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The (Limited) Competitive Advantage of Tax Planning

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The (Limited) Competitive Advantage of Tax Planning

by

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Dedicated to my family.

ABSTRACT OF THE DISSERTATION

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Professor Richard M. Frankel, Chair

This dissertation documents that corporate tax planning innovations, proxied by decreases in effective tax rates, contribute to excess shareholder returns and, thereby, a competitive advantage. Compared to other improvements in firm performance, tax planning innovations have smaller factor loadings and explain fewer variations in excess returns. Notably, sales growth explains more than seven times the variations in excess returns compared to tax planning innovations. Tax planning even falls behind interest expense reductions, given the challenge of altering firm capital structure. To address the concern that changes in firm performance drive the association between tax planning innovations and excess returns, I explore the market reactions to the legislation events of the Tax Cuts and Jobs Act (TCJA). Consistent with a lower statutory rate reducing the benefit of tax planning, firms with stronger tax planning competitive advantage before TCJA experienced more negative market reactions. Overall, my study suggests that tax planning is not a major driver of competitive advantages.

Chapter 1: Introduction

> *It depletes government revenues, and if not accompanied by egalitarian measures, it risks increasing inequality by boosting the after-tax profits of shareholders, who tend to be towards the top of the income distribution.* – Alstadsæter, Godar, Nicolaides, and Zucman (2023)

This dissertation shows that corporate tax planning innovations constitute a competitive advantage by documenting their ability to generate *excess* returns[1]. I further compare tax planning innovations to other firm performance enhancers and find that tax planning's competitive edge is relatively modest. Adhering to the shareholder value maximization principle (Friedman, 1970), I focus on the *excess* returns accrued to shareholders. Thus, in this context, tax planning innovations refer to tax strategies not anticipated by shareholders.

Whether and by how much tax planning produces competitive advantage receives considerable attention. It is relevant to managers and shareholders who apply corporate tax strategies to maximizes equity value (Scholes et al. 2014; Dyreng et al. 2010; Armstrong et al. 2012). Gauging excess returns from tax planning informs whether corporate tax planning represents a wealth transfer from the public to proprietors, which potentially creates disparities in tax burdens and affects the government's functions (Zucman 2014). It also provides insights into the ethical debates surrounding corporate tax planning (Davis et al. 2016; Dyreng et al. 2016; Hasan et al. 2017). For regulators, understanding the competitive advantage of tax planning helps formulate tax policies that foster socially desirable outcomes rather than benefiting the existing owners of tax-favored assets (e.g., Stiglitz and Rosengard 2015; Donohoe et al. 2022). Some believe that corporate tax planning grants a sizeable advantage to shareholders (e.g., Alstadsæter et al. 2023).

[1] I follow Dyreng et al. (2008) and Hanlon and Heitzman (2010) and define tax planning broadly as all transactions that reduce explicit taxes.

To explore the presence and magnitude of tax planning's competitive advantage, I analyze the relation between decreases in cash effective tax rate and the *contemporaneous* common stock alpha (ALPHA). Decreases in cash effective tax rates proxy for innovations in tax planning (i.e., unexpected corporate tax planning activities). This measure assumes that cash effective tax rates (CETRs) follow a random walk process so that the first-order difference represents the unexpected tax planning[2]. ALPHA is the intercept term obtained by regressing weekly returns over the fiscal year on Fama-French three factors plus momentum. It reflects excess returns for shareholders by capturing the realized returns over and above the required returns predicted by the factor model. A stronger positive correlation between decreases in CETRs and ALPHA indicates a more substantial competitive edge from marginal tax planning efforts.

The examination of the relation between tax planning innovations and excess returns is distinct from existing literature. Previous studies focusing on levels of prices instead of excess returns do not preclude the explanation that the information embedded in prices predicts changes in tax planning proxies (i.e., prices lead taxes). Research linking tax planning to *future* returns primarily addresses market efficiency in assimilating tax information, not the competitive edge tax planning might offer. Examining market-to-book ratios further complicates the issue by introducing noise from the book values. Some studies use accounting rates of returns, such as ROA and ROE, which are distant from economic and excess returns (Fisher and McGowan 1983; Penman and Zhang 2021; Green et al. 2022)[3]. By focusing on the relation between decreases in CETRs and the *contemporary* common equity alpha, this dissertation speaks to the competitive advantage of tax planning, circumvents the measurement issues of accounting-based measures, and sheds light on the *relative* importance of tax planning, an area not extensively covered in

[2]Some changes in CETRs are anticipated. Section 5.1 shows that the CETRs are mean-reverting. Therefore, market participants expect a future decrease (increase) for firms with currently high (low) CETRs. However, the anticipated changes in CETRs do not qualitatively alter the inference on the existence of tax planning competitive advantage. Given market efficiency, the anticipated changes will not affect current and future returns and only constitute classical measurement errors that bias coefficients toward zero (i.e., attenuation bias). Section 5.1 further shows that the attenuation bias is not substantial.

[3]Appendix B analytically describes the biases introduced by accounting rates of returns when analyzing the value implications of tax planning.

existing literature[4].

I find robust evidence that decreases in CETRs are associated with higher ALPHA, suggesting that the competitive advantage of tax planning exists and financial accounting reflects such an advantage in a timely fashion. However, the magnitude of the association seems modest. Specifically, a one percent decrease in CETRs correlates with a 14 to 17 basis-point increase in annualized ALPHA. The effect is notably weaker than expected if tax planning were viewed as sustainable. For instance, if a firm could consistently save one more cent on every dollar earned through tax planning without incurring additional risks, the resultant excess return would be at least 1 percent[5].

Four major reasons suggest that the excess returns from tax planning innovations are modest, especially compared to other firm performance improvements. Unlike competitive advantages developed through R&D and brand names, the competitive moat surrounding tax-planning strategies appears narrow. First, firms cannot maintain an information advantage of tax planning because tax knowledge is non-exclusive and easily spread. Firms often shop tax strategies by consulting with professionals who serve many clients (e.g., Cook et al. 2020; McGuire et al. 2012). Additionally, tax strategies are also disseminated through "industry gossip and clever reverse-engineering (Novack and Saunders, 1998)[6]."

Second, the widespread adoption of similar tax strategies diminishes the ability of firms to retain nominal tax savings. The tax benefits will be passed on to customers (in competitive product markets) or suppliers (facing a downward demand curve). Consider the scenario where many manufacturers exploit tax advantages from semiconductor-related investments. The prices

[4]Hanlon and Heitzman (2010) assert that "taxes potentially affect many 'real' corporate decisions but their order of importance is still an open question."

[5]Suppose a perpetual firm operates with no leverage, expected future cash flows c, the required rate of returns r, and effective tax rate τ. Further, assume these parameters stay constant. In this case, the value of the firm p is $p = \frac{c(1-\tau)}{r}$. If the firm permanently shifts the effective tax rate from τ_0 to τ_1 holding everything else constant, the relative change of the firm value will be $\frac{p_1 - p_0}{p_0} = \frac{\tau_0 - \tau_1}{1-\tau_0} > \tau_0 - \tau_1$. That is, the percentage increases in firm value ($\frac{p_1 - p_0}{p_0}$%) are at least as large as the absolute reductions in the effective tax rate ($\tau_0 - \tau_1$). Note that $1 - \tau_0$ is less than 1 because the effective tax rate is non-negative.

[6]Barrios and Gallemore (2023) posit that some tax planning knowledge is firm-specific. However, the degree to which specific tax knowledge underpins overall tax planning activities remains unclear.

of the inputs – including materials necessary to build foundries, engineering talents, etc.– will increase due to the heightened demand. Meanwhile, the prices of semiconductor outputs will decrease due to the increased supply. Consequently, the competition among tax planners reduces the pretax returns, transferring real tax savings to suppliers and customers rather than retaining them for shareholders (Scholes et al., 2014; Stiglitz and Rosengard, 2015; Dyreng et al., 2022).

Tax planning also incurs various costs, including direct administrative costs (Scholes et al., 2014), agency issues (Desai and Dharmapala, 2006, 2009), conflicts between financial and tax objectives (Mills, 1998), and potential enforcement or political repercussions (Zimmerman, 1983). These non-tax costs dilute potential shareholder benefits. In addition, tax authorities and legislative entities are aware of prevalent tax-planning techniques and are poised to address them promptly.

Moreover, tax planning may increase the firm's risk exposure. These risks encompass tax audits and enforcement actions (Zimmerman, 1983; Mills, 1998), increased firm complexity and opacity (Desai and Dharmapala, 2006), the ambiguity inherent in tax codes and the challengeable legitimacy of claimed tax benefits (Frischmann et al., 2008), and future legislative or regulatory events.

From a valuation perspective, the aforementioned reasons collectively suggest that tax planning innovations might (1) have a negative impact on pretax cash flows, (2) lack persistence, and (3) result in increased risks and, consequently, higher required returns. Therefore, excess returns from tax planning innovations are likely modest both in absolute terms and when compared to other competitive advantages.

To evaluate the relative importance of tax planning innovations in generating excess returns, I conduct "horserace" regressions and analyses of covariance (ANCOVA). I find that ALPHA's relation with decreases in CETRs is weaker than its relation with pretax performance enhancements, such as sales growth and profit margin increases. Tax planning innovations also fall short compared to other cost leadership indicators, such as cuts in COGS (costs of goods sold) or SG&A (selling, general and administrative expenses)[7]. Analyses of covariance further indicate that tax planning innovations have less explanatory power for ALPHA compared to other revenue-boosting and cost-cutting variables. Remarkably, sales growth and COGS reductions each account for over seven times the variance explained by tax planning innovations in some specifications. Even reducing interest expenses has a stronger effect than tax planning innovations. This finding is surprising considering the difficulties inherent in adjusting capital structures (Flannery and Rangan 2006; Lemmon et al. 2008; Kim et al. 2019). These analyses suggest that tax planning is not an efficient avenue for gaining competitive advantages. They also overcome the shortcomings of studying tax planning innovations in isolation. Because we only observe marginal changes in tax planning, the absolute importance of tax planning might be understated. Accessing the relative importance avoids the need for a counterfactual scenario where no tax planning exists.

A major threat to identifying competitive advantages from tax planning is that changes in firm performance could concurrently influence both CETRs and excess returns. I address this concern by exploring the reduction in the statutory tax rate introduced by the Tax Cuts and Jobs Act (TCJA) in 2017. By reducing the federal corporate tax rate from 35% to 21%, the 2017 tax reform marks the most substantial reduction in federal statutory rates for corporations. The swift legislative process meant that many of TCJA's facets took managers by surprise, resulting in minimal anticipation effects (Gaertner et al., 2020). More importantly, TCJA did not directly affect firm performance.

I examine whether the market reactions to TCJA legislation events vary with the pre-TCJA competitive advantages from tax planning innovations. The rationale is that the decrease in the statutory rate diminishes the tax savings for each dollar a firm can shield from the IRS. For instance, transferring one dollar to an income category previously taxed at 12.5% saved \$(35%-12.5%)=\$0.225 before TCJA, compared to \$(21%-12.5%)=\$0.085 after. Hence, TCJA might decrease the competitive advantage of firms that are better at tax planning. Consistent with

[7]The interpretation of horserace regression needs the assumption that the specification does not bias against tax planning or for other performance improvements. It also assumes that once standardized, revenue-enhancing and cost-reducing strategies are as easy to implement as tax planning. Unlike horserace regression, analysis of covariance does not depend on these assumptions.

this notion, I find that firms with stronger *firm-level* relations between decreases in CETRs and ALPHA before TCJA experienced more negative market reactions during TCJA legislation events. These findings suggest that the association between decreases in CETRs and ALPHA captures shareholder excess returns from tax planning rather than changes in underlying performance. The findings also underscore the vulnerability of tax planning competitive advantage to legislative events and government interventions.

