, are biased. An OLS approach can overestimate the coefficient on the lagged dependent variable, thus underestimating the speed of adjustment in *Cash ETR*. Including fixed-effects does not necessarily fix the issue. In fact, including firm fixed-effects reverses the direction of bias and overestimates the speed of adjustment (Bond 2002; Nickell 1981).

Several estimation methods, including the Blundell and Bond (1998) method, are introduced to address this issue. However, many of the estimation methods are developed under the assumption that the data structure meets ideal conditions (e.g., independently and normally distributed variables). As mentioned in Flannery and Hankins (2013), data in accounting and finance studies rarely meet such strict requirements. They survey various estimation methods for dynamic models, evaluate their effectiveness in estimating the typical Compustat data, and make recommendations for appropriate methods based on the nature of dependent variables. *Cash ETR*

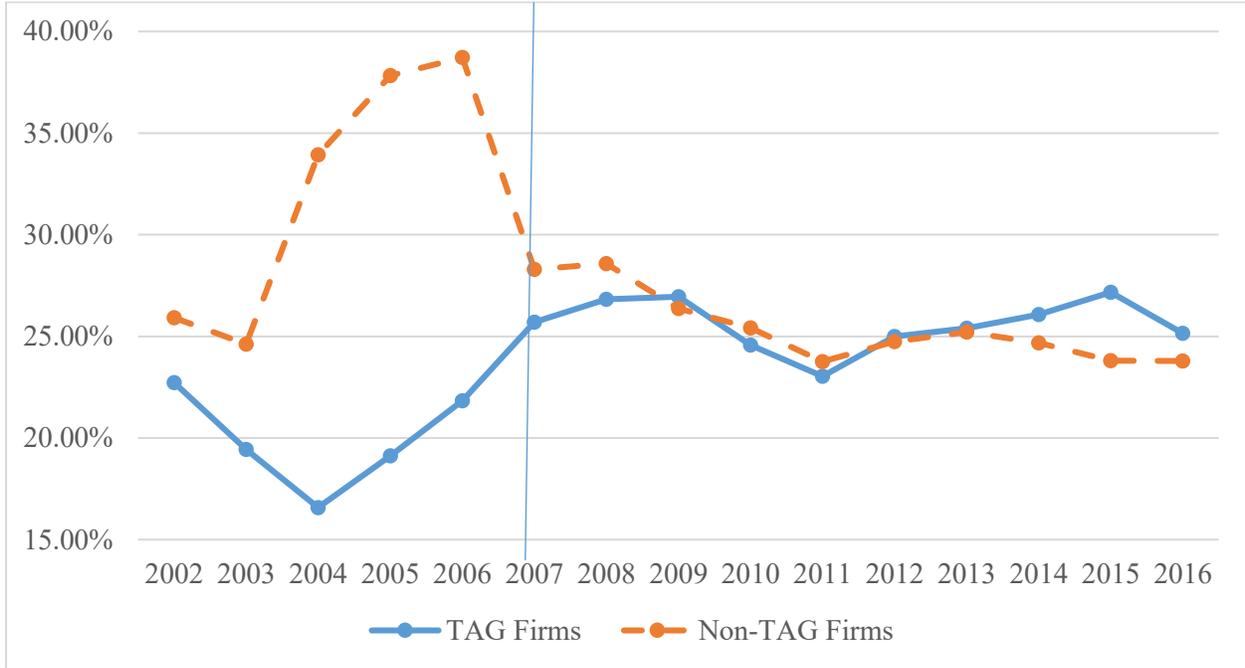
is a ratio censored between zero and one and is calculated for profitable firm-years only. As a result, it is subject to missing observations for unprofitable years and censoring problems. Flannery and Hankins (2013) show that the Blundell and Bond (1998) method is the best approach for ratios like Cash ETR.

Roodman (2009), Afonso and Wintoki (2011), Wintoki, Linck, and Netter (2012), and Flannery and Hankins (2013) contain detailed discussions on this methodology. For example, Afonso and Wintoki (2011) and Wintoki et al. (2012) discuss the methodological issues in the context of corporate governance. Flannery and Hankins (2013) evaluate the effectiveness of multiple estimation methods using Compustat data. In implementing the Blundell and Bond (1998) approach, this study utilizes the Stata command `xtabond2`. Roodman (2009) and Wintoki et al. (2012) provide helpful instructions on how to implement the approach in Stata.



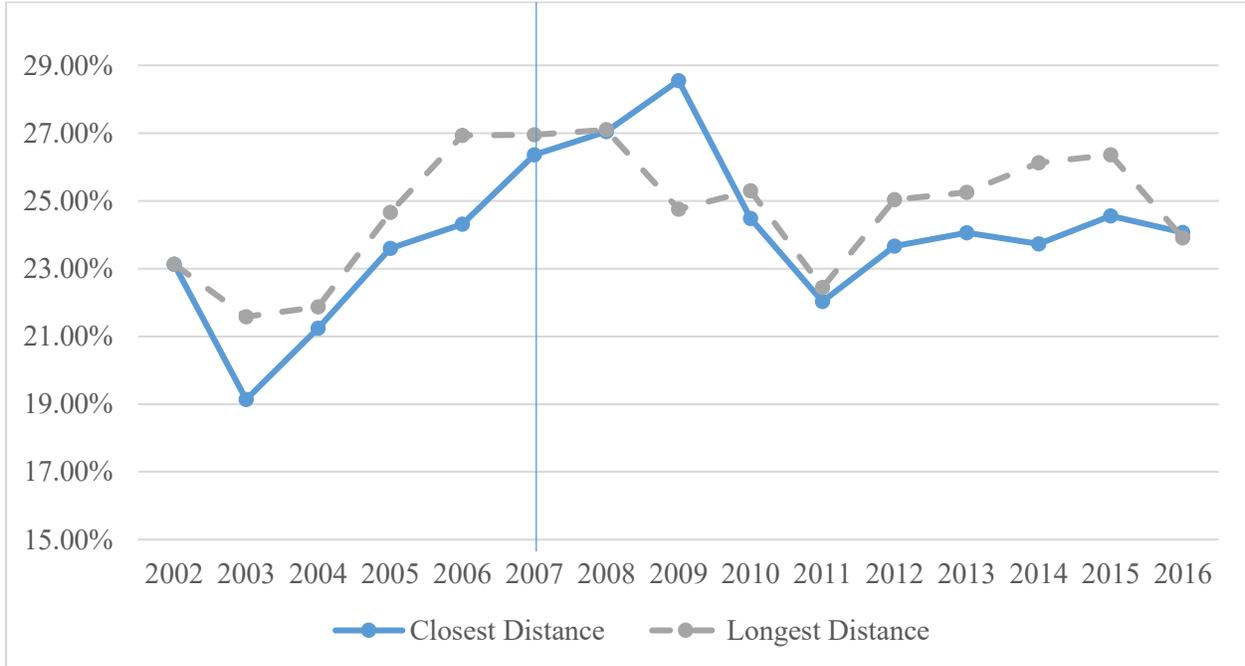
The solid line depicts the yearly mean Cash Effective Tax Rates of sample firms from 2002 to 2016. The bars reflect the aggregate corporate income tax collection by the IRS in thousands of dollars. FIN 48 became effective for the first fiscal period beginning after December 15, 2006. The vertical line approximates the time of FIN 48 adoption.

