Do Unrecognized Tax Benefit Reserve Disclosures affect Corporate Investment?

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ABSTRACT: Beginning in 2007, under FIN 48, firms are required to disclose their unrecognized tax benefit (UTB) reserve in their financial statements. Many of the UTBs firms reserve for relate to investment, and the disclosure of the reserve to the taxing authorities lowers firms expectations for receiving the corresponding tax benefits. Since these tax benefits help catalyze corporate investment by lowering the hurdle rate for a positive net present value project, I posit that UTB reserve disclosure leads to lower corporate investment. I find evidence consistent with this expectation, and I specifically estimate that firms subject to FIN 48 reduce investment between 8.46% and 9.44%. My results enhance our understanding of the role of disclosure to adversarial parties on investment as well as provide evidence of an unintended consequence of enhancing tax financial statement disclosures.

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Keywords: Real Effects of Disclosure; Unrecognized Tax Benefits; Investment; FIN 48; Disclose to Adversaries

Do Unrecognized Tax Benefit Disclosures affect Corporate Investment?

1. Introduction

Firms must disclose income tax information in their financial statements, and beginning in 2007, firms were required to increase these disclosures. Under Financial Statement Interpretation Number 48 (henceforth "FIN 48"), firms must provide a detailed reconciliation and discussion of their reserve for unrecognized tax benefits, which comprises tax positions for which there is a more likely than not chance that they will not be upheld upon IRS audit. While the uncertain positions that pertain to the reserve can be diverse, publicly available statistics from the IRS suggest that three of the most common categories of tax positions included as an unrecognized tax benefit are deductions and credits related to research and experimentation (R&E), mergers and acquisitions (M&A), and depreciation. Tax benefits from these investment-related deductions and credits help subsidize and support firms' investment decisions by increasing after-tax benefits. However, these tax positions, particularly those reserved for as an unrecognized tax benefit, can be subject to IRS audit. As firms increase financial statement disclosure of these reserves in the post-FIN 48 era, the taxing authority's enhanced scrutiny on the tax positions may affect firms expectation that they ultimately receive the corresponding tax benefits. If firms impound these expected cash flow shocks into their calculations when assessing whether an investment has a positive net present value, then following FIN 48, firms will pass on marginal investment projects at a higher rate than before FIN 48.

In this study, I examine whether financial statement disclosure of the unrecognized tax benefit (henceforth 'UTB') reserve affects corporate investment. The real effects of disclosure hypothesis suggests that a firm's accounting disclosures determines how it allocates resources, and changes to a firm's disclosures will result in a new equilibrium of real decisions (Kanodia

and Sapra 2016). In the case of UTB reserve disclosures, after FIN 48, firms disclose to adversarial parties the uncertainty associated with their tax planning activities, which may significantly affect firms' perceived likelihood that they receive the corresponding tax benefits. Indeed, prior to the enactment of FIN 48, 89 percent of professionals surveyed by KPMG believed that UTB disclosures would increase scrutiny by the taxing authorities (Blouin, Gleason, Mills, and Sikes 2007; 2010). Furthermore, following the onset of FIN 48, the IRS increased downloads of firms' financial statements (Bozanic, Hoopes, Thornock, and Williams 2017), and Katz (2014) suggests that UTBs provide a roadmap for the IRS to understand firms tax positions and better combat corporate tax avoidance. Additionally, the Treasury Inspector General for Tax Administration (2018) recently issued a report that states that the tax issues can be reasonably gleaned from the firm's financial statements and UTB disclosures. As a result, firms appeared to have reason to believe that their tax positions would face greater scrutiny from adversarial parties due to the new disclosures and thus result in a new allocation of firm resources and a new equilibrium of real decisions.

A change in the expected likelihood of upholding a tax position may have a small effect on whether a firm chooses an investment if the investment project is clearly or is not clearly a positive net present value project. However, if an investment is positive net present value, but absent any tax benefits (i.e., R&E tax credit, accelerated and bonus depreciation, tax-deductible acquisitions, acquired tax benefits from mergers and acquisitions), is no longer positive net present value, then the firm may pass on the project. Given evidence that FIN 48 increased IRS scrutiny, because UTB disclosures affect the expected likelihood firms receive investment-related tax benefits, I posit that the increased disclosures cause firms to decrease investment following the onset of FIN 48.

To test my research question, I employ a difference-in-difference research design. My first difference is pre versus post-FIN 48, and my second difference is whether the firm-year observation is domiciled in the U.S. and adheres to U.S. GAAP versus whether the firm-year observation is domiciled in a non-U.S. country that is not affected by the FIN 48 requirements. To ensure that the control sample is subject to similar macro-economic considerations as my treatment sample, I restrict the control sample to firm-year observations that are domiciled in a G8 member country. I also restrict my sample to a balanced panel of firms. Within this balanced panel, I document a parallel-trend among my treatment and control observations across the pre-FIN 48 era, thereby providing credence to the use of this research design in testing my research question. In my multivariate tests, I find that firms disclosing UTB reserves significantly lower investment after its implementation. I specifically estimate the effect ranging between 8.46% and 9.44% lower investment for firms disclosing versus not disclosing UTB reserves.

I expect variation in how firms respond to the enhanced tax disclosures required under FIN 48. For example, if before FIN 48, a firm had a high likelihood of IRS audit, then the new disclosures provide less novel information to the IRS. For firms under continuous audit (Coordinated Industry Case (CIC) program firms), I anticipate the UTB reserve disclosures have less of an effect on investment. Consistent with expectations, I find that the results are more significant among the firms less likely to be in the CIC program than non-U.S. firms and U.S. firms that are more likely to be in the CIC program. These findings help support that my primary results are a function of the UTB reserve disclosure. Furthermore, because CIC program membership is not directly affected by the economic downturn, this finding mitigates concerns that my results are driven by the crisis.

An alternative explanation to my findings is that firms changed the recognition of UTB reserves due to FIN 48 in a manner that systematically increases the reserve. This explanation is not plausible for several reasons. First, the change in the reserves has no cash flow effect, and thus the link to an effect on investment is not clear. Second, only about 67% of firms increased their UTB reserves due to FIN 48 implementation, whereas the remaining 33% either did not change or decreased their reserves. Thus, it is not clear that firms systematically responded to changing their reserves in the same manner as they systematically had to increase the *disclosure* of these reserves. Finally, among the firms that restated their financials for FIN 48 adoption, the total effect across 1,641 firms is a decrease to retained earnings of about $3.1B, or about $1.8M per firm (Audit Analytics 2008). Thus, the net effect of the FIN 48 adoption for the adoption is immaterial to the majority of the firms in my sample. To further mitigate concerns that the change in standard, and not the change in disclosure, is what drives my results, I obtain the FIN 48 financial statement revisions data from Audit Analytics and classify each firm as either increasing their UTB reserves in response to FIN 48 or not. I find that firms not changing or decreasing their UTB reserves have a statistically similar change in investment relative to those that are increasing their reserve. Because changes to the measurement of the UTB reserve do not appear to be driving my findings, I assert that the disclosure of the reserve more significantly drives my results relative to a change in reserve measurement.

In additional analysis, I provide evidence that my findings are a function of each of the components of investment: capital expenditures, research and development, and acquisitions. However, the decrease in acquisition expenditures is more significant than the other two components.[1] I also do not observe changes in the affected firms' investment efficiency,

[1] Specific examples of UTBs a firm may reserve for as part of mergers and acquisitions are having tax-free reorganization that allows the acquirer to defer recognition of taxes, as well as the acquisition of tax benefits (i.e.,

suggesting that firms lower investment is in line with an increase in the firm's hurdle rate for a positive net present value investment. My findings are robust to numerous alternative specifications, such as including firm fixed effects, entropy balancing, not requiring a balanced panel, and changing the country membership of my control firms. I also perform a falsification test, and I fail to document a significant change in investment behavior using an alternative event date where there are no changes to the disclosure of UTBs.

This study is among the first to examine the effects of financial statement tax disclosure on real decisions and the first study to examine whether UTB disclosures affect investment levels. While the extant literature provides evidence that increasing mandatory disclosure lowers agency costs (Botosan 1997) and leads to positive real effects (Cho 2015; Jayaraman and Wu 2018), firms may uniquely respond to changes to tax disclosures because they provide additional information to the IRS, a significant adversarial party. The majority of the literature examining the real effects of disclosure focuses on collaborative parties (i.e., Botoson 1997; Botoson and Plumlee 2002; Core, Guay, and Verdi 2006; Lambert, Leuz, and Verrecchia 2007; Kanodia and Sapra 2016; Shroff 2017), whereas few studies consider the real effects of disclosure to adversarial parties. In examining the real effects of FIN 48, a standard that primarily increases adversarial disclosure with little or no effect on collaborative disclosure, I provide novel and unique evidence that adversarial disclosure of investment-related information lowers corporate investment.

I also contribute to the literature examining the significant disclosure and accounting change of FIN 48. Numerous studies examine FIN 48 and provide mixed evidence on whether it represents a significant improvement over the prior standard. For example, Lisowsky, Robinson,

acquiring net operating loss deductions or other UTBs pertaining to the target's R&E tax credits, depreciation, or other uncertain tax planning activities) to which the target firm may have previously been reserving.

and Schmidt (2013), Robinson and Schmidt (2013), Beck and Lisowsky (2014), Gupta, Mills, and Towery (2014), Gupta, Laux, and Lynch (2016), Henry, Massel, and Towery (2016) and Bozanic, Hoopes, Thornock, and Williams (2017) provide evidence that the new disclosures provide information that can be useful for external parties. Whereas, Frischmann, Shevlin, and Wilson (2008), Cazier, Rego, Tian, and Wilson (2015), Robinson, Stomberg, and Towery (2016), Robinson, Savor, and Sikes (2017), and Gleason, Mills, and Nessa (2018) cast doubt over the informativeness and accuracy of the new disclosures. One explanation for the seemingly contradictory conclusions for these two sets of studies is the UTB reserve disclosures are more useful for some financial statement users (i.e., adversarial parties) than others (i.e., collaborative parties), and the real effects of disclosure vary depending on who is using the information and what new information is being disclosed (Kanodia and Sapra 2016; Leuz and Wysocki 2016; Dutta and Nezlobin 2017). My findings are consistent with this explanation.

My study answers the call from Blouin and Robinson (2014), who suggest that more research should be performed examining the real effects of UTB reserve disclosures. My findings differ from concurrent working papers examining the effect of FIN 48 on innovation (Goldman, Lampenius, Radhakrishnan, Stenzel, and Feres de Almeida 2018; Williams and Williams 2018) across two key dimensions. First, my study examines the inputs to investment (i.e., capital expenditures, research and development expenditures, and acquisitions), rather than the outputs of investment (i.e., patent applications). Second, I examine firm's entire portfolio of investment rather than just the portion pertaining to innovation.[2] These differences are

[2] In a related and concurrent study, Jacob, Wentland, and Wentland (2019) examine whether Schedule UTP affects the timing of capital expenditures. However, Schedule UTP is not a publicly disclosed financial statement disclosure. While complementary, their findings cannot speak to the real effects of public disclosure. Furthermore, their study centers on how Schedule UTP affects how firms use *precautionary* cash holdings related to UTBs, whereas my study examines whether FIN 48 affects the net present value of investment projects.

particularly important given that the other concurrent studies suggest that firms are not necessarily changing innovation levels, and instead could be shifting from less uncertain innovation to more uncertain innovation. As a result, my findings cannot be inferred from the concurrent papers.