To investigate whether the limited competitive advantage from tax planning is due to the lack of persistence, I apply the method of Lemmon et al. (2008) to examine the time-series properties of CETRs. My analysis reveals a strong mean-reversion pattern: Firms with initially low CETRs soon experience increases, whereas those with high CETRs tend to shift to more favorable tax conditions rapidly. These findings suggest that first, companies can easily use tax planning to transition out of disadvantageous tax positions. Second, firms do not commit to maintaining costly and replicable tax strategies in the long run. Compared to CETRs, pretax profit margin and sales do not exhibit such rapid mean reversion.

I further explore whether the relation between decreases in CETRs and ALPHA can measure effective tax planning – tax planning activities that maximize after-tax returns. A competitive advantage is a sufficient condition for a tax planning strategy to be effective[8]. Despite this conceptual difference, I show that a higher relation between decreases in CETRs and ALPHA predicts better future tax outcomes, such as lower tax payments and postponed settlement with tax authorities. These results suggest that my measure of tax planning competitive advantage can substitute the effective tax planning measure proposed by Schwab et al. (2022a), especially considering its ease of interpretation and light computational demands.

Finally, I examine potential determinants of the competitive advantage of tax planning in the cross-section. I find that the relation between decreases in CETRs and ALPHA is more prominent for firms with more R&D opportunities, which is notably tax-advantaged. I find no evidence that commonly known tax planning activities, such as tax consulting or using tax havens, affect

[8] In a competitive equilibrium, firms do not earn excess returns. However, tax planning can still be considered effective if it prevents a decrease in returns that would otherwise occur in its absence.

the correlation. These results align with the notion that generic tax planning knowledge does not contribute to excess economic returns (Stigler, 1963). However, firms under tighter financial constraints appear to gain more from tax planning innovations, consistent with the view that tax planning acts as an internal financing mechanism (Edwards et al., 2016). Additionally, I investigate the societal views on the ethics of tax planning and find that firms with high ASSET4 community scores (a component of the social pillar that includes “tax controversies”) show a weaker association between decreases in CETRs and ALPHA. These findings suggest that the community score captures firms’ social images related to their tax behaviors. The concern over tarnishing these social images lowers the perceived excess returns from tax planning.

This dissertation contributes to the tax literature by presenting comprehensive evidence that tax planning innovations yield excess returns, and suggests that, on average, *marginal* tax planning activities are effective. Thus, the association between decreases in CETRs and ALPHA may serve as a measure of effective tax planning. I also highlight the modest magnitude of competitive advantage from tax planning, underscoring the necessity of selecting appropriate proxies for economic returns when analyzing the value implications of tax planning.

My dissertation also contributes to valuation literature by showing that investors seem to understand that nominal tax savings do not necessarily contribute to excess returns, which respond more strongly to other firm performance improvements. The documented mean-reverting properties of CETRs are useful for market participants to forecast firm tax burdens. Meanwhile, the moderate value implications of tax planning innovations raise doubts about the need for complex and costly forecasting methods.

For policymakers, my results indicate that market forces naturally limit shareholder gains from tax planning, and regulations can effectively nullify some of the already modest gains. Therefore, when combating tax avoidance, legislators can consider leveraging the competitive forces rather than introducing complicated tax codes, which may distract entrepreneurs from their core missions (Schumpeter, 1942).

The rest of my dissertation is organized as follows. Chapter 2 reviews existing literature and develops hypotheses based on the dissemination of tax knowledge, non-tax costs, tax planning risks, and government interventions. Chapter 3 describes the variables, data sources, and sample selection process, providing summary statistics. Chapter 4 presents the empirical analysis, demonstrating that decreases in cash effective tax rates (DCETR) are associated with higher equity alpha (ALPHA), but with relatively modest gains compared to other performance improvements. Chapter 5 includes additional tests and robustness checks to ensure the validity of the findings. Finally, Chapter 6 concludes with a summary of the main findings and discusses implications for managers, policymakers, and future research directions.

Chapter 2: Literature review and hypothesis development

2.1 Prior research on corporate tax planning and firm value

This dissertation is related to the literature on tax planning and shareholder value. I address a unique question of whether tax planning innovations generate excess returns and create competitive advantages. The distinctive feature of this dissertation is its use of contemporaneous ALPHA to gauge excess shareholder returns. Existing papers using other shareholder value metrics address different research questions[1].

Research that regresses prices on tax planning metrics (Koester, 2011) examines whether corporate tax information is integrated into firm valuation. Given that prices reflect all relevant information, anticipated tax planning activities, rather than tax planning innovations at the margin, may influence the results.

Another commonly used proxy is the market-to-book ratio (M2B) (Desai and Dharmapala, 2009; De Simone and Stomberg, 2012; Inger, 2014; Drake et al., 2019). Like prices, M2B incorporates information that may precede tax planning measures. Moreover, it is reliant on accounting book values, thereby potentially introducing measurement errors. For example, Fisher and McGowan (1983) illustrate that shifts in depreciation policies can influence accounting-based measures without actual changes in a firm's economic value. Even if the book value introduces mere white noise into the dependent variable, this noise is problematic as it can inflate regression standard errors, resulting in Type II errors.

Some studies use purely accounting-based measures such as ROA and ROE (Katz et al.,

[1] Barth et al. (2001) stressed that "[b]ecause price levels and price change approaches address related but different questions, failure to recognize these differences could result in drawing incorrect inferences."

2013; Blaylock, 2016). These measures are distant from economic and excess returns (Penman and Zhang, 2021; Green et al., 2022). Appendix B discusses the possibility that the measurement errors in ROA or ROE are directional due to accounting conservatism[2]. The concern over measurement errors is more pronounced if anticipated competitive advantage or shareholder gains from tax planning are moderate. In such situations, a statistical relation will be more difficult to document or driven by measurement errors.

Within the arena of returns, using contemporaneous or future returns yields different implications. Studies showing the associations between tax planning and future returns suggest "tax anomalies"- the market does not react in a timely manner or overreacts to tax-related information (Lev and Nissim, 2004; Heitzman and Ogneva, 2019). Demeré (2023) regresses contemporaneous buy and hold returns on tax expenses and finds mixed evidence. Thomas and Zhang (2014) (in their Table 6) find that contemporaneous returns are negatively associated with changes in tax expenses only when changes in pretax incomes are aggressively truncated. In most of their specifications, changes in tax expenses positively correlated with returns, consistent with tax expenses signaling future profitability. Note that neither Thomas and Zhang (2014) nor Demeré (2023) differentiate excess returns from overall returns. Moreover, tax expenses are not equivalent to tax planning.

Goh et al. (2016) examine tax planning and *ex ante* expected rate of returns, which they measure using the implied cost of capital derived from analyst forecasts and stock prices. They do not examine *excess* returns. Additionally, they control for the contemporaneous returns in their regression and, thereby, partial out any effect from the arrival of information regarding unanticipated tax planning innovations.

[2]ROE and ROA may decrease if a firm adopts a tax planning strategy that necessitates a significant upfront cost. For example, if the firm obtains tax benefits through additional R&D expenditures, accounting earnings will decrease due to the immediate expensing of R&D, leading to a lower contemporaneous ROE or ROA. Appendix B provides a more rigorous analysis showing that ETR will decrease when a new tax planning strategy is in place, but the contemporaneous ROE and ROA will decrease. The M2B ratio can provide correct inference when the book value of equity is positive.

Existing empirical studies hint at possible directional measurement errors. For example, Hasan et al. (2017) demonstrates a positive correlation between ROA and GAAP ETR, but a negative one with cash ETR. Such divergences are not predicted by existing tax planning theories. In addition, Huang (2022) examines government subsidies (essentially negative corporate taxes) and finds they are associated with lower ROA but higher M2B.

By focusing on the relation between decreases in CETRs and the *contemporaneous* common equity alpha, this dissertation provides large sample evidence that tax planning generates a competitive advantage. Utilizing ALPHA helps avoid the measurement issues common with accounting-based metrics. With a large sample and a relatively clean design, this dissertation sheds light on the *relative* importance of tax planning compared to other improvements in firm performance, filling a gap in the literature and responding to the call by Hanlon and Heitzman (2010) that "taxes potentially affect many 'real' corporate decisions but their order of importance is still an open question."

2.2 Hypothesis development

The benefit of tax planning is the reduction in tax cash outflows. However, whether the nominal tax savings translate into excess returns is more nuanced. The competitive edge from tax planning might be marginal or non-existent for four reasons. First, the competition among firms using similar tax strategies compels firms to shift tax savings to suppliers or consumers. Second, tax planning involves costly activities that reduce the net cash flows from tax savings. Third, tax planning may increase the firm's riskiness. Lastly, the government has incentives to curb widespread tax planning tactics, limiting potential tax savings.

2.2.1 Dissemination of tax knowledge and competition among tax planners

A strategy can generate excess returns when it is challenging for others to replicate. For instance, patents and trademarks provide exclusive rights to certain technologies or designs, requiring other firms to pay royalties to use them. In contrast, tax planning strategies do not come with such exclusive rights granted by any institution, making them more accessible and less likely to yield unique excess returns.

The spread of tax planning knowledge is likely swift in reality. Managers frequently acquire tax strategies through consultation with external professionals, such as legal and accounting firm tax experts, who are adept at unraveling and applying complex tax strategies. These specialists often advise multiple clients simultaneously (McGuire et al., 2012; Cook et al., 2020), potentially offering similar strategies to various firms, as the adoption by one does not hinder its use by others. Additionally, firms can gain tax insights through "industry gossip and clever reverse-engineering" (Novack and Saunders, 1998). This widespread availability of tax knowledge makes it challenging for a firm to maintain a lasting advantage in tax expertise.

Certain tax strategies might be specific to particular industries or firms. For example, firms may influence tax legislation to favor their own industry (Hanlon, 2018). However, the firm does not entirely retain the benefits from such influence, as politicians involved in these arrangements often extract their own rents. Neither can the firm prevent industry peers from free-riding its lobbying efforts (Pecorino, 1998). Barrios and Gallemore (2023) posit that some tax planning knowledge is unique to individual firms. Should this firm-specific tax knowledge significantly contribute to tax planning activities, one might expect the excess returns stemming from it to be persistent.

When multiple firms adopt similar tax strategies, competition tends to reduce pretax cash flows. Nominal tax savings are essentially shifted to suppliers or consumers. For example, if many firms invest in tax-exempt municipal bonds, increased demand would raise bond prices and lower yields. Similarly, if firms seek to utilize the 25% tax credit for qualified investments under the CHIPS and Science Act by expanding foundries in the US, this could intensify competition for resources like electrical engineers, pushing up input costs. Additionally, an increased supply of semiconductor products could lead to lower prices. As a result, in such scenarios, the pretax returns decrease, and the tax savings are transferred to suppliers and consumers[3] (Scholes et al., 2014; Stiglitz and Rosengard, 2015; Dyreng et al., 2022).

The previous argument presumes that firms engage in tax planning through investment activities. Tax planning can also occur through the manipulation of tax accounting figures,

[3] Note that the competition among tax planners is not equivalent to product market competition. In the municipal bond example, firms are competitive capital providers rather than product market competitors.

independent of actual investments. However, this approach to tax planning is not immune to competitive forces. Competitors employing similar "book-cooking" techniques may redirect tax savings towards improving product quality or lowering prices. Ultimately, in a competitive equilibrium, these savings are passed on to consumers.

In conclusion, the dissemination of tax knowledge and the competition among tax planners suggest that nominal tax savings are often passed to consumers and suppliers, leading to decreasing pretax cash flows over time. This reduction in pretax cash flows gradually undermines the net advantages of tax planning, leading to a lack of persistence in its benefits.

2.2.2 Non-tax costs of tax planning

Tax planning entails various non-tax costs. (1) Administrative expenses, such as fees for consultants and lawyers, are direct costs. (2) If tax planning involves relocating business operations abroad, adjustment costs arise. (3) Additionally, tax planning goals can clash with financial accounting objectives, creating a trade-off between minimizing taxable income and maximizing reported earnings (e.g., Maydew 1997; Mills 1998). This tension is especially pronounced since discrepancies between book and tax incomes can signal aggressive tax strategies. (4) Moreover, tax planning carries the risk of enforcement actions by tax authorities (Zimmerman, 1983) and potential backlash from the public (e.g., Davis et al. 2016; Dyreng et al. 2016; Hasan et al. 2017).