**Figure 1: U.S. Firms' Cash ETRs and the IRS's Aggregate Tax Collection**



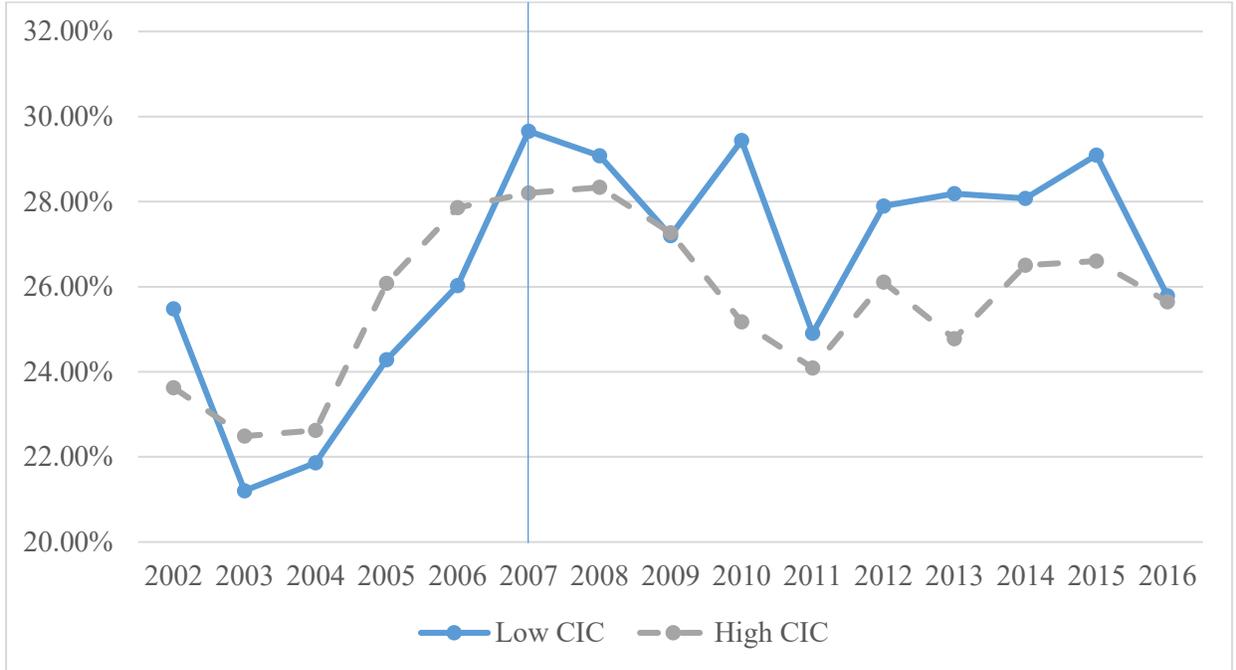
This figure depicts the yearly mean Cash Effective Tax Rates of pre-FIN 48 tax-aggressive firms (solid line) and nonaggressive firms (dashed line). FIN 48 became effective for the first fiscal period beginning after December 15, 2006. The vertical line approximates the time of FIN 48 adoption.

**Figure 2: Cash ETRs of Pre-FIN 48 Tax Aggressive and Nonaggressive Firms**



This figure depicts the yearly mean Cash Effective Tax Rates of U.S. companies with different levels of geographic distance to the IRS’s Large Business and International (LB&I) offices. FIN 48 became effective for the first fiscal period beginning after December 15, 2006. The vertical line approximates the time of FIN 48 adoption.

**Figure 3: U.S. Firms’ Cash ETRs by Geographic Distance to IRS Offices**



This figure depicts the yearly mean Cash Effective Tax Rates of U.S. companies with different probability of being assigned in the IRS’s Coordinated Industry Case (CIC) program. FIN 48 became effective for the first fiscal period beginning after December 15, 2006. The vertical line approximates the time of FIN 48 adoption.

**Figure 4: U.S. Firms’ Cash ETRs by CIC Assignment Probability**

**Table 1**  
**Sample Selection**

<b>Data Steps</b>	<b>Observations</b>
Compustat North America file from 2002 to 2016	167,218
<i>Less:</i> Foreign incorporated firms (FIC code ≠ USA)	(43,750)
<i>Less:</i> Firm-years observations with negative pretax income	(65,296)
<i>Less:</i> Firm-years observations with missing effective tax rates or any control variable	(21,931)
<i>Less:</i> Firm in financial (SIC: 6000-6999) and utility (SIC: 4900-4999) industries	(11,920)
<i>Less:</i> Firm-year observations with missing historical zip code or predicted CIC assignment probability	(1,052)
<i>Less:</i> Total assets less than 10 million	(549)
 Equals: Sample for cash ETR spikes analysis (2002–2016)	 22,720
<i>Less:</i> Pre–FIN 48 years (2002–2006)	(8,770)
<i>Less:</i> Without consecutive years to estimate the speed of adjustment	(6,057)
 Equals: Sample for post–FIN 48 speed of adjustment analysis (2007–2016)	 7,893

This table shows the sample selection process.

**Table 2**  
**Descriptive Statistics**

**Panel A: Summary Statistics**

<b>Variable</b>	<b>N</b>	<b>Mean</b>	<b>Std. Dev.</b>	<b>Min</b>	<b>Lower Quartile</b>	<b>Median</b>	<b>Upper Quartile</b>	<b>Max</b>
<i>Cash ETR</i>	22,720	0.247	0.166	0.000	0.115	0.245	0.346	0.759
<i>TAG</i>	22,720	0.607	0.488	0.000	0.000	1.000	1.000	1.000
<i>DIST</i>	22,720	3.032	1.401	0.000	2.197	2.918	3.998	5.888
<i>CIC</i>	22,720	0.158	0.274	0.006	0.013	0.030	0.134	0.999
<i>SIZE</i>	22,720	6.473	1.934	2.457	5.141	6.471	7.758	11.289
<i>MTB</i>	22,720	3.233	3.018	0.455	1.505	2.325	3.751	18.498
<i>LEV</i>	22,720	0.181	0.193	0.000	0.001	0.137	0.286	0.838
<i>ROA</i>	22,720	0.124	0.093	0.009	0.060	0.101	0.162	0.510
<i>ACC</i>	22,720	0.008	0.126	-0.337	-0.044	0.000	0.043	0.533
<i>FI</i>	22,720	0.022	0.038	-0.012	0.000	0.000	0.030	0.174
<i>EQINC</i>	22,720	0.001	0.003	-0.003	0.000	0.000	0.000	0.020
<i>INTAN</i>	22,720	0.222	0.234	0.000	0.025	0.146	0.353	0.964
<i>PPE</i>	22,720	0.275	0.251	0.009	0.091	0.193	0.378	1.126
<i>NOL</i>	22,720	0.479	0.500	0.000	0.000	0.000	1.000	1.000
<i>ANOL</i>	22,720	-0.002	0.053	-0.240	-0.001	0.000	0.000	0.228
<i>FCF</i>	22,720	0.072	0.094	-0.224	0.025	0.070	0.119	0.371
<i>R&amp;D</i>	22,720	0.028	0.048	0.000	0.000	0.000	0.034	0.217

This table shows the descriptive statistics of the test sample.