Lastly, my findings are particularly relevant given a recent proposal to change the disclosure requirements for income taxes. Specifically, the FASB has issued a revised standards update about whether to require enhanced income tax disclosures in the firm's financial statements that would further expose uncertainty surrounding the firm's tax positions (FASB 2019). My results suggest that the potential change could adversely affect corporate investment.

2. Background Information and Hypothesis Development

2.1 FIN 48

The Financial Accounting Standards Board issued FIN 48 in July of 2016, and it went into effect for fiscal years beginning after December 15, 2006. It's intended goals were to improve the breadth and depth of tax-related financial statement disclosures as well as to reduce subjectivity in the treatment of uncertain tax positions (Scholes, Wolfson, Erickson, Hanlon, Maydew, and Shevlin 2014). FIN 48 was designed to address the issue that not all tax positions that firms choose are upheld upon IRS audit. To better map the economic activities of tax avoidance with earnings, firms must record a reserve for the cash tax savings that have a higher risk of reversing. The previous standard, SFAS 5, did require firms to record this reserve but did not provide specific requirements towards how to disclose these reserves, which often led to their inclusion in the contingent liabilities balance, rather than a separate disclosure, and the standard provided little guidance to firms as to what positions to reserve (Robinson, Stomberg, and Towery 2016). To increase the comparability and relevance of tax information disclosed, FIN 48

significantly changed the disclosure and determination of the UTB reserve (Scholes, Wolfson, Erickson, Hanlon, Maydew, and Shevlin 2014). The primary change resulting from FIN 48 is the requirement to disclose UTBs separately in the footnotes to the financial statements. The increase in the quantity of disclosure is robust and includes a tabular reconciliation on UTBs from the prior year to the current year as well as a calculation of its effect on the firm's effective tax rate.

To illustrate the differences in disclose in these two financial reporting regimes, Appendix A provides excerpts from SPX Corp.'s SEC Annual Filings (10-K) for the years 2006 and 2007 of their uncertain tax benefits. Before the onset of FIN 48 in 2006, SPX provides a general paragraph about the procedures for estimating the contingencies for UTBs followed by discussions on two changes that occurred in recent years. While the description paragraph is informative to the process for determining the reserve, it is also generically used in many years proceeding FIN 48 and appears to have little incremental value to current year positions. Before FIN 48, this is the extent to which this information was available to both collaborative and adversarial parties. Meanwhile, in 2007, SPX provides a more detailed discussion of the reserve, its calculation, and a detailed roll forward for reserve balance that includes some components that caused the change in the balance. This level of detail persists in each of the following years.[3]

In addition to the change in disclosure, firms were also provided specific guidance on the measurement of the UTB reserve. Prior to FIN 48, FAS 5 required managers to record contingent liabilities for uncertain tax positions using a "probable" and "measurable" standard. FIN 48

[3] While the new disclosures under FIN 48 do not explicitly describe the positions reserved, numerous studies with access to IRS information document that the reserve is associated with aggressive tax positions (Lisowsky, Robinson, and Schmidt 2013; Beck and Lisowsky 2014) and three of the most common positions that they correspond to pertain to R&E, depreciation and M&A related decisions (Towery 2017). As a result, external parties can infer information regarding the nature of firms' investment decisions from these disclosures.

differs by demanding a two-step process where the firm must first assess whether a tax position is "more likely than not" to survive the examination by the taxing authorities, and, if not, the firm must estimate the tax benefit from the position that has a greater than 50 percent probability of realization upon audit (Erickson, Goldman, and Stekelberg 2016; Robinson, Stomberg, and Towery 2016). While the measurement of these positions conceivably could have changed, the average effect of the change in measurement is, on average, immaterial. For example, Audit Analytics (2008) provides a descriptive report of the adoption of FIN 48 based on the restated financial statements specifically due to the FIN 48 implementation. Audit Analytics notes that the total effect across their sample of 1,641 firms is a decrease in earnings of $3,058,270,443, which averages a mere $1,863,663 decrease per firm. Thus, for a typical firm with $500 million in assets, the changes incurred by adopting FIN 48 would not even eclipse 0.5% of total assets. As a result, it is unlikely that the change in the measurement of UTBs from adopting FIN 48 elicits significant real effects.

Extant literature examines the FIN 48 standard and suggests that the new disclosures provide substantial information to adversarial parties (i.e., the taxing authorities). For example, Lisowsky, Robinson, and Schmidt (2013) use proprietary IRS information and suggest that the UTB disclosures are positively associated with tax shelter activity. Robinson and Schmidt (2013) document that firms with high proprietary costs disclose less about their UTBs following FIN 48, thereby suggesting that the disclosures contain valuable additional information to the taxing authorities. Beck and Lisowsky (2014) provide evidence that UTB reserves reflect tax uncertainty and tax aggressiveness. Additionally, Bozanic, Hoopes, Thornock, and Williams (2017) provide evidence that following the onset of FIN 48, the IRS significantly increased the downloads of firms annual financial statements. Consistent with the IRS using the information

provided in the UTB disclosures to combat tax avoidance, Gupta, Mills, and Towery (2014) provide evidence that the FIN 48 adoption is associated with an increase in tax compliance behavior and Henry, Massel, and Towery (2016) document that tax avoidance declined following FIN 48.

However, it is not entirely clear that FIN 48 lowers information asymmetry between firms and collaborative parties. For example, studies provide evidence that the FIN 48 requirements lowered the informativeness of tax disclosures (Robinson, Stomberg, and Towery 2016), lowered the value-relevance of tax disclosures (Robinson, Savor, and Sikes 2017), did not increase the accuracy of reserves (Gleason, Mills, and Nessa 2017), and did not lower the usage of tax-based earnings management (Cazier, Rego, Tian, and Wilson 2015). As a result, UTB disclosures appear to provide little capital market benefits to collaborative parties, while providing substantial information to adversarial parties.

2.2 Disclosure and Investments

Prior literature suggests that disclosure can have a real effect on firm decisions through the real effects of disclosure hypothesis. In their review of this literature, Kanodia and Sapra (2016) summarize the real effects hypothesis as follows:

> "The measurement and disclosure rules that govern the functioning of accounting systems—which economic transactions are measured and which are not measured, how they are measured and aggregated, what is disclosed to capital markets and how frequently such disclosures are made—have significant effects on the real decisions." (Kanodia and Sapra 2016, pp. 624)

This hypothesis follows the theory that external parties respond to firms' disclosures (Kanodia 1980) and that as firms provide new information to external parties, the external parties react to said information, and managers respond to those reactions via their real decisions (Brandenburger and Polak 1996). Thus, the accounting regime is an important aspect of the firm's information environment and can dictate how firms allocate resources. The literature

suggests that information produced to an external party can positively affect real firm decisions by lowering information asymmetry between the firm and collaborative parties. For example, the lower information asymmetry from enhanced disclosure lowers a firm's cost of equity capital (Botoson 1997; Botoson and Plumlee 2002; Core, Guay, and Verdi 2006; Lambert, Leuz, and Verrecchia 2007). One result of the lower costs of capital is that the hurdle rate for a positive net present value project decreases. This feedback loop increases the probability that a firm chooses an investment because the firm receives a signal from external parties that the rate of return demanded for equity decreased.

However, lowering the information asymmetry between the firm and an adversarial party can have the opposite effect. Numerous studies document that firms change financial reporting behavior in response to changes to disclosure requirements when the new disclosures pertain to segments, customers, or trade secrets, thereby substantiating that there is a proprietary cost to disclosing information to adversarial parties (Hayes and Lundholm 1996; Berger and Hann 2007; Ellis, Fee, and Thomas 2012; Li, Lin, and Zhang 2018). While the majority of the literature analyzed by Kanodia and Sapra (2016) focus on the real effects of disclosure for collaborative parties (i.e., stock market reactions to disclosure driving real decisions), little evidence exists as it pertains to the real effects of disclosure for adversarial parties, which the hypothesis suggests should have an adverse effect on investment.[4] Thus, even though a firm garners capital market benefits from lowering information between internal and external shareholders (i.e., collaborative parties), the firm must balance these capital market benefits with disclosing information to its rivals (i.e., adversarial parties).

[4] Prior literature does suggest that managers prefer to withhold information from adversarial parties, namely competitors (Botosan and Stanford 2005; Verrecchia and Weber 2006). However, prior literature does not examine whether this adversarial disclosure affects investment decisions.

Within the accounting literature, numerous studies examine changes to accounting standards to obtain an understanding of the role of mandatory information disclosure on firm decisions.[5] Shroff (2017) takes a general viewpoint and examines many of the accounting standard changes and their aggregate effect on firm investment. Specifically, he compiles 49 changes to U.S. GAAP and provides evidence that changes to financial reporting do affect corporate investment. He then provides evidence that the change is a function of managers enhancing their information in response to the new U.S. GAAP requirements. However, he does not examine whether regulatory changes to disclosure affects investment through lower information asymmetry, and he even caveats his findings that this mechanism is a possible alternative explanation to his results. One reason why he does not extend his findings in this way is that he examines changes to information asymmetry that affect both collaborative and adversarial parties, and thus Shroff (2017) is unable to disentangle the information asymmetry effect.

Examining whether disclosure affects investments through lower information asymmetry is important but difficult to study because the real effects of disclosure hypothesis suggests that disclosures can both help and hurt firms real activities (Kanodia and Sapra 2016). Dutta and Nezlobin (2017) theoretically provide evidence that the type of information disclosed can either positively or negatively influence the effects of disclosure on investment, depending on how the information is being used. Thus, to understand the role of disclosure on information asymmetry and investment, one must carefully consider the relative changes of information asymmetry to collaborative versus adversarial parties. As it specifically pertains to the UTB disclosures, the taxing authority, a prominent adversarial party, appears to garner significant benefits from the

[5] See, for example, Middlestaedt, Nichols, and Regier (1995), Bens and Monohan (2008), Amir, Guan, and Oswald (2010), among others.

enhanced disclosures. However, the information asymmetry between the firm and collaborative parties appears to increase or remain the same (see Section 2.1). Consequently, FIN 48 is a standard that uniquely allows the examination of the role of disclosure affecting investments via lower information asymmetry.