Desai and Dharmapala (2006, 2009) caution that tax planning might be a smokescreen for managerial rent-seeking. However, competition in the managerial labor market and shareholders' price protection can curtail such opportunistic behaviors[4](Ross, 1979). Belnap et al. (2023) further quantifies this perspective, finding that proxies for agency cost only account collectively for 8 to 11% of the explained variations in the tax avoidance metrics.

In the context of valuation, the non-tax costs associated with tax planning reduce the net tax savings derived from tax planning innovations. Should tax planning involve substantial agency

[4]Stock prices reflect information about managerial opportunistic behaviors. Lower stock prices can pose threats to management, such as takeovers. This pricing mechanism automatically protects investors.

issues, its NPV could potentially turn negative.

2.2.3 Tax planning risks

Tax planning may increase the firm's risk exposure. (1) It heightens the chances of audits and enforcement actions by tax authorities (e.g., Zimmerman 1983; Mills 1998). (2) Moreover, tax planning often increases the complexity and opacity of the firm(Desai and Dharmapala, 2006), as firms aim to conceal their tax avoidance strategies (Hope et al., 2013; Balakrishnan et al., 2019), thereby increasing information risk. (3) The ambiguity inherent in tax codes also introduces risks regarding the legitimacy of claimed tax benefits (Frischmann et al., 2008). (4) Moreover, tax strategies are vulnerable to changes in legislation and policies.

Should the risks associated with tax planning[5]be non-diversifiable, shareholders will demand a higher required rate of return as compensation. This increase in the required return would, in turn, reduce the excess returns that can be attributed to tax planning innovations.

2.2.4 Government intervention

Governments are motivated to curb prevalent tax avoidance tactics, as it not only secures government revenue but also addresses the concern over unfair tax burdens. For example, the legislators of the Tax Reform Act of 1986 stated that the reform aims to "[reduce] the number of economically healthy income-earning individuals and corporations who ... escape taxation altogether"(Auerbach and Slemrod, 1997). Similarly, the Tax Cuts and Jobs Act (TCJA) of 2017 introduced measures such as the Base-Erosion and Anti-Abuse Tax (BEAT) and the Global Intangible Low-Tax Income tax (GILTI). BEAT restricts the ability of firms to make deductible payments to affiliates in low-tax areas, while GILTI sets a minimum tax on certain foreign

[5]The empirical evidence regarding the risks associated with tax planning is mixed and contentious. Hasan et al. (2014) report that firms with lower ETRs face higher interest rates on bank loans. Contrarily, Dyreng et al. (2023) argue that adjusting for prior accounting losses nullifies the effect observed by (Hasan et al., 2014), suggesting that recent poor economic performance, rather than deliberate tax avoidance, drives the relation between low Cash ETR and higher loan spreads. Additionally, Guenther et al. (2017) find no evidence of the relation between proxies for tax avoidance and either future tax rate volatility or overall firm risk.

incomes. The acronyms of these provisions subtly hint at the legislative stance on tax avoidance and their intended goals. If implemented effectively, these government interventions could lessen the longevity of tax strategies, thereby reducing their potential for generating excess returns.

2.2.5 Conceptual hypothesis

The analysis so far suggests that tax planning innovations may not substantially enhance after-tax cash flows. Furthermore, any potential enhancement could be temporary and might introduce non-diversifiable risks. Consequently, the ability of tax planning innovations to generate excess returns remains an empirical question. Therefore, I present my conceptual hypothesis in its null form:

H0: Firm-level tax planning innovations do not generate excess shareholder returns.

Although tax planning may not directly result in excess returns, it remains a vital component of a business's strategic framework. Consider a competitive equilibrium where no firms generate excess returns. In this case, any inefficiency, such as incurring unnecessary tax expenses, could lead to a firm's competitive disadvantage and eventual elimination. Thus, this dissertation does not advocate that tax planning is unimportant.

Chapter 3: Variables, data, and summary statistics

3.1 Variables

The dependent variable in my analyses is the firm-year level equity alpha (ALPHA). This measure captures the concept of excess returns and addresses measurement errors inherent in return metrics based on book values. Specifically, I regress weekly returns on Fama-French three factors plus momentum at the firm-level (Carhart, 1997). ALPHA for a given firm is then defined as the intercept of this regression. Thus, ALPHA is the unexpected returns over and above the required rate of returns.

The key independent variable is the decrease in cash effective tax rates (DCETR), which proxies for tax planning innovations. This measure assumes that cash effective tax rates (CETR) follow a random walk process so that the first-order difference represents unexpected tax planning activities. My analysis includes both short-run (one-year) and long-run (three-year and five-year) CETRs because they may convey different information regarding tax planning (Dyreng et al., 2008). CETRs are capped between zero and one. DCETRs are calculated without overlapping the windows if long-run CETRs are used[1]. Schwab et al. (2022b) argue that extremely high or low ETRs (i.e., those above 40% or below 5%) are largely shaped by factors unrelated to firm tax practices. Therefore, I confine DCETRs from -35% to 35% to exclude observations that cross the thresholds of extreme ETRs.

Control variables include stock volatility (VOL) and coefficient of variance of sales ($CVSale$) to account for risk exposure. Firm size ($SIZE$), sales growth ($GROWTH$), and before-tax operating earnings margin ($BTPM$) (Ball and Nikolaev, 2022) collectively control for the pretax performance[2]. To isolate ETR determinants not related to tax planning, I incorporate a compre-

[1] For example, the decreases in the three-year cash ETRs ($DCETR3$) in the fiscal year 2017 are the three-year CETRs during the fiscal year 2012 to 2014 minus the three-year CETRs based on the fiscal year 2015 to 2017.

hensive set of controls, such as goodwill impairment ($GDWL$); the level ($NOLCF$), the change ($\Delta NOLCF$), and the indicator for net operating-losses-carry-forward ($INOLCF$)(Schwab et al., 2022b); and the exercise of options granted to managers ($OPTEXSD$)(Nissim, 2023). Additional "routine variables" include the level of accrual ($Accrual$) to control for earnings management that affects the denominator of ETRs (i.e., pre-tax incomes), institutional ownership ratio ($InstOwn$) to account for potential agency issues, and the leverage ratio ($LEVERAGE$) and its changes ($\Delta LEVERAGE$) to adjust for capital structure. Details of all variables are in Appendix A.

3.2 Sample and Data

The sample period is from the fiscal year 1993 to fiscal year 2022[3]. I require observations to have well-defined CETRs [4]. Following Dyreng et al. (2008), I exclude firms with "LP" or "TRUST" in their names and those with six-digit CUSIPs ending in "Y" or "Z." I also exclude firms from the "Banking, Insurance, Real Estate, Trading" sector, those lacking a clear Fama-French 30 industry classification (i.e., Fama-French 30 industry code equals 29 and 30 respectively), and firms in the public administration sector (i.e., SIC starts with 9). To calculate ALPHA, a firm-year is required to have at least 26 weekly return observations.

Firm fundamental data is from COMPUSTAT. Return data is from CRSP. For the cross-sectional tests, the tax consulting fees paid to auditors are from Audit Analytics. ESG data is acquired from Refinitiv, and the combined statutory rate data are from OECD. The sample

[2]The main DCETR-ALPHA relation (i.e., Column (4) to (6) of Table 4.1) remains largely unchanged without controlling for $GROWTH$ and $BTPM$. Thomas and Zhang (2014) argue that tax expenses might act as proxies for profitability if expectations of future performance are not controlled for. In this case, correlated omitted variable bias could arise from simultaneous improvements in performance, increasing both tax expenses and returns. Section 4.3 delves deeper into this issue. Though controlling for pretax performance mitigates concerns about correlated omitted variable bias, it reduces the variation of interest. Specifically, competition among tax planners, a channel previously discussed, tends to lower the pretax rate of returns. However, existing research suggests that the "proxy-for-profitability" role generally outweighs the competition among tax planners (e.g., Edwards et al. 2021). Moreover, tax planning's effect on pretax performance is not immediate because competitive equilibrium takes time to establish. Therefore, the influence of tax planner competition should remain even after controlling for contemporaneous pretax performance.

[3]The sample period is shorter accordingly when DCETR is based on the five-year window.

[4]That is, both cash taxes paid (numerator) and pretax income (denominator) are required to be positive, thereby excluding firms with negative pretax incomes.

selection procedure yields 42,310, 37,362, and 25,658 observations with all the control variables available for the one-year, three-year, and five-year measurement window, respectively.

3.3 Summary statistics

Table 3.1 presents the summary statistics for the one-year, three-year, and five-year measurement windows, respectively. ALPHA (interpreted as the weekly abnormal return) is ten basis points on average. Kothari and Warner (2007) asserts that the annual expected return is approximately 12% to 13%, suggesting that most of the returns are expected. Thus, it is not surprising that the average ALPHA is small but positive, indicative of innovations and economic growth. DCETRs are generally negative, consistent with the downward trend of overall corporate ETRs (Dyreng et al., 2017; Zucman, 2014; Edwards et al., 2021). The only exception is DCETR5. A possible explanation is that the longer window requires firms to maintain positive earnings over the long run, thereby reinforcing the role of tax expenses as an indicator of performance.

Table 3.1: Summary Statistics

Panel A: One-year measurement window

	N	Mean	STD	Min	Median	Max
$ALPHA$	42310	0.001	0.007	-0.017	0.001	0.026
$DCETR1$	42310	-0.004	0.120	-0.310	-0.003	0.307
$BTPM1$	42310	0.001	0.051	-0.181	0.001	0.183
VOL	42310	0.056	0.026	0.019	0.050	0.147
$CVSale$	42310	0.214	0.163	0.022	0.168	0.838
$GROWTH1$	42310	0.122	0.197	-0.300	0.085	0.979
$SIZE1$	42310	6.665	1.839	2.557	6.666	11.083
$GDWL1$	42310	-0.002	0.009	-0.078	0.000	0.000
$\Delta NOLCF1$	42310	-0.000	0.044	-0.206	0.000	0.233
$\Delta LEVERAGE1$	42310	0.001	0.071	-0.212	-0.003	0.266
$Leverage$	42310	0.495	0.212	0.072	0.503	1.000
$Accural$	42310	0.015	0.042	-0.095	0.009	0.178
$InstOwn$	42310	0.602	0.290	0.001	0.658	1.000
$INOLCF$	42310	0.371	0.483	0.000	0.000	1.000
$NOLCF$	42310	0.056	0.168	0.000	0.000	1.167
$OPTEXD1$	42310	0.005	0.009	0.000	0.000	0.048

Panel B: Three-year measurement window

	N	Mean	STD	Min	Median	Max
$ALPHA$	37362	0.001	0.007	-0.018	0.001	0.026
$DCETR3$	37362	-0.002	0.118	-0.309	0.000	0.300
$BTPM3$	37362	0.003	0.052	-0.169	0.002	0.179
VOL	37362	0.056	0.027	0.019	0.050	0.156
$CVSale$	37362	0.202	0.147	0.022	0.162	0.744
$GROWTH3$	37362	0.429	0.588	-0.357	0.267	3.300
$SIZE3$	37362	7.770	1.820	3.647	7.781	12.108
$GDWL3$	37362	-0.003	0.012	-0.085	0.000	0.000
$\Delta NOLCF3$	37362	0.003	0.028	-0.109	0.000	0.156
$\Delta LEVERAGE3$	37362	0.009	0.120	-0.325	0.002	0.398
$Leverage$	37362	0.497	0.212	0.070	0.506	1.000
$Accural$	37362	0.013	0.028	-0.049	0.008	0.129
$InstOwn$	37362	0.616	0.289	0.001	0.678	1.000
$INOLCF$	37362	0.374	0.484	0.000	0.000	1.000
$NOLCF$	37362	0.047	0.134	0.000	0.000	0.896
$OPTEXD3$	37362	0.015	0.023	0.000	0.001	0.109

(Continue)

Panel C: Five-year measurement window

	N	Mean	STD	Min	Median	Max
$ALPHA$	25658	0.001	0.007	-0.017	0.001	0.023
$DCETR5$	25658	0.008	0.115	-0.300	0.009	0.296
$BTPM5$	25658	0.004	0.055	-0.168	0.003	0.179
VOL	25658	0.054	0.026	0.019	0.048	0.152
$CVSale$	25658	0.179	0.125	0.021	0.146	0.647
$GROWTH5$	25658	0.676	0.861	-0.408	0.432	4.866
$SIZE5$	25658	8.521	1.781	4.353	8.544	12.678
$GDWL5$	25658	-0.003	0.011	-0.078	0.000	0.000
$\Delta NOLCF5$	25658	0.004	0.022	-0.068	0.000	0.129
$\Delta LEVERAGE5$	25658	0.016	0.141	-0.360	0.009	0.441
$Leverage$	25658	0.505	0.211	0.074	0.513	1.000
$Accural$	25658	0.010	0.021	-0.036	0.007	0.100
$InstOwn$	25658	0.665	0.276	0.003	0.741	1.000
$INOLCF$	25658	0.432	0.495	0.000	0.000	1.000
$NOLCF$	25658	0.054	0.139	0.000	0.000	0.904
$OPTEXD5$	25658	0.029	0.036	0.000	0.016	0.166

This table provides descriptive statistics for variables used in subsequent tests. All continuous variables are winsorized at the 1% and 99% level. Variable definitions are in the Appendix A.