**Table 2 (Continued)**  
**Descriptive Statistics**

**Panel B: Summary Statistics by Industry**

SIC	Industry	N	Mean Cash ETR	Mean Distance to IRS	Mean CIC Assignment Rate
01	Agricultural Production Crops	9	17.75%	61.31	0.22
10	Metal Mining	72	24.45%	98.07	0.41
12	Coal Mining	56	11.87%	71.01	0.10
13	Oil and Gas Extraction	877	13.03%	51.31	0.15
14	Mining and Quarrying of Nonmetallic Minerals, Except Fuels	30	16.38%	76.97	0.07
15	Building Construction General Contractors and Operative Builders	144	27.84%	25.37	0.13
16	Heavy Construction other than Building Construction Contractors	140	27.01%	23.71	0.20
17	Construction Special Trade Contractors	30	28.99%	31.86	0.04
20	Food and Kindred Products	843	26.91%	61.15	0.25
22	Textile Mill Products	29	29.81%	96.02	0.13
23	Apparel and Other Finished Products Made from Fabrics and Similar Materials	315	29.73%	34.25	0.09
24	Lumber and Wood Products, Except Furniture	118	27.82%	77.30	0.10
25	Furniture and Fixtures	221	29.41%	93.56	0.11
26	Paper and Allied Products	273	23.98%	74.69	0.29
27	Printing, Publishing, and Allied Industries	312	29.57%	38.75	0.10
28	Chemicals and Allied Products	1,708	24.82%	47.56	0.25
29	Petroleum Refining and Related Industries	222	28.59%	74.69	0.52
30	Rubber and Miscellaneous Plastics Products	279	25.75%	53.73	0.14
31	Leather and Leather Products	130	30.88%	56.06	0.03
32	Stone, Clay, Glass, and Concrete Products	165	24.83%	45.19	0.09
33	Primary Metal Industries	361	26.42%	68.31	0.14
34	Fabricated Metal Products, Except Machinery and Transportation Equipment	503	29.10%	39.48	0.12
35	Industrial and Commercial Machinery and Computer Equipment	1,529	23.99%	45.75	0.19
36	Electronic and Other Electrical Equipment and Components, Except Computer Equipment	1,942	21.35%	40.72	0.14
37	Transportation Equipment	732	25.50%	53.22	0.24

**Table 2 (Continued)  
Descriptive Statistics**

**Panel B: Summary Statistics by Industry**

SIC	Industry	N	Mean Cash ETR	Mean Distance to IRS	Mean CIC Assignment Rate
38	Measuring, Analyzing, and Controlling Instruments; Photographic, Medical and Optical Goods; Watches and Clocks	1,668	23.57%	46.43	0.12
39	Miscellaneous Manufacturing Industries	233	27.62%	75.64	0.08
42	Motor Freight Transportation and Warehousing	285	26.22%	78.80	0.11
44	Water Transportation	65	16.66%	133.44	0.05
45	Transportation by Air	182	15.93%	91.12	0.17
46	Pipelines, Except Natural Gas	10	1.89%	88.03	0.07
47	Transportation Services	144	25.45%	44.33	0.14
48	Communications	615	20.12%	50.81	0.24
50	Wholesale Trade—Durable Goods	802	29.93%	42.63	0.14
51	Wholesale Trade—Nondurable Goods	455	22.57%	57.15	0.21
53	General Merchandise Stores	232	30.91%	61.40	0.38
54	Food Stores	185	30.25%	96.16	0.30
55	Automotive Dealers and Gasoline Service Stations	227	26.61%	120.78	0.17
56	Apparel and Accessory Stores	467	32.70%	62.38	0.11
57	Home Furniture, Furnishings, And Equipment Stores	151	30.24%	33.61	0.15
58	Eating and Drinking Places	521	25.32%	36.90	0.09
59	Miscellaneous Retail	576	28.10%	45.15	0.15
70	Hotels, Rooming Houses, Camps, and Other Lodging Places	52	24.64%	64.95	0.19
72	Personal Services	38	23.38%	64.10	0.06
73	Business Services	2,916	22.70%	36.78	0.12
75	Automotive Repair, Services, and Parking	3	24.75%	29.23	0.20
78	Motion Pictures	86	23.92%	40.86	0.08
79	Amusement and Recreation Services	303	25.67%	92.39	0.07
80	Health Services	621	25.25%	36.98	0.07
82	Educational Services	186	32.65%	46.17	0.04
83	Social Services	12	32.62%	29.57	0.01
87	Engineering, Accounting, Research, Management, and Related Services	588	28.39%	31.55	0.05
99	Nonclassifiable Establishments	57	22.38%	138.63	0.62
	Total	22,270	24.67%	50.07	0.16

This sample shows the industry distribution (2-digit SIC), the average Cash Effective Tax Rates, the average distance to the nearest IRS office (in miles) , and the average probability of being assigned into the IRS’s CIC program.

**Table 3**  
**Correlation Table**

<b>Variable</b>		<b>[1]</b>	<b>[2]</b>	<b>[3]</b>	<b>[4]</b>	<b>[5]</b>	<b>[6]</b>	<b>[7]</b>	<b>[8]</b>
<i>Cash ETR</i>	[1]	1.000	-0.123*	0.019*	0.006	0.062*	-0.029*	-0.077*	0.004
<i>TAG</i>	[2]	-0.130*	1.000	-0.013^	0.057*	0.137*	-0.018*	0.008	-0.023*
<i>DIST</i>	[3]	0.027*	-0.009	1.000	-0.083*	-0.092*	-0.060*	0.017^	-0.009
<i>CIC</i>	[4]	-0.045*	0.124*	-0.059*	1.000	0.546*	0.050*	0.043*	-0.026*
<i>SIZE</i>	[5]	0.073*	0.135*	-0.078*	0.619*	1.000	0.092*	0.297*	-0.119*
<i>MTB</i>	[6]	0.014^	0.013#	-0.065*	0.052*	0.184*	1.000	0.126*	0.392*
<i>LEV</i>	[7]	-0.061*	0.026*	0.031*	0.173*	0.404*	0.028*	1.000	-0.187*
<i>ROA</i>	[8]	0.070*	-0.001	-0.013#	-0.089*	-0.066*	0.465*	-0.228*	1.000
<i>ACC</i>	[9]	-0.071*	-0.008	0.054*	-0.024*	-0.100*	-0.097*	0.043*	-0.030*
<i>FI</i>	[10]	0.018*	0.099*	-0.089*	0.287*	0.351*	0.153*	0.031*	0.091*
<i>EQINC</i>	[11]	-0.001	0.044*	-0.007	0.176*	0.217*	-0.002	0.140*	-0.004
<i>INTAN</i>	[12]	0.052*	0.057*	-0.065*	0.081*	0.280*	0.100*	0.297*	-0.090*
<i>PPE</i>	[13]	-0.031*	0.020*	0.113*	0.085*	0.122*	-0.021*	0.299*	0.032*
<i>NOL</i>	[14]	-0.128*	0.048*	-0.030*	0.063*	0.159*	0.015^	0.102*	-0.152*
<i>ANOL</i>	[15]	0.097*	0.000	-0.007	0.058*	0.085*	0.003	0.060*	-0.033*
<i>FCF</i>	[16]	0.015^	0.027*	-0.054*	-0.028*	-0.001	0.320*	-0.225*	0.481*
<i>R&amp;D</i>	[17]	-0.114*	0.075*	-0.017#	0.125*	-0.043*	0.200*	-0.225*	0.033*

This table shows the Pearson correlations (upper-right) and Spearman correlations (lower-left). Significant correlations are marked with # (10% level), ^ (5% level), and \* (1% level).

**Table 3**  
**Correlation Table (Continued)**

	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]	[17]
[1]	-0.069*	-0.021*	-0.015^	0.023*	-0.108*	-0.114*	0.084*	0.003	-0.142*
[2]	0.003	0.083*	0.027*	0.033*	0.004	0.048*	0.004	0.017*	0.061*
[3]	0.043*	-0.104*	-0.019*	-0.076*	0.081*	-0.036*	-0.002	-0.040*	-0.052*
[4]	-0.043*	0.166*	0.156*	0.031*	0.022*	0.003	0.009	0.014^	0.018*
[5]	-0.097*	0.269*	0.156*	0.209*	0.088*	0.144*	0.079*	-0.008	-0.117*
[6]	-0.048*	0.147*	0.003	0.022*	-0.033*	0.013#	-0.021*	0.267*	0.166*
[7]	0.050*	-0.042*	0.065*	0.334*	0.328*	0.089*	0.074*	-0.213*	-0.226*
[8]	-0.003	0.179*	0.031*	-0.100*	0.023*	-0.149*	-0.067*	0.491*	0.059*
[9]	1.000	-0.032*	0.049*	-0.127*	0.179*	0.015^	0.006	-0.297*	-0.071*
[10]	-0.036*	1.000	0.055*	0.022*	-0.090*	0.118*	0.035*	0.174*	0.183*
[11]	0.056*	0.086*	1.000	-0.037*	0.078*	-0.010	0.010	-0.039*	-0.073*
[12]	-0.155*	0.168*	0.025*	1.000	-0.310*	0.148*	0.060*	0.126*	-0.010
[13]	0.232*	-0.109*	0.098*	-0.318*	1.000	-0.103*	0.056*	-0.325*	-0.285*
[14]	-0.012#	0.169*	0.016^	0.175*	-0.118*	1.000	0.034*	-0.034*	0.114*
[15]	0.006	0.031*	0.025*	0.039*	0.053*	0.014^	1.000	-0.066*	-0.038*
[16]	-0.357*	0.131*	-0.068*	0.154*	-0.252*	-0.029*	-0.041*	1.000	0.198*
[17]	-0.089*	0.298*	-0.063*	0.105*	-0.299*	0.131*	-0.030*	0.205*	1.000

This table shows Pearson correlations (upper-right) and Spearman correlations (lower-left). Significant correlations are marked with # (10% level), ^ (5% level), and \* (1% level).

**Table 4**  
**Variation in Cash ETR Spikes by Pre-FIN 48 Tax Aggressiveness**

<i>Variable</i>	(1) <i>Cash ETR</i>	(2) <i>Cash ETR</i>
<i>TAG</i>	-0.047*** (0.000)	-0.053*** (0.000)
<i>FIN 48</i>	0.031*** (0.000)	0.015** (0.037)
<b><i>TAG × FIN 48</i></b>	- -	0.029*** (0.000)
<i>SIZE</i>	0.009*** (0.000)	0.009*** (0.000)
<i>MTB</i>	-0.001** (0.034)	-0.001** (0.035)
<i>LEV</i>	-0.066*** (0.000)	-0.066*** (0.000)
<i>ROA</i>	0.067*** (0.001)	0.067*** (0.001)
<i>ACC</i>	-0.092*** (0.000)	-0.091*** (0.000)
<i>FI</i>	-0.033 (0.544)	-0.033 (0.539)
<i>EQINC</i>	-0.825* (0.090)	-0.833* (0.087)
<i>INTAN</i>	-0.000 (0.976)	-0.001 (0.953)
<i>PPE</i>	-0.060*** (0.000)	-0.060*** (0.000)
<i>NOL</i>	-0.037*** (0.000)	-0.037*** (0.000)
<i>ΔNOL</i>	0.290*** (0.000)	0.291*** (0.000)
<i>FCF</i>	-0.139*** (0.000)	-0.139*** (0.000)
<i>R&amp;D</i>	-0.443*** (0.000)	-0.442*** (0.000)
<i>Constant</i>	0.267*** (0.000)	0.270*** (0.000)
Industry Fixed Effects	Yes	Yes
Year Fixed Effects	Yes	Yes
Observations	22,720	22,720
Adjusted R-squared	0.141	0.142

This table shows the variation in the spikes in Cash Effective Tax Rates by pre-FIN 48 tax aggressiveness in the first three-year window after the adoption of FIN 48 (2007–2009). All continuous variables are winsorized at the 1<sup>st</sup> and 99<sup>th</sup> percentiles. *p*-values are calculated using standard errors clustered at the firm level and are included in parentheses. \*, \*\*, and \*\*\* denote two-tailed statistical significance at 10%, 5%, and 1% levels, respectively.

**Table 5**  
**Variation in the Speed of Adjustment in Cash ETR by Pre-FIN 48 Tax Aggressiveness**

<i>Variable</i>	(1) <i>TAG Firms</i> <i>Cash ETR<sub>t+1</sub></i>	(2) <i>Non-TAG Firms</i> <i>Cash ETR<sub>t+1</sub></i>
<i>Cash ETR<sub>t</sub></i>	0.287*** (0.000)	0.016 (0.732)
<i>SIZE<sub>t</sub></i>	-0.004 (0.771)	-0.001 (0.942)
<i>MTB<sub>t</sub></i>	0.007** (0.045)	-0.011** (0.043)
<i>LEV<sub>t</sub></i>	-0.093 (0.154)	-0.116 (0.129)
<i>ROA<sub>t</sub></i>	-0.093 (0.422)	0.296*** (0.003)
<i>ACC<sub>t</sub></i>	0.063 (0.358)	0.023 (0.508)
<i>FI<sub>t</sub></i>	-0.433 (0.137)	0.110 (0.752)
<i>EQINC<sub>t</sub></i>	3.012 (0.361)	-4.021 (0.288)
<i>INTAN<sub>t</sub></i>	0.046 (0.479)	-0.013 (0.797)
<i>PPE<sub>t</sub></i>	0.087 (0.408)	0.023 (0.791)
<i>NOL<sub>t</sub></i>	-0.016 (0.320)	-0.049** (0.032)
<i>ΔNOL<sub>t</sub></i>	-0.027 (0.911)	0.127 (0.334)
<i>FCF<sub>t</sub></i>	0.191 (0.210)	-0.040 (0.586)
<i>R&amp;D<sub>t</sub></i>	-0.699 (0.230)	-1.108 (0.105)
<b>Speed of Adjustment:</b>	<b>71.3%</b>	<b>98.4%</b>
<b>Half-Life:</b>	<b>7 months</b>	<b>2 months</b>
<b>Welch test for difference (1) - (2)</b>		<b>27.1%***</b>
<b><i>p</i>-value</b>		<b>(0.003)</b>
AR(2) test ( <i>p</i> -value)	(0.211)	(0.871)
Hansen test of over-identification ( <i>p</i> -value)	(0.228)	(0.452)
Year Fixed Effects	Yes	Yes
Observations	5,631	2,262

This table shows the variation in the speed of adjustment in Cash ETR after FIN 48 adoption. The sample split is pre-FIN 48 tax aggressiveness. All continuous variables are winsorized at the 1<sup>st</sup> and 99<sup>th</sup> percentiles. *p*-values are calculated using standard errors clustered at the firm level and are included in parentheses. \*, \*\*, and \*\*\* denote two-tailed statistical significance at 10%, 5%, and 1% levels, respectively.

**Table 6**  
**Variation in Cash ETR Spikes by Firms' Proximity to IRS Offices**

<i>Variable</i>	(1) <i>Cash ETR</i>	(2) <i>Cash ETR</i>	(3) <i>Cash ETR</i>
<i>FIN 48</i>	0.033*** (0.000)	0.045*** (0.000)	0.049*** (0.000)
<i>DIST (Cont.)</i>	0.002 (0.182)	0.002* (0.058)	- -
<i>HIGH DIST</i>	- -	- -	0.006* (0.100)
<i>FIN 48 × DIST (Cont.)</i>	- -	-0.004** (0.049)	- -
<i>FIN 48 × HIGH DIST</i>	- -	- -	-0.011** (0.047)
<i>SIZE</i>	0.008*** (0.000)	0.008*** (0.000)	0.008*** (0.000)
<i>MTB</i>	-0.001 (0.108)	-0.001 (0.109)	-0.001 (0.105)
<i>LEV</i>	-0.063*** (0.000)	-0.063*** (0.000)	-0.063*** (0.000)
<i>ROA</i>	0.080*** (0.000)	0.080*** (0.000)	0.080*** (0.000)
<i>ACC</i>	-0.099*** (0.000)	-0.099*** (0.000)	-0.098*** (0.000)
<i>FI</i>	-0.056 (0.314)	-0.057 (0.304)	-0.059 (0.293)
<i>EQINC</i>	-0.853* (0.092)	-0.850* (0.093)	-0.861* (0.088)
<i>INTAN</i>	-0.003 (0.712)	-0.003 (0.716)	-0.003 (0.710)
<i>PPE</i>	-0.069*** (0.000)	-0.069*** (0.000)	-0.069*** (0.000)
<i>NOL</i>	-0.039*** (0.000)	-0.039*** (0.000)	-0.039*** (0.000)
<i>ΔNOL</i>	0.295*** (0.000)	0.295*** (0.000)	0.295*** (0.000)
<i>FCF</i>	-0.154*** (0.000)	-0.154*** (0.000)	-0.154*** (0.000)
<i>R&amp;D</i>	-0.484*** (0.000)	-0.485*** (0.000)	-0.484*** (0.000)
<i>Constant</i>	0.250*** (0.000)	0.247*** (0.000)	0.246*** (0.000)
Industry Fixed Effects	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes
Observations	22,720	22,720	22,720
Adjusted R-squared	0.123	0.124	0.124

This table shows the variation in the spikes in Cash Effective Tax Rates by the distance to IRS offices in the first three-year window after the adoption of FIN 48 (2007–2009). All continuous variables are winsorized at the 1<sup>st</sup> and 99<sup>th</sup> percentiles. *p*-values are calculated using standard errors clustered at the firm level and are included in parentheses. \*, \*\*, and \*\*\* denote two-tailed statistical significance at 10%, 5%, and 1% levels, respectively.

**Table 7**  
**Variation in the Speed of Adjustment in Cash ETR by Firms' Proximity to IRS Offices**

	(1)	(2)	(3)
<i>Variable</i>	<i>Short Distance</i>	<i>Medium Distance</i>	<i>Long Distance</i>
	<i>Cash ETR<sub>t+1</sub></i>	<i>Cash ETR<sub>t+1</sub></i>	<i>Cash ETR<sub>t+1</sub></i>
<i>Cash ETR<sub>t</sub></i>	0.696*** (0.001)	0.308** (0.013)	0.027 (0.824)
<i>SIZE<sub>t</sub></i>	-0.024 (0.252)	0.004 (0.846)	0.010 (0.468)
<i>MTB<sub>t</sub></i>	0.008 (0.277)	-0.017** (0.016)	0.003 (0.707)
<i>LEV<sub>t</sub></i>	-0.134 (0.376)	-0.068 (0.544)	-0.160 (0.156)
<i>ROA<sub>t</sub></i>	-0.229 (0.321)	0.292 (0.225)	0.214 (0.346)
<i>ACC<sub>t</sub></i>	0.180 (0.379)	0.001 (0.992)	-0.025 (0.733)
<i>FI<sub>t</sub></i>	-0.027 (0.951)	0.142 (0.721)	-0.471 (0.324)
<i>EQINC<sub>t</sub></i>	-1.275 (0.880)	2.863 (0.542)	-5.880 (0.200)
<i>INTAN<sub>t</sub></i>	-0.065 (0.665)	-0.057 (0.569)	0.087 (0.267)
<i>PPE<sub>t</sub></i>	-0.086 (0.755)	-0.168 (0.205)	0.090 (0.598)
<i>NOL<sub>t</sub></i>	0.036 (0.228)	-0.013 (0.589)	-0.041 (0.195)
<i>ΔNOL<sub>t</sub></i>	-0.314 (0.757)	-0.002 (0.992)	0.086 (0.758)
<i>FCF<sub>t</sub></i>	0.037 (0.945)	0.130 (0.622)	0.095 (0.709)
<i>R&amp;D<sub>t</sub></i>	-0.043 (0.952)	-0.625 (0.454)	-0.353 (0.701)
<b>Speed of Adjustment:</b>	<b>30.4%</b>	<b>69.2%</b>	<b>97.3%</b>
<b>Half-Life:</b>	<b>23 months</b>	<b>7 months</b>	<b>2 months</b>
<b>Welch test for difference (3) - (1)</b>		<b>66.9%***</b>	
<b>p-value</b>		<b>(0.006)</b>	
AR(2) test ( <i>p</i> -value)	(0.126)	(0.154)	(0.610)
Hansen test of over-identification ( <i>p</i> -value)	(0.167)	(0.742)	(0.275)
Year Fixed Effects	Yes	Yes	Yes
Observations	2,598	2,575	2,720

This table shows the variation in the speed of adjustment in Cash ETR after FIN 48 adoption. The sample split is the tercile ranking of the geographic distance to IRS offices. All continuous variables are winsorized at the 1<sup>st</sup> and 99<sup>th</sup> percentiles. *p*-values are calculated using standard errors clustered at the firm level and are included in parentheses. \*, \*\*, and \*\*\* denote two-tailed statistical significance at 10%, 5%, and 1% levels, respectively.

**Table 8**  
**Variation in Cash ETR Spikes by CIC Assignment Probability**

<i>Variable</i>	(1) <i>Cash ETR</i>	(2) <i>Cash ETR</i>	(3) <i>Cash ETR</i>
<i>FIN 48</i>	0.032*** (0.000)	0.033*** (0.000)	0.045*** (0.000)
<i>CIC (Cont.)</i>	-0.050*** (0.001)	-0.045*** (0.002)	- -
<i>HIGH CIC</i>	- -	- -	-0.008** (0.041)
<i>FIN 48 × CIC (Cont.)</i>	- -	-0.032* (0.055)	- -
<i>FIN 48 × HIGH CIC</i>	- -	- -	-0.010* (0.093)
<i>SIZE</i>	0.010*** (0.000)	0.010*** (0.000)	0.009*** (0.000)
<i>MTB</i>	-0.001* (0.093)	-0.001* (0.091)	-0.001* (0.096)
<i>LEV</i>	-0.066*** (0.000)	-0.067*** (0.000)	-0.064*** (0.000)
<i>ROA</i>	0.081*** (0.000)	0.082*** (0.000)	0.077*** (0.000)
<i>ACC</i>	-0.097*** (0.000)	-0.097*** (0.000)	-0.097*** (0.000)
<i>FI</i>	-0.061 (0.276)	-0.059 (0.289)	-0.054 (0.332)
<i>EQINC</i>	-0.752 (0.138)	-0.750 (0.140)	-0.817 (0.105)
<i>INTAN</i>	-0.005 (0.600)	-0.004 (0.612)	-0.004 (0.669)
<i>PPE</i>	-0.070*** (0.000)	-0.069*** (0.000)	-0.068*** (0.000)
<i>NOL</i>	-0.040*** (0.000)	-0.040*** (0.000)	-0.039*** (0.000)
<i>ANOL</i>	0.293*** (0.000)	0.293*** (0.000)	0.294*** (0.000)
<i>FCF</i>	-0.156*** (0.000)	-0.156*** (0.000)	-0.154*** (0.000)
<i>R&amp;D</i>	-0.474*** (0.000)	-0.474*** (0.000)	-0.468*** (0.000)
<i>Constant</i>	0.246*** (0.000)	0.246*** (0.000)	0.259*** (0.000)
Industry Fixed Effects	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes
Observations	22,720	22,720	22,720
Adjusted R-squared	0.124	0.124	0.124

This table shows the variation in the spikes in Cash Effective Tax Rates by CIC assignment probability in the first three-year window after the adoption of FIN 48 (2007–2009). All continuous variables are winsorized at the 1<sup>st</sup> and 99<sup>th</sup> percentiles. *p*-values are calculated using standard errors clustered at the firm level and are included in parentheses. \*, \*\*, and \*\*\* denote two-tailed statistical significance at 10%, 5%, and 1% levels, respectively.

**Table 9**  
**Variation in the Speed of Adjustment in Cash ETR by CIC Assignment Probability**

	(1)	(2)	(3)
<i>Variable</i>	<i>Low CIC</i> <i>Cash ETR<sub>t+1</sub></i>	<i>Medium CIC</i> <i>Cash ETR<sub>t+1</sub></i>	<i>High CIC</i> <i>Cash ETR<sub>t+1</sub></i>
<i>Cash ETR<sub>t</sub></i>	0.061 (0.620)	0.352 (0.110)	0.531** (0.038)
<i>SIZE<sub>t</sub></i>	0.020 (0.293)	-0.019 (0.500)	-0.025 (0.650)
<i>MTB<sub>t</sub></i>	0.002 (0.818)	0.008 (0.543)	-0.009 (0.510)
<i>LEV<sub>t</sub></i>	0.321** (0.019)	-0.328 (0.292)	-0.338 (0.106)
<i>ROA<sub>t</sub></i>	0.187 (0.475)	-0.419 (0.478)	-0.097 (0.879)
<i>ACC<sub>t</sub></i>	0.082 (0.401)	-0.017 (0.921)	-0.299 (0.175)
<i>FI<sub>t</sub></i>	-1.033 (0.272)	0.636 (0.299)	0.999 (0.360)
<i>EQINC<sub>t</sub></i>	8.489 (0.401)	-6.327 (0.471)	3.898 (0.524)
<i>INTAN<sub>t</sub></i>	-0.207 (0.126)	0.304* (0.068)	-0.109 (0.489)
<i>PPE<sub>t</sub></i>	-0.388** (0.017)	0.098 (0.654)	-0.018 (0.909)
<i>NOL<sub>t</sub></i>	-0.041 (0.300)	-0.007 (0.840)	0.005 (0.907)
<i>ΔNOL<sub>t</sub></i>	0.258 (0.480)	0.296 (0.649)	-0.401 (0.633)
<i>FCF<sub>t</sub></i>	0.333 (0.150)	0.061 (0.907)	-0.229 (0.760)
<i>R&amp;D<sub>t</sub></i>	1.136 (0.568)	-0.846 (0.355)	-0.797 (0.606)
<b>Speed of Adjustment:</b>	<b>93.9%</b>	<b>64.8%</b>	<b>46.9%</b>
<b>Half-Life:</b>	<b>3 months</b>	<b>8 months</b>	<b>13 months</b>
<b>Welch test for difference (1) - (3)</b>		<b>47.0%*</b>	
<b>p-value</b>		<b>(0.097)</b>	
AR(2) test ( <i>p</i> -value)	(0.674)	(0.262)	(0.453)
Hansen test of over-identification ( <i>p</i> -value)	(0.245)	(0.154)	(0.272)
Year Fixed Effects	Yes	Yes	Yes
Observations	2,453	2,516	2,924

This table shows the variation in the speed of adjustment in Cash ETR after FIN 48 adoption. The sample split is the tercile ranking of the predicted CIC assignment probability. All continuous variables are winsorized at the 1<sup>st</sup> and 99<sup>th</sup> percentiles. *p*-values are calculated using standard errors clustered at the firm level and are included in parentheses. \*, \*\*, and \*\*\* denote two-tailed statistical significance at 10%, 5%, and 1% levels, respectively.

**Table 10**  
**Subsample Analyses of Tax Aggressiveness**

**Panel A: Variation in Cash ETR Spikes by DIST**

<i>Variable</i>	(1) <i>TAG Firms</i> <i>Cash ETR</i>	(2) <i>Non-TAG Firms</i> <i>Cash ETR</i>	(3) <i>Coefficient</i> <i>Difference Test</i>
<i>FIN 48</i>	0.066*** (0.000)	0.016 (0.292)	0.050** (0.006)
<i>DIST</i>	0.003** (0.021)	0.001 (0.764)	0.002 (0.224)
<i>FIN 48 × DIST</i>	-0.006** (0.017)	-0.001 (0.728)	-0.005 (0.273)
Control Variables	Included	Included	
Industry Fixed Effects	Yes	Yes	
Year Fixed Effects	Yes	Yes	
Observations	13,797	8,923	
Adjusted R-squared	0.159	0.176	

This table shows the variation in the spikes in Cash Effective Tax Rates by the distance to IRS offices in the first three-year window after the adoption of FIN 48 in subsamples (e.g., tax-aggressive firms and nonaggressive firms). All continuous variables are winsorized at the 1<sup>st</sup> and 99<sup>th</sup> percentiles. *p*-values are calculated using standard errors clustered at the firm level and are included in parentheses. \*, \*\*, and \*\*\* denote two-tailed statistical significance level at 10%, 5%, and 1% levels, respectively.

**Panel B: Variation in Speed of Adjustment by DIST**

<i>Variable</i>	(1) <i>Short Distance</i> <i>TAG = 1</i> <i>Cash ETR<sub>t+1</sub></i>	(2) <i>Long Distance</i> <i>TAG = 1</i> <i>Cash ETR<sub>t+1</sub></i>	(3) <i>Short Distance</i> <i>TAG = 0</i> <i>Cash ETR<sub>t+1</sub></i>	(4) <i>Long Distance</i> <i>TAG = 0</i> <i>Cash ETR<sub>t+1</sub></i>
<i>Cash ETR<sub>t</sub></i>	0.474*** (0.005)	0.118 (0.375)	0.052 (0.604)	0.034 (0.920)
<i>Control Variables</i>	Included	Included	Included	Included
<b>Speed of Adjustment:</b>	<b>52.6%</b>	<b>88.2%</b>	<b>94.8%</b>	<b>96.6%</b>
<b>Half-Life</b>	<b>11 months</b>	<b>4 months</b>	<b>3 months</b>	<b>2 months</b>
<b>Welch test for difference</b>	<b>35.6%*</b>			<b>1.8%</b>
<b><i>p</i>-value</b>	<b>(0.095)</b>			<b>(0.956)</b>
AR(2) test (p-value)	(0.112)	(0.538)	(0.746)	(0.398)
Hansen test of over-identification (p-value)	(0.521)	(0.248)	(1.000)	(0.284)
Year Fixed Effects	Yes	Yes	Yes	Yes
Observations	1,944	1,792	651	851

This table shows the variation in the speed of adjustment in U.S. companies' Cash ETR after FIN 48 adoption in subsamples. The sample split is the tercile ranking of the geographic distance to IRS offices. For brevity, only the top and bottom tercile samples are shown. All continuous variables are winsorized at the 1<sup>st</sup> and 99<sup>th</sup> percentiles. *p*-values are calculated using standard errors clustered at the firm level and are included in parentheses. \*, \*\*, and \*\*\* denote two-tailed statistical significance level at 10%, 5%, and 1% levels, respectively.

**Table 10 (Continued)**  
**Subsample Analyses of Tax Aggressiveness**  
**Panel C: Variation in Cash ETR Spikes by CIC**

<i>Variable</i>	(1) TAG Firms <i>Cash ETR</i>	(2) Non-TAG Firms <i>Cash ETR</i>	(3) <i>Coefficient Difference Test</i>
<i>FIN 48</i>	0.049*** (0.000)	0.012 (0.222)	0.037*** (0.004)
<i>CIC</i>	-0.060*** (0.000)	-0.023 (0.306)	-0.037 (0.195)
<i>FIN 48 × CIC</i>	-0.041** (0.023)	-0.015 (0.690)	-0.026 (0.533)
Control Variables	Included	Included	
Industry Fixed Effects	Yes	Yes	
Year Fixed Effects	Yes	Yes	
Observations	13,797	8,923	
Adjusted R-squared	0.161	0.176	

This table shows the variation in the spikes in Cash Effective Tax Rates by CIC assignment probability in the first three-year window after the adoption of FIN 48 in subsamples (e.g., tax-aggressive firms and nonaggressive firms). All continuous variables are winsorized at the 1<sup>st</sup> and 99<sup>th</sup> percentiles. *p*-values are calculated using standard errors clustered at the firm level and are included in parentheses. \*, \*\*, and \*\*\* denote two-tailed statistical significance level at 10%, 5%, and 1% levels, respectively.

**Panel D: Variation in Speed of Adjustment by CIC**

<i>Variable</i>	(1) <i>Low CIC TAG = 1 Cash ETR<sub>t+1</sub></i>	(2) <i>High CIC TAG = 1 Cash ETR<sub>t+1</sub></i>	(3) <i>Low CIC TAG = 0 Cash ETR<sub>t+1</sub></i>	(4) <i>High CIC TAG = 0 Cash ETR<sub>t+1</sub></i>
<i>Cash ETR<sub>t</sub></i>	0.005 (0.959)	0.523* (0.061)	0.020 (0.816)	0.377 (0.305)
<i>Control Variables</i>	Included	Included	Included	Included
<b>Speed of Adjustment:</b>	<b>99.5%</b>	<b>47.7%</b>	<b>98.0%</b>	<b>62.3%</b>
<b>Half-Life</b>	<b>2 months</b>	<b>13 months</b>	<b>2 months</b>	<b>9 months</b>
<b>Welch test for difference</b>		<b>51.8%*</b>		<b>35.7%</b>
<b><i>p</i>-value</b>		<b>(0.079)</b>		<b>(0.341)</b>
AR(2) test (p-value)	(0.952)	(0.583)	(0.258)	(0.517)
Hansen test of over-identification (p-value)	(0.122)	(0.380)	(0.128)	(0.335)
Year Fixed Effects	Yes	Yes	Yes	Yes
Observations	1,608	2,183	845	741

This table shows the variation in the speed of adjustment in U.S. companies' Cash ETR after FIN 48 adoption in subsamples. The sample split is the tercile ranking of the predicted CIC assignment probability. For brevity, only the top and bottom tercile samples are shown. All continuous variables are winsorized at the 1<sup>st</sup> and 99<sup>th</sup> percentiles. *p*-values are calculated using standard errors clustered at the firm level and are included in parentheses. \*, \*\*, and \*\*\* denote two-tailed statistical significance level at 10%, 5%, and 1% levels, respectively.

**Table 11**  
**Additional Analyses**

**Panel A: Mechanisms through which tax policies are changed**

<i>Variable</i>	(1) <i>Foreign Subs</i>	(2) <i>Tax Fees</i>	(3) <i>ACC</i>
<i>FIN 48</i>	-4.009*** (0.001)	-0.570*** (0.010)	0.020*** (0.000)
Control Variables	Included	Included	Included
Industry Fixed Effects	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes
Observations	13,731	21,471	22,720
Adjusted R-squared	0.331	0.217	0.208

This panel shows the temporary changes in the extent of foreign operations, the purchase of auditor-provided tax service, and pretax earnings management in the first three-year window after the adoption of FIN 48 (2007–2009). For brevity, coefficient estimates on control variables are not reported. In the *Tax Fees* regression, additional control variables are included (e.g., Big N auditor, M&A activities, restructuring activities, special items, internal control material weakness, tax-related material weakness, busy season clients, receivable and inventory ratios, and the natural log of audit fees). The sample size reduces due to the unavailability of the dependent or additional control variables. All continuous variables are winsorized at the 1<sup>st</sup> and 99<sup>th</sup> percentiles. *p*-values are calculated using standard errors clustered at the firm level and are included in parentheses. \*, \*\*, and \*\*\* denote two-tailed statistical significance at 10%, 5%, and 1% levels, respectively.

**Panel B: CEO Risk Incentive**

<i>Variable</i>	(1) <i>Cash ETR</i>
<i>FIN 48</i>	0.034*** (0.001)
<i>Vega</i>	0.001 (0.515)
<i>FIN 48</i> × <i>Vega</i>	0.003* (0.052)
Control Variables	Included
Industry Fixed Effects	Yes
Year Fixed Effects	Yes
Observations	11,757
Adjusted R-squared	0.112

This panel shows the variation in the spikes in Cash ETR in the first three-year window after the adoption of FIN 48 (2007–2009) by the CEO’s risk incentive. CEO compensation vega (risk incentive effects) is calculated as the sensitivity of CEO wealth (captured by option holdings) to a 0.01 increase in stock volatility, following the estimation procedures in Core and Guay (2002). For brevity, coefficient estimates on control variables are not reported. The sample size reduces due to the unavailability of the vega measure. All continuous variables are winsorized at the 1<sup>st</sup> and 99<sup>th</sup> percentiles. *p*-values are calculated using standard errors clustered at the firm level and are included in parentheses. \*, \*\*, and \*\*\* denote two-tailed statistical significance at 10%, 5%, and 1% levels, respectively.

**Table 11 (Continued)**  
**Additional Analyses**

**Panel C: Tax Footnote Complexity**

<i>Variable</i>	(1) <i>Cash ETR</i>
<i>FIN 48</i>	0.022 (0.110)
<i>Tax Footnotes</i>	-0.019*** (0.000)
<i>FIN 48 × Tax Footnotes</i>	0.012*** (0.008)
Control Variables	Included
Industry Fixed Effects	Yes
Year Fixed Effects	Yes
Observations	15,404
Adjusted R-squared	0.127

This panel shows the variation in the spikes in Cash ETR in the first three-year window after the adoption of FIN 48 (2007–2009) by tax footnote complexity. Specifically, Tax Footnotes is the natural log of the number of sentences in Form 10-K’s income tax footnotes. For brevity, coefficient estimates on control variables are not reported. The sample size reduces slightly due to the unavailability of computer-readable income tax footnotes. All continuous variables are winsorized at the 1<sup>st</sup> and 99<sup>th</sup> percentiles. *p*-values are calculated using standard errors clustered at the firm level and are included in parentheses. \*, \*\*, and \*\*\* denote two-tailed statistical significance at 10%, 5%, and 1% levels, respectively.

**Panel D: Big N Auditor and Tax Specialist (Cash ETR Spikes)**

<i>Variable</i>	(1) <i>Cash ETR</i>	(2) <i>Cash ETR</i>
<i>FIN 48</i>	0.036*** (0.000)	0.033*** (0.000)
<i>Big N Auditor</i>	0.018*** (0.000)	
<i>Tax Specialist</i>		0.003 (0.444)
<i>FIN 48 × Big N Auditor</i>	-0.000 (0.955)	
<i>FIN 48 × Tax Specialist</i>		-0.003 (0.641)
Control Variables	Included	Included
Industry Fixed Effects	Yes	Yes
Year Fixed Effects	Yes	Yes
Observations	22,720	22,720
Adjusted R-squared	0.125	0.123

This panel shows the variation in the spikes in Cash ETR in the first three-year window after the adoption of FIN 48 (2007–2009) by auditor characteristics. Auditor information is collected from the Audit Analytics database. Big N auditors include Arthur Andersen, Deloitte, EY, KPMG, and PwC. Tax specialized auditors are audit offices with the largest market share in a given industry (2-digit SIC), MSA, and year. For brevity, coefficient estimates on control variables are not reported. All continuous variables are winsorized at the 1<sup>st</sup> and 99<sup>th</sup> percentiles. *p*-values are calculated using standard errors clustered at the firm level and are included in parentheses. \*, \*\*, and \*\*\* denote two-tailed statistical significance at 10%, 5%, and 1% levels, respectively.

**Table 11 (Continued)**  
**Additional Analyses**

**Panel E: Big N Auditor and Tax Specialist (Speed of Adjustment)**

	(1)	(2)	(3)	(4)
	<i>Big N Auditor</i> = 1	<i>Big N Auditor</i> = 0	<i>Tax Specialist</i> = 1	<i>Tax Specialist</i> = 0
<i>Variable</i>	<i>Cash ETR</i> <sub><i>t+1</i></sub>	<i>Cash ETR</i> <sub><i>t+1</i></sub>	<i>Cash ETR</i> <sub><i>t+1</i></sub>	<i>Cash ETR</i> <sub><i>t+1</i></sub>
<i>Cash ETR</i> <sub><i>t</i></sub>	0.470** (0.030)	0.407* (0.073)	0.047 (0.250)	0.309*** (0.001)
Control Variables	Included	Included	Included	Included
<b>Speed of Adjustment:</b>	<b>53.0%</b>	<b>59.3%</b>	<b>95.3%</b>	<b>69.1%</b>
<b>Half-Life</b>	<b>11 months</b>	<b>9 months</b>	<b>3 months</b>	<b>7 months</b>
<b>Welch test for difference</b>		<b>6.3%</b>		<b>26.2%**</b>
<b><i>p</i>-value</b>		<b>(0.841)</b>		<b>(0.011)</b>
AR(2) test ( <i>p</i> -value)	(0.368)	(0.180)	(0.502)	(0.149)
Hansen test of over-identification ( <i>p</i> -value)	(0.119)	(0.235)	(0.419)	(0.243)
Year Fixed Effects	Yes	Yes	Yes	Yes
Observations	6,210	1,683	2,266	5,627

This panel shows the variation in the speed of adjustment in Cash ETR after FIN 48 adoption by auditor characteristics. Auditor information is collected from the Audit Analytics database. Big N auditors include Arthur Andersen, Deloitte, EY, KPMG, and PwC. Tax specialized auditors are audit offices with the largest market share in a given industry (2-digit SIC), MSA, and year. For brevity, coefficient estimates on control variables are not reported. All continuous variables are winsorized at the 1<sup>st</sup> and 99<sup>th</sup> percentiles. *p*-values are calculated using standard errors clustered at the firm level and are included in parentheses. \*, \*\*, and \*\*\* denote two-tailed statistical significance at 10%, 5%, and 1% levels, respectively.

**Table 11 (Continued)**  
**Additional Analyses**

**Panel F: Changes in the Relative Tax Aggressiveness within Industry**

<i>Variable</i>	(1) <i>Became More Aggressive Cash ETR</i>	(2) <i>No change in Aggressiveness Cash ETR</i>	(3) <i>Became Less Aggressive Cash ETR</i>
<i>FIN 48</i>	-0.066*** (0.000)	0.036*** (0.009)	0.144*** (0.000)
<i>Test of Coefficient Difference</i>			
<i>(1) vs. (2)</i>		(0.000)	
<i>(2) vs. (3)</i>		(0.000)	
<i>(1) vs. (3)</i>		(0.000)	
Control Variables	Included	Included	Included
Industry Fixed Effects	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes
Observations	6,405	3,711	7,279
Adjusted R-squared	0.147	0.217	0.205

This panel shows the variation in the spikes in Cash ETR in the first three-year window after the adoption of *FIN 48* (2007–2009) by the changes in relative tax aggressiveness within the industry. Specifically, the sample is spliced into three categories: (1) firms became more tax aggressive within each industry after *FIN 48*; (2) firms that did not change relative aggressiveness within each industry; (3) firms became less tax aggressive within each industry after *FIN 48*. The sample size reduces as this split requires non-missing data before and after *FIN 48* adoptions. For brevity, coefficient estimates on control variables are not reported. All continuous variables are winsorized at the 1<sup>st</sup> and 99<sup>th</sup> percentiles. *p*-values are calculated using standard errors clustered at the firm level and are included in parentheses. \*, \*\*, and \*\*\* denote two-tailed statistical significance at 10%, 5%, and 1% levels, respectively.

**Table 11 (Continued)**  
**Additional Analyses**

**Panel G: The Effects of Schedule UTP**

<i>Variable</i>	(1) <i>Full Sample</i> <i>Cash ETR</i>	(2) <i>TAG = 1</i> <i>Cash ETR</i>	(3) <i>TAG = 0</i> <i>Cash ETR</i>
<i>FIN 48</i>	0.033*** (0.000)	0.049*** (0.000)	0.012 (0.205)
<i>Schedule UTP</i>	0.017* (0.052)	0.002 (0.874)	0.020* (0.090)
<i>Test of Coefficient Difference</i> <i>FIN 48 = Schedule UTP</i> <i>(p-value)</i>	(0.138)	(0.003)	(0.624)
Control Variables	Included	Included	Included
Industry Fixed Effects	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes
Observations	22,720	13,797	8,923
Adjusted R-squared	0.124	0.158	0.176

This panel shows the magnitude of the spikes in Cash ETR in the three years after adopting FIN 48 (2007–2009) in comparison to the effects of filing a Schedule UTP. Corporate taxpayers with total assets that equal or exceed \$100 million, \$50 million, and \$10 million are required to file a new form Schedule UTP with the IRS starting from 2010, 2012, and 2014, respectively. An indicator variable, Schedule UTP, equals one for years when Schedule UTP filing requirement is in place. For brevity, coefficient estimates on control variables are not reported. All continuous variables are winsorized at the 1<sup>st</sup> and 99<sup>th</sup> percentiles. *p*-values are calculated using standard errors clustered at the firm level and are included in parentheses. \*, \*\*, and \*\*\* denote two-tailed statistical significance at 10%, 5%, and 1% levels, respectively.