2.3 Hypothesis Development

2.3.1 Hypothesis 1

A central tenant to investment theory is that firms should invest in all positive net present value projects and forego all negative net present value projects (Tobin 1969). One way that the government promotes investment is to provide various tax deductions and credits for investment-related activities (i.e., accelerated depreciation, bonus depreciation, R&E tax credits, tax-deferred acquisitions, among others). I illustrate the impact of the tax benefits in Appendix B. Each of the four hypothetical projects yield the same expected benefits of $100 but vary in cost in the amount of 95, 105, 115, and 125 for project A, B, C, and D respectively. In Scenario 1, I assume there are no tax benefits for investment, and thus the firm should choose project A, and pass on projects B, C, and D since the net present value of project A is greater than 0 and the net present value of projects B, C, and D are less than 0. However, in Scenario 2, if I were to assume that each project yields $20 in tax benefits, then projects A, B, and C become positive net present value, and the firm should choose those three projects while continuing to pass on project D.

In this study, I examine what happens when firms' expectations for receiving their tax benefits diminish as a consequence of UTB reserve disclosures. Following the real effects of disclosure hypothesis (Kanodia and Sapra 2016), for this information to affect investment, firms must believe that this information will be informative to external parties. Indeed, prior to the enactment of FIN 48, KPMG surveyed practitioners and noted that 89% of respondents indicated

that they expect the UTB disclosures to increase taxing authority scrutiny (Blouin, Gleason, Mills, and Sikes 2007; 2010). Moreover, this suspicion of enhanced scrutiny appears to be warranted. Hoopes, Bozanic, Thornock, and Williams (2017) provide evidence that the IRS increased downloads of firms' financial statements following the onset of FIN 48, and Katz (2014) reports that the IRS is, in fact, "using corporate financial reports of uncertain tax positions as a tool to go after more tax revenues." Gupta, Mills, and Towery (2014) provide evidence that firms increase tax compliance following FIN 48. Similarly, Henry, Massel, and Towery (2016) document that firms reduce tax avoidance following the onset of FIN 48. These two studies consistently suggest that the enhanced IRS scrutiny led firms to lower their tax planning activities.

In discussions with anonymous Big 4 employees and individuals working in corporate tax and accounting departments, the threat that disclosing UTB reserve information in financial statements posed to firms was real and credible. Practitioners specifically noted that the UTB reserve disclosure provides real insights into the nature of firms' tax planning decisions, thereby enhancing the information available to financial statement users. However, one practitioner noted that it is not clear whether this information would be useful for all parties. Specifically, for the average shareholder, the UTB reserve may not affect their decision to invest in a firm.[6] However, an external party like the taxing authority has different objectives in that they are interested in ensuring that firms pay the appropriate amount of taxes. Additionally, the practitioner noted that the taxing authority already has access to other proprietary tax information and thus may be able to make better use of the UTB disclosures than an investor without the

[6] The practitioner anecdote that UTB reserve disclosures may not be useful to collaborative external parties is consistent with Robinson, Stomberg, and Towery (2016), who provide evidence that the onset of FIN 48 did not enhance financial statement informativeness.

same proprietary information. Practitioners suggest that it is these reasons that led firms to believe that the onset of FIN 48 would adversely affect the expected value of firms' tax benefits.

While I expect that the disclosures required under FIN 48 yielded many significant effects, I believe the effects on investment to be among the most direct and impactful.[7] Research suggests that the UTBs can include nearly any type of tax planning activity, but that the tax positions related to investment decisions are among the most prominent. For example, Towery (2017) uses IRS data following the onset of Schedule UTP to provide insights into the type of tax positions that are likely reserved for as UTBs. In Figure 2 of her study, Towery (2017) documents that R&E Credits, M&A deductions, and depreciation deductions were the 1st, 5th, and 6th most common items, respectively.[8] If following the disclosure of the UTB reserve, firms believed that the taxing authorities would more authoritatively contest their investment-related tax benefits, then firms likely would adjust their expectation for receiving these benefits. I illustrate this effect in Scenario 3 of Appendix B. Different from Scenario 1 and 2, firms have $20 of tax benefits, but their expectation of receiving these benefits is reduced by 50% to $10 because of the effects of the UTB disclosures. Under this scenario, Project A and B are positive net present value. However, the change in expected tax benefits from Scenario 2 to Scenario 3

[7] Concurrent studies also support this notion by documenting that the UTB reserve disclosures affect corporate innovation, as proxied by patent filings (Goldman, Lampenius, Radhakrishnan, Stenzel, and Feres de Almeida 2018; Williams and Williams 2018). However, while corporate innovation is a subset of corporate investment, it is difficult to glean my findings from these concurrent studies for two reasons. First, corporate innovation represents a very specific subset of all corporate investment that, relative to capital expenditures and acquisitions, is more commonly associated with risk-taking (Barker and Mueller 2002; Gentry and Shen 2013) and accounting manipulation (Dechow and Sloan 1991; Bushee 1998; Roychowdhury 2006). Thus, it is unclear whether finding that firms change corporate innovation can be extended to all forms of corporate investment. This notion is particularly relevant given Goldman, Lampenius, Radhakrishnan, Stenzel, and Feres de Almeida (2018) provide evidence of a change in corporate innovation in response to FIN 48 by firms reallocating their innovation from incremental to radical projects, rather than clear decrease in all types of corporate innovation. Second, the concurrent studies examine the outputs to corporate innovation, whereas the component of corporate investment that I examine that pertains to corporate innovation captures the inputs to innovation (R&D expense). As a result, while the findings of concurrent literature compliment my hypothesis, the results are not a direct reflection of one another.

[8] Other common positions included in Schedule UTP are transfer pricing, general business deductions, foreign tax rate differentials, capitalization, and accruals. See Towery (2017) Figure 2 Panel A.

affects whether Project C is positive net present value, and thus I would expect the firm to no longer choose this project. As a result, I posit that upon firms more explicitly disclosing their UTB reserves, they will then lower investment, relative to firms that do not disclose their UTB reserves. I state my first hypothesis in the alternative form as follows:

> *H1: Following the onset of FIN 48, firms disclosing UTB reserves decrease investment, relative to non-disclosing firms.*

Despite the expectations that firms subject to FIN 48 will lower investment, I may not observe the intended result for three key reasons. First, tax benefits may not influence investment decisions. As illustrated in Appendix B, across Scenario 1, 2, and 3, the firm always should invest in project A and always should not invest in project D regardless of the firm's expected tax benefits. Should all investments be a positive net present value project without considering tax benefits or a negative net present value project after considering tax benefits, then the effects of UTB reserve disclosures on investment would be negligible. Second, the UTB reserve disclosures only provide a reconciliation of the balances from the prior year to the current year, as well as a general discussion of the balances. To the extent that the taxing authorities do not actually use these disclosures to enhance their information set, then firms may not change their expectations for receiving tax benefits, and thus there would be no change to investment. Third, I follow prior literature in suggesting that FIN 48 provides limited benefits to collaborative parties (i.e., Robinson, Stomberg, and Towery 2016). To the extent that the benefits to collaborative parties are understated, I would expect the cost of capital benefits to offset the adverse consequences from the firm having to disclose this information to an adversarial party, thereby resulting in a less significant or no effect on investments.

2.3.2 Hypothesis 2

Regardless of the overall effect of UTB disclosures on investment, I expect that the effects of disclosing UTBs to vary in the cross-section based on the likelihood that the firm faced IRS audit prior to the onset of FIN 48. Ayers, Seidman, and Towery (2019) use confidential data from the IRS to provide evidence that some firms are more likely than others to be part of the Coordinated Industry Case (CIC) program and thus are audited by the IRS continuously. If the IRS audits a firm continuously before the onset of FIN 48, then the new disclosures are less likely to provide new information to the taxing authorities as a firm that had not received as much scrutiny. As a result, I expect the effect of UTB disclosures to be more concentrated among firms that had a lower likelihood of being part of the CIC program before the onset of FIN 48. I state my second hypothesis in the alternative form as follows:

> *H2: Firms disclosing UTB reserves that received less IRS scrutiny prior to the onset of FIN 48 decrease investment, relative to disclosing firms that receive more IRS scrutiny in the pre-period and non-disclosing firms.*

3. Research Design

3.1 Hypothesis 1

Hypothesis 1 examines the relation between UTB reserve disclosure and investment. To examine this hypothesis, I follow a large body of literature that model investment by estimating the following regression:[9]

$$Invest_{i,t} = \alpha + \beta_1 CFO_{i,t} + \beta_2 Q_{i,t-1} + \beta_3 Size_{i,t} + \beta_4 PostFIN48_{i,t} + \beta_5 US_{i,t} + \beta_6 PostFIN48*US_{i,t} + Fixed\ Effects + \varepsilon_{i,t} \quad (1)$$

[9] See Fazzari, Hubbard, and Peterson (1988), Kaplan and Zingales (1997), Rauh (2006), Shroff (2017), Jayaraman and Wu (2018), among many others.

Invest is the sum of capital expenditures, research and development expenditures, and acquisition expenditures scaled by the average total assets from year t-1 to year t.[10] I examine the effects of UTB reserve disclosure on *Invest* using a differences-in-differences estimation. My first difference is an indicator variable equal to one if the firm-year observation is after the onset of FIN 48 (*PostFIN48*) and zero otherwise. My second difference is whether the firm-year observation is a U.S.-domiciled firm following U.S. GAAP, and thus is subject to the FIN 48 disclosure requirements, and zero otherwise.[11,12] My variable of interest is the interaction *PostFIN48*US,* which captures the effect of FIN 48 on firm investment among those affected by the disclosure versus those that are unaffected. Following H1, I expect the coefficient on *PostFIN48*US* to be negative and significant ($\beta_6 < 0$).

In addition to my independent variables of interest, I also include several control variables. *CFO* is the cash flows from operations scaled by total revenues. *Q* is Tobin's Q, calculated at the market value of assets scaled by the book value of assets. Following prior literature, I examine *Q* in the prior year. *Size* is the natural log of total assets. Consistent with the prior literature, I expect *CFO* and *Q* to be positively associated with *Invest*. I do not make a formal prediction for *Size*. See Appendix C for detailed variable definitions. I perform this estimation under four different fixed-effect models (none, country, industry, and firm). I cluster standard errors by firm.

[10] The research and experimentation tax credit is a tax credit for qualifying R&D expenditures. Thus, I used R&D expenses to proxy for firms likelihood of having significant R&E tax credits.
[11] If a U.S. firm is cross-listed, it can elect to follow international accounting standards. For the purposes of this study, I treat those observations as control firms.
[12] I perform two procedures to help mitigate concerns of non-linerity between my treatment and control groups. First, I exclude all observations of control firms that are not domiciled in G8 countries. See additional discussion in Section 3. Second, I assess the robustness of my testing to a entropy-balanced sample. See Table 8. Furthermore, while the main specification includes all non-U.S. observations, I make several attempts to adjust the control observations included in my estimation to mitigate concerns of treatment and control firms being substantially different along unobservable dimensions. See discussion and testing in Section 5.

3.2 Hypothesis 2

Hypothesis 2 examines the relation between UTB reserve disclosure and investment for firms that were subject to more versus less IRS scrutiny prior to the onset of FIN 48. To examine this hypothesis, I follow equation 1 and modify the independent variables of interest by splitting *US* into two sub-groups. I estimate the following regression:

$$Invest_{i,t} = \alpha + \beta_1 CFO_{i,t} + \beta_2 Q_{i,t-1} + \beta_3 Size_{i,t} + \beta_4 PostFIN48_{i,t} + \beta_5 LowCIC_{i,t} + \beta_6 HighCIC_{i,t} + \beta_7 PostFIN48*LowCIC_{i,t} + \beta_8 PostFIN48*HighCIC_{i,t} + Fixed\ Effects + \varepsilon_{i,t} \quad (2)$$

Invest, CFO, Q, Size, and *PostFIN48* are defined as the same as equation 1. *LowCIC* is an indicator variable equal to one if the firm-year observation is a U.S. domiciled firm and is not likely to be part of the CIC program and zero otherwise. *HighCIC* is an indicator variable equal to one if the firm-year observation is a U.S. domiciled firm and is likely to be part of the CIC program and zero otherwise. I follow Ayers, Seidman, and Towery (2019) to calculate firm-year observations' CIC score for all firms for the years 2004, 2005, and 2006. I average the scores to create average CIC scores for the pre-FIN 48 years. I then follow Ayers, Seidman, and Towery (2019) and designate U.S. firm-year observations in the top 1,000 of CIC score as *HighCIC* and all other U.S. firm-year observations as *LowCIC*.[13] See Appendix C for detailed variable definitions. I estimate equation 2 using four different fixed-effect models (none, country, industry, and firm), and I cluster standard errors by firm. Following H2, I expect the interaction term for low CIC firms to be significantly more negative than the interaction term for high CIC firms ($\beta_7 < \beta_8$). As a corollary to H1, I also expect the interaction term for low CIC firms to be

[13] I specifically calculate firms CIC scores and assess whether a firm is in the top 1,000 firms based on all firms with available data to calculate CIC score. Ayers, Seidman, and Towery (2019) suggest that between 500 and 1,500 taxpayers participate in the CIC program each year, and thus, the observations with the top 1,000 scores are more likely to be part of the program, relative to other observations.

significantly more negative than 0 ($\beta_7 < 0$). I do not make a formal prediction as to whether the coefficient on the interaction term for high CIC firms will be negative.

3.3 Sample Selection

Table 1 summarizes the sample selection procedure. The initial sample consists of all Compustat and Compustat Global firms that are domiciled in G8 member countries with fiscal year ends between 2004 and 2010. The sample ends in 2010 to ensure symmetrical years surrounding the onset of FIN 48.[14] I restrict my control group to be only other G8 member countries to ensure that the control group and treatment group have similar economic conditions.[15] I exclude observations with assets of less than $1 million. Next, I exclude observations in regulated industries since these firms often have different tax incentives, and may respond differently to having to disclose their UTBs.[16] I also exclude observations in the first year after the onset of FIN 48 (the fiscal year 2007) to provide enough time for firms to internalize the change in accounting. I then exclude observations that do not have enough information to calculate all the variables. Lastly, I remove all observations that do not have data available in every year of the sample. This balanced sample helps strengthen inferences since all firms are equally represented within my difference-in-difference model, and no firms enter or leave the sample during the testing period. After employing these restrictions, I have a total sample size of 48,714. Among these observations, 19,530 are U.S. domiciled firms, whereas 29,184 are non-US domiciled firms.

[Insert Table 1 here]

[14] The inferences for my hypothesized results remain unchanged if I expand my sample to begin in 1992 and extend through 2016.
[15] In additional analysis, my inferences are unchanged when I include all non-U.S. domiciled firms as control firms. See Section 5.
[16] Specifically, I exclude firms that belong to industries designated with Fama-French 48 Industry classifications of 31, 44, 45, 46, and 47.

4. Analysis

4.1 Descriptive Statistics

Table 2 presents the descriptive statistics for the test sample. Panel A, B, and C present the statistics for the full sample, U.S. firms, and non-U.S. firms, respectively. The mean value of *Invest* is 9.483. This statistic suggests that, on average, firms invest at a rate of 9.48% of their total assets each year. This amount varies from 13.39% for the U.S. firms to 6.87% for the non-US firms. I also document that the mean value of *CFO* is 0.071, and thus cash flows from operations represent 7.1% of total revenues. U.S. firms tend to have a higher value of *CFO* (7.5%) relative to non-U.S. firms (6.9%). *Q*, which captures the market to book value, has an average of 1.618 in my sample and ranges from 1.831 for the U.S. firms to 1.469 for non-U.S. firms. These average statistics are in line with prior literature.[17]

[Insert Table 2 here]

4.2 Parallel Trends Assumption and Univariate Evidence

Using a difference-in-difference technique requires the assumption that the treatment and control groups exhibit a parallel trend prior to the exogenous shock (Bertrand, Duflo, and Mullainathan 2004; Leuz and Wysocki, 2016). I document this parallel trend in two ways. First, I plot the mean value of *Invest* by year and whether *US = 1* or *US = 0*. See Figure 1. In the years 2004, 2005, and 2006, the two groups move in unison, thereby generating a visual parallel trend. Statistically, the average values are 99% correlated, which is statistically significant ($p < 0.01$).

[Insert Figure 1 here]

[17] While the U.S. and international firms appear to differ on a number of dimensions, I mitigate concerns that these differences drive my results by first controlling for these variables in my analysis, and second, in additional analysis, by employing an entropy balance estimation.

Second, I follow Christensen, Floyd, Liu, and Maffett (2017) and plot the counter-factual treatment effects over my sample period. I specifically use a 90% two-tailed confidence interval to examine whether the two groups are similar in the pre-period. See Figure 2. In plotting the differences between the treatment and control group based on the baseline year of 2007, I document that the two groups are statistically similar to one another in 2004, 2005, and 2006, as signified by the 90% confidence interval overlapping with zero. Said another way, the treatment and the control groups co-vary with one another during the pre-FIN 48 era, which is statistical evidence consistent with a parallel-trend.

[Insert Figure 2 here]

Consistent across both Figure 1 and Figure 2 is also univariate evidence consistent with my H1. Specifically, in Figure 1, U.S. firms significantly lower *Invest* beginning in 2006 through 2009, whereas non-U.S. firms' average level of *Invest* remains relatively flat throughout the sample period. Furthermore, in Figure 2, following 2007, the point values in the post-FIN 48 years are not within a 90% confidence interval of 0, thereby suggesting that the effect on the treatment group is significantly greater than the control group following the onset of FIN 48.

4.3 Multivariate Evidence

4.3.1 Hypothesis 1

Table 3 presents my estimation of equation 1, examining my first hypothesis on whether UTB reserve disclosure is associated with a decrease in investment. Column (1) presents my primary analysis. Consistent with prior literature, both *CFO* and *Q* are positively associated with *Invest* (Fazzari, Hubbard, and Peterson 1988; Kaplan and Zingales 1997). For my variable of interest *PostFIN48*US*, I document a negative and significant coefficient (β_6 = -1.201, t-stat = -9.58). This coefficient suggests that firms subject to the FIN 48 requirements, relative to those

that were not subject to these requirements, incurred a significant decrease in investment following the onset of FIN 48. Furthermore, the coefficient suggests that investment lowers by 1.2%. Given a mean value of *Invest* of 13.39% for the U.S. observations, my evidence suggests that affected firms lowered investment by 8.97% following the onset of FIN 48, relative to unaffected firms.

Columns (2), (3), and (4) repeat the estimation of equation 1 with the inclusion of country, industry, and firm fixed effects, respectively. Across all the additional specifications, I continue to document a negative and significant interaction term (β_6 = -1.188, t-stat = -7.21 for column (2), β_6 = -1.242, t-stat = -7.45 for column (3), β_6 = -1.325, t-stat = -7.71 for column (4)), and the economic magnitude of the reduction in investment ranges from 8.46% and 9.44%.[18] The findings from the collective evidence from Table 3 appear consistent with my H1 hypothesis.

[Insert Table 3 here]

4.3.2 Hypothesis 2

Table 4 presents my estimation of equation 2, examining my second hypothesis on whether firms less likely to be in the CIC program, and thus less likely to be audited more often by the IRS prior to the onset of FIN 48 have incrementally lower investment following FIN 48, relative to firms are more likely to be in the CIC program. Column (1) presents the primary analysis. The control variables and main effects are consistent with Table 3. The coefficients of interest for H2 pertain to *PostFIN48*LowCIC* and *PostFIN48*HighCIC*. As presented in this table, both coefficients are negatively associated with *Invest* (β_7 = -2.174, t-stat = -7.26; β_8 = -0.958, t-stat = -4.25), thereby suggesting that both firms with a low likelihood of being in the CIC program and high likelihood of being in the CIC program significantly lower investment

[18] Because I include firm fixed effects in Column (4), and firms typically do not switch between being a U.S. and non-U.S. domiciled firm, I do not have a coefficient on U.S. in this specification.

following the onset of FIN 48. However, the difference in magnitude is substantial. Specifically, I estimate that low CIC firms lower investment by 14.47%, whereas high CIC firms only lower investment by 6.31%.[19] The difference between β_7 and β_8 is statistically significant ($p < 0.01$).[20]

Columns (2), (3), and (4) present the estimation of equation 2, including country, industry, and firm fixed effects, respectively.[21] Consistent with column (1), I continue to estimate β_7 and β_8 both being negative and significant ($p < 0.01$), and that β_7 is significantly more negative than β_8 in all columns ($p < 0.01$). Across these columns, the decrease in investment for CIC firms ranges between 6.79% to 8.86%, whereas the decrease in investment for non-CIC firms ranges between 14.69% and 15.27%. These findings from the collective evidence from Table 4 appear consistent with my H2 hypothesis.

[Insert Table 4 here]

4.4 Additional Analysis

4.4.1 The Effect of Changing the Measurement of UTBs on Investment

While the most prominent effect of FIN 48 on investment is the change to the disclosure of the UTBs, it is also possible that the change in measurement of UTBs could also have an effect on corporate investment. Following FIN 48, firms now have to reserve for their UTBs if they are "more likely than not" to be overturned upon IRS audit, and they must do so using a new two-step process. Changes to tax reserves can affect firm decisions because these tax reserves ultimately affect the firm's GAAP effective tax rates. Anecdotal evidence from a survey

[19] I calculate the economic significance by dividing the coefficient from β_7 (-1.202) by the mean of *Invest* (10.679, Table 2), as well as dividing the coefficient from β_8 (-0.542) by the mean of *Invest* (10.679, Table 2).
[20] In untabulated analysis, I re-estimate equation 2 without the control firms. Specifically, I examine a U.S. only sample that compares the *LowCIC* and *HighCIC* firms. I continue to document a statistically significant difference between β_7 and β_8.
[21] *LowCIC* and *HighCIC* are firm-specific variables and do not vary by year. As a result, the main effect on *LowCIC* and *HighCIC* are not measurable when including firm fixed effects, and thus I exclude them from the model in column (4).

by Graham, Hanlon, Shevlin, and Shroff (2014) indicates that executives try to not accrue for tax positions that adversely affect GAAP ETR because GAAP ETR is an important metric used by them and their shareholders.

However, whether changing the measurement of the reserves actually affect investment is not clear for several reasons. First, investment theory suggests that firms should invest in all positive net present value projects and pass on all negative net present value projects (Tobin 1969; Fazzarri, Hubbard, and Peterson 1988; Kaplan and Zingales 2007). Since the reserve itself only affects the timing of the financial accounting benefits and does not affect the net present value of the investment, it is not clear that the reserve would affect the decision to invest or not invest.

Second, for the change in the measurement of the reserve to affect investment in a manner consistent with decreasing investment, it would also have to systematically increase firms' tax reserves. While Robinson, Stomberg, and Towery (2016) use proprietary data to document that, on average, firms only expense 24% of all dollars reserved for under FIN 48, it is not clear whether the 24% rate is an improvement, decline, or not changed from the prior standard. A report provided by Audit Analytics (2008) supports this point that the change in the level of UTB reserves after FIN 48 is ambiguous. Following the onset of FIN 48, Audit Analytics documents that 1,641 firms issued a restatement to update their tax reserves for positions already taken on the prior standard. In this report, only 1,106 of the firms (about 67%) increase their reserves in response to FIN 48. This suggests that at least 1/3 of all firms either did not change their UTBs in response to FIN 48 or even decreased their UTBs. Furthermore, this external report only captures firms that issued a restatement. Since firms are unlikely to restate their financials if there is no material change to their financials and since 1,641 is a small

representation of all firms in Audit Analytics, it is likely that the estimation of 1/3 of firms not changing or decreasing their reserves is an underestimation. If firms did not systematically increase their UTB reserves following the onset of FIN 48, then it is not clear that the change in measurement would decrease investment.

Lastly, even if firms increased their UTB reserves in response to FIN 48, it is not clear that the new standard represents a material departure from the prior standard. For example, the same Audit Analytics report documents that the total change in earnings due to FIN 48 across the 1,641 firms amounts to a total of $3,058,270,443. While, in sum, the total change in earnings is a large number, when dispersed across all the firms, it only represents a $1,863,663 decrease in retained earnings per firm, which is immaterial among virtually all publicly traded firms in my sample.

While these three reasons (investment theory, the ambiguous change to the reserve, and the immaterial change to the size of the reserve) make it unlikely that the change in the measurement of the UTB reserves decreases investment, I perform additional analysis to support this assertion. I specifically obtain data connected with Audit Analytics (2008) report of firms with restatements due to financial statement revisions from FIN 48. Using this dataset, I break out all firms into whether they decreased their earnings in response to FIN 48 and thus increased their UTB reserve, (*IncreaseUTB*) or whether they increased or did not change their earnings in response to FIN 48 and thus decreased their UTB reserve (*DecNoChangeUTB*).[22] I replace *US* with these variables and interact them with *PostFIN48*. I then estimate the following regression:

[22] I treat all U.S.-domiciled firms that did not restate their financials in response to FIN 48 as not changing their reserves. My inferences are not changed if I exclude these observations from this estimation.

$$Invest_{i,t} = \alpha + \beta_1 CFO_{i,t} + \beta_2 Q_{i,t-1} + \beta_3 Size_{i,t} + \beta_4 PostFIN48_{i,t} + \beta_5 IncreaseUTB_{i,t} + \beta_6 DecNoChangeUTB_{i,t} + \beta_7 PostFIN48*IncreaseUTB_{i,t} + \beta_8 PostFIN48*DecNoChangeUTB_{i,t} + Fixed\ Effects + \varepsilon_{i,t} \quad (3)$$

If the measurement change is a significant factor in the relation between the onset of FIN 48 and a decrease in investment, then I would expect that the firms that increased their UTB reserve in response to FIN 48 to have a more significant decrease in investment, relative to those firms that decreased or did not change their UTB reserve ($\beta_8 > \beta_7$).

Table 5 presents my findings when estimating equation 3. Column (1) presents the estimation without any control variables. The coefficients on both variables of interest are negative and significant (β_7 = -1.312, t = -3.90; β_8 = -1.715, t = -6.67) and the difference between the coefficients is not statistically significant.[23] Columns (2), (3), and (4) present similar findings. Given that firms that did not increase their UTB reserves are not decreasing their investments at any different rate than firms that increased their UTB reserves, it appears unlikely that the change in the standard significantly contributes to the primary documented relation, and instead the decrease in investment is likely due to the consequences from the disclosure changes.

4.4.2 Types of Investment

Invest is a function of three types of investment: capital expenditures, research and development, and acquisitions. To assess the relative effects of the different types of investment, I re-estimate equation 1 separately for *Capex*, calculated as capital expenditures scaled by assets, *RD*, calculated as research and development expenditures scaled by assets, and *AQC* calculated as acquisition expenses scaled by total assets. *Capex*, *RD*, and *AQC* are each multiplied by 100 to

[23] While not statistically significant, the coefficient on firms that decreased or did not change the measure of their UTB reserve in response to FIN 48 is larger than those that increased their reserve, thereby further mitigating the concern that my primary findings are a function of measure change than disclosure.

reflect the percentage. See Table 6. Column (1), (2), and (3) present the estimation of equation 1 when the dependent variable of interest is *Capex, RD,* and *AQC*, respectively.[24] The interaction term (*PostFIN48*US*) is the dependent variable of interest. Across all three specifications, I document a negative and significant coefficient (β_6 = -0.507, t-stat = -1.79; β_6 = -0.086, t-stat = -1.88; β_6 = -0.262, t-stat = -8.40, for columns (1), (2), and (3), respectively). Furthermore, using the mean of *Capex* (6.255), *RD* (2.421), and *AQC* (2.129), I estimate the economic significance as an 8.10% decrease in capital expenditures, 3.55% decrease in research and development expenditures, and 12.30% decrease in acquisition expenditures. Thus, while firms disclosing UTBs are associated with lower levels of all three main types of investment, both the economic and statistical significance appears to be strongest among acquisition expenditures.

[Insert Table 6 here]

4.4.3 Investment Efficiency

Evidence that firms decrease investments in response to UTB disclosures is consistent with investment theory, and thus if the investments are becoming less valuable, then firms should pass on them at a greater rate. An alternative explanation is that firms are not abiding by investment theory and just decreasing investments due to irrational behavior. If this were to be occurring, then I would expect investment efficiency also to decrease significantly following the onset of FIN 48 for affected firms.

To test this alternative explanation, I follow and Jayaraman and Wu's (2018) investment efficiency model and modify it as follows:[25]

[24] In Table 6, I present the specification with firm fixed effects. In untabulated analysis, I document that the inferences remain unchanged when I include country or industry fixed effects, or do not include any fixed effects.
[25] In untabulated analysis, I also follow Shroff's (2017) investment model by including additional control variables and the inferences remain unchanged.

$$Invest_{i,t+1} = \alpha + \beta_1 CFO_{i,t} + \beta_2 Q_{i,t} + \beta_3 Size_{i,t} + \beta_4 PostFIN48_{i,t} + \beta_5 PostFIN48*US_{i,t} + \beta_6 CFO*US_{i,t} + \beta_7 CFO*PostFIN48_{i,t} + \beta_8 CFO*PostFIN48*US_{i,t} + \beta_9 Q*US_{i,t} + \beta_{10} Q*PostFIN48_{i,t} + \beta_{11} Q*PostFIN48*US_{i,t} + \varepsilon_{i,t} \quad (4)$$

All variables are defined as the same as equation 1. The primary modifications that are made to equation 1 to arrive at equation 4 are that I now examine *Invest* in year t+1, and I measure all dependent variables in year t. Additionally, I interact *CFO* and *Q* with *PostFIN48* and *US* to capture the 'investment-Q sensitivity' and 'investment-cash flow sensitivity' for before versus after the exogenous shock to UTB disclosures. If I fail to document a significant coefficient on either of these three-way interaction terms, then the evidence suggests that investment efficiency is unchanged. If, however, I document a significantly negative (positive) coefficient for β_8 (β_{11}), then the evidence would suggest that investment-cash flow (investment-Q) sensitivity is decreasing (increasing), thereby suggesting an increase (decrease) in investment efficiency.

I present the estimation of equation 4 in Table 7. Column (1) presents my primary specification. Consistent with my H1, I continue to document a negative and significant coefficient on *PostFIN48*US* (β_5 = -1.201, t-stat = -2.29), suggesting that at the conditional mean of *CFO* and *Q*, firms affected by FIN 48 significantly decrease investment following the onset of the regulation, relative to unaffected firms. However, both *CFO*PostFIN48*US* and *Q*PostFIN48*US* are not significantly associated with *Invest*.[26] As a result, investment efficiency does not appear to change following the onset of FIN 48. Said another way, firms do not decrease investments in positive net present value projects at a different rate after having to disclose UTBs, and thus the evidence is inconsistent with the alternative explanation.

[Insert Table 7 here]

[26] For presentation purposes, I only present the analysis with firm fixed effects. In untabulated analysis, I document that the inferences remain unchanged when I include country or industry fixed effects, or do not include any fixed effects.

4.5 Robustness Tests

4.5.1 Entropy Balanced Sample

In my primary analysis, I control for cash flows, Tobin's Q, firm size, and a variety of fixed effects (country, industry, and year). However, it is possible that I am unable to control for fundamental differences in the firms across my two groups. To the extent that these inherent differences among firms in my treatment and control groups generate non-linearity, it could bias my inferences by generating functional-form misspecification (Hainmuller 2012; Shipman, Swanquist, and Whited 2017).

To mitigate this concern, I entropy balance my sample among the covariates in my model. Specifically, I follow Hainmuller (2012) and balance my treatment and control groups based on the first three moments (mean, variance, and skewness). In Panel A of Table 8, I present the mean, variance, and skewness of my sample following the entropy balancing procedure. All values between the treatment and control groups are virtually identical. In Panel B of Table 8, I re-estimate equation 1 using this new entropy balanced sample. Column (1) presents my primary estimation without any fixed effects.[27] Consistent with the primary analysis, I document that the coefficient on *PostFIN48*US* is negative and significant across all four specifications. As a result, my inferences do not appear to be affected by controlling for non-linearity.

[Insert Table 8 here]

4.5.2 Alternative Samples

I extend my analysis by examining three alternative samples. First, I restrict my sample to only firms that exist and have data available for any years in my sample period of 2004 to 2010

[27] For presentation purposes, I only present the analysis without any fixed effects. In untabulated analysis, I document similar inferences when including country, industry, and firm fixed effects.

(i.e., an unbalanced panel). While this change allows firms to enter and leaving my sample, it also eliminates any potential 'survivorship bias' that could be induced by requiring an unbalanced panel. Second, I open up my sample to all non-U.S. firms rather than just firms domiciled in G8 countries. Third, I examine only U.S. firms. My treatment group remains the same. However, I comprise my control group of U.S. cross-listed firms that elect to comply with international accounting standards (i.e., IFRS). Because IFRS does not have reporting requirements similar to those required under FIN 48, this group of U.S. cross-listed firms forms a plausible control group. Lastly, I include year fixed effects in all specifications. In untabulated analysis, my inferences remain unchanged across each of these alternative settings.

4.5.3 Falsification Test

In my final robustness test, I estimate equation 1 using a pseudo-event date. Specifically, I set my event date equal to the year 2000, where 1997, 1998, and 1999 are my pre-event years, and 2001, 2002, and 2003 are my post-event years. I choose this pseudo-event date so that my primary analysis has no overlap with this alternative test. Should my primary findings primarily be a function of the onset of UTB disclosures and the onset of FIN 48, then I would not expect to find any significant results using this alternative analysis. In untabulated analysis, my evidence is consistent with this conjecture. Furthermore, this test helps mitigate concerns that my primary findings are merely a function of economic trends unrelated to UTB disclosures.

5. Conclusion

Tax deductions and credits are paramount to corporate investments. However, these benefits also involve significant uncertainty in whether they will ultimately be realized. Beginning in 2007, firms must now provide enhanced disclosures of their reserves for these uncertain tax positions. Following the real effects of disclosure hypothesis, I provide robust

evidence that firms disclosing these reserves lower investment. My inferences are stronger for firms that were less likely to be subject to continuous audit by the IRS in the pre-period (i.e., *LowCIC* firm), thereby supporting the notion that the findings are a function of the UTB disclosure changes. I fail to find a difference in investment levels among firms that significantly increased their UTB reserve in response to FIN 48, thereby mitigating concerns that the change in investment is to how UTBs are measured, rather than the disclosure of the reserve. I also provide evidence that the decrease in investment is present for each of the three categories of corporate investment but strongest for acquisition investments. Lastly, I do not document any changes to firms investment-Q or investment-cash flow sensitivities, thereby suggesting that the decrease in investments does not appear to reflect changes in investment efficiency.

My findings extend our understanding of the role of financial statement disclosures on investment via its effect on information asymmetry. While numerous studies examine the relation between investment and disclosure, most focus their attention on whether disclosure to collaborative parties improves investment and do not consider whether the decrease in information asymmetry to adversarial parties affects investment. Using the unique setting of changes to UTB disclosures, a shock that affects information asymmetry to adversarial but not collaborative parties, I am able to provide archival evidence that adversarial disclosures have real effects on investment. Additionally, I extend our understanding of the role of tax disclosures on firms decisions. This contribution is particularly important given the significant debate behind the merits of the UTB reserve disclosures (Lisowsky, Robinson and Schmidt 2013; Robinson and Schmidt 2013; Erickson, Goldman, and Stekelberg 2016; Robinson, Stomberg, and Towery 2016 among others), as well as the potential upcoming changes to the accounting for income taxes (FASB 2019).

APPENDIX A

UTB Disclosure Example – Pre vs Post FIN 48 for SPX Inc. (SPW)

2006 - Pre-FIN 48 Disclosure

Tax Contingencies

We perform reviews of our income tax positions on a continuous basis and accrue for potential contingencies when we believe a liability is probable and can be reasonably estimated. Accruals for these contingencies are recorded in "income taxes payable" and "deferred and other income taxes" in the accompanying consolidated balance sheets based on the expectation as to the timing of when the contingency will be resolved. As events change and resolution occurs, these accruals are adjusted, such as in the case of audit settlements with taxing authorities. Management believes any potential liabilities in excess of amounts not recorded are not material.

During 2006, we reduced our income tax provision by $43.0 and goodwill by $4.7 relating to the closure of certain matters with both domestic and international taxing authorities. In addition, taxes associated with discontinued operations were reduced by $2.9 in 2006.

During 2005, we reduced our income tax provision by $15.1 and goodwill by $41.0 relating to the closure of certain matters with both domestic and international taxing authorities. In addition, taxes associated with discontinued operations were reduced by $1.6 in 2005.

2007 -Post-FIN 48 Disclosure

FIN 48

As disclosed in Note 3, effective January 1, 2007 we adopted the provisions of FIN 48. As a result of such adoption, we recognized a decrease of $52.5 to our liability for unrecognized tax benefits, with a corresponding increase to retained earnings. As of December 31, 2007, we had gross unrecognized tax benefits of $120.1 (net unrecognized tax benefits of $98.1), of which $64.2, if recognized, would impact our effective tax rate from continuing operations.

We classify interest and penalties related to unrecognized tax benefits as a component of our income tax provision. As of January 1, 2007, gross accrued interest, excluded from the amounts above, totaled $78.0 (net accrued interest of $48.2), while the related amount as of December 31, 2007 was $23.0 (net accrued interest of $14.9). There were no penalties recorded as of January 1, 2007 or during the year ended December 31, 2007.

Based on the outcome of certain examinations or as a result of the expiration of statute of limitations for certain jurisdictions, we believe that within the next 12 months it is reasonably possible that our previously unrecognized tax benefits could decrease by approximately $12.0.

The following is a reconciliation of the total amounts of unrecognized tax benefits for the year:

Unrecognized tax benefit — opening balance	$ 204.3
Gross increases — tax positions in prior period	4.1
Gross decreases — tax positions in prior period	—
Gross increases — tax positions in current period	15.0
Settlements	(101.1)
Lapse of statute of limitations	(2.2)
Unrecognized tax benefit — ending balance	$ 120.1

APPENDIX B
Investment Scenarios

Scenario 1

Investment Project	A	B	C	D
Expected Benefits	100	100	100	100
Expected Costs	-95	-105	-115	-125
Expected Tax Benefits	*0*	*0*	*0*	*0*
Net Benefits (Costs)	**5**	**-5**	**-15**	**-25**

Scenario 2

Investment Project	A	B	C	D
Expected Benefits	100	100	100	100
Expected Costs	-95	-105	-115	-125
Expected Tax Benefits	*20*	*20*	*20*	*20*
Net Benefits (Costs)	**25**	**15**	**5**	**-5**

Scenario 3

Investment Project	A	B	C	D
Expected Benefits	100	100	100	100
Expected Costs	-95	-105	-115	-125
Expected Tax Benefits	*20*	*20*	*20*	*20*
Adjustment for UTB Disclosure	*-10*	*-10*	*-10*	*-10*
Net Benefits (Costs)	**15**	**5**	**-5**	**-15**

APPENDIX C
Variable Definitions

Variable Name	Description
Dependent Variables	
Invest	The sum of capital expenditures (CAPX), research and development expenditures (XRD), and acquisition expenditures (AQC), all scaled by total assets (AT) averaged over year t and year t-1. I multiply the value by 100 for presentation purposes.
Capex	Capital expenditures (CAPX) scaled by total assets (AT) averaged over year t and year t-1. I multiply the value by 100 for presentation purposes.
Rd	Research and development expenditures (XRD) scaled by total assets (AT) averaged over year t and year t-1. I multiply the value by 100 for presentation purposes.
AQC	Acquisition expenditures (AQC) scaled by total assets (AT) averaged over year t and year t-1. I multiply the value by 100 for presentation purposes.
Independent Variables	
CFO	Cash-flow from operations (OANCF) scaled by revenue (SALE).
Q	The market-to-book ratio. The market value of assets is calculated as the market value of equity (PRCC_F*CSHO) plus the book value of assets (AT) minus equity (CEQ) all scaled by the book value of assets (AT).
Size	The natural log of total assets (AT).
PostFIN48	An indicator variable equal to 1 if the firm-year observation has a fiscal-year-end after the onset of FIN 48 (2007 or later), and 0 otherwise.
US	An indicator variable equal to 1 if the firm-year observation is domiciled in the U.S., and 0 otherwise.
HighCIC	An indicator variable equal to 1 if the firm-year observation is in the top 1,000 of firms for CIC Prediction Score in the pre-period, and 0 otherwise. The CIC prediction score is based on Ayers, Seidman, and Towery (2019) equation (6) as follows: $CIC\ Prediction\ Score = \beta_1 AssetPoints + \beta_2 GrossReceiptsPoints + \gamma_1 GeoSegPoints + \gamma_2 BusSegPoints + \gamma_3 ForeignSalesPoints + \gamma_4 ForeignTaxPoints + \delta_1 Leverage + \delta_2 R\&D + \delta_3 CapInt + \delta_4 ExcessStockBen + \delta_5 NOL$ I replace $\beta's$, $\gamma's$, and $\delta's$, with the estimated coefficients obtained by Ayers, Seidman, and Towery (2019) Table 3 Panel B. I then calculate each firm-year observation's CIC prediction score for the period before the onset of FIN 48 (2004 - 2006) and average the values. If I firm-year observation has a score in the top 1,000, then I consider it a high score.

LowCIC	An indicator variable equal to 1 if the firm-year observation is outside of the top 1,000 of firms for CIC Prediction Score in the pre-period, and 0 otherwise. The CIC prediction score is based on Ayers, Seidman, and Towery (2019) equation (6) as follows: $CIC\ Prediction\ Score = \beta_1 AssetPoints + \beta_2 GrossReceiptsPoints + \gamma_1 GeoSegPoints + \gamma_2 BusSegPoints + \gamma_3 ForeignSalesPoints + \gamma_4 ForeignTaxPoints + \delta_1 Leverage + \delta_2 R\&D + \delta_3 CapInt + \delta_4 ExcessStockBen + \delta_5 NOL$ I replace $\beta's$, $\gamma's$, and $\delta's$, with the estimated coefficients obtained by Ayers, Seidman, and Towery (2019) Table 3 Panel B. I then calculate each firm-year observation's CIC prediction score for the period before the onset of FIN 48 (2004 - 2006) and average the values. If I firm-year observation has a score outside of the top 1,000, then I consider it a low score.
IncreaseUTB	An indicator variable equal to 1 if the firm-year observation has a revised UTB balance from adopting FIN 48 that increases the reserve, and thus decreases retained earnings, and 0 otherwise. I obtain the data for determining whether the firm increased its UTB balance from Audit Analytics revisions database. This specific dataset was directly provided by Alicia Ritter at Audit Analytics and is based on the FIN 48 briefing document published by Audit Analytics. See https://www.auditanalytics.com/doc/briefing-fin-48.pdf for additional details.
DecNoChangeUTB	An indicator variable equal to 1 if the firm-year observation has a revised UTB balance from adopting FIN 48 that decreases or does not change the reserve, and thus does not change or increases retained earnings, or does not revise its financials for the adoption of FIN 48, and 0 otherwise. I obtain the data for determining whether the firm increased its UTB balance from Audit Analytics revisions database. This specific dataset was directly provided by Alicia Ritter at Audit Analytics and is based on the FIN 48 briefing document published by Audit Analytics. See https://www.auditanalytics.com/doc/briefing-fin-48.pdf for additional details.

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FIGURE 1

***Invest* by year, *US* = 1 vs *US* = 0**

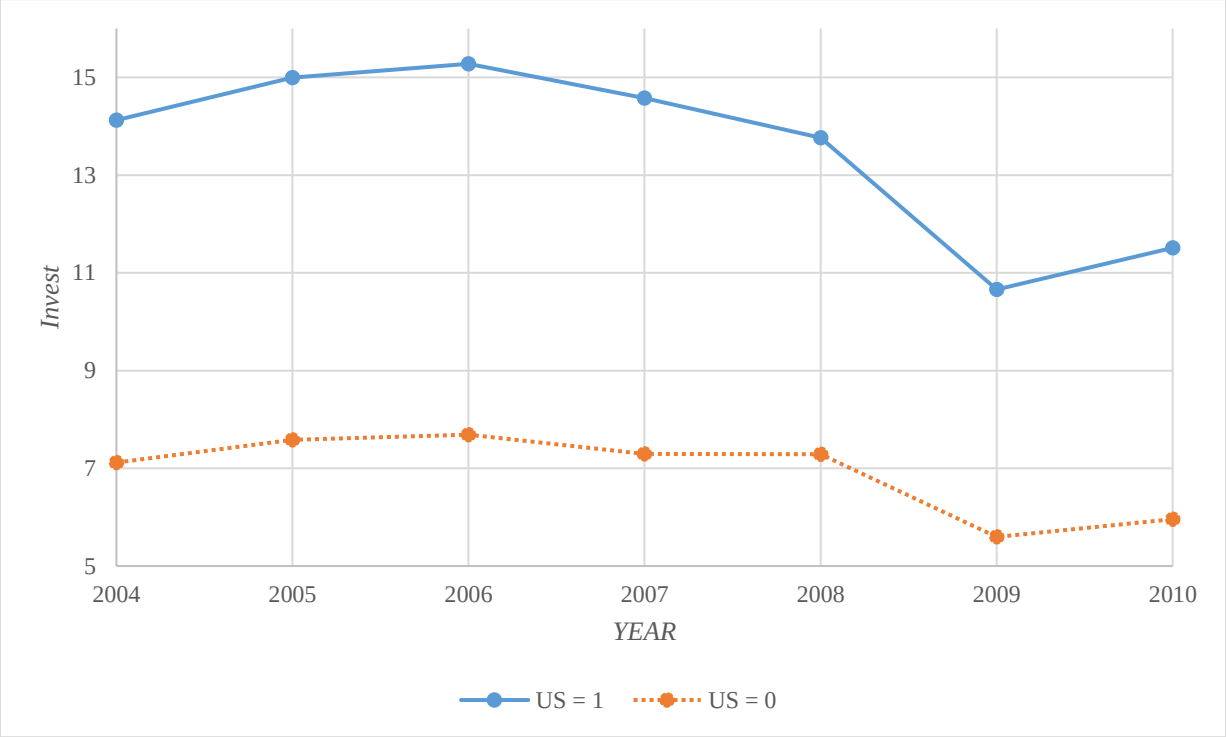

FIGURE 2

***Invest* by year, *US* = 1 vs *US* = 0 with 90% Confidence Interval**

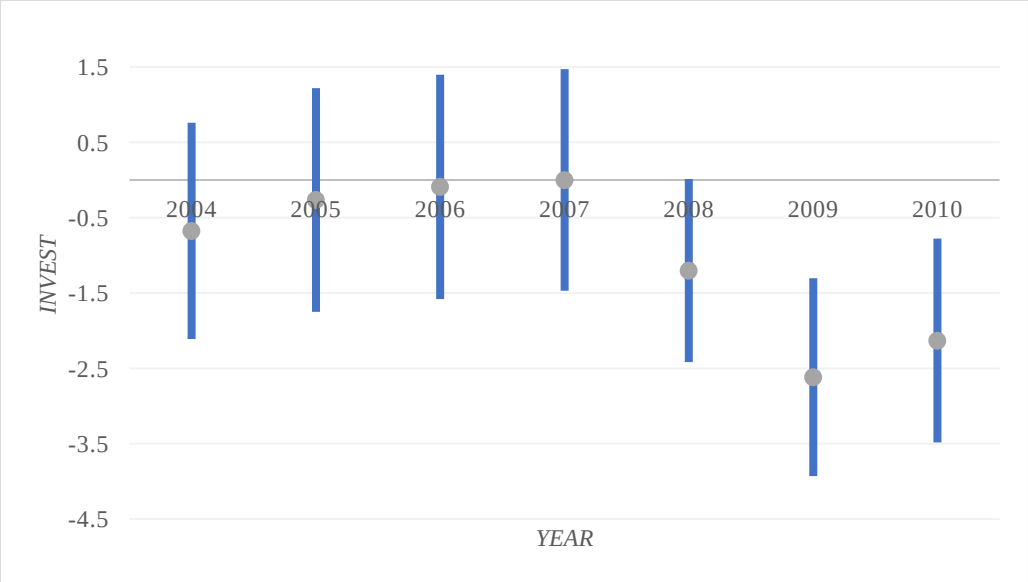

TABLE 1
Sample Selection

Criteria:	
2004 - 2010 Compustat and Compust Global firm-year observations domiciled in G8 Countries	133,875
Less: Observations with less than $1,000,000 in assets	-4,245
Less: Observations in regulated industries	-24,066
Less: Observations in fiscal-year 2007	-15,265
Less: Observations without enough data to compute testing variables	-29,818
Less: Observations without data in every year of the sample	-11,767
Total Sample Size	**48,714**

Notes: Table 1 presents my sample selection procedure.

TABLE 2
Descriptive Statistics

Panel A: Full Sample

Variable	N	Mean	Std Dev	25th Pctl	50th Pctl	75th Pctl
Invest	48,714	9.483	11.991	2.451	5.633	11.531
Q	48,714	1.618	1.034	1.108	1.529	1.963
CFO	48,714	0.071	0.194	0.021	0.069	0.134
Size	48,714	7.457	2.876	5.337	7.419	9.706
PostFIN48	48,714	0.500	0.500	0.000	0.500	1.000
US	48,714	0.401	0.490	0.000	0.000	1.000

Panel B: U.S. Firms

Variable	N	Mean	Std Dev	25th Pctl	50th Pctl	75th Pctl
Invest	19,530	13.385	14.895	3.889	8.411	16.803
Q	19,530	1.831	1.254	1.055	1.647	2.150
CFO	19,530	0.075	0.248	0.025	0.086	0.168
Size	19,530	7.120	2.285	4.472	7.156	7.695
PostFIN48	19,530	0.500	0.500	0.000	0.500	1.000
US	19,530	1.000	0.000	1.000	1.000	1.000

Panel C: Non U.S. Firms

Variable	N	Mean	Std Dev	25th Pctl	50th Pctl	75th Pctl
Invest	29,184	6.872	8.633	1.834	4.441	8.571
Q	29,184	1.469	0.307	0.908	1.365	1.703
CFO	29,184	0.069	0.148	0.020	0.061	0.116
Size	29,184	7.352	2.884	6.483	7.672	10.523
PostFIN48	29,184	0.500	0.500	0.000	0.500	1.000
US	29,184	0.000	0.000	0.000	0.000	0.000

Notes: Table 2 presents the descriptive statistics for the primary testing sample compiled using the criteria outlined in Table 1. *Invest* is the total amount of capital expenditures, R&D expenditures, and acquisition expenditures scaled by total assets. *Invest* is multiplied by 100. *Q* is the market-to-book value tabulated in year t-1. *CFO* is the cash-flow from operations scaled by revenues. *Size* is the natural log of total assets. *PostFIN48* is an indicator variable equal to 1 if the firm-year observation has a fiscal-year after FIN 48, and 0 otherwise. *US* is an indicator variable equal to 1 if the firm-year observation is domiciled in the U.S., and 0 otherwise. All continuous variables are winsorized at the 1 and 99%.

TABLE 3
H1 Analysis: UTB Disclosure and Investment

Dependent Variable = *Invest*	(1) Coef. (t-stat)	(2) Coef. (t-stat)	(3) Coef. (t-stat)	(4) Coef. (t-stat)
Intercept	7.519***	6.223***	5.041***	-8.073***
	(25.64)	(7.97)	(6.63)	(-4.82)
CFO	1.456***	0.767	0.992**	1.059**
	(4.86)	(1.47)	(2.01)	(1.99)
Q	2.763***	2.830***	2.710***	2.609***
	(37.79)	(20.23)	(19.93)	(15.88)
Size	-0.209***	0.232***	-0.165***	2.122***
	(-6.59)	(4.33)	(-5.19)	(9.54)
PostFIN48	**-1.156*** **	**-1.238*** **	**-1.181*** **	**-1.610*** **
	(-11.04)	**(-12.43)**	**(-11.73)**	**(-15.98)**
US	**3.353*** **	**1.731** **	**2.590*** **	
	(14.70)	**(2.28)**	**(9.47)**	
PostFIN48*US	**-1.201*** **	**-1.188*** **	**-1.242*** **	**-1.325*** **
	(-9.58)	**(-7.21)**	**(-7.45)**	**(-7.71)**
N	48,714	48,714	48,714	48,714
Adjusted R-Square	0.129	0.139	0.186	0.450
Fixed Effects	None	Country	Industry	Firm

Notes: Table 3 presents my estimation of equation 1. Column (1), (2), (3), and (4) present the estimation with no, country, industry (Fama-French 48 classifications), and firm fixed effects, respectively. The independent variable of interest is *Invest*, calculated as the total amount of capital expenditures, R&D expenditures, and acquisition expenditures scaled by average total assets. I multiply *Invest* by 100. *CFO* is the cash flow from operations scaled by revenues. *Q* is the market-to-book value tabulated in year t-1. *Size* is the natural log of total assets. *PostFIN48* is an indicator variable equal to 1 if the firm-year observation has a fiscal-year after FIN 48, and 0 otherwise. *US* is an indicator variable equal to 1 if the firm-year observation is domiciled in the U.S., and 0 otherwise. All continuous variables are winsorized at the 1 and 99%. Each regression clusters standard errors by firm. ***, **, and * signifies statistical significance at the 1%, 5%, and 10% level, respectively.

TABLE 4
H2 Analysis: UTB Disclosure and Investment - CIC Cross Section

Dependent Variable = *Invest*	(1) Coef. (t-stat)	(2) Coef. (t-stat)	(3) Coef. (t-stat)	(4) Coef. (t-stat)
Intercept	9.555***	18.487***	6.620***	-4.886***
	(25.99)	(16.60)	(8.61)	(-2.75)
CFO	1.625***	2.682***	1.142**	1.791***
	(3.17)	(5.70)	(2.36)	(3.49)
Q	3.054***	2.763***	2.975***	2.599***
	(21.47)	(20.62)	(21.67)	(15.98)
Size	-0.407***	0.171***	-0.335***	2.046***
	(-11.01)	(2.86)	(-9.66)	(9.22)
PostFIN48	**-1.120*** **	**-1.218*** **	**-1.137*** **	**-1.567*** **
	(-10.90)	**(-11.89)**	**(-10.96)**	**(-15.21)**
LowCIC	**0.015**	**-11.341*** **	**-0.349**	
	(0.04)	**(-10.33)**	**(-0.87)**	
HighCIC	**2.014*** **	**-9.848*** **	**1.396*** **	
	(6.25)	**(-9.37)**	**(4.51)**	
PostFIN48*LowCIC	**-2.174*** **	**-2.294*** **	**-2.206*** **	**-2.289*** **
	(-7.26)	**(-7.63)**	**(-7.34)**	**(-7.43)**
PostFIN48*HighCIC	**-0.958*** **	**-1.062*** **	**-1.031*** **	**-1.344*** **
	(-4.25)	**(-4.65)**	**(-4.53)**	**(-5.65)**
Test: PostFIN48*LowCIC - PostFIN48*HighCIC = 0	**-1.216*** **	**-1.232*** **	**-1.175*** **	**-0.945*** **
N	48,714	48,714	48,714	48,714
Adjusted R-Square	0.131	0.163	0.190	0.452
Fixed Effects	None	Country	Industry	Firm

Notes: Table 4 presents my estimation of equation 2. Column (1), (2), (3), and (4) present the estimation with no, country, industry (Fama-French 48 classifications), and firm fixed effects, respectively. The independent variable of interest is *Invest*, calculated as the total amount of capital expenditures, R&D expenditures, and acquisition expenditures scaled by average total assets. I multiply *Invest* by 100. *CFO* is the cash flow from operations scaled by revenues. *Q* is the market-to-book value tabulated in year t-1. *Size* is the natural log of total assets. *PostFIN48* is an indicator variable equal to 1 if the firm-year observation has a fiscal-year after FIN 48, and 0 otherwise. *LowCIC* (*HighCIC*) is an indicator variable equal to 1 if the firm has a low (high) likelihood of being part of the CIC program in the pre-period, and 0 otherwise. An F-test is used to compute the difference between the coefficient on *PostFIN48*LowCIC* and *PostFIN48*HighCIC*. All continuous variables are winsorized at the 1 and 99%. Each regression clusters standard errors by firm. ***, **, and * signifies statistical significance at the 1%, 5%, and 10% level, respectively.

TABLE 5
Additional Analysis: UTB Disclosure and Investment - Changes to the UTB Reserve in Response due to FIN 48

Dependent Variable = *Invest*	(1) Coef. (t-stat)	(2) Coef. (t-stat)	(3) Coef. (t-stat)	(4) Coef. (t-stat)
Intercept	7.290***	6.898***	4.890***	-8.055***
	(22.30)	(8.62)	(6.40)	(-4.80)
CFO	1.505***	0.815	1.046**	1.074**
	(2.87)	(1.55)	(2.10)	(2.01)
Q	2.772***	2.832***	2.714***	2.611***
	(19.86)	(20.22)	(19.93)	(15.86)
Size	-0.182***	0.294***	-0.146***	2.121***
	(-5.51)	(5.51)	(-4.60)	(9.52)
PostFIN48	**-1.162*** **	**-1.251*** **	**-1.190*** **	**-1.610*** **
	(-11.66)	**(-12.55)**	**(-11.81)**	**(-15.97)**
IncreaseUTB	**4.163*** **	**1.685** **	**3.239*** **	
	(13.17)	**(2.17)**	**(10.60)**	
DecNoChangeUTB	**1.287*** **	**-1.612* **	**1.045*** **	
	(3.23)	**(-1.86)**	**(2.72)**	
PostFIN48*IncreaseUTB	**-1.212*** **	**-1.202*** **	**-1.266*** **	**-1.302*** **
	(-3.90)	**(-3.88)**	**(-4.07)**	**(-4.13)**
PostFIN48*DecNoChangeUTB	**-1.515*** **	**-1.505*** **	**-1.548*** **	**-1.653*** **
	(-6.65)	**(-6.59)**	**(-6.77)**	**(-7.07)**
Test: PostFIN48*IncreaseUTB - PostFIN48*DecNoChangeUTB = 0	**0.303**	**0.303**	**0.282**	**0.351**
N	48,714	48,714	48,714	48,714
Adjusted R-Square	0.131	0.163	0.190	0.452
Fixed Effects	None	Country	Industry	Firm

Notes: Table 5 presents my estimation of equation 3. Column (1), (2), (3), and (4) present the estimation with no, country, industry (Fama-French 48 classifications), and firm fixed effects, respectively. The independent variable of interest is *Invest*, calculated as the total amount of capital expenditures, R&D expenditures, and acquisition expenditures scaled by average total assets. I multiply *Invest* by 100. *CFO* is the cash flow from operations scaled by revenues. *Q* is the market-to-book value tabulated in year t-1. *Size* is the natural log of total assets. *PostFIN48* is an indicator variable equal to 1 if the firm-year observation has a fiscal-year after FIN 48, and 0 otherwise. *IncreaseUTB* (*DecNoChangeUTB*) is an indicator variable equal to 1 if the firm has an increase (no change or decrease) in UTB reserve following the standard changes for the UTB reserve under FIN 48, and 0 otherwise. An F-test is used to compute the difference between the coefficient on *PostFIN48*IncreaseUTB* and *PostFIN48*DecNoChangeUTB*. All continuous variables are winsorized at the 1 and 99%. Each regression clusters standard errors by firm. ***, **, and * signifies statistical significance at the 1%, 5%, and 10% level, respectively.

TABLE 6
Additional Analysis: UTB Disclosure and Investment by Type

Dependent Variable =	(1) *Capex* Coef. (t-stat)	(2) *RD* Coef. (t-stat)	(3) *AQC* Coef. (t-stat)
Intercept	0.689	2.610***	-5.238***
	(0.80)	(10.82)	(-13.73)
CFO	0.976***	-0.465	0.154
	(3.65)	(-0.75)	(1.23)
Q	1.028***	0.171	0.618***
	(13.34)	(1.34)	(6.32)
Size	0.546***	-0.198***	0.776***
	(4.72)	(-5.73)	(16.19)
PostFIN48	-1.223***	0.112	-0.406***
	(-18.25)	(0.71)	(-11.84)
PostFIN48*US	**-0.280****	**-0.075***	**-0.174*****
	(-2.49)	**(-1.79)**	**(-6.63)**
N	48,714	48,714	48,714
Adjusted R-Square	0.587	0.723	0.198
Fixed Effects	Firm	Firm	Firm

Notes: Table 6 presents the estimation of equation 1 for different types of investment. Column (1), (2), and (3) present the estimation when *Capex* (capital expenditures divided by average total assets), *RD* (R&D expenses divided by average total assets), and *AQC* (acquisition expenses divided by average total assets) are the dependent variables of interest, respectively. Each variable is multiplied by 100. *CFO* is the cash flow from operations scaled by revenues. *Q* is the market-to-book value tabulated in year t-1. *Size* is the natural log of total assets. *PostFIN48* is an indicator variable equal to 1 if the firm-year observation has a fiscal-year after FIN 48, and 0 otherwise. US is an indicator variable equal to 1 if the firm-year observation is domiciled in the U.S., and 0 otherwise. All continuous variables are winsorized at the 1 and 99%. Each regression clusters standard errors by firm. ***, **, and * signifies statistical significance at the 1%, 5%, and 10% level, respectively.

TABLE 7
Additional Analysis: UTB Disclosure and Investment Efficiency

Dependent Variable = *Invest*	(4) Coef. (t-stat)
Intercept	-8.181***
	(-4.21)
CFO	4.127***
	(3.88)
Q	-1.346
	(-1.61)
Size	2.280***
	(9.03)
PostFIN48	-2.045***
	(-5.97)
*PostFIN48*US*	-1.201**
	(-2.29)
*CFO*PostFIN48*	-1.280
	(-0.85)
*CFO*US*	-4.122***
	(-3.13)
CFO*PostFIN48*US	**-2.310**
	(-1.31)
*Q*PostFIN48*	4.120***
	(4.79)
*Q*US*	1.212**
	(2.23)
Q*PostFIN48*US	**-0.760**
	(-1.35)
N	48,714
Adjusted R-Square	0.454
Fixed Effects	Firm

Notes: Table 7 presents the estimation of equation 4. *Invest* is the dependent variable of interest and is calculated as capital expenditures, R&D expenses, and acquisition expenses, all scaled by average total assets. I multiply *Invest* by 100. *CFO* is the cash flow from operations scaled by revenues. *Q* is the market-to-book value tabulated in year t-1. *Size* is the natural log of total assets. *PostFIN48* is an indicator variable equal to 1 if the firm-year observation has a fiscal-year after FIN 48, and 0 otherwise. *US* is an indicator variable equal to 1 if the firm-year observation is domiciled in the U.S., and 0 otherwise. All continuous variables are winsorized at the 1 and 99%. Each regression clusters standard errors by firm. ***, **, and * signifies statistical significance at the 1%, 5%, and 10% level, respectively.

TABLE 8

Panel A
Additional Analysis: Entropy Balance Procedure

	US = 1			*US = 0*		
	Mean	Variance	Skewness	Mean	Variance	Skewness
CFO	0.074	0.062	-2.221	0.074	0.062	-2.221
Q	1.831	1.573	1.929	1.831	1.573	1.929
Size	7.120	5.222	0.066	7.120	5.222	0.066

Panel B
Additional Analysis: UTB Disclosure and Investment - Entropy Balance

Dependent Variable = *Invest*	(1) Coef. (t-stat)	(1) Coef. (t-stat)	(1) Coef. (t-stat)	(1) Coef. (t-stat)
Intercept	4.766***	4.894**	3.535*	-22.405**
	(3.05)	(2.42)	(1.67)	(-2.25)
CFO	-4.461	-4.622	-5.316	-3.565
	(-0.86)	(-0.96)	(-1.03)	(-0.90)
Q	1.787***	2.040***	1.859***	2.479***
	(4.19)	(3.78)	(4.28)	(8.11)
Size	-0.198	0.005	0.021	4.704***
	(-1.05)	(0.02)	(0.10)	(2.89)
PostFIN48	**0.406**	**0.873**	**0.689**	**1.323**
	(0.30)	**(0.64)**	**(0.44)**	**(1.08)**
US	**8.406*** **	**6.305*** **	**7.002*** **	
	(12.23)	**(4.34)**	**(6.79)**	
PostFIN48*US	**-3.437*** **	**-3.860*** **	**-3.764** **	**-5.235*** **
	(-2.71)	**(-2.94)**	**(-2.47)**	**(-3.60)**
N	48,714	48,714	48,714	48,714
Adjusted R-Square	0.100	0.130	0.169	0.549

Notes: Table 8 presents the entropy balance robustness analysis. Panel A presents the results of the entropy balancing procedure. Panel B presents the estimation of equation 1 using the entropy balanced sample. *Invest* is the dependent variable of interest and is calculated as capital expenditures, R&D expenses, and acquisition expenses, all scaled by average total assets. I multiply *Invest* by 100. *CFO* is the cash flow from operations scaled by revenues. *Q* is the market-to-book value tabulated in year t-1. *Size* is the natural log of total assets. *PostFIN48* is an indicator variable equal to 1 if the firm-year observation has a fiscal-year after FIN 48, and 0 otherwise. *US* is an indicator variable equal to 1 if the firm-year observation is domiciled in the U.S., and 0 otherwise. All continuous variables are winsorized at the 1 and 99%. Each regression clusters standard errors by firm. ***, **, and * signifies statistical significance at the 1%, 5%, and 10% level, respectively.