Chapter 4: Empirical analysis

This section provides evidence that the DCETR-ALPHA correlation reflects a competitive advantage from tax planning innovations. I then compare tax planning innovations to other operating improvements, shedding light on their relative efficacy in creating excess returns.

4.1 Tax planning innovation and excess returns

I first regress ALPHA on DCETRs. DCETRs capture the unexpected tax planning activities, and ALPHA captures the excess returns in response. Eq. 4.1 summarizes the model:

$$ALPHA_{i,t} = \alpha + \beta DCETRn_{i,t} + \sum \times \mathbf{Controls_{i,t}} + \sum FE \tag{4.1}$$

where n stands for the length of the DCETR measurement window, which is one, three, or five years. The coefficient of interest is β. This base model adheres to the framework of an association study, enabling comparison among the factors influencing ALPHA.

Control variables are generally measured over the same period as DCETRs, except for those representing specific firm characteristics at a given point in time. These point-in-time variables include the leverage ratio, the ratio of institutional holdings, and both the level and indicator of net-operating-loss carryforwards. Additionally, accruals are calculated over a one-year window to reflect the firm's recent accounting practices. Variations are examined within industries (firms) using industry-fixed (firm-fixed) effects.

4.1.1 DCETR-ALPHA association

Table 4.1 presents the results using a one-year measurement window. DCETR1 has a significant positive relation with ALPHA across all specifications. The results are consistent with the notion that tax planning innovations provide excess returns. Given that ALPHA is based on weekly returns, the coefficients translate into 14 to 17 basis points of annualized excess returns for one percent extra decreases in CETR[1].

The economic magnitude of the association is noticeable but moderate. To illustrate, consider a basic perpetuity model where a firm with pretax cash flows E, the required rate of returns r, and effective tax rate τ operates perpetually without leverage. Assuming these parameters remain constant, the value of the firm p is then calculated as $p = \frac{E(1-\tau)}{r}$. If the firm permanently shifts the ETR from τ_0 to τ_1 holding everything else constant, the percentage change of the firm value will be $\frac{p_1-p_0}{p_0} = \frac{\tau_0-\tau_1}{1-\tau_0}$. Because the ETR is non-negative (i.e., $1 > \tau > 0$), the denominator is less than 1. Therefore, the percentage increases in firm value are at least as large as the absolute reductions in the ETR (i.e., $\tau_0 - \tau_1$).

The discrepancy between the theoretical benchmark and the observed DCETR-ALPHA correlation suggests that the competitive advantage from tax planning innovations is reduced by decreased pretax returns, non-tax costs, the lack of persistence, or increased risk exposures.

Figure 4.1 illustrates the DCETR-ALPHA correlation on a yearly basis. It shows that this relation holds across most years in the sample, suggesting that the observed DCETR-ALPHA correlation is not merely a consequence of the large sample size. Besides, there is no apparent time trend of the DCETR-ALPHA correlation[2]. Figure 4.2 provides the binned scatterplots of the DCETR-ALPHA relation[3], which reveal no significant non-linearity in the correlation.

[1]Using the coefficient in column (2) as an example, the annualized excess return for 1% decrease in tax burden is $(1\%)0.0027 \times 100 \times 52 \approx 14(bps)$.

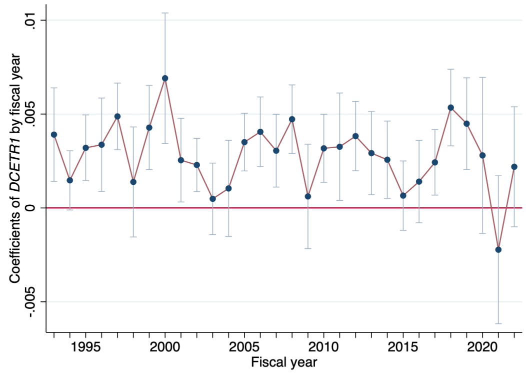
[2]Excluding the firm-years before they exited from the sample diminishes the year-over-year volatility of the DCETR-ALPHA correlation in general but accentuates the effect of TCJA (untabulated). This observation aligns with the idea that the TCJA, being a significant reform in U.S. tax history, offered a temporary window for firms to gain competitive advantages through tax planning. Furthermore, the removal of one or two years of data before firms exit the sample does not alter the main results (untabulated).

[3]Binned scatterplots are an application of the Frisch–Waugh–Lovell theorem. The procedure first regresses the y- and x-axis variables on the set of control variables, including fixed effects, and generates the residuals from those regressions. The program then groups the residualized x-variable into 20 equal-sized bins and computes the mean of the x-variable and y-variable residuals within each bin. The slope of the fit line matches the coefficient of the multivariate regression.

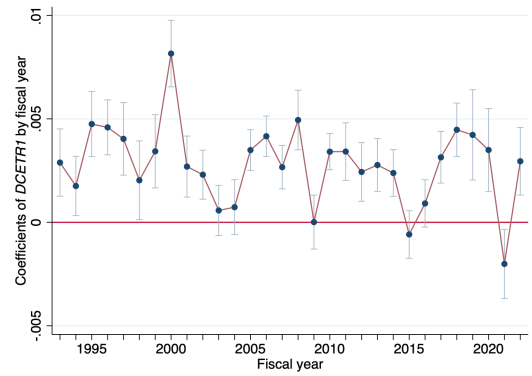
Table 4.1: Tax planning innovation and after-tax returns

	Dependent variable: ALPHA					
	(1)	(2)	(3)	(4)	(5)	(6)
$DCETR1$	**0.0027*** **	**0.0027*** **	**0.0030*** **	**0.0032*** **	**0.0029*** **	**0.0030*** **
	(9.39)	**(6.31)**	**(9.31)**	**(11.68)**	**(7.98)**	**(9.34)**
$BTPM1$				0.0253***	0.0254***	0.0235***
				(38.41)	(11.87)	(19.63)
VOL				0.0564***	0.0531***	0.0658***
				(39.18)	(5.82)	(9.05)
$CVSale$				-0.0051***	-0.0055***	-0.0053***
				(-19.78)	(-7.62)	(-8.35)
$SIZE1$				-0.0001***	-0.0001**	-0.0014***
				(-4.77)	(-2.20)	(-9.08)
$GROWTH1$				0.0089***	0.0095***	0.0091***
				(42.49)	(10.68)	(16.92)
$GDWL1$				0.0455***	0.0437***	0.0380***
				(12.76)	(11.75)	(7.66)
$Leverage$				0.0003*	0.0003	0.0017***
				(1.74)	(0.59)	(4.17)
$\Delta LEVERAGE1$				-0.0081***	-0.0079***	-0.0079***
				(-17.02)	(-10.41)	(-9.97)
$Accural$				-0.0098***	-0.0091***	-0.0092***
				(-11.92)	(-7.24)	(-6.64)
$InsOwn$				-0.0002	0.0000	0.0024***
				(-1.59)	(0.04)	(3.13)
$INOLCF$				-0.0003***	-0.0002**	-0.0000
				(-3.67)	(-2.67)	(-0.05)
$NOLCF$				-0.0007***	-0.0006**	-0.0003
				(-3.31)	(-2.17)	(-0.49)
$\Delta NOLCF1$				-0.0018**	-0.0018	-0.0018
				(-2.31)	(-1.43)	(-1.65)
$OPTEXD1$				0.0755***	0.1031***	0.1126***
				(20.64)	(14.19)	(15.98)
Constant	0.0015***	0.0015***	0.0015***	-0.0009***	-0.0010	0.0049***
	(41.53)	(2710.94)	(2397.90)	(-5.15)	(-1.25)	(3.81)
Observations	42310	42310	41317	42310	42310	41317
R-squared	0.002	0.024	0.155	0.139	0.156	0.265
Year FE		✓	✓		✓	✓
Industry FE		✓			✓	
Firm FE			✓			✓
Cluster		Year & Ind.	Year & Firm.		Year & Ind.	Year & Firm

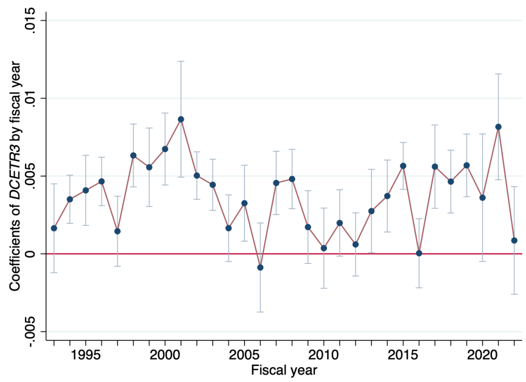
This table reports the association between DCETR1 and excess returns, proxied by the contemporaneous alpha from a three-factor plus momentum model. The observations are at the firm-year level. The sample is restricted to non-singletons with the presence of fixed effects. Columns (2) and (5) use industry fixed effect (Fama-French 30 industries). Columns (3) and (6) control for firm-fixed effects. Standard errors are clustered at the same level as the fixed effects. T statistics are in parentheses. ***, **, and * denote 1%, 5%, and 10% (two-tailed) significance level respectively. Variable definitions are in the Appendix A. Coefficients of interest are in bold.



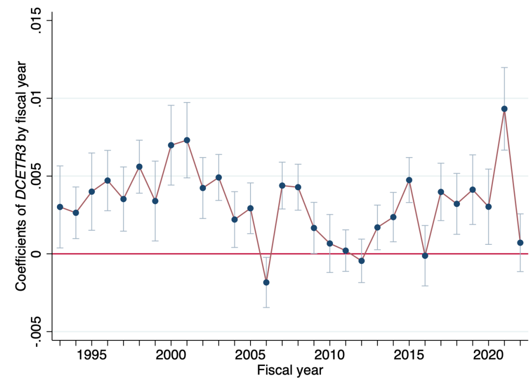
(A) One-year CETR (Industry FE)



(B) One-year CETR (Firm FE)



(C) Three-year CETR (Industry FE)

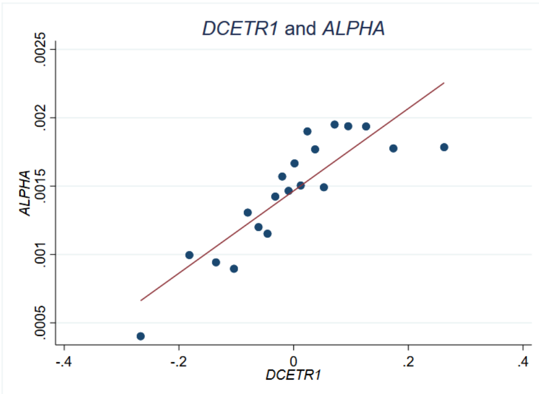


(D) Three-year CETR (Firm FE)

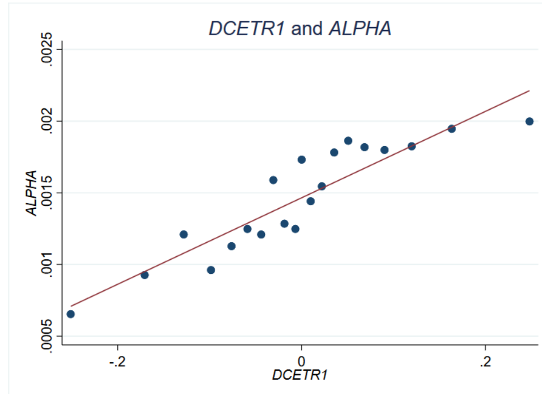
Figure 4.1: DCETR-ALPHA association over years. This figure illustrates the time-trend of the relation between DCETR and ALPHA. The vertical lines crossing each data point represent the 90% confidence intervals.

4.1.2 The differential information content of long-run versus short-run tax planning innovations

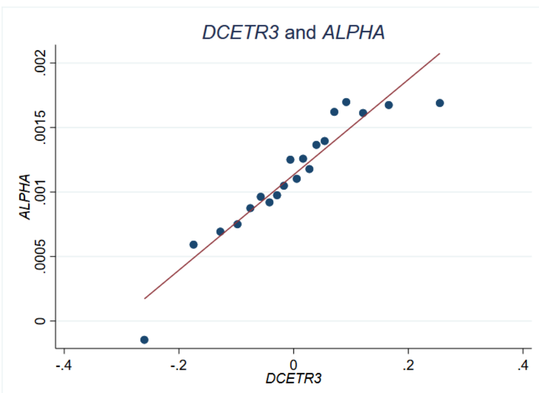
Table 4.2 presents the DCETR-ALPHA relation using various measurement windows for CETRs. The effectiveness of these measurement windows in capturing tax planning innovations is not clear *ex-ante*. Dyreng et al. (2008) argue that a long-term CETR serves as a better indicator of persistent tax planning strategies. If true, decreases in the long-term CETR would have a stronger influence on excess returns and provide incremental information to the short-run CETR. The long-term CETR also helps mitigate the transient fluctuations inherent in short-term CETR, potentially enhancing statistical power. On the other hand, the market incorporates



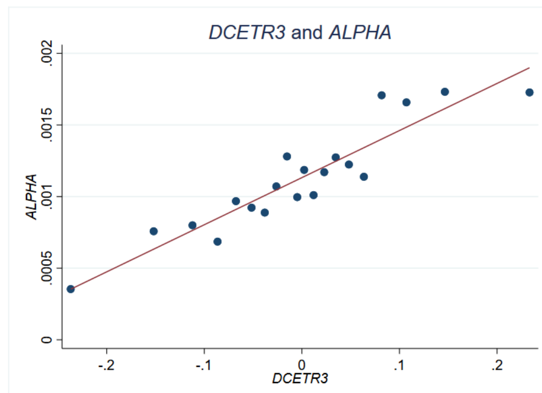
(A) DCETR1 (Industry FE)



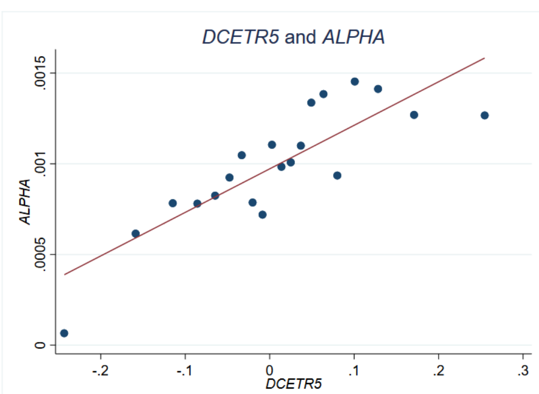
(B) DCETR1 (Firm FE)



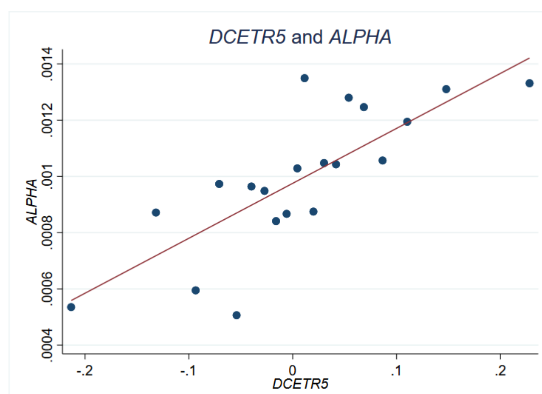
(C) DCETR3 (Industry FE)



(D) DCETR3 (Firm FE)



(E) DCETR5 (Industry FE)



(F) DCETR5 (Firm FE)

Figure 4.2: DCETR-ALPHA association. This figure illustrates the binned scatterplots of the relation between DCETR and ALPHA.

tax-related information in a relatively timely fashion. ALPHA is measured using a one-year window, whereas the long-run CETR is "backward-looking" and contains information already

Table 4.2: Tax planning innovation and after-tax returns

	Dependent variable: ALPHA					
	n=1	n=3	n=5	n=1	n=3	n=5
	(1)	(2)	(3)	(4)	(5)	(6)
$DCETRn$	0.0029***	0.0038***	0.0024***	0.0030***	0.0033***	0.0019***
	(7.98)	(7.33)	(4.64)	(9.34)	(7.64)	(3.19)
Observations	42310	37362	25658	41317	36660	25251
R-squared	0.156	0.057	0.047	0.265	0.183	0.167
Controls	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓
Industry FE	✓	✓	✓			
Firm FE				✓	✓	✓
Cluster	Year & Ind.	Year & Ind.	Year & Ind.	Year & Firm	Year & Firm	Year & Firm

This table reports the association between DCETRn and excess returns, proxied by the contemporaneous alpha from a three-factor plus momentum model. The observations are at the firm-year level. The sample is restricted to non-singletons with the presence of fixed effects. Columns (1) to (3) use industry fixed effect (Fama-French 30 industries). Columns (4) to (6) control for firm-fixed effects. n represents the length of the measurement window in calculating long-run CETR and other variables. Standard errors are clustered at the same level as the fixed effects. T statistics are in parentheses. ***, **, and * denote 1%, 5%, and 10% (two-tailed) significance level respectively. The list of the control variables and variable definitions are in Appendix A.

factored into prices before the starting point of ALPHA's measurement window. The obsolete information results in classical measurement errors and biases against finding any statistical relation. Therefore, long-run CETRs may not be more suitable for capital market research than short-run CETRs.

Table 4.2 shows that the strength of the DCETR-ALPHA relation initially rises and then declines as the measurement window of CETRs extends backward. This pattern indicates that the "backward-looking" nature of the long-term CETR measure introduces noise that eventually surpasses any potential incremental information. Furthermore, the R-squared also decreases as the measurement window extends.

Table 4.3 "stacks" DCETRs measured over different windows to directly investigate if long-run CETRs contain incremental information. I find that DCETR3 (i.e., the three-year window measure) loads positively, suggesting that long-run CETRs convey information regarding more persistent tax planning innovations. However, the coefficient of DCETR5 (i.e., the five-year window measure) is insignificant, implying that the market may have already factored in the information contained in DCETR5 in previous periods. Subsequent analyses, therefore, focus on

Table 4.3: Incremental information in long run ETRs

	Dependent variable: ALPHA	
	(1)	(2)
$DCETR1$	0.0025***	0.0026***
	(5.53)	(9.05)
$DCETR3$	0.0014***	0.0012***
	(3.91)	(3.61)
$DCETR5$	0.0001	0.0002
	(0.10)	(0.45)
Observations	21042	20622
R-squared	0.171	0.271
Controls	✓	✓
Year FE	✓	✓
Industry FE	✓	
Firm FE		✓
Cluster	Year & Ind.	Year & Firm

This table reports whether long-run tax planning innovations provide incremental information. I re-estimate Model 4.1 by "stacking" DCETRn measured over different windows, with control variables stacked as well. The observations are at the firm-year level. The sample is restricted to non-singletons with the presence of fixed effects. Standard errors are clustered at the same level as the fixed effects. T statistics are in parentheses. ***, **, and * denote 1%, 5%, and 10% (two-tailed) significance level respectively. The list of the control variables and variable definitions are in Appendix A.

the implications of the one-year and three-year window measures.

4.2 The relative importance of tax planning innovations

The findings thus far suggest that the absolute competitive advantage derived from tax planning innovation is moderate. In this subsection, I assess the relative importance of tax planning innovations compared to other performance improvements.

4.2.1 Comparison of the factor loading on ALPHA

I begin by examining the effect of tax planning innovations compared to other performance enhancements using horserace regressions. In Table 4.4, I reassess Eq.4.1 with all variables standardized. Therefore, the magnitude of the coefficients can be directly interpreted as the effect of a one standard deviation shift in the regressor on ALPHA. The covariates include all the aforementioned control variables plus measures of cost-cutting strategies, including the reduction of Cost of Goods Sold (COGS), Selling, General and Administrative Expenses (SG&A), and interest expenses. Additionally, to account for the investment components within these line items, I also control for R&D and marketing expenses. Note in Panel A that with the three-year measurement window (i.e., column (2) and column (4)), other performance improvement measures show weaker statistical power. A possible explanation is that the market incorporates information about other performance enhancements more swiftly than tax planning innovations. Consequently, using a three-year window could exaggerate the importance of tax planning innovations. My analysis of the relative importance of tax planning innovations thus focuses on the one-year measurement window.

The results in Panel A show that DCETR has the smallest effect among all covariates. Specifically, its impact is markedly weaker than that of sales growth, reductions in COGS, and decreases in SG&A expenses.

Breuer and deHaan (2023) argue that in the presence of fixed effects, the analysis should use the variables' standard deviation within these fixed effects to assess the economic significance. Accordingly, Panel B of Table 4.4 focuses on the "within fixed-effects" variation for each variable. Specifically, the first two columns report the standard deviation of the residuals for each variable after partialling out the variations attributable to fixed effects. Column (3) to Column (4) report the economic significance using the standard deviations of the residuals. The results show that DCETR has a considerable amount of variations within industry or firm fixed effects, while profit margin has fewer variations, indicating the challenges inherent in escalating prices or reducing per-unit costs within a specific firm or industry. When evaluating variations within fixed effects, tax planning seems to outperform reductions in interest expenses and is comparable to SG&A reductions. However, it remains less impactful than other forms of performance improvement.

I caution the readers that the interpretation using "one standard deviation change" assumes that such changes are equivalently probable across different variables. The ensuing variance

Table 4.4: Tax planning surplus compared to pre-tax revenue improvement (all variables standardized)

Panel A: Horserace regression

	Dependent variable: ALPHA			
	n=1	n=3	n=1	n=3
	(1)	(2)	(3)	(4)
$s(DCETRn)$	0.0267***	0.0596***	0.0279***	0.0543***
	(4.67)	(7.19)	(5.67)	(7.80)
$s(BTPMn)$	0.0850***	0.0800***	0.0756***	0.0728***
	(9.42)	(5.32)	(10.49)	(6.92)
$s(GROWTHn)$	0.2147***	-0.0634**	0.2061***	-0.0563***
	(10.48)	(-2.76)	(15.89)	(-2.91)
$s(\Delta COGSn)$	-0.1693***	-0.0179*	-0.1647***	0.0036
	(-7.54)	(-1.91)	(-12.75)	(0.38)
$s(\Delta SG\&An)$	-0.1343***	-0.0113	-0.1265***	0.0113
	(-7.93)	(-1.45)	(-10.27)	(1.15)
$s(\Delta XINTn)$	-0.0440***	-0.0044	-0.0488***	-0.0009
	(-4.20)	(-0.61)	(-6.22)	(-0.12)
Observations	42310	37362	41317	36660
R-squared	0.181	0.057	0.286	0.183
Controls	✓	✓	✓	✓
Year FE	✓	✓	✓	✓
Industry FE	✓	✓		
Firm FE			✓	✓
Cluster	Year & Ind.	Year & Ind.	Year & Firm	Year & Firm

Panel B: Economic significance evaluation using within fixed effects variations

	Standard deviation within fixed effects (SD)		*Estimated effects ($SD \times \|Coefficicent\|$)*	
	n=1	n=3	n=1	n=3
	(1)	(2)	(3)	(4)
Variations within industries				
$s(DCETRn)$	0.1195	0.1159	0.0032	0.0069
$s(BTPMn)$	0.0507	0.0519	0.0043	0.0042
$s(GROWTHn)$	0.1882	0.5507	0.0404	0.0349
$s(\Delta COGSn)$	0.0284	0.0442	0.0048	0.0008
$s(\Delta SG\&An)$	0.0223	0.0350	0.0030	0.0004
$s(\Delta XINTn)$	0.0066	0.0107	0.0003	0.0000
Variations within firms				
$s(DCETRn)$	0.1144	0.1051	0.0032	0.0057
$s(BTPMn)$	0.0482	0.0453	0.0036	0.0033
$s(GROWTHn)$	0.1613	0.3885	0.0332	0.0219
$s(\Delta COGSn)$	0.0263	0.0363	0.0043	0.0001
$s(\Delta SG\&An)$	0.0207	0.0284	0.0026	0.0003
$s(\Delta XINTn)$	0.0061	0.0089	0.0003	0.0000

This table reports the results of the horserace regressions where tax planning innovations are compared with other performance improvements. All variables are standardized. Panel A reports the coefficients. Columns (1) to (2) include industry-fixed effects. Columns (3) to (4) control for firm-fixed effects. In Panel B, Columns (1) to (2) report the variances within fixed effects. Columns (3) to (4) report the analysis of economic significance using variations within the fixed effects. n represents the length of the measurement window in calculating long-run CETR and other variables. Standard errors are clustered at the same level as the fixed effects. All control variables in Table 4.2 are included. The observations are at the firm-year level. The sample is restricted to non-singletons with the presence of fixed effects. T statistics are in parentheses. ***, **, and * denote 1%, 5%, and 10% (two-tailed) significance level respectively. The list of the control variables and variable definitions are in Appendix A.

Table 4.5: Variance decomposition

	Dependent variable: ALPHA								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Year FE	1.000				0.087	0.036		0.075	0.034
Ind FE		1.000			0.022			0.017	
Firm FE			1.000			0.510			0.454
$\Delta CETR1$				0.024	0.020	0.008	0.006	0.004	0.002
$BTPMnE$				0.246	0.231	0.079	0.031	0.029	0.011
$GROWTH$				0.222	0.221	0.088	0.103	0.104	0.048
$\Delta COGS$							0.129	0.119	0.052
$\Delta SG\&A$							0.082	0.075	0.029
$\Delta XINT$							0.014	0.012	0.006
Controls				0.509	0.421	0.279	0.633	0.564	0.362
R-squared	0.015	0.008	0.179	0.131	0.148	0.295	0.159	0.175	0.316

This table reports the results of the analysis of covariance (ANCOVA). For each specification, the variances are decomposed, and the numbers in the table represent the portion of the partial sum of squares explained by the variable or a category of variables, except for the last row, which reports the R-squared for each specification. Therefore, all cells but the last one in each column sum to unity. The list of the control variables and variable definitions are in Appendix A. Columns (7) to (9) also control for changes in R&D and advertisement expenditure.

decomposition tests complement the analysis by not relying on this assumption.

4.2.2 Comparison of the abilities to explain variation in ALPHA

Table 4.5 presents the results of variance decomposition of ALPHA. Each column represents a specification with ALPHA as the dependent variable, while each row denotes a (set of) regressor(s). The last row reports the R-squared of a given specification. Except for the last row, each cell's number denotes the partial sum of squares explained by the corresponding variable or set of variables, scaled by the total variations explicated by the model. Therefore, the numbers for all the regressors in a column sum up to one.

Table 4.5 indicates that across varied specifications, tax planning accounts for the least amount of variations in ALPHA relative to other revenue-increasing or cost-cutting measures. Notably, it is even less impactful than reducing interest expenses. This finding is surprising considering the challenges inherent in adjusting capital structures (e.g., Flannery and Rangan 2006; Lemmon et al. 2008; Kim et al. 2019). Taking the results together, it appears that tax planning is not a particularly efficient strategy for creating excess returns.

4.3 Endogeneity due to changes in firm performance

An endogeneity concern is that firm performance might simultaneously affect DCETR and ALPHA. I address this concern using two tests. The first test examines the impact of the Tax Cuts and Jobs Act (TCJA), which lowered the statutory tax rate, on the excess returns from tax planning innovations. The second test leverages the idea that performance enhancement makes ETRs converge to the statutory rate (Henry and Sansing, 2019).

4.3.1 Market reactions to the reduced tax planning benefits

I first apply an event study leveraging the significant deduction of the statutory rate introduced by TCJA. Reducing the federal corporate tax rate from 35% to 21%, the 2017 reform represents the largest cut in corporate statutory rates since the availability of tax cash flow data. The swift legislative process meant that many of TCJA's facets took managers by surprise, resulting in minimal anticipation effects (Gaertner et al., 2020). More importantly, TCJA did not directly affect firm performance.

Specifically, I examine whether the market reactions to TCJA legislation events vary in the cross-section with the *firm-level* DCETR-ALPHA relation prior to TCJA. The rationale is that the decrease in the statutory rate diminishes the tax savings for each dollar a firm can shield from the IRS. For instance, transferring one dollar to an income category previously taxed at 12.5% saved $(35%-12.5%)=$0.225 before TCJA, compared to $(21%-12.5%)=$0.085 after. Hence, TCJA might relatively decrease the equity values of the firms whose excess returns are more sensitive to tax planning.

This argument applies to tax planning through converting income from "one type to another" or from "one pocket to another," but not necessarily from "one period to another." The nuance is that the TCJA's rate reduction unexpectedly decreased net deferred tax liabilities. For example, deferring a dollar of taxable income until after TCJA would result in a nominal 14-cent tax saving. If intertemporal income shifting were the main source of tax planning competitive advantage, firms with a strong DCETR-ALPHA relation might see relatively positive market reactions. Yet, there are reasons to doubt that intertemporal income shifting is the primary driver of the DCETR-ALPHA correlation. The prevalence of tax deferral strategies and the low-interest environment prior to TCJA suggest that the benefits of such deferrals were likely marginal.

I follow Gaertner et al. (2020) in selecting significant TCJA event dates based on spikes in the Google Trends index for "tax reform[4]." For each event, I compute the three-day cumulative abnormal returns (CAR) and aggregate them to assess the overall market reaction to the TCJA legislation events. I then regress the aggregate CAR on the firm-level DCETR-ALPHA association prior to TCJA. Specifically, I estimate the DCETR-ALPHA relation (denoted as DTAR) for firms with at least 15 observations in the time series to ensure adequate degrees of freedom with the presence of control variables. Consistent with my main tests, I exclude firms with absolute changes in cash ETRs greater than 35%.

Table 4.6 reports the event study results. Consistent with the notion that TCJA decreases the marginal benefits of tax planning innovations, firms with stronger DCETR-ALPHA relations before TCJA (i.e., higher DTAR) experienced more negative market reactions during TCJA legislation events. The results are robust to the inclusion of control variables pre- or post-TCJA (i.e., control variables measured in 2016 or 2018). These findings suggest that the DCETR-ALPHA correlation captures excess returns from tax planning innovations rather than changes in underlying performance. Column (5) controls for the levels of CETRs measured in various time frames and shows robust results, suggesting that my proxy for the tax planning competitive advantage at the firm level (DTAR) offers insights beyond the intensive margin of tax planning. Moreover, shifting income from one time period to another does not seem to be the predominant tax planning strategy for generating excess returns. The findings also underscore the vulnerability

[4](See Figure 1 of Gaertner et al. 2020. The key events include the United Framework's reveal (09/27/2017), the TCJA's introduction to the House (11/02/2017), its House passage (11/16/2017), Senate passage (12/02/2017), the joint conference committee report (12/15/2017), and the Senate's finalization (12/20/2017).

Table 4.6: Tax planning shareholder gains and TCJA market reactions

	Dependent variable: Total CARs of TCJA events				
	(1)	(2)	(3)	(4)	(5)
$DTAR$	-0.0587***	-0.0574**	-0.0575***	-0.0576**	-0.0626**
	(-2.90)	(-2.67)	(-2.86)	(-2.56)	(-2.74)
$CETR1_{Pre}$					-0.0698
					(-1.61)
$CETR3_{Pre}$					0.1118
					(1.28)
$CETR5_{Pre}$					-0.0570
					(-0.77)
Observations	424	424	424	424	415
R-squared	0.274	0.317	0.306	0.343	0.355
Pre-TCJA Controls		✓		✓	✓
Post-TCJA Controls			✓	✓	✓
Industry FE	✓	✓	✓	✓	✓
Cluster	Ind.	Ind.	Ind.	Ind.	Ind.

This table reports the relation between TCJA market reactions and the competitive advantage from tax planning before TCJA. $DTAR$ is the firm-level relation between DCETR1 and ALPHA before TCJA, estimated for firms with at least 15 observations in the time series to obtain a sufficient degree of freedom when adding the control variables to the firm-level regression. "Pre-(post-)TCJA Controls" are the control variables measured in 2016 (2018). Standard errors are clustered by Fama-French 30 industries and fiscal years. The observations are at the firm-year level. The sample is restricted to non-singletons with the presence of fixed effects. T statistics are in parentheses. ***, **, and * denote 1%, 5%, and 10% (two-tailed) significance level respectively. The list of the control variables and variable definitions are in Appendix A.

of such a competitive edge to legislative events.

4.3.2 Convergence to the statutory rate driven by performance

The direction in which performance will affect the DCETR-ALPHA relation is uncertain. If firm performance rises without additional tax planning, the added income will be taxed at the statutory rate[5], causing the ETR trend toward the statutory rate. Henry and Sansing (2019) refer to such convergence as "the income effect." The influence of performance on the DCETR-ALPHA relation thus depends on the starting ETR (i.e., the ETR in the absence of any performance changes). If the initial ETR is above the statutory rate, ETR will decrease as performance improves, and thus, performance improvement biases in favor of my baseline results. Conversely, if the initial ETR is below the statutory rate, ETR will rise with performance improvements, biasing against my findings.

CETRs from the previous period serve as the proxy for the starting ETR. I use the OECD's "combined statutory rate" for the US, which includes all levels of taxation (federal, state, municipal, etc.), as the benchmark ETR that firms approach as their performance improves[6]. I label "Ascend" as one if the CETR in the previous period is lower than the "combined statutory rate" in the current period. These firms' ETRs are likely to approach the combined statutory rate from below as their performance improves, and the firms will exhibit a weaker DCETR-ALPHA association. This analysis uses observations with limited foreign sales to ensure that the "combined statutory rate" for the US reflects the rate firms are approaching.

Table 4.7 shows that, consistent with my predictions, "ascending" firms demonstrate a less positive DCETR-ALPHA relation. I further reestimate my main tests using only "ascending" firms to provide a conservative estimate. My main findings remain robust, suggesting that the DCETR-ALPHA relation captures tax planning competitive advantage even after being biased downward by performance changes.

[5] I define the "statutory rate" broadly, including taxes from all levels of the government.

[6] Since the combined statutory rate was unavailable before 2000, I estimate the rate for the years as the top-line federal statutory rate plus 6.6% multiplied by the difference between one and the federal rate.

Table 4.7: Tax planning innovation and after-tax returns

Panel A: Convergence to the combined statutory rate

	Dependent variable: ALPHA					
	Industry fixed effects			*Firm fixed effects*		
	$FS1$ < 5%	$FS1$ < 10%	$FS1$ < 15%	$FS1$ < 5%	$FS1$ < 10%	$FS1$ < 15%
	(1)	(2)	(3)	(4)	(5)	(6)
$DCETR1$	0.0034***	0.0038***	0.0035***	0.0039***	0.0044***	0.0041***
	(4.68)	(5.53)	(5.23)	(5.54)	(6.37)	(5.95)
$Ascend$	0.0002	0.0002	0.0001	0.0002*	0.0003**	0.0003**
	(1.17)	(1.51)	(1.22)	(1.94)	(2.62)	(2.27)
$DCETR1 \times Ascend$	**-0.0015**	**-0.0017**	**-0.0013**	**-0.0021****	**-0.0024*****	**-0.0020****
	(-1.26)	**(-1.44)**	**(-1.07)**	**(-2.42)**	**(-2.92)**	**(-2.36)**
Observations	22910	24677	26500	22078	23795	25596
R-squared	0.164	0.164	0.161	0.296	0.291	0.285
Controls	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓
Industry FE	✓	✓	✓			
Firm FE				✓	✓	✓
Cluster	Year & Ind.	Year & Ind.	Year & Ind.	Year & Firm	Year & Firm	Year & Firm

Panel B: $Ascend$ = 1

	Dependent variable: ALPHA					
	Industry fixed effects			*Firm fixed effects*		
	$FS1$ < 5%	$FS1$ < 10%	$FS1$ < 15%	$FS1$ < 5%	$FS1$ < 10%	$FS1$ < 15%
	(1)	(2)	(3)	(4)	(5)	(6)
$DCETR1$	0.0019**	0.0022***	0.0022***	0.0021***	0.0022***	0.0022***
	(2.69)	(3.11)	(2.99)	(4.42)	(4.84)	(4.47)
Observations	18625	20079	21581	17751	19172	20645
R-squared	0.160	0.161	0.157	0.306	0.302	0.296
Controls	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓
Industry FE	✓	✓	✓			
Firm FE				✓	✓	✓
Cluster	Year & Ind.	Year & Ind.	Year & Ind.	Year & Firm	Year & Firm	Year & Firm

This table examines whether changes in firm performance drive the relation between $DCETR$ and $ALPHA$ based on the notion that the bias's direction depends on the previous period's effective tax rate. $Ascend$ is an indicator variable that equals one if the CETR in the previous period is below the combined statutory rate. Panel A reports whether the relation between $DCETR$ and $ALPHA$ differs depending on the value of $Ascend$. Panel B reports the results from Model 4.1 using only the observations with $Ascend = 1$. The observations are at the firm-year level. The sample is restricted to non-singletons with the presence of fixed effects. Columns (1) to (3) use industry fixed effect (Fama-French 30 industries). Columns (4) to (6) control for firm-fixed effects. n represents the length of the measurement window in calculating long-run ETRs and other variables. Standard errors are clustered at the same level as the fixed effects. T statistics are in parentheses. ***, **, and * denote 1%, 5%, and 10% (two-tailed) significance level respectively. The list of the control variables and variable definitions are in Appendix A. Coefficients of interest are in bold.

Chapter 5: Additional Tests

5.1 The dynamics of effective tax rates

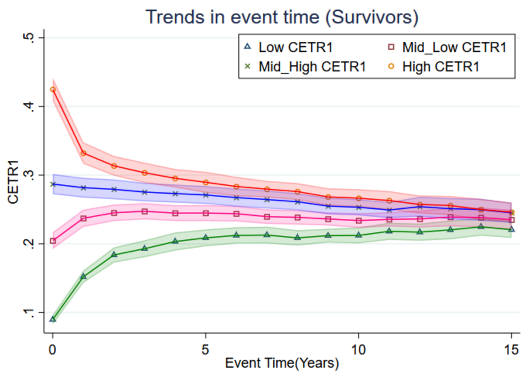
Given that tax planning innovations result in only marginal excess returns, firms may not maintain costly and easily replicable tax strategies in the long run. Thus, I apply the method from Lemmon et al. (2008) to investigate the dynamics of CETRs[1]. Figure 5.1 reveals a significant initial disparity in CETRs across the portfolios. However, firms with lower initial CETRs then experience a rapid increase, indicating a lack of commitment to maintaining the tax strategies. Conversely, firms with high CETRs swiftly shed these unfavorable conditions. The average tax burdens across all portfolios converge within a fifteen-year time frame.

Figure 5.2 repeats this analysis with pretax profit margins and sales, and yields drastically different results. Unlike CETRs, these performance metrics do not show strong convergence.

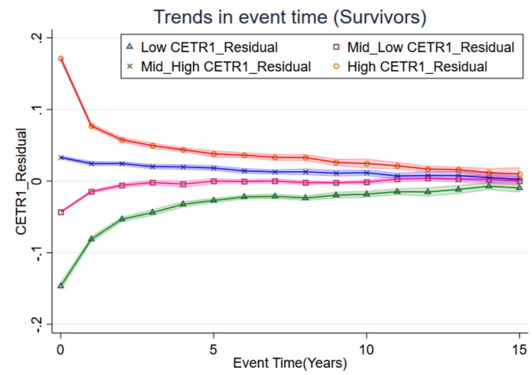
The results contrast Kim et al. (2019), who argue that different non-tax costs lead to different optimal tax strategies in equilibrium. By applying a more dynamic approach over a longer time window, I demonstrate that firms tend to converge towards similar tax positions over time, supporting the idea that tax planning offers a limited competitive advantage. In alignment with Guenther et al. (2017), firms with low CETRs generally remain within the low-tax group. However, my analysis indicates a gradual decrease in the average tax burden across groups over time. These inferences hold after using the residuals by partialling out the variations from control variables and fixed effects.

The dynamics of CETRs depicted in Figure 5.1 resemble an autoregressive process, indicating that historical CETRs can help predict future changes in CETRs. Using ALPHA as the dependent

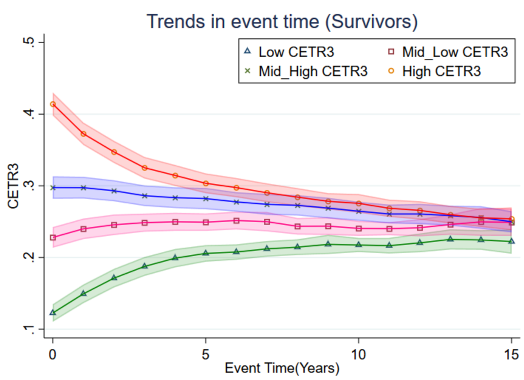
[1] I rank all firms annually based on their CETRs and allocate them into “high,” “mid-high,” “mid-low,” and “low” portfolios. Holding the portfolio fixed for the next 15 years, I compute the average CETR for each portfolio. This process of sorting and averaging is reiterated annually throughout the sample horizon. Figure 5.1 shows the average of these averages using solid lines, with the shaded areas delineating the 95% confidence intervals.



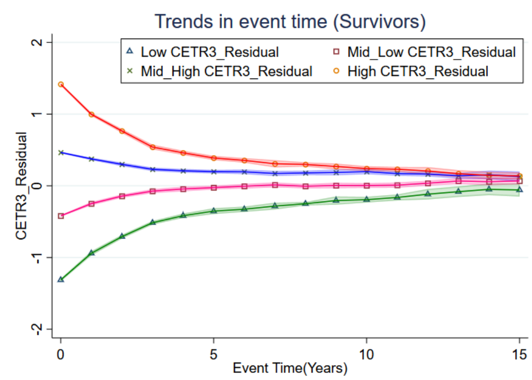
(A) One-year CETR



(B) One-year CETR (Residual)



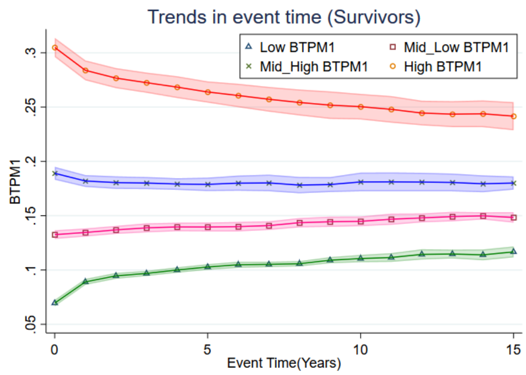
(C) Three-year CETR



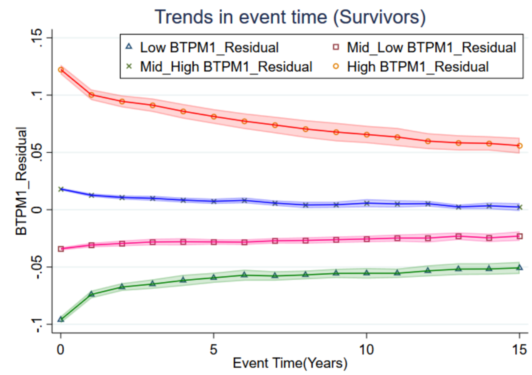
(D) Three-year CETR (Residual)

Figure 5.1: Dynamics of effective tax rate. This figure illustrates the dynamics of the effective tax rate of four distinct portfolios over time, with year zero marking the period in which the portfolios are constituted. Specifically, I rank all firms annually based on their CETRs and allocate them into high, mid-high, mid-low, and low categories. Holding the portfolio fixed for the next 15 years, I compute the average CETR for each portfolio. This process of sorting and averaging is reiterated annually throughout the sample horizon. Subsequently, the average of these averages is calculated to derive the solid lines depicted in the figure, with the shaded areas delineating the 95% confidence intervals. Sample firms must have a presence in the sample for a minimum of 15 years.

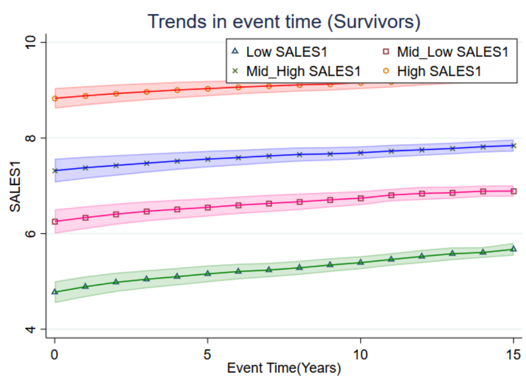
variable ensures that any predicted components in DCETR do not qualitatively affect the main conclusions given market efficiency. To further examine potential attenuation bias caused by predicted CETR changes, I employed dynamic panel data analysis. Specifically, I use the one-step Arellano–Bond estimator[2] (untabluated) and find that the first three lags of CETR1 significantly correlated with current CETR1, with the positive coefficients decreasing for more distant lags,



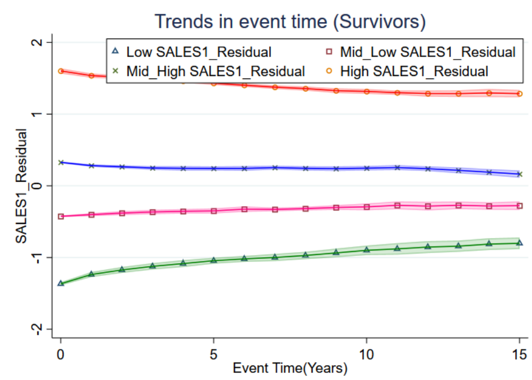
(A) Pretax profit margin



(B) Pretax profit margin (Residual)



(C) Sales



(D) Sales (Residual)

Figure 5.2: Dynamics of the pre-tax profit margin and the level of sales. This figure illustrates the dynamics of the pre-tax profit margin and level of sales, with year zero marking the period in which the portfolios are constituted. Specifically, I rank all firms annually based on pre-tax profit margin (level of sales) and allocate them into high, mid-high, mid-low, and low categories. Holding the portfolio fixed for the next 15 years, I compute the average pre-tax profit margin (level of sales) for each portfolio. This process of sorting and averaging is reiterated annually throughout the sample horizon. Subsequently, the average of these averages is calculated to derive the solid lines depicted in the figure, with the shaded areas delineating the 95% confidence intervals. Sample firms must have a presence in the sample for a minimum of 15 years.

aligning with the trends observed in Figure 5.1. I then re-estimate the baseline DCETR-ALPHA relation (Table 4.1) by controlling for the first three lags of CETR1 (untabulated). I find that the coefficients of DCETRs increase slightly, suggesting that accounting for these lags helps correct for some attenuation bias. Specifically, the loadings for DCETR1 increased by 0.0006 (18.75%), 0.0004 (13.79%), and 0.0003 (10%) compared to columns (4), (5), and (6) of Table

4.1, respectively. Despite these minor improvements, the inclusion of lag terms does not alter the conclusion that tax planning innovations are of relatively low importance compared to other competitive advantages.

5.2 DCETR-ALPHA relation and effective tax planning

This session compares the tax planning competitive advantage (i.e., the DCETR-ALPHA relation) with the effective tax planning measure proposed by Schwab et al. (2022a). Effective tax planning is defined as tax strategies that align with after-tax return maximization. However, achieving a competitive advantage through tax planning is more stringent than merely being effective. In a competitive equilibrium where all firms adopt an identical tax strategy and have zero after-tax returns, no competitive advantage is gained from that particular tax strategy. Nonetheless, not adopting that strategy is disadvantageous because the firm then will not efficiently manage its costs. Therefore, the tax strategy in this case is still effective because the after-tax return for the firm will be lower if such a strategy is not in place.

Despite the conceptual distinction between tax planning competitive advantage and effective tax planning, I repeat the validation tests from Schwab et al. (2022a)[3]. Panel A of Table 5.1 shows that excess returns from tax planning are negatively associated with cash taxes paid over the following three fiscal years (measured by $F3.CTP3$ and $F3.CETR3$). Panel B shows that the excess returns from tax planning are associated with lower settlements with tax authorities in the following year ($F1.SETTLE1$), but with higher settlements in the second year ($F2.SETTLE1$). Columns (3) and (4) of Panel B do not find statistically significant evidence that the DCETR-ALPHA relation is associated with lower total statements over the next three years. The findings

[2] The Arellano-Bond estimator is a statistical technique designed to address the endogeneity issue arising from lagged dependent variables and unobserved, individual-specific, time-invariant effects (i.e., firm-fixed effects) in panel data Nickell (1981). This method applies first differences to remove individual-fixed effects and uses past values of the lagged dependent variables as their own instruments. The identification assumption is that these instruments do not correlate with the first-differenced error terms.

In applying this technique, I model CETR1 by incorporating up to the fifth-order lag terms while also controlling for year-fixed effects and employing robust standard errors. The post-estimation Arellano–Bond test for serial correlation in the first-differenced errors suggests that the identification assumption is not violated.

in Panel B suggest that postponing adverse legal outcomes is a component of the competitive advantages of tax planning.

The results in Table 5.1 collectively document that tax planning competitive advantage, like the effective tax planning measure of Schwab et al. (2022a), correlates with favorable future tax outcomes. Therefore, the DCETR-ALPHA relation can serve as an alternative measure because the excess returns from tax planning are a sufficient but not a necessary condition for effective tax planning. The appeals of the DCETR-ALPHA relation are its straightforward interpretability and light computing burden.

5.3 Potential determinants of the DCETR-ALPHA relation

5.3.1 Availability of tax planning projects

Tax planning often necessitates tangible investments, such as R&D (to qualify for tax credits). However, firms' access to tax-advantaged investments varies. Firms that would have pursued investments regardless of tax benefits receive tax benefits as if they are incidental windfalls. In contrast, firms undertaking projects that only become profitable after considering tax benefits must accept the corresponding lower pretax returns. Additionally, firms may face entry barriers to tax-favored industries, incurring higher real costs of tax planning.

I test the effect of the availability of tax planning projects using changes in R&D intensity (*ΔR&DINT*), given R&D's significant role in explaining variations in ETRs[4]. Panel A in Table 5.2 shows that firms with more R&D have a more pronounced DCETR-ALPHA relation, suggesting that the excess returns from tax planning innovations are lower for firms with limited access to tax planning opportunities.

[3] I interact DCETR on the right-hand side of Eq.4.1 with future tax payments and future settlements with tax authorities. Therefore, the coefficient of the interaction term describes how these future tax outcomes vary with the DCETR-ALPHA relation.

[4] Belnap et al. (2023) show that R&D by itself explains 19% (49%) of variation in cash ETR (unrecognized tax benefits).

Table 5.1: Effective tax planning

Panel A: Future tax expenses

	Dependent variable: ALPHA			
	(1)	(2)	(3)	(4)
$DCETR1$	0.0049***	0.0047***	0.0054***	0.0047***
	(7.06)	(5.67)	(5.66)	(4.87)
$F3.CTP3$	-0.0098	-0.0115**		
	(-1.54)	(-2.18)		
$DCETR1 \times F3.CTP3$	**-0.0630****	**-0.0653*****		
	(-2.69)	**(-2.80)**		
$F3.CETR3$			-0.0005	-0.0012
			(-0.82)	(-1.66)
$DCETR1 \times F3.CETR3$			**-0.0077****	**-0.0062***
			(-2.39)	**(-1.86)**
Observations	24017	23412	23673	23094
R-squared	0.159	0.267	0.158	0.266
Controls	✓	✓	✓	✓
Year FE	✓	✓	✓	✓
Industry FE	✓		✓	
Firm FE		✓		✓
Cluster	Year & Ind.	Year & Firm	Year & Ind.	Year & Firm

Panel B: Settlements with tax authorities

	Dependent variable: ALPHA			
	(1)	(2)	(3)	(4)
$DCETR1$	0.0035***	0.0026***	0.0036***	0.0027***
	(4.10)	(3.39)	(4.40)	(3.54)
$F1.Settle1$	-0.0839	-0.0730		
	(-1.72)	(-1.73)		
$F2.Settle1$	-0.0769**	-0.0567		
	(-2.28)	(-1.34)		
$F3.Settle1$	-0.0687	-0.0221		
	(-1.38)	(-0.43)		
$DCETR1 \times F1.SETTLE1$	**-0.7441*****	**-0.6927****		
	(-3.54)	**(-2.52)**		
$DCETR1 \times F2.SETTLE1$	**0.7691***	**0.7237***		
	(1.78)	**(2.01)**		
$DCETR1 \times F3.SETTLE1$	**-0.0042**	**0.2815**		
	(-0.01)	**(0.72)**		
$F3.Settle3$			-0.2059***	-0.1563*
			(-4.44)	(-1.99)
$DCETR1 \times F3.SETTLE3$			**-0.2399**	**0.1192**
			(-0.72)	**(0.26)**
Observations	8675	8448	8675	8448
R-squared	0.137	0.263	0.136	0.262
Controls	✓	✓	✓	✓
Year FE	✓	✓	✓	✓
Industry FE	✓		✓	
Firm FE		✓		✓
Cluster	Year & Ind.	Year & Firm	Year & Ind.	Year & Firm

This table investigates the association between the DCETR-ALPHA relation and future tax outcomes. Panel A focuses on the relation's link to future tax cash payments and CETRs. Panel B assesses its connection with future settlements with tax authorities. The observations are at the firm-year level. The sample is restricted to non-singletons with the presence of fixed effects. Standard errors are clustered by Fama-French 30 industries and fiscal years. T statistics are in parentheses. ***, **, and * denote 1%, 5%, and 10% (two-tailed) significance level respectively. The list of the control variables and variable definitions are in Appendix A.

Table 5.2: Cross-sectional determinants of tax planning competitive advantage

Panel A: Availability of R&D projects

	Dependent variable: ALPHA			
	n=1	n=3	n=1	n=3
	(1)	(2)	(3)	(4)
$DCETRn$	0.0029***	0.0037***	0.0029***	0.0032***
	(8.04)	(7.28)	(7.96)	(5.45)
$\Delta R\&DINTn$	-0.0059	-0.0038	-0.0084	-0.0037
	(-0.71)	(-0.77)	(-0.90)	(-0.50)
$DCETRn \times \Delta R\&DINTn$	**0.0112**	**0.0987*****	**0.0098**	**0.1115*****
	(0.37)	**(3.01)**	**(0.33)**	**(3.60)**
Observations	42310	37362	41317	36660
R-squared	0.156	0.058	0.265	0.184
Controls	✓	✓	✓	✓
Year FE	✓	✓	✓	✓
Industry FE	✓	✓		
Firm FE			✓	✓
Cluster	Year & Ind.	Year & Ind.	Year & Firm	Year & Firm

Panel B: Income shifting

	Dependent variable: ALPHA			
	n=1	n=3	n=1	n=3
	(1)	(2)	(3)	(4)
$DCETRn$	0.0030***	0.0038***	0.0030***	0.0033***
	(8.15)	(7.86)	(8.07)	(5.87)
ΔFSn	-0.0003	-0.0004	-0.0003	-0.0009
	(-0.31)	(-0.52)	(-0.34)	(-1.40)
$DCETRn \times \Delta FSn$	**-0.0021**	**0.0020**	**-0.0056**	**-0.0020**
	(-0.31)	**(0.28)**	**(-0.89)**	**(-0.28)**
Observations	42310	37362	41317	36660
R-squared	0.156	0.057	0.265	0.183
Controls	✓	✓	✓	✓
Year FE	✓	✓	✓	✓
Industry FE	✓	✓		
Firm FE			✓	✓
Cluster	Year & Ind.	Year & Ind.	Year & Firm	Year & Firm

Panel C: New tax haven operation

	Dependent variable: ALPHA			
	n=1	n=3	n=1	n=3
	(1)	(2)	(3)	(4)
$\Delta CETRn$	0.0029***	0.0038***	0.0026***	0.0035***
	(5.71)	(5.55)	(5.17)	(4.70)
$NewHaven$	-0.0003***	-0.0002***	-0.0000	-0.0001
	(-3.24)	(-3.13)	(-0.57)	(-0.72)
$DCETRn \times NewHaven$	**0.0002**	**-0.0001**	**0.0008**	**-0.0006**
	(0.27)	**(-0.15)**	**(1.24)**	**(-0.62)**
Observations	42310	37362	41317	36660
R-squared	0.156	0.057	0.265	0.183
Controls	✓	✓	✓	✓
Year FE	✓	✓	✓	✓
Industry FE	✓	✓		
Firm FE			✓	✓
Cluster	Year & Ind.	Year & Ind.	Year & Firm	Year & Firm

5.3.2 Generic tax planning knowledge

Superior knowledge of profitable opportunities leads to excess returns (Stigler, 1963). Yet, common tax planning strategies, such as income shifting and using tax consultancy services, are broadly adopted and unlikely to outperform average tax strategies.

Panels B to D in Table 5.2 present the results pertaining to the impact of generic tax planning knowledge. Panel B uses the changes in foreign sales ratio (ΔFS) as a proxy for income shifting to low-tax jurisdictions. Panel C investigates the effect of newly established tax-haven operations in the past three years ($NewHaven$). These panels provide no statistically significant evidence that income shifting strengthens the DCETR-ALPHA correlation. Panel D uses the level of tax fees paid to the auditor as a proxy for outside tax services. There is no evidence that, on average, outside tax services alter the DCETR-ALPHA correlation.

5.3.3 Financial constrains

Tax planning is a means of internal financing. In equilibrium, the marginal costs of tax planning should equal the marginal costs of external financing (Edwards et al., 2021). Tax planning innovations, by reducing the marