THE EFFECT OF TAX AGGRESSIVENESS ON INVESTMENT EFFICIENCY

by

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To my mother, Jody, for always being so positive and willingness to selflessly serve others

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ABSTRACT

Tax aggressiveness generates significant cash savings and information asymmetry. Combining these two consequences of tax aggressiveness, I suggest that tax aggressiveness is associated with higher agency costs of free cash flows that affect investment decisions. Using the conditional investment efficiency model, I find evidence that tax aggressiveness is associated with more investments in firms with high access to investable funds, thus suggesting tax aggressiveness is associated with overinvestment. I also provide evidence that stronger tax monitoring and a change in tax disclosures mitigate the relation between tax aggressiveness and overinvestment. Lastly, I find that the overinvestment is associated with lower future abnormal returns. Thus, my results suggest that poor managerial investment decision making is an unintended consequence to tax aggressiveness. Additionally, I further the need for shareholders and board of directors to exert influence to avoid compensating managers for aggressive tax strategies.

I. INTRODUCTION

Investment choices are important firm decisions that have implications for firm growth and value (Tobin, 1969; Tobin and Brainard, 1977). A necessary condition for materializing these decisions is securing funds to pay for the investments. Among the many internal avenues used to generate cash flows, aggressive tax planning strategies, or tax aggressiveness,[1] is an interesting opportunity because these actions are discretionary and generate substantial operating cash flows (Mills, Erickson, and Maydew, 1998). For example, relative to the statutory tax rate, in my sample a tax aggressive firm saves an average of $98 million in cash taxes paid. In perspective, this large amount of savings dwarfs the funds that could be saved from other discretionary decisions such as eliminating R&D expenses ($56 million) or advertising expenses ($51 million). Since the average firm in my sample invests $206 million per year, aggressive tax activities appear to be an economically meaningful activity with the potential to significantly affect cash flows and consequently investment decisions.

Based on the importance of tax aggressiveness, I explore how it affects investment decisions. Tax aggressiveness reduces cash taxes paid relative to a non-tax aggressive firm, thereby increasing cash flows available for investment (Mills et al., 1998). Shareholders often incentivize tax aggressiveness since it represents a shift in cash flows from the government to the firm (Rego and Wilson, 2012). While tax savings may be beneficial for some firms, the increase in cash increases the agency problem of free

[1] I define tax aggressiveness as activities that are uncertain and have a high likelihood of drawing IRS scrutiny. This definition is consistent with those used in prior and concurrent research (Hanlon and Slemrod, 2009; Wilson, 2009; Hanlon and Heitzman, 2010; Lisowsky, 2010; Rego and Wilson, 2012; Chyz, Leung, Li, and Rui, 2013; Lisowsky, Robinson, and Schmidt, 2013; Donohoe and Knechel, 2014, among many others). In my primary analysis, I measure tax aggressiveness as the difference between firm's actual cash effective tax rate and a benchmark for its expected cash effective tax rate, consistent with Balakrishnan et al. (2012) and Armstrong et al. (2015), and the discretionary permanent book-tax differences (Frank et al., 2009). My inferences are robust to a variety of other commonly used measures.

cash flows (Jensen, 1986). Thus, tax aggressive firms have more cash flows, relative to non-tax aggressive firms, without necessarily having better investment opportunity sets. As a result, a tax aggressive firm has a greater risk of utilizing cash flows to increase manager utility rather than shareholder value. Furthermore, this agency problem may be moderated by an indirect effect of tax aggressiveness, external information opacity (Balakrishnan, Blouin, and Guay, 2012; Hope, Ma, and Thomas, 2013). For example, tax aggressive firms in my sample, relative to non-tax aggressive firms, have significantly higher analyst forecast errors and analyst forecast dispersions.[2] As a result, if firms choose aggressive tax strategies that generate greater cash flows and external information asymmetry, then tax aggressiveness may adversely affect investment decisions (Biddle and Hilary, 2006; Biddle, Hilary, and Verdi, 2009; Cheng, Dhaliwal, and Zhang, 2013). Accordingly, I question whether weaker investment decisions are an unintended consequence of tax aggressiveness.

I examine my research question using the conditional investment efficiency model. This model conditions on firms' access to investable funds to examine whether a particular factor is associated with firms investment decisions, specifically overinvestment and underinvestment (Biddle et al., 2009; Cheng et al., 2013; Balakrishnan, Core, and Verdi 2014). I proxy for tax aggressiveness using two measures: the difference between expected and actual cash effective tax rates (Armstrong, Blouin, Jagolinzer, and Larcker, 2015), and discretionary permanent book-tax differences, or DTAX (Frank, Lynch, and Rego, 2009). Conditional on high access to investable funds, I

[2] This untabulated analysis is performed by splitting firms into high, medium and low tax aggressiveness groups. Using a t-test to compare the mean analyst forecast error and dispersion for the high and low groups, I find that analyst forecast error is 15.12% ($p < 0.10$) higher and analyst forecast dispersion is 17.42% ($p < 0.05$) higher for tax aggressive firms relative to tax conservative firms. This analysis complements Balakrishnan et al. (2012) and Hope et al. (2013), by confirming that tax aggressiveness is associated with higher external information asymmetry in my sample population.

predict that tax aggressive firms' higher cash flows (Mills et al., 1998) and greater information opacity (Balakrishnan et al., 2012; Hope et al., 2013) are associated with more investment, which the literature interprets as overinvestment. In addition, conditional on firms' lack of access to investable funds, tax aggressive firms may use the cash flows from tax savings to address financial constraint (Edwards, Schwab, and Shevlin, 2015), thereby having more subsequent year investments. Conversely, these firms may also have lower investments due to precautionary savings (Hanlon, Maydew, and Saavedra, 2014) and more expensive external capital (Hasan, Hoi, Wu, and Zhang, 2014; Hutchens and Rego, 2015), which extant literature interprets as underinvestment.

Naturally, a weaker information environment moderating the effect of cash flows on investments is just one possible mechanism to explain the relation between tax aggressiveness and investment efficiency. Furthermore, the relation may be endogenous since firms could structure investments to lower cash taxes paid or increase permanent book-tax differences. Hence, I conduct other analysis to delineate the effect of tax aggressiveness on investment efficiency. First, I examine cross-sectional variation in firms that have strong tax monitoring using firms that engage their external auditor for tax services. If a firm engages its auditor for tax services, thus prompting board of director approval of those specific tax positions, then the firm has stronger monitoring of its tax activities. Thus, I posit that firms with auditor-provided tax services (APTS) exhibit a weaker relation between tax aggressiveness and investment efficiency, relative to a firm without APTS. Additionally, I use a quasi-natural experiment surrounding the onset of FIN 48, a FASB pronouncement which requires firms to disclose significantly more information about their aggressive tax positions. Given the exogenous shock to the

quality and quantity of tax information disclosed, I expect the effects of tax aggressiveness on investment efficiency are significantly reduced in the post-FIN 48 period, relative to the pre-FIN 48 period. Finally, I study the link between tax aggressiveness, investment efficiency, and lower firm value by examining whether tax aggressiveness is associated with lower buy-and-hold abnormal returns (BHAR) for firms with high and low access to investable funds.

I find evidence that conditional on access to investable funds, tax aggressiveness is associated with investment inefficiency. Specifically, I find results consistent with my expectations for firms with more investable funds, tax aggressiveness is associated with more investment. Following the prior literature that uses and develops the conditional investment model, the positive coefficient suggests that these firms overinvest (Biddle et al., 2009; Cheng et al., 2013). In addition, I do not find consistent evidence that tax aggressive firms with low access to investable funds have different subsequent year investments. This evidence suggests that tax aggressiveness may not be associated with underinvestment. Furthermore, I yield results that the relation between tax aggressiveness and overinvestment is significantly mitigated for firms with APTS as well as for firms in the post-FIN 48 period. These findings are important to address concerns surrounding correlated omitted variables and an endogenous relation, as well as to provide a foundation for tax aggressiveness causing overinvestment. Next, I examine subsequent-year BHAR and find tax aggressive firms with strong access to investable funds have lower future shareholder returns. This evidence suggests that for firms with access to investable funds, the value diminishing investment activities resulting from tax aggressiveness outweigh the cash flow benefits. Lastly, in additional analyses I provide

evidence that other forms of discretionary savings (i.e. cutting R&D or advertising expenses) are not associated with inefficient investment, as well as differential managerial ability or overconfidence. I also provide evidence that the findings are robust to alternative tax aggressiveness measures and other investment efficiency models.

This study makes several contributions to the literature. First, I document a non-tax consequence of tax aggressiveness. Hanlon and Slemrod (2009) and Graham, Hanlon, Shevlin, and Shroff (2014) identify adverse capital market consequences for firms engaging in tax aggressiveness. However, these studies focus on the market reaction to the perception of tax aggressiveness, rather than the outcomes associated with tax aggressiveness. I extend the tax aggressiveness literature by examining how tax behavior affects other corporate decisions, such as investment efficiency. Because overinvestment may negatively affect profitability, I offer a potential explanation for the adverse market reaction to tax aggressiveness.

Also, I extend the literature examining the agency costs of tax aggressiveness. Extant finance, law, and accounting literature claim that tax planning strategies generate significant agency costs (Desai and Dharmapala, 2006; Desai, Dyck, and Zingales, 2007; Desai and Dharmapala, 2009). However, concerns related to empirical specification (Armstrong et al., 2015), and generalizability (Blaylock, 2015) limit the usefulness of their evidence. In a departure from the literature, I examine the effect of *tax aggressiveness* on managerial decision making. Since tax aggressiveness is associated with greater cash flows and more information opacity, I posit and find evidence that tax aggressiveness is associated with investment decisions. Because these investment decisions may be interpreted as inefficient, and thus a significant non-tax cost of tax

aggressiveness that likely hurts firm value (Tobin, 1969; Tobin and Brainard, 1977), I provide evidence that tax aggressiveness generates significant agency costs that may affect the degree to which firms engage in tax sheltering activities.

My results should also be of interest to investors and board of directors. Prior research suggests that pre-tax versus after-tax earnings metrics may influence CEO tax risk preferences (Crocker and Slemrod 2005; Gaertner 2014; Powers, Robinson, and Stomberg 2015; Brown, Drake, and Martin, 2015). Given my evidence that tax aggressiveness is associated with inefficient investment activities, investors and board of directors may want to design executive pay structures to limit tax aggressiveness. Additionally, my empirical evidence complements Crocker and Slemrod's (2005) theoretical model of the agency costs of tax aggressiveness. Specifically, their results suggest that stricter executive contracts can act as a mechanism to limit the value-decreasing behavior. I extend their analysis by providing some empirical evidence consistent with their propositions because my results suggest that tax aggressiveness is associated with value-decreasing decisions. As a result, I further their call for investor and board action to limit aggressive tax activities.

The remainder of this paper is organized as follows. Section II provides a literature review and hypothesis development. Section III discusses the data and research design. Section IV presents the results. Section V provides a summary of additional analysis performed. Section VI concludes.

II. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Literature Review

Tax Aggressiveness Overview

Hanlon and Heitzman (2010) suggest that tax strategies exist on a continuum with lower explicit tax savings, and perfectly legal positions are at one end, and higher explicit tax savings and questionable legal positions are at the other end. They further state that "a tax planning activity or a tax strategy could be anywhere along the continuum depending on how aggressive the activity is in reducing taxes" (pg. 137). Examples of tax aggressiveness include sheltering activities (Weisbach, 2002; Wilson, 2009; Dyreng and Lindsey, 2009; Lisowsky, 2010; Lisowsky et al., 2013), positions with uncertain IRS audit outcomes (Rego and Wilson, 2012), and complex financial reporting (Frank et al., 2009; Mills, Robinson, and Sansing, 2010; Donohoe and Knechel, 2014).

Tax aggressiveness may take many forms. For example, a *New York Times* article documents Apple Inc.'s "Double Irish" tax strategy. It states:

> "This strategy ["The Double Irish"] … involves setting up a shell subsidiary in an offshore tax haven — a.k.a. Ireland — and transferring most of Apple's intellectual property rights to the dummy subsidiary. The subsidiary, in turn, charges "royalties" that allows it to capture billions of dollars in what otherwise would be taxable profits in the United States. In Ireland, according to Apple, it pays an astonishing 2 percent in taxes, thanks to a deal it has with the government." (Nocera, 2013)

This tax strategy reflects a complex set of actions designed to reduce Apple's tax liabilities. What makes these actions unique from other non-aggressive tax planning activities (i.e. investment in municipal bonds or deductions for accelerated depreciation) is that "The Double Irish" attracted regulatory scrutiny, and it was unclear whether Apple

would be able to keep all the funds it obtained through the tax activities. Therefore, this complex, but not uncommon, tax planning technique may be labeled as aggressive.[3]

Tax aggressiveness has the potential to be a beneficial firm financial activity. For instance, Mills et al. (1998) provide evidence that for every dollar invested in tax planning, the firm saves an average of four dollars in tax liabilities. This result suggests that tax aggressiveness is a value-enhancing activity due to the activity's ability to increase cash flows through lower explicit taxes. Another *New York Times* article on Apple anecdotally substantiates this positive effect. It states, "Even as Apple became the nation's most profitable technology company, it avoided billions in taxes in the United States and around the world" (Schwartz, 2013). Since tax expense is often one of the largest expenses on firms' income statements, it appears reasonable that tax planning benefits are substantial. Furthermore, Robinson, Sikes, and Weaver (2010) document that many firms consider their tax department as a profit center. Essentially, firms increasingly view taxes as a contributor to the bottom line rather than as a measurement system designed to minimize costs. Additionally, Goh, Lee, Lim, and Shevlin (2016) find that tax planning is associated with a lower cost of equity capital. Lastly, Edwards et al. (2015) provide evidence that tax planning can be used as an internal source of financing, as shown by tax savings allowing constrained firms to access good investment projects. Thus, tax aggressiveness may be a value increasing firm activity.

Despite the benefits of tax aggressiveness, numerous studies document adverse consequences of tax aggressiveness. For example, Rego and Wilson (2012) identify

[3] This example is merely one of many possible tax aggressiveness activities. Large multinational firms are likely to be engaging in countless tax planning transactions on an annual basis that can range from aggressive to conservative. While it is outside of the scope of this study to document all tax transactions in which firms engage in, I do provide two proxies that capture the approximate annual level of firm tax aggressiveness.

several direct costs to tax aggressiveness, such as fees paid to accountants and attorneys, employee time spent resolving IRS audits, or even the penalties paid when the IRS "challenges" or "overturns" an aggressive tax position. These direct costs are further substantiated by Hoopes, Mescall, and Pittman (2012) who find that tax aggressiveness is positively associated with I.R.S. audits and corresponding penalities. Other studies examine indirect or non-tax costs of tax aggressiveness. For instance, Scholes, Wilson, and Wolfson (1990) provide evidence that firms consider non-tax costs within tax strategy decision making, suggesting an equilibrium between maximizing tax planning and minimizing non-tax costs. Other non-tax costs of tax aggressiveness include adverse market reactions (Hanlon and Slemrod, 2009), weaker information environments (Balakrishnan et al., 2012; Hope et al., 2013), more expensive capital (Hasan et al., 2014; Hutchens and Rego, 2015), higher firm risk (Frank et al., 2009; Guenther, Matsunaga, and Williams, 2015), and higher external audit fees (Donohoe and Knechel, 2014).

Additional research investigates agency concerns of tax aggressiveness. For example, Scholes, Wolfson, Erickson, Hanlon, Maydew, and Shevlin (2014) state:

> "Aggressive tax planning and tax shelters are structured so as to obfuscate the underlying transaction so that the Internal Revenue Service has difficulty identifying the transaction and fully unraveling the transaction. Such complex transaction structuring could also obfuscate management's actions and obscure underlying firm performance in the financial statements, thus facilitating opportunism or even rent extraction by management. (Pg. 133)

They suggest that tax aggressiveness is both an agency cost of free cash flows problem and an external information asymmetry problem (Slemrod, 2004; Chen and Chu, 2005; Crocker and Slemrod, 2005). Numerous studies empirically examine the possibility that tax strategies as a whole result in higher agency costs. For example, Desai and Dharmapala (2006) examine the link between corporate tax planning and managerial

incentives. The study finds evidence of a complementary relation between rent-extraction and tax sheltering, as primarily demonstrated by firms with weak corporate governance. These findings are further delineated by Desai et al. (2007), who find that rent extraction through tax strategies and corporate governance are inversely related. Lastly, Desai and Dharmapala (2009) provide evidence that tax planning strategies are associated with a higher firm value, but only for firms with strong corporate governance.[4]

However, other studies question this evidence due to a lack of generalizability or empirical specification. Specifically, Blaylock (2015) suggests that some of the prior findings may not apply to firms in the United States since Desai et al. (2007) focus on firms in Russia, a country with weak investor protection. Furthermore, Armstrong et al. (2015) identify numerous limitations of the prior studies (i.e. adequately identifying governance mechanisms, non-linear relation, etc…), thus casting doubt on the theoretical framework of Desai and Dharmapala (2006), Desai et al. (2007), and Desai and Dharmapala (2009).[5] As a result, whether tax planning activities generate significant agency costs remains an empirical question.

To overcome the generalizability and empirical specification concerns, as well as help, answer this empirical question, I use *tax aggressiveness*. Because tax aggressiveness is a subset of tax strategies that particularly affects both cash flows and information opacity, it may be a more specific construct to examine the effect of tax strategies on managerial decision making since it is a setting where I would expect the

[4] Numerous other studies also investigate the relation between agency costs and tax planning strategies (i.e. Wilson, 2009; Chen, Chen, Cheng, and Shevlin, 2010; Kim, Li, and Zhang, 2011; Donohoe and McGill, 2011). Each of these studies use the framework developed by Desai and Dharmapala (2006), Desai et al. (2007), and Desai and Dharmapala (2009).

[5] Gallemore and Labro (2015) find evidence of a positive relation between internal information quality and tax avoidance. This also questions established theory. Because Gallemore and Labro's (2015) findings are primarily related to *internal* (rather than external) information asymmetry, they may not translate to my research setting. However, it is important to acknowledge their findings.

relation to be especially strong. Furthermore, I concentrate on how tax aggressiveness affects the agency costs of free cash flows, an area which has implications, and potentially unintended negative consequences, for managerial decision making such as investment decisions.[6]

Agency Costs of Free Cash Flows

Jensen (1986) highlights and analyzes the agency costs of free cash flows. These costs increase when cash flows exceed profitable investment opportunities. While shareholders prefer payouts to reduce resources under managers' control, managers have incentives to grow firms. This growth increases the resources under the manager's control, thus yielding more compensation and executive power over the firm (Jensen and Meckling, 1976). As a result, Jensen (1986) suggests that managers and shareholders may possess different preferences over what to do with excess cash flows. This difference in preferences generates agency costs of free cash flows.

Numerous studies document the adverse consequences of excess cash flows.[7] For example, Richardson (2006) finds evidence that overinvestment commonly occurs in firms with excess free cash flows. This finding is consistent with Jensen's (1986) discussion of oil and gas firms investing in value decreasing diversification after a cash flow surprise. Also, Lang, Stulz, and Walking (1991) provide evidence that successful

[6] I acknowledge that tax aggressiveness is just one of numerous ways for firms to increase internal liquidity. Even narrowing down to discretionary managerial decisions, tax aggressiveness is similar to managers cutting spending, such as R&D or advertising expenses. Different from other accounts, tax aggressiveness generates information opacity (Balakrishnan et al., 2012; Hope et al., 2013), in addition to the prevailing cash flows. I empirically test the differences in additional analysis.

[7] It is also worth noting that several studies document significant benefits to excess cash flows, such as more effective leverage adjustments (Faulkender, Flannery, Hankins, and Smith, 2012), greater asset tangibility to increase investment ability (Almeida and Campello, 2007), and stronger ability to invest in positive net present value projects among constrained firms (Dennis and Sibilkov, 2010). Because I expect the information opacity from tax aggressiveness to adversely affect the cash flows, I focus my review on the negative consequences.

tender offers for firms with high cash flows and low investment opportunities incur negative abnormal returns because concerns exist over what managers may do with these cash flows. Additionally, Leuz, Triantis, and Wang (2008) find that excess free cash flows are a common reason firms deregister from the SEC and that deregistering is a mechanism for managers to choose self-serving projects.

Other studies use the relation between investments and cash flows to examine whether firms are investing efficiently (Fazarri, Hubbard, Peterson, 1988; Kaplan and Zingales, 1997; Biddle and Hilary, 2006). The general presumption in these models is that firms follow q-theory, which states that firms should formulate investment decisions based upon investment opportunities, rather than cash flows (Tobin, 1969; Tobin and Brainard, 1977). Thus, a significant positive relation between investments and cash flows may suggest inefficient investment. Lastly, excess cash flows lead to a higher likelihood of holding more cash, which can have significant costs related to the agency costs of free cash flows (e.g. Harford, 1999; Faulkender and Wang, 2006; Acharya, Davydenko, and Strebulaev, 2012).

An area that has received some attention is how tax planning strategies influence the agency costs of free cash flows. Different from changes to revenues that affect cash flows (i.e. Lamont, 1997) tax planning strategies are unique in that they are voluntary activities that generate cash flows, which can be used to affect firms. For example, Edwards et al. (2015) document that financially constrained firms choose tax planning strategies to increase internally-generated funds. Law and Mills (2015) find similar results while examining the relation between financial constraints and the financial reporting consequences of tax planning. However, tax related activities may also generate

agency costs of free cash flows. For instance, Hanlon, Lester, and Verdi (2015) and Edwards, Kravet, and Wilson (2015) provide evidence that firms use foreign cash holdings trapped overseas in a value decreasing manner. Additionally, Yost (2015) examines the market reaction to acquisitions made by tax avoiding firms and finds that they are, on average, negative relative to non-tax avoiding firms, suggesting that investors are innately concerned with how managers use tax savings. This evidence highlights that cash savings from tax strategies might generate agency costs of free cash flows, which may affect investment decisions.

Investment Decisions

The literature suggests that firms should invest until the marginal benefits of capital investment equal the marginal costs (Yoshikawa, 1980; Hayashi, 1982; Abel, 1983). Extant research documents that firms depart from this investment theory due to agency concerns such as moral hazard (Jensen, 1986; Blachard, Lopez-de-Silanes, Shleifer, Vishny, 1994; Hope and Thomas, 2008) and adverse selection (Myers and Majluf, 1984; Baker, Stein, Wurgler, 2003). Recent literature examines these agency costs and investigates how firm-specific attributes affect capital investment decisions such as financial reporting quality (Biddle and Hilary, 2006; Biddle et al., 2009; Balakrishnan et al., 2014) earnings management (McNichols and Stubben, 2008), and internal control weaknesses (Cheng et al., 2013). Notably, Biddle et al. (2009) and Cheng et al. (2013) use the conditional investment efficiency model to provide evidence on whether a firm-specific attribute (i.e. accounting quality) affects firm decisions to invest sub-optimally in negative net present value projects or not to invest in positive net present value projects. Either occurrence of these actions is often referred to as inefficient

investment. Because investments comprise a large firm expenditure each year, investment inefficiency has the potential to be a significant non-tax cost, and unintended consequence, of tax aggressiveness.

Hypothesis Development

Tax Aggressiveness and Investment Efficiency

Firms that choose aggressive tax strategies have more cash flows, relative to tax conservative firms (Mills et al., 1998). Shareholders often incentivize managers to choose aggressive tax strategies since it represents a shift in cash flows from the government to the firm (Rego and Wilson, 2012). In addition to the higher cash flows, tax aggressiveness is also associated with higher external information asymmetry because managers must conceal aggressive actions from the regulatory agencies, thereby also concealing actions from shareholders (Desai and Dharmapala, 2006; Desai et al., 2007; Desai and Dharmapala, 2009; Balakrishnan et al., 2012; Hope et al., 2013). I posit the combination of increased cash flows and increased external information asymmetry has unintended consequences for managerial actions, specifically investment decisions.[8]

To assess the effects of tax aggressiveness on investment decisions, I follow Biddle et al. (2009), Cheng et al. (2013), and Balakrishnan et al. (2014) by focusing on how a specific factor effects subsequent investment choices conditional on access to investable funds. I posit that for firms with access to investable funds,[9] the additional free cash flows from tax aggressiveness represent an agency concern because management is

[8] A recent anecdote from *The Texas Tribune* cites that the transition of Oncor from a public company to a real estate investment trust, a common tax planning strategy, is expected to increase investments by way of lower cash taxes paid. While utility firms are not included in my sample due to their membership in a regulated industry, this anecdote is just one example of firms using tax planning to affect investment decisions (Malewitz, 2016).

[9] I define firms having access to investable funds as those firms with high amounts of cash holdings and low amounts of leverage. This is consistent with prior studies that use the conditional investment efficiency model (Biddle et al., 2009; Cheng et al., 2013; Balakrishnan et al., 2014).

incentivized to spend these funds on growing the size of the firm, even if such growth is suboptimal (Jensen, 1986; Hope and Thomas, 2008), or other self-serving behavior. Additionally, tax aggressiveness exacerbates these concerns due to information asymmetry between managers and monitors.[10]

Ceteris paribus, I posit, managers choose aggressive tax strategies that generate excess cash flows. However, due to the inherent complexity of these strategies and incentives to hide such activities from monitors and tax authorities, these positions are difficult to understand and increase external information asymmetry. This difficulty leads me to suggest that, conditional on high access to investable funds, tax aggressiveness is associated with more subsequent year investment. Extant literature using this model suggests that this result is evidence of overinvestment. As a result, I make the following hypothesis (stated in the alternate form):

H1a: Conditional on high access to investable funds, tax aggressiveness is associated with a higher subsequent year level of investments, or overinvestment.

While there is a clear direction for the H1a theoretical prediction, the relation between tax aggressiveness and subsequent year investments when there is low access to investable funds is less clear. For example, for firms with low access to investable funds, tax aggressiveness may be associated with higher subsequent year investment because they are currently less able to access external markets. As a result, the additional cash flows may provide these firms the opportunity to fund positive net present value projects

[10] A recent Wall Street Journal article anecdotally substantiates the presence of opacity (Mann, 2015). The article suggests that General Electric has long used GE Capital to reduce its effective tax rates by way of convoluted and complex overseas subsidiaries. However, most expert analysts are unable to identify the mechanisms for these strategies. As a result, the effects of tax aggressiveness on taxes saved and information opacity appear consistent with practice.

that the firm may have otherwise not been able to finance (Edwards et al., 2015). Conversely, low access to investable funds may result in lower subsequent year investment due to the incentives to exercise precaution with the additional cash flows in case they need to be used towards future tax claims on prior and current uncertain tax positions (Hanlon et al., 2014).[11] The cash savings motive, combined with the more expensive capital associated with tax aggressiveness (Hasan et al., 2014; Hutchens and Rego, 2015) may intensify firm capital constraints. Together, these two explanations may result in an insignificant relation between tax aggressiveness and underinvestment.[12] As a result, I make the following hypothesis (stated in the null form):

H1b: Conditional on firms inability to access to investable funds, tax aggressiveness is not associated with the subsequent year level of investments, or underinvestment.

Tax Aggressiveness, Investment Efficiency, and Tax Monitoring

Alternative explanations may exist for the relation between tax aggressiveness and investment efficiency. To help improve identification of my proposed mechanism, I examine cross-sectional variation in firms tax-related information asymmetry as identified as firms that use their external auditor for tax services (APTS).[13]

[11] While the precautionary motive theory exists for all firms, I expect it to more significantly affect firms with low access to investable funds because they are already more likely to spend less. Furthermore, to the extent this precautionary motive affects firms more prone to overinvest, it would likely bias against finding significant results for H1a.

[12] Similar to H1a, I use the conditional investment efficiency model (Biddle et al., 2009). Different from H1a, I examine firms with low amounts of cash holdings and high amounts of leverage.

[13] Prior literature uses a cross-section on firm governance, proxied as the G-Score, to examine whether managerial oversight mitigates the agency costs of tax planning activities (e.g. Desai and Dharmapala, 2006; 2009). Because general firm governance can significantly affect both tax planning activities and investment decisions, I use APTS so that I may more directly examine the consequences to the decision to choose a tax strategy, rather than all firm decisions.

Title II of the Sarbanes-Oxley Act of 2002 focuses on enhancing auditor independence. In this chapter, Section 201 specifically focuses on services that external auditors may no longer provide (e.g. bookkeeping, information systems design and implementation, actuarial services, etc…). One gray area is tax services. Section 201 states:

> "A registered public accounting firm may engage in any non-audit service, including tax services, that is not expressly prohibited, after audit committee pre-approval. Accordingly, accountants will be able to continue to provide tax compliance, tax planning and tax advice to audit clients, subject to audit committee pre-approval requirements."

Firms have numerous outlets for implementing a tax strategy, including their external audit firm, other accounting or law firms, or self-implementation. Although many differences exist between each of these avenues, the most discernable difference is that APTS requires additional approval, and thus greater information transparency, by the firms' board of directors. The information that the external auditor must provide to the audit committee is not trivial as substantiated by Klassen, Lisowsky, and Mescall (2015), which finds that firms without APTS take advantage of manager to board of directors information asymmetry.[14] Their result is that firms that do not use APTS are more tax aggressive than firms with APTS.

I posit that the additional disclosure of this information to the audit committee may have two outcomes. First, the approval stage gives the audit committee the opportunity to decline the service if it is too aggressive. As a result, for firms with APTS, an approved tax position may be less aggressive relative to a position not provided by its auditor. More importantly, the APTS approval provides a greater external insight into the

[14] See PCAOB Rule 3524 for a full description of the information required to be provided to the audit committee.

firms tax strategies, thus potentially mitigating the adverse effects of tax aggressiveness on managerial decisions. These two possible actions lead me to suggest that APTS moderates the relation between tax aggressiveness and investment inefficiency. As a result, I make the following hypothesis (stated in the alternate form):

H2: Firms with APTS have a significantly weaker relation between tax aggressiveness and investment inefficiency, relative to firms without APTS.

Tax Aggressiveness, Investment Efficiency, and Tax Disclosure: A Quasi-Natural Experiment

While I posit that tax aggressiveness affects investment decisions, it is possible that firms structure investment decisions to enhance tax aggressiveness opportunities. Even though I lessen the potential for an endogenous relation by examining how tax aggressiveness affects subsequent year investments, I further alleviate these concerns through a quasi-natural experiment surrounding the onset of FIN 48.[15]

FIN 48 was enacted beginning in 2007 and required firms to separately disclose their reserve for uncertain tax positions. Previous disclosure requirements under SFAS 5 required firms to include this reserve in their contingent liability reserves. The prior disclosure was not disaggregated. Thus, FIN 48 marked a notable, and exogenous, increase in the quality and quantity of tax-related information disclosed, specifically related to uncertain and potentially aggressive tax positions (Blouin, Gleason, Mills, and Sikes, 2007; Erickson, Goldman, and Stekelberg, 2015).[16]

[15] Roberts and Whited (2012) suggest that a natural experiment can be used to help mitigate endogeneity concerns as well as generate causal inferences in empirical corporate finance research. Furthermore, Gow, Larcker, and Reiss state "papers using these methods [quasi-experimental methods] are considered stronger research contributions (pg. 11)."

[16] FIN 48 marks a plausible quasi-natural experiment because the passage of this pronouncement was not certain. In the years leading up to its passage, a significant number of objections were raised, thus clouding the likelihood of approval (Erickson et al., 2015).These actions run parallel to Michels (2015), who exploits

I posit that the additional disclosure of the tax financial statement information informs external parties regarding the aggressive nature of firm tax strategies. Similar to APTS, this may result in firms not choosing tax positions that are as aggressive. However, for firms that make these disclosures in 2007 and are therefore continuing to choose aggressive tax positions, I suggest that the disclosure raises financial statement user awareness for the cash flows generated from tax aggressiveness. The result may be that managers are less able to use the additional cash flows towards negative net present value projects. This theory leads me to suggest that, for firms that disclose a FIN 48 reserve in 2007, tax aggressiveness is significantly less associated with inefficient investment, relative to the pre-period. As a result, I make the following hypothesis (stated in the alternate form):

H3: Firms with a FIN 48 disclosure in 2007 have a significantly weaker relation between tax aggressiveness and investment inefficiency, relative to 2006.

Buy-And-Hold Abnormal Return Analysis

Under q-theory, perfectly efficient firms invest in all positive net present value projects and do not invest in all negative net present value projects (Tobin, 1969; Tobin and Brainard, 1977). As a result, firms investing efficiently are expected to have higher firm value, relative to firms investing inefficiently. I apply this theory to my setting. If tax aggressiveness is associated with poorer managerial decisions, such as investment inefficiency, then I anticipate that a tax aggressive firm has a lower market adjusted return relative to a tax conservative firm. Consistent with the primary analysis, I expect

a difference in disclosure requirements. Michels (2015) is a study highlighted by Gow et al. (2016) for having adequately executed a natural experiment research design to infer causality.

this effect is most pronounced among firms with high and low access to investable funds because the extant literature suggests that these firms are more prone to inefficient investment (Biddle et al., 2009; Cheng et al., 2013). However, it is also possible that the benefits from tax aggressiveness mitigate these costs. For example, if a firm is tax aggressive and uses the additional cash flows to purchase a negative net present value asset, then it is not clear that the firm would have lower returns (i.e. tax aggressiveness may insignificantly affect firms value) since the firm essentially transfers funds from the I.R.S. to the seller of the asset. In fact, firms may still benefit from tax aggressiveness if some of the cash flows are efficiently allocated to shareholders. As a result, I make the following hypothesis (stated in the null form):

H4: Tax aggressiveness is not associated with subsequent BHAR

III. RESEARCH DESIGN

Tax Aggressiveness

I proxy for tax aggressiveness two ways: (1) the difference between a firm's expected and actual cash effective tax rate, or *DiffETR* (Balakrishnan et al., 2012; Armstrong et al., 2015), and discretionary permanent book-tax-differences, or *DTAX* (Frank et al. 2009). These two definitions follow the literature that defines tax aggressiveness as "a subset of tax positions have weak support (Lisowsky et al., 2013, pg. 589)" or positions that are "pushing the envelope of tax law (Hanlon and Heitzman, 2010, pg. 137)."

For *DiffETR,* I define expected cash effective tax as the three-year average cash effective tax rate for each industry, year, size-decile grouping of firms. I consider this average to be the expected rate for all firms in that particular group. I define actual cash effective tax rate as the three-year cash effective tax rate (Dyreng, Hanlon, and Maydew 2008). For each observation, I subtract the actual cash effective tax rate from the expected cash effective tax rate to generate tax aggressiveness, where a positive (negative) *DiffETR* is considered aggressive (conservative) since it suggests that the firm has a lower (higher) cash effective tax rate than its industry-year-size decile would suggest. Lastly, I scale the difference by the expected cash effective tax rate to generate the percentage difference. I define *DTAX* consistent with Frank et al. (2009), which is the residual from a regression of permanent book-tax-differences on nondiscretionary book-tax-differences unrelated to aggressive tax planning. The regression is run by year and industry and generates a residual which is positive (negative) if the firm has more discretionary-permanent book-tax-differences, thus suggesting tax aggressiveness

(conservativeness). See the Appendix for a more detailed explanation of the *DiffETR* and *DTAX* calculations. [17]

Model

To test my hypotheses, I follow the conditional investment efficiency model (Biddle et al., 2009; Cheng et al., 2013; Balakrishnan et al., 2014). This model examines the relation between tax aggressiveness and the subsequent year level of capital investment conditional on firms access to investable funds. Using this methodology, I estimate the following model:

$$Investment_{i,t+1} = \alpha + \beta_1 DiffETR / DTAX_{i,t} + \beta_2 OverFirm_{i,t} + \beta_3 DiffETR / DTAX_{i,t} * OverFirm_{i,t} + Controls + Year\ F.E. + Industry\ F.E. + \varepsilon_{i,t} \quad (1)$$

$Investment_{t+1}$ measures subsequent year capital and non-capital investment. *DiffETR* and *DTAX* measures the firm-specific tax aggressiveness. Lastly, *Overfirm* proxies for access to investable funds. This measure uses cash holdings and leverage to distinguish between observations where overinvestment or underinvestment activity may be more likely.[18]

In particular, *OverFirm* reasonably captures the firm's financial state relative to its available investment opportunities. For example, if a firm has high cash and low leverage (i.e., high *OverFirm*) then it has cash that can be readily spent and may be under-levered (Graham, 1996; Blouin, Core, Guay, 2010). These conditions suggest that the firm can invest in positive net present value projects if they exist, and the presence of

[17] To further validate these measures, I examine the sample and find that well-known tax aggressive firms within my sample (e.g., Starbucks, Apple, Amazon, etc…) have positive *DiffETR* and *DTAX*.

[18] Operationalized, I separately rank firm cash holdings and debt from one to 1,000. To keep the directions consistent, debt is multiplied by negative one so that a high value of *OverFirm* represents a firm with high cash and low leverage, thus having high access the investable funds. I then sum each firms score and rank the scores from 1 to 11. Finally, I adjust the groups to take a value from 0 to 1 in increments of 0.1. This formulation is similar to that used in Cheng et al. (2013). In addition, it allows the effect for firms with the lowest value of *OverFirm* to be captured by β_1, and firms with the highest value of *OverFirm* to be captured by $\beta_1 + \beta_3$ (Burks, Randolph, and Seida, 2015). See additional discussion of the composition of *OverFirm* in the Appendix.

such attributes means that the firm is more likely to have exhausted the possibilities to invest in projects that are positive net present value. On the contrary, if a firm has low cash and high leverage (i.e., low *OverFirm*), then the firm does not have cash that can be spent and might have limited additional access to the debt market. These conditions suggest that the firm is more likely to have quality investment projects available, but may not have the ability to finance the projects. In summary, a high *OverFirm* may indicate that a firm has limited positive net present value projects available, and a low *OverFirm* may indicate that a firm has more positive net present value projects available, thus firms at the extremes are more at risk for tax aggressiveness affecting investment efficiency (Biddle et al. 2009; Cheng et al. 2013).

I control for numerous variables known to affect investments and tax aggressiveness. First, I control for firm maturity. Specifically, I posit that large mature firms that are more stable are significantly less likely to purchase assets in the future. As a result, I expect firm size (*Size*), likelihood of bankruptcy (*ZScore),* and firm age (*Age*) to be negatively associated with subsequent year investments. Conversely, I include controls for firm growth opportunities, as proxied by return on assets (*ROA*), cash-flows from operations (*CFO*), Tobin's Q (*TobinQ*),[19] sales growth (*SalesGrowth*) and foreign income (*ForIncome*). I expect each of these variables to be positively associated with subsequent year investments. Additional variables that may positively affect subsequent year investments include firm tangibility (*PPE)* and financial constraint (*Rating*). Meanwhile, other variables that may negatively affect subsequent year investments

[19] Hayashi (1982) and Chirinko (1993) argue that the inclusion of Tobin's Q as a control variable may not be appropriate because it is a forward-looking variable that may reflect all firm characteristics, including those related to tax aggressiveness. In untabulated analysis, I remove *TobinQ* as a control variable, and note that my inferences remain unchanged.

include sales volatility (*StdDevSales*), institutional holdings (*TotalIO),* and dividend issuance (*Dividend*). Each of these control variables and predictions follow prior literature (see Biddle and Hilary, 2006; Biddle et al. 2009; Cheng et al., 2013).

In addition to these variables, I also consider two managerial characteristics. First, I control for percentage of compensation derived from equity earnings since managers with high equity compensation (*EqComp*) are more likely to grow the size of the firm (Murphy, 1999; Coles, Daniel, and Naveen, 2006). As a result, I expect *EqComp* to be positively associated with subsequent year investments. Additionally, I control for the CEOs age (*CEOAge)* because older executives have a shorter incentive horizon (Dechow and Sloan, 1991; Yim, 2013) and may invest less. Thus, I expect *CEOAge* to be negatively associated with subsequent year investments. Lastly, it is possible that investments are sticky from year to year. Therefore, I control for current year investments (*Investment*) and expect it to be positively associated with subsequent year investments. See the Appendix for a more detailed definition of each the control variables. I also include industry and year fixed effects and cluster standard errors at the firm level.

Beginning with H1a, the sum of β_1 and β_3 measures the effect of *DiffETR / DTAX* on $Investment_{t+1}$ when firms have high access to investable funds (i.e. when *OverFirm* takes the value of 1). As a result, I expect a positive and significant $\beta_1 + \beta_3$. For H1b, the coefficient on β_1 measures the effect of *DiffETR / DTAX* on $Investment_{t+1}$ when firms have low access to investable funds (i.e. *OverFirm* takes the value of 0). In corollary with the null hypothesis for H1b, I do not make a signed prediction for β_1. While the direct interpretations of the model correspond to the affect tax aggressiveness has on subsequent year investment, prior literature argues that the results can speak to firm investment

efficiency (Biddle et al., 2009; Cheng et al., 2013). Following these studies, a positive and significant $\beta_1 + \beta_3$, or a negative and significant β_1 suggests the firm may be investing less efficiently. Meanwhile, a negative and significant $\beta_1 + \beta_3$, or a positive and significant β_1 suggest the firm may be investing more efficiently. Additionally, H2 and H3 follow a similar research design while splitting the sample on firms with or without APTS,[20] and firms in the pre versus post-FIN 48 era, respectively.

Lastly, H4 examines buy-and-hold abnormal returns for tax aggressive firms, relative to non-tax aggressive firms. Following the literature, I calculate *BHAR* as the difference in returns between the observation and the return on a buy-and-hold investment in a portfolio of similar firms in the same period (Barber and Lyon, 1997). I use *BHAR* from year t+2 so that the investment decisions can be realized.[21] For this analysis, I rank firms into groups based on decile of *TAX* and compare firms in the lowest decile (*RankDiffETR* = 0, *RankDTAX* = 0) to firms in the highest decile (*RankDiffETR* = 9, *RankDTAX* = 9) across values of *OverFirm* (ranging from 0 to 1 in 0.1 increments). I do not make signed predictions, but a t-test showing high *DiffETR / DTAX* is greater than low *DiffETR / DTAX* when *OverFirm* equals 1 (0) would be consistent with firms having high (low) access to investable funds making value decreasing investment decisions with the cash flows.

Sample Selection

Table 1 summarizes the sample selection procedure. The initial sample consists of all Compustat and Execucomp firms with fiscal year ends between 1992 and 2014. The

[20] I define firms as having APTS if their tax fees are in excess of 1% of their total audit fees. Requiring firms to have more than a trivial amount of tax fees mitigates the concern that the APTS are not significant services that do not trigger the attention of the audit committee.

[21] In untabulated analysis, I use *BHAR* from year t + 3 and the aggregate *BHAR* from both t+2 and t+3, and the inferences remain unchanged.

sample period begins in 1992 subsequent to the implementation of SFAS 109. The sample period ends in 2014 since that is the most current data available I also exclude observations in regulated industries (Fama-French 48 #'s 31,32, 44, 45, 46, 47, and 48). Additionally, I exclude observations with negative pre-tax income over a rolling three-year window from t-2 to t as well as negative pre-tax income in year t. Lastly, I exclude observations that do not have enough information to calculate *DiffETR, DTAX,* or any of the other variables used in this study. See the Appendix for a full list of these variables. After removing observations that do not meet all of the criteria, I am left with a total sample size of 12,876 firm-year observations.

IV. PRIMARY ANALYSIS

Descriptive Statistics and Correlations

Table 2 presents the descriptive statistics for the sample population. The mean value of *Investment* is 13.906 suggesting that, on average, capital and non-capital expenditures equal about 14% of firm assets each year. The average of the two primary dependent variables is -0.005 and 0.045 for *DiffETR* and *DTAX*, respectively. By construction, these two variables should approximate to 0. However, they are calculated on a full sample of firms in the COMPUSTAT database with available data to calculate each variable, and before other sample cuts in the study. As a result, the minor deviation from 0 appears reasonable. Conversely, *OverFirm* is calculated on the testing sample to ensure equal distribution, and accordingly takes an average value of 0.500. In examining the remaining variables, I do not note any unusual descriptive statistics.

Table 3 reports the Pearson and Spearman correlations for my sample population. Consistent with expectations, *DiffETR, DTAX* and *OverFirm* are positively correlated with *Investment* ($p < 0.01$). This result provides preliminary evidence that tax aggressiveness and access to investable funds are appropriate determinants of subsequent year investments. Furthermore, current year $Investment_t$ is highly correlated with subsequent year $Investment_{t+1}$ ($p < 0.01$). This correlation suggests that investments are sticky from year to year and controlling for the prior year activity is appropriate. In examining the remaining variables, I do not note any unusual associations.

Hypothesis Testing

In Table 4, I present the results of estimating Model (1). First, I find that the combination of the coefficients on *DiffETR* and *DiffETR*OverFirm* is positive and

significant ($p < 0.01$), and insignificant when examining *DTAX*. This result yields some evidence for H1a that tax aggressiveness is associated with more investment for firms with access to investable funds. Additionally, the coefficient on *DiffETR / DTAX* is insignificant in both specifications. As a result, I fail to reject the null hypothesis for H1b. Overall, Table 4 provides limited evidence that tax aggressiveness is associated with overinvestment.

While the findings in Table 4 are not completely in line with the hypothesized results, I posit that the lack of significant results may be due to a non-linear relation between investment decisions and tax aggressiveness. Numerous studies examine the effects of tax aggressiveness and find that it has a non-linear relation to firm characteristics like the cost of equity capital (Cook, Moser, and Omer, 2015), or even how tax aggressiveness affects the relation between managerial incentives and firm governance (Armstrong et al., 2015). Furthermore, assuming a linear relation may be problematic because it would suggest that tax aggressive firms invest less efficiently, while tax conservative firms invest more efficiently, a finding that runs counter to prior research documenting the positive effects of reducing cash taxes paid (Mills et al., 1998; Desai and Dharmapala, 2009).

To overcome concerns related to non-linearity, I split the same at 0 for both *DiffETR* and *DTAX*. I then estimate Model (1) separately for each of the four groups (*DiffETR > 0, DiffETR < 0, DTAX > 0, DTAX < 0*), and present my findings in Table 5. Column (1) and (2) present the findings when *DiffETR* and *DTAX* are greater than 0 (tax aggressive subset), while Columns (3) and (4) present the findings when *DiffETR* and *DTAX* are less than 0 (tax conservative subset). When examining only tax aggressive

firms, I find evidence consistent with H1a. Specifically, for this subset of firms, I find that conditional on high access to investable funds, tax aggressiveness (*DiffETR*, $p < 0.01$; *DTAX*, $p < 0.05$) is associated with higher subsequent year investments. Because these firms are more likely to have already exhausted positive net present value projects, the prior literature suggests that these firms are investing inefficiently by way of overinvestment (Biddle et al., 2009; Cheng et al., 2013). Additionally, I find limited evidence to reject the null hypothesis for H1b that firms with low access to investable funds that are tax aggressive have lower subsequent year investments (*DiffETR*, $p < 0.05$). In addition to statistical significance, the results are also economically significant. For example, a one standard deviation increase in *DiffETR (DTAX)* is associated with 36.0% (33.5%) increase in subsequent year investments for firms with high access to investable funds, and a 14.4% (12.5%) decrease in subsequent year investments for firms without access to investable funds.

Meanwhile, for firms that are tax conservative, the primary inferences do not persist. Interestingly for *DTAX*, I find results suggesting an opposite effect in that tax aggressiveness is associated with less overinvestment for firms with access to investable funds ($p < 0.05$). This significant result further reflects the non-linear relation between tax aggressiveness and investment decisions.

For H2, I examine the effect of strong tax monitoring on the relation between tax aggressiveness and investment efficiency. Operationalized, I split the sample into firms with or without APTS. This test does involve a reduced sample because the Audit Analytics database does not begin tracking this information until 2000. I conservatively make an additional cut to only firms on or after 2003 since the Sarbanes-Oxley Act of

2002 significantly changed the types of APTS allowed. These cuts result in a sample size of 8,975. Using this reduced sample, I re-estimate Model (1) separately for firms with and without APTS. See Table 6. Columns (1) and (2) present the findings of observations that have APTS (*DiffETR* and *DTAX*, respectively), while Columns (3) and (4) present the estimation when the observations do not have APTS.

Consistent with expectations, the results strongly persist when observations do not have APTS. That is when APTS is not present, and firms have access to investable funds, *DiffETR* + *DiffETR*OverFirm* ($p < 0.01$) and *DTAX* + *DTAX*Overfirm* ($p < 0.01$) are positively associated with subsequent year investment, or overinvestment. Meanwhile, the relation fails to persist when APTS is present. The aggregate of findings in Table 6 provides evidence consistent with H2, in that APTS significantly moderates the relation between tax aggressiveness and investment efficiency.

For H3, I examine a quasi-natural experiment surrounding the implementation of FIN 48. To better capture the effect of the exogenous shock, I make numerous sample cuts. First, I only examine observations in 2006 (pre-period) and 2007 (post-period). This sample cut helps to mitigate other events confounding the inferences. I also require the firm to exist in both the pre-period and post-period. Lastly, I remove any observations that did not disclose an uncertain tax position reserve in 2007. These restrictions result in 1,280 firms for a total of 2,560 observations. Consistent with the H2 analysis, I split the sample into the pre and post periods and separately analyze the relation between tax aggressiveness and investment efficiency for each sub-group. See Table 7. Columns (1) and (2) present the findings from observations in the pre-period for *DiffETR* and *DTAX*,

respectively, while Columns (3) and (4) present the same findings, but for observations in the post period.

Consistent with expectations, the results significantly persist in the pre-period. For firms with high access to investable funds, tax aggressiveness (*DiffETR* + *DiffETR*OverFirm*, $p < 0.05$; *DTAX* + *DTAX*OverFirm*, $p < 0.05$) is associated with more subsequent year investment, or overinvestment. Meanwhile, the same firms in the post-period no longer have the same positive relation. Due to the nature of the empirical specification being a quasi-experiment, the combined findings from Table 7 provide some evidence that tax aggressiveness generates agency costs of free cash flows that cause more investment for firms with high access to investable funds; Said another way, tax aggressiveness leads to overinvestment.

For H4, I cluster all firms into one of 110 groups based on the firm's *RankDiffETR* / *RankDTAX* decile ranking and 0 to 1 *OverFirm* ranking. For presentation purposes, I only display the cells when *RankDiffETR* or *RankDTAX* is 0 (most conservative) or 9 (most aggressive). I then provide the difference between *RankDiffETR* and *RankDTAX* at 0 and 9 across each value of *OverFirm*, along with corresponding t-statistic. For both definitions of tax aggressiveness, I reject the null hypothesis that there are no differences in *BHAR*, but only for firms with high access to investable funds ($p < 0.05$ for both specifications when *OverFirm* equals 1).

This finding has numerous important implications. First, the positive differences when *OverFirm* equals 1 yields confirmatory evidence to the conditional investment efficiency model that a positive coefficient for $\beta_1 + \beta_3$, suggests overinvestment. While prior literature posits this statistical effect to be associated with inefficient investment, I

am the first to connect the result directly to an effect on firm value, thus providing credence to the model. Additionally, this finding provides evidence that, among firms with high access to investable funds, the cash flow benefits of tax aggressiveness are significantly outweighed by poor managerial decision making. While inefficient investment is one-way managers may make value-destroying decisions, my findings imply that firms that have access to investable funds subsume the cash flow benefits due to direct and indirect costs of a more opaque information environment.

V. ADDITIONAL ANALYSES

Other Cash Flow Sources

While my study relates to the cash obtained from tax aggressiveness, it is possible that this cash flow source is not any different from other discretionary managerial decisions. For example, instead of being tax aggressive managers can cut advertising expense or R&D expense, and incur similar cash flow benefits (Bublitz and Ettredge, 1989). To mitigate the concern that tax aggressiveness is not any different from other discretionary cash flow sources, I examine firms with significant decreases in advertising and R&D expenses. To operationalize this, I calculate the change in each expense from year t-1 to t. I then decile rank the changes and identify firms with the most significant decreases as an indicator variable taking the value of 1, and 0 otherwise. Finally, I separately replace tax aggressiveness with each indicator variable and re-estimate model (1). In untabulated analysis, I find that decreasing advertising expense or R&D expense do not significantly affect subsequent year investments for both firms with low and high access to investable funds. Because tax aggressiveness differs from the other two discretionary expenditure accounts due to the action's opacity, this analysis provides some evidence that the combination of cash flows and opacity is important to my findings.

Managerial Characteristics

An alternative explanation for my primary results is that managers make aggressive tax decisions and inefficient investments primarily because they have a low managerial ability or because they or overconfident with their ability to be tax aggressive and choose good investments. To mitigate this concern, I repeat the analysis using a

proxy for managerial ability (Demerjian, Lev, and McVay, 2012; Demerjian, Lev, Lewis, and McVay, 2012; Koester, Shevlin, and Wangerin, 2016) and managerial overconfidence (Ahmed and Duellman, 2013; Hrirbar and Yang, 2015). In untabulated analysis, I find no significant difference in the relation between tax aggressiveness and subsequent year investments among high and low ability managers, or high and low overconfident managers.[22] As a result, while managerial ability may affect tax aggressiveness or investment efficiency, it does not appear to affect the relation between the two constructs.

Alternative Measures of Tax Aggressiveness

While *DiffETR* and *DTAX* are appropriate measures of tax aggressiveness that align with the definitions provided by Hanlon and Heitzman (2010) and Lisowsky et al. (2013), the literature also uses other measures. To ensure my results are robust to other specifications, I also examine my results when tax aggressiveness takes the form of a three-year cash effective tax rate (Dyreng et al., 2008), low three-year cash effective tax rate (Donohoe and Knechel, 2014), and tax haven usage (Dyreng and Lindsay, 2009. In untabulated analysis, my inferences remain unchanged when using these alternative proxies for tax aggressiveness.

Unconditional Investment Efficiency Model

Biddle et al. (2009) and Cheng et al. (2013) both employ the conditional investment model, but Biddle et al. (2009) also use an unconditional investment model. The unconditional investment model assesses how a firm-specific attribute contributes to

[22] I caveat my results such that the calculation of these two managerial characteristics involves significant data cuts that reduce the power of my variables of interest. Therefore, in a broader sample, it may be possible that ability or overconfidence do moderate the relation between tax aggressiveness and investment decisions. However, I fail to find any statistical differences.

deviation from the expected level of investment. While valid, this model suffers from the assumption that researchers can document the expected level of investment, and thus is subject to numerous criticisms. To assess the robustness of my analysis, I also examine my research question using the unconditional investment model. In untabulated analysis, I find my inferences remain unchanged. As a result, my evidence from the unconditional model appears to complement the primary results.

VI. CONCLUSION

This study finds evidence that tax aggressiveness is significantly associated with investment decisions. Specifically, I find that for firms with access to investable funds, tax aggressiveness is associated with higher levels of subsequent year investments relative to firms that are not tax aggressive. Prior research interprets this relation as evidence of overinvestment. Thus, I provide evidence that tax aggressiveness is associated with inefficient investment. To further explore these results, I find that the relation weakens for firms with stronger monitoring of tax accounts, thus offering credence to the theory that tax aggressiveness is associated with higher agency costs of free cash flows. Furthermore, using a natural experiment around the uncertain tax position disclosure requirements, I find that an increase in tax aggressiveness disclosure is associated with a weaker relation between tax aggressiveness and overinvestment, thus providing some evidence that tax aggressiveness may cause investment inefficiency by way of high agency costs of free cash flows. Lastly, I examine subsequent year buy-and-hold abnormal returns and find that the overinvestment firms have a significantly lower return, thus suggesting that the benefits of tax aggressiveness for firms with high access to investable funds are significantly outweighed by some of the unintended consequences, such as inefficient investment.

This study provides evidence consistent with investment inefficiency as a significant non-tax cost of tax aggressiveness. The results suggest that the negative market reaction associated with the disclosure of firm tax aggressiveness may be more than reputational concerns (Hanlon and Slemrod, 2009). Also, I offer a potential explanation for the undersheltering puzzle (Weisbach, 2002). If tax aggressiveness is

required to maximize sheltering, then managers making suboptimal investments may incentivize shareholders to shift managerial incentives away from choosing aggressive tax strategies.

APPENDIX A

Variable Definitions

Dependent Variables of Interest

Investment$_{t+1}$ — Capital expenditures (CAPX) plus research and development expenses (XRD), plus acquisitions (AQC) less the sale of property, plant, and equipment (SPPE). All scaled by lagged total assets (AT). The product is multiplied by 100.

Independent Variables of Interest

DiffETR — The difference between expected and actual three-year cash effective tax rate scaled by expected cash effective tax rate. Expected three-year cash effective tax rate is calculated by placing all firms into industry-year-size decile buckets. The average of each group's three-year cash effective tax rate is considered expectation. The actual three-year cash effective tax rate is defined as the sum of cash taxes paid (TXPD) for years t-2 through year t. It is them scaled by the sum of pre-tax income (PI) for years t-2 through year t less special items (SPI) for year t-2 through year t.

DTAX — Discretionary permanent book-tax differences, as created by Frank et al. (2009). This is calculated by regressing total permanent book-tax differences on nondiscretionary items that are known to cause permanent differences, but are unrelated to tax reporting aggressiveness. The resulting residual is averaged from year t-2 to year t to generate *DTAX*. Specifically, I calculate it as follows:

PERMDIFF = Intercept + Intang + Uncon + MI + Cste + ChangeNOL + LagPERM + Residual

Where:

PERMDIFF = (PI - [(TXT + TXO) / 0.35] - (DTA / 0.35)) / AT
Intang = INTAN / AT
Uncon = ESUB / AT
MI = MII / AT
Cste = TXS / AT
ChangeNOL = (TLCF - LagTLCF) / AT.

OverFirm	The average of rankings for firm cash holdings (CHE/AT) and leverage (DLTT/AT). Firms are ranked from one to 1,000 for each attribute. Leverage is multiplied by negative 1 so that both variables are increasing in the propensity to overinvest. The two rankings are combined into a single score. That score is then ranked from 1 to 11. I rescale the ranking to take a value between 0 (low cash & high leverage) and 1 (high cash & low leverage) in increments of 0.1.

Control Variables

Size	The natural log of total assets (AT).
ZScore	Mathematical formula to help predict bankruptcy calculated as the following: 1.2*A + 1.4*B + 3.3*C + 0.6*D + 0.999*E A = Working Capital (ACT-LCT) / Total Assets (AT) B = Retained Earnings (RE) / Total Assets (AT) C = Earnings Before Interest and Taxes (EBIT) / Total Assets (AT) D = Market Value of Equity (PRCC_F*CSHO) / Total Liabilities (LT) E = Sales (REVT) / Total Assets (AT).
Age	The natural log of the number of years the firm has appeared in the CRSP database.
ROA	Pre-tax income scaled by prior year assets.
CFO	Cash flows from operations (IB + DPC + TXBD) scaled by prior year total assets.
TobinQ	The market value of equity (PRCC_F*CSHO) plus book value of assets (AT) less book value of equity (CEQ) less deferred taxes (TXDB), all scaled by book value of assets (AT).
SalesGrowth	Current year sales (REVT) less prior year sales (REVT) scaled by prior year sales (REVT).
ForIncome	Pre-tax foreign income (PIFO) scaled by lagged total assets.

PPE	Net property, plant, and equipment (PPENT) scaled by total assets (AT).
Rating	Indicator variable equal to 1 if the firm has a credit rating, and 0 otherwise.
StdDevSales	The standard deviation of the sales (REVT) from years t-2, t-1, and t.
Total_IO	The percentage of ownership held by institutional investors.
Dividend	Indicator variable equal to 1 if dividends (DVC) or cash dividends (DV) is greater than 0, and 0 otherwise.
EqComp	Percentage of CEO salary derived from equity-based compensation (TDC1 - Salary - Bonus - OthComp) scaled by total compensation (TDC1).
CEOAge	Natural log of the CEOs age.
Investment	Capital expenditures (CAPEX) scaled by lagged net property, plant, and equipment (PPENT), all in year t.

Other Variables of Interest

APTS	Indicator variable equal to 1 if a firm's auditor-provided tax services (TAX_FEES, audit analytics) are more than 1% of total audit fees (TOTAL_FEES, audit analytics), and 0 otherwise.
Post	Indicator variable equal to 1 if the observation is in 2007, and 0 if the observation is in 2006.
BHAR	The buy-and-hold abnormal return year t+2 adjusted for market returns.

APPENDIX B

TABLE LISTING

TABLE 1

Sample Selection

Criteria:	
1992 - 2014 Intersection of Compustat and Execucomp	38,704
Less: Observations in regulated industries	-8,818
Less: Observations with negative 3 year pre-tax income	-12,479
Less: Observations without enough data to calculate *DiffETR* and *DTAX*	-2,487
Less: Observations without enough data to compute testing variables	-2,044
Total Sample Size	12,876

TABLE 2

Descriptive Statistics

Variable	N	Mean	Std Dev	P25	Median	P75
Investment$_{t+1}$	12,876	13.905	12.939	4.678	9.112	16.151
DiffETR	12,876	-0.045	0.533	-0.312	-0.024	0.261
DTAX	12,876	0.004	0.178	-0.016	0.001	0.023
OverFirm	12,876	0.500	0.318	0.200	0.500	0.800
Size	12,876	7.302	1.455	6.231	7.124	8.217
ZScore	12,876	3.823	5.153	2.945	3.300	6.614
Age	12,876	2.910	0.825	2.398	2.944	3.526
ROA	12,876	0.138	0.097	0.071	0.116	0.181
CFO	12,876	0.176	0.087	0.115	0.160	0.218
TobinQ	12,876	2.156	1.313	1.309	1.743	2.529
SalesGrowth	12,876	0.119	0.190	0.009	0.083	0.181
ForIncome	12,876	0.026	0.040	0.000	0.005	0.040
PPE	12,876	0.272	0.214	0.107	0.210	0.379
Rating	12,876	0.438	0.496	0.000	0.000	1.000
StdDevSales	12,876	0.150	0.131	0.066	0.110	0.186
TotalIO	12,876	0.553	0.346	0.283	0.668	0.829
Dividend	12,876	0.562	0.496	0.000	1.000	1.000
EQComp	12,876	0.554	0.294	0.368	0.634	0.798
CEOAge	12,876	4.015	0.131	3.932	4.025	4.111

Notes: this table presents the descriptive statistics for the primary testing sample compiled using the criteria outlined in Table 1. All variables are as defined in the Appendix. All continuous variables are winsorized at the 1% and 99% levels.

TABLE 3
Correlation Table

	Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
(1)	*Investment*$_{t+1}$	**1**	**0.09**	**0.06**	**0.14**	**-0.13**	**0.18**	**-0.15**	**0.19**	**0.22**	**0.23**	**0.16**	**0.07**	**0.08**	**-0.10**	**-0.02**	**0.02**	**-0.13**	**0.02**	**-0.07**	**0.27**
(2)	*DiffETR*	**0.09**	**1**	**0.02**	0.01	**-0.03**	**0.03**	**-0.08**	**-0.04**	0.00	**0.05**	**0.10**	**0.05**	-0.01	0.00	-0.01	**0.03**	**-0.14**	**0.07**	**-0.06**	**0.08**
(3)	*DTAX*	**0.04**	**0.09**	**1**	**0.02**	-0.01	**0.02**	**-0.04**	0.01	**0.01**	**0.02**	**0.02**	**0.03**	**-0.04**	-0.01	0.01	**0.04**	**-0.04**	-0.01	**-0.03**	**0.02**
(4)	*OverFirm*	**0.18**	0.01	**0.10**	**1**	**-0.32**	**0.55**	**-0.17**	**0.36**	**0.06**	**0.40**	**0.05**	**0.16**	**-0.37**	**-0.45**	0.01	**0.06**	**-0.22**	0.00	**-0.08**	**-0.04**
(5)	*Size*	**-0.11**	**-0.03**	0.00	**-0.34**	**1**	**-0.31**	**0.43**	**-0.18**	0.01	**-0.14**	**-0.07**	**0.22**	**0.18**	**0.66**	**-0.14**	**-0.03**	**0.30**	**0.36**	**0.11**	**-0.09**
(6)	*ZScore*	**0.25**	**-0.05**	**0.05**	**0.67**	**-0.40**	**1**	**-0.22**	**0.56**	**0.28**	**0.73**	**0.19**	**0.05**	**-0.19**	**-0.35**	**0.05**	0.01	**-0.15**	**-0.05**	**-0.07**	**0.08**
(7)	*Age*	**-0.15**	**-0.09**	-0.01	**-0.18**	**0.42**	**-0.20**	**1**	**-0.17**	**-0.09**	**-0.20**	**-0.23**	**0.11**	**0.07**	**0.34**	**-0.16**	**-0.04**	**0.44**	**0.11**	**0.17**	**-0.19**
(8)	*ROA*	**0.26**	**-0.08**	**0.02**	**0.35**	**-0.17**	**0.63**	**-0.14**	**1**	**0.72**	**0.66**	**0.30**	**0.17**	**-0.08**	**-0.21**	**0.10**	**0.03**	**-0.05**	**-0.03**	**-0.05**	**0.19**
(9)	*CFO*	**0.29**	**-0.01**	0.01	**0.06**	**0.00**	**0.29**	**-0.08**	**0.71**	**1**	**0.41**	**0.31**	**0.11**	**0.34**	**-0.05**	**0.03**	**-0.02**	**0.03**	-0.01	**-0.03**	**0.34**
(10)	*TobinQ*	**0.30**	0.01	**0.08**	**0.42**	**-0.14**	**0.70**	**-0.17**	**0.67**	**0.41**	**1**	**0.24**	**0.18**	**-0.17**	**-0.20**	0.01	-0.01	**-0.11**	**0.06**	**-0.10**	**0.16**
(11)	*SalesGrowth*	**0.18**	**0.07**	**0.04**	**0.09**	**-0.08**	**0.18**	**-0.22**	**0.31**	**0.28**	**0.25**	**1**	**0.06**	**-0.05**	**-0.09**	**0.13**	**0.05**	**-0.19**	**0.02**	**-0.06**	**0.36**
(12)	*ForIncome*	**0.07**	**0.05**	**0.15**	**0.10**	**0.28**	-0.01	**0.19**	**0.06**	-0.01	**0.12**	-0.01	**1**	**-0.14**	**0.08**	**-0.11**	**0.07**	**0.04**	**0.16**	**-0.02**	**0.06**
(13)	*PPE*	**0.14**	**-0.02**	**-0.11**	**-0.35**	**0.15**	**-0.18**	**0.11**	**-0.03**	**0.32**	**-0.16**	**-0.09**	**-0.17**	**1**	**0.18**	**-0.12**	**-0.04**	**0.17**	**-0.08**	**0.07**	**0.09**
(14)	*Rating*	**-0.10**	0.00	**-0.02**	**-0.44**	**0.68**	**-0.43**	**0.35**	**-0.20**	**-0.05**	**-0.20**	**-0.11**	**0.15**	**0.19**	**1**	**-0.06**	**-0.01**	**0.26**	**0.21**	**0.09**	**-0.09**
(15)	*StdDevSales*	**-0.04**	**-0.02**	**-0.04**	**0.04**	**-0.20**	**0.11**	**-0.15**	**0.08**	-0.01	-0.01	**0.09**	**-0.15**	**-0.10**	**-0.10**	**1**	**-0.03**	**-0.10**	**-0.08**	**-0.06**	**0.07**
(16)	*TotalIO*	**0.04**	**0.04**	**0.04**	**0.07**	0.01	**0.01**	**-0.07**	**0.02**	**-0.04**	0.00	**0.10**	**0.07**	**-0.09**	-0.01	**-0.02**	**1**	**-0.08**	**0.08**	**-0.04**	0.00
(17)	*Dividend*	**-0.14**	**-0.15**	**-0.04**	**-0.22**	**0.30**	**-0.13**	**0.46**	**-0.02**	**0.04**	**-0.08**	**-0.21**	**0.09**	**0.21**	**0.26**	**-0.11**	**-0.12**	**1**	**-0.03**	**0.18**	**-0.16**
(18)	*EQComp*	**0.02**	**0.08**	**0.06**	**0.03**	**0.39**	**-0.05**	**0.10**	0.00	0.01	**0.11**	**0.04**	**0.21**	**-0.13**	**0.21**	**-0.09**	**0.12**	**-0.04**	**1**	**-0.11**	**0.02**
(19)	*CEOAge*	**-0.06**	**-0.06**	**-0.03**	**-0.08**	**0.10**	**-0.06**	**0.17**	**-0.03**	**-0.01**	**-0.09**	**-0.06**	0.01	**0.09**	**0.10**	**-0.05**	**-0.05**	**0.17**	**-0.10**	**1**	**-0.07**
(20)	*Investment*	**0.48**	**0.09**	**0.03**	**0.06**	**-0.10**	**0.14**	**-0.19**	**0.25**	**0.36**	**0.24**	**0.32**	**0.05**	**0.15**	**-0.12**	0.00	0.00	**-0.19**	**0.04**	**-0.07**	**1**

Notes: this table presents Pearson (above identity) and Spearman (below identity) correlations among our variables of interest and control variables. All variables are as defined in the Appendix. All continuous variables are winsorized at the 1% and 99% levels. Correlations in bold are statistically significant at the 5% level or better.

TABLE 4
The Effect of Tax Aggressiveness on Investment Efficiency

Dependent Variable = $Investment_{t+1}$	Prediction	(1) Coefficient (t-stat)	(2) Coefficient (t-stat)
Intercept	?	20.2766***	20.8438***
		(5.90)	(6.06)
DiffETR	**? (H1b)**	**0.3656**	
		(0.99)	
DTAX	**? (H1b)**		**-0.3764**
			(-0.29)
OverFirm	**+**	**4.7367*** **	**4.7313*** **
		(9.68)	**(9.68)**
DiffETR*OverFirm	**+**	**1.3613** **	
		(2.22)	
DTAX*OverFirm	**+**		**0.9715**
			(0.52)
Size	-	-0.8042***	-0.8256***
		(-7.09)	(-7.27)
ZScore	-	-0.0817**	-0.0753**
		(-2.33)	(-2.14)
Age	-	-0.6404***	-0.6465***
		(-4.07)	(-4.11)
ROA	+	1.9136	0.0235
		(0.82)	(0.01)
CFO	+	4.5959*	5.6847**
		(1.89)	(2.34)
TobinQ	+	1.3206***	1.3633***
		(9.28)	(9.58)
SalesGrowth	+	0.9169	1.2356*
		(1.39)	(1.88)
ForIncome	+	1.5297	2.7915
		(0.51)	(0.93)
PPE	+	9.4983***	9.6573***
		(11.18)	(11.37)
Rating	+	0.6968**	0.7499**
		(2.31)	(2.48)
StdDevSales	-	-3.7300***	-3.6961***
		(-4.38)	(-4.34)
TotalIO	-	-0.8955**	-0.8718**
		(-2.22)	(-2.16)
Dividend	-	-1.1738***	-1.3321***
		(-4.61)	(-5.26)
EQComp	+	2.7565***	2.9066***
		(6.50)	(6.86)
CEOAge	-	-2.1134**	-2.2712***
		(-2.58)	(-2.77)
Investment	+	0.1463***	0.1473***
		(15.74)	(15.84)
Test: *DiffETR + DiffETR*OverFirm = 0*	**+ (H1a)**	**1.7269*** **	
		(4.10)	
Test: *DTAX + DTAX*OverFirm = 0*	**+ (H1a)**		**0.5952**
			(0.45)
Fixed Effects		Year & Industry	Year & Industry
Clustered Standard Errors		Firm	Firm
N		12,876	12,876
Adjusted R-Square		18.5%	18.3%

Notes: This table presents results of estimating OLS regression model 1. $Investment_{t+1}$ is measured as total investments (capital expenditures, research and development, and acquisitions) less the sale of property, plant, and equipment in year t + 1. Column (1) is the regression when tax aggressiveness is proxied as *DiffETR*, the difference between expected and actual three-year cash effective tax rates scaled by the expected three-year cash effective tax rate. Column (2) is the regression when tax aggressiveness is proxied as *DTAX*, the discretionary permanent book-tax differences (Frank et al., 2009). *OverFirm* is the ability to invest measured as the average ranking of cash and leverage rescaled to take a value between 0 and 1. All dependent, independent, and control variables are defined in the Appendix. All continuous variables are winsorized at the 1% and 99% levels. T-statistics are reported in italics below coefficient estimates. The symbols *, ** and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

TABLE 5
The Effect of Tax Aggressiveness on Investment Efficiency by Tax Aggressiveness and Tax Conservativeness

Dependent Variable = $Investment_{t+1}$	Prediction	(1) Coefficient (t-stat)	(2) Coefficient (t-stat)	(3) Coefficient (t-stat)	(4) Coefficient (t-stat)
Intercept	?	19.4799***	19.5569***	22.3394***	22.1003***
		(3.67)	(4.15)	(4.96)	(4.38)
DiffETR	**? (H1b)**	**-2.0131***		**0.7901**	
		(-1.91)		**(1.20)**	
DTAX	**? (H1b)**		**-1.6820**		**3.2684**
			(-0.87)		**(1.58)**
OverFirm	**+**	**2.0763****	**4.8739*****	**4.1057*****	**3.2891*****
		(2.17)	**(6.98)**	**(5.21)**	**(4.45)**
DiffETR*OverFirm	**+**	**7.0093*****		**-0.7116**	
		(4.19)		**(-0.65)**	
DTAX*OverFirm	**+**		**6.3407****		**-8.7276*****
			(2.24)		**(-2.90)**
Size	-	-0.9160***	-0.7896***	-0.7134***	-0.8271***
		(-5.38)	(-5.20)	(-4.68)	(-4.82)
ZScore	-	-0.0689	-0.1323***	-0.0848*	-0.0211
		(-1.36)	(-2.78)	(-1.71)	(-0.40)
Age	-	-0.6922***	-0.6729***	-0.5371**	-0.6242***
		(-2.92)	(-3.08)	(-2.54)	(-2.74)
ROA	+	1.5617	-2.4674	5.2243	2.0167
		(0.45)	(-0.78)	(1.63)	(0.59)
CFO	+	6.1426*	4.3074	1.8755	6.1983*
		(1.75)	(1.27)	(0.55)	(1.76)
TobinQ	+	1.4736***	1.4003***	1.1018***	1.3757***
		(7.13)	(7.33)	(5.55)	(6.42)
SalesGrowth	+	0.3369	1.9203**	1.0326	0.3574
		(0.36)	(2.10)	(1.11)	(0.38)
ForIncome	+	6.8161	6.8997*	-3.7544	-4.7660
		(1.57)	(1.81)	(-0.89)	(-0.97)
PPE	+	8.8201***	9.7026***	10.5221***	9.9501***
		(6.80)	(8.14)	(9.25)	(8.19)
Rating	+	0.7130	0.6898*	0.6404	0.7783*
		(1.54)	(1.65)	(1.61)	(1.78)
StdDevSales	-	-3.0408**	-3.8353***	-4.6166***	-3.7043***
		(-2.34)	(-3.18)	(-4.07)	(-3.06)
TotalIO	-	-0.4093	-0.6965	-1.5248***	-0.8830
		(-0.66)	(-1.24)	(-2.87)	(-1.53)
Dividend	-	-0.7887**	-1.4844***	-1.5371***	-1.0361***
		(-2.03)	(-4.24)	(-4.56)	(-2.82)
EQComp	+	1.5054**	2.7223***	3.9266***	3.1085***
		(2.36)	(4.75)	(6.91)	(4.95)
CEOAge	-	-1.8286	-1.6693	-2.4461**	-2.7666**
		(-1.45)	(-1.49)	(-2.27)	(-2.30)
Investment	+	0.1590***	0.1640***	0.1273***	0.1284***
		(11.51)	(12.73)	(10.07)	(9.53)
Test: *DiffETR + DiffETR*OverFirm = 0*	**+ (H1a)**	**4.9962*****		**0.0784**	
		(4.58)		**(0.10)**	
Test: *DTAX + DTAX*OverFirm = 0*	**+ (H1a)**		**4.6587****		**-5.4592****
			(2.27)		**(-2.57)**
Fixed Effects		Year & Industry	Year & Industry	Year & Industry	Year & Industry
Clustered Standard Errors		Firm	Firm	Firm	Firm
N		6,123	6,753	6,762	6,114
Adjusted R-Square		20.0%	19.4%	16.3%	17.7%

Notes: This table presents results of estimating OLS regression model 1. $Investment_{t+1}$ is measured as total investments (capital expenditures, research and development, and acquisitions) less the sale of property, plant, and equipment in year t + 1. Column (1) and (3) is the regression when tax aggressiveness is proxied as *DiffETR*, the difference between expected and actual three-year cash effective tax rates scaled by the expected three-year cash effective tax rate. Column (2) and (4) is the regression when tax aggressiveness is proxied as *DTAX*, the discretionary permanent book-tax differences (Frank et al., 2009). The columns are additionally separated by whether the firm is tax aggressive (*DiffETR* and *DTAX* > 0 for Columns (1) and (2), respectively) or tax conservative (*DiffETR* and *DTAX* > 0 for Columns (3) and (4), respectively). *OverFirm* is the ability to invest measured as the average ranking of cash and leverage rescaled to take a value between 0 and 1. All dependent, independent, and control variables are defined in the Appendix. All continuous variables are winsorized at the 1% and 99% levels. T-statistics are reported in italics below coefficient estimates. The symbols *, ** and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

TABLE 6

The Effect of Tax Monitoring on the Relation between Tax Aggressiveness and Investment Efficiency

Dependent Variable = $Investment_{t+1}$	Prediction	(1) Coefficient (t-stat)	(2) Coefficient (t-stat)	(3) Coefficient (t-stat)	(4) Coefficient (t-stat)
Intercept	?	14.0627***	15.2066***	30.1847***	30.5485***
		(2.89)	(3.12)	(3.72)	(3.75)
DiffETR	**? (H2)**	**0.0546**		**1.5833***	
		(0.11)		**(1.77)**	
DTAX	**? (H2)**		**-2.8030**		**-0.0191**
			(-1.59)		**(-0.01)**
OverFirm	+	4.2275***	4.2566***	5.8045***	5.7868***
		(6.18)	(6.23)	(5.04)	(5.01)
*DiffETR*OverFirm*	+	2.1715**		-0.3801	
		(2.57)		(-0.26)	
*DTAX*OverFirm*	+		6.3753*		-0.8498
			(1.91)		(-0.21)
Test: *DiffETR + DiffETR*OverFirm = 0*	**+ (H2)**	**2.2261*** **		**1.2032**	
		(3.98)		**(1.19)**	
Test: *DTAX + DTAX*OverFirm = 0*	**+ (H2)**		**3.5723***		**-0.8689**
			(1.85)		**(-0.35)**
Controls		Yes	Yes	Yes	Yes
Fixed Effects		Year & Industry	Year & Industry	Year & Industry	Year & Industry
Clustered Standard Errors		Firm	Firm	Firm	Firm
N		4,648	4,648	4,327	4,327
Adjusted R-Square		16.3%	16.0%	19.1%	18.8%

Notes: This table presents results of estimating OLS regression model 1. $Investment_{t+1}$ is measured as total investments (capital expenditures, research and development, and acquisitions) less the sale of property, plant, and equipment in year t + 1. Column (1) and (3) is the regression when tax aggressiveness is proxied as *DiffETR*, the difference between expected and actual three-year cash effective tax rates scaled by the expected three-year cash effective tax rate. Column (2) and (4) is the regression when tax aggressiveness is proxied as *DTAX*, the discretionary permanent book-tax differences (Frank et al., 2009). The columns are additionally separated by whether the firm does not have *APTS* (Columns (1) and (2)) or has *APTS* (Columns (3) and (4)). *OverFirm* is the ability to invest measured as the average ranking of cash and leverage rescaled to take a value between 0 and 1. All dependent, independent, and control variables are defined in the Appendix. All continuous variables are winsorized at the 1% and 99% levels. T-statistics are reported in italics below coefficient estimates. The symbols *, ** and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

TABLE 7

A Quasi-Natural Experiment Examining the Relation between Tax Aggressiveness and Investment Efficiency: Pre Versus Post FIN 48

Dependent Variable = $Investment_{t+1}$	Prediction	(1) Coefficient (t-stat)	(2) Coefficient (t-stat)	(3) Coefficient (t-stat)	(4) Coefficient (t-stat)
Intercept	?	5.3084	5.8031*	4.1424*	4.1414*
		(1.62)	(1.77)	(1.65)	(1.65)
DiffETR	**? (H3)**	**0.4440**		**3.7438*****	
		(0.34)		**(3.42)**	
DTAX	**? (H3)**		**-6.4266****		**2.5618**
			(-2.79)		**(1.54)**
OverFirm	+	1.2607	0.5641	1.2792	0.8020
		(0.71)	(0.32)	(0.90)	(0.56)
DiffETR*OverFirm	+	3.2889*		-3.6149**	
		(1.68)		(-2.11)	
DTAX*OverFirm	+		9.3905**		-0.2807
			(1.98)		(-0.12)
Test: *DiffETR + DiffETR*OverFirm = 0*	**+ (H3)**	**3.7329****		**0.1289**	
		(1.97)		**(0.12)**	
Test: *DTAX + DTAX*OverFirm = 0*	**+ (H3)**		**2.9639***		**2.2811**
			(1.67)		**(1.37)**
Controls		Yes	Yes	Yes	Yes
Fixed Effects		Year & Industry	Year & Industry	Year & Industry	Year & Industry
Clustered Standard Errors		Firm	Firm	Firm	Firm
N		1,280	1,280	1,280	1,280
Adjusted R-Square		16.6%	16.8%	17.6%	17.1%

Notes: This table presents results of estimating OLS regression model 1. $Investment_{t+1}$ is measured as total investments (capital expenditures, research and development, and acquisitions) less the sale of property, plant, and equipment in year t + 1. Column (1) and (3) is the regression when tax aggressiveness is proxied as *DiffETR*, the difference between expected and actual three-year cash effective tax rates scaled by the expected three-year cash effective tax rate. Column (2) and (4) is the regression when tax aggressiveness is proxied as *DTAX*, the discretionary permanent book-tax differences (Frank et al., 2009). The columns are additionally separated by whether the observation is in 2006 (Columns (1) and (2)) or in 2007 (Columns (3) and (4)). *OverFirm* is the ability to invest measured as the average ranking of cash and leverage rescaled to take a value between 0 and 1. All dependent, independent, and control variables are defined in the Appendix. All continuous variables are winsorized at the 1% and 99% levels. T-statistics are reported in italics below coefficient estimates. The symbols *, ** and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

TABLE 8
Buy-And-Hold Abnormal Returns: Tax Aggressive Versus Tax Conservative for Firms with High and Low Access to Investable Funds

		Rank *OverFirm*										
		0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
DiffETR	0	0.1611	0.1645	0.1824	0.1094	0.1099	0.2681	0.1354	0.1831	0.2157	0.2302	0.1976
	9	0.0086	0.0419	0.2115	0.2464	-0.0101	0.3257	0.0484	0.1436	0.1246	0.0942	0.0030
	Difference	**0.1525**	**0.1226**	**-0.0291**	**-0.1370**	**0.1200**	**-0.0576**	**0.0870**	**0.0395**	**0.0911**	**0.1360**	**0.1946****
	T-Stat	**1.52**	**1.40**	**-0.28**	**-1.33**	**1.21**	**-0.19**	**1.18**	**0.35**	**0.97**	**1.53**	**2.01**
DTAX	0	0.0718	-0.00315	0.2342	-0.1137	-0.1121	0.0132	0.2509	0.126	0.0958	0.1603	0.1659
	9	0.2848	0.1306	0.0106	0.047	0.146	-0.0377	-0.0149	-0.0145	0.0146	-0.0659	-0.1534
	Difference	**-0.2130**	**-0.1338**	**0.2236**	**-0.1607**	**-0.2581**	**0.0509**	**0.2658**	**0.1405**	**0.0812**	**0.2262***	**0.3193****
	T-Stat	**-0.56**	**-0.88**	**1.24**	**-1.22**	**-1.61**	**0.48**	**1.40**	**1.06**	**0.90**	**1.90**	**2.08**

Notes: This table presents the results of a difference in means for firms that are tax aggressive versus tax conservative across different levels of access to investable funds (*OverFirm*). Each firm is independently grouped by *OverFirm* and decile rank of tax aggressiveness (*DiffETR* or *DTAX*). For presentation purposes, I present the most conservative (*DiffETR,DTAX = 0*) and aggressive (*DiffETR,DTAX = 9*) groups and display the difference in means. Additionally, I calculate a t-statistic for whether that difference is significantly different from 0. The symbols *, ** and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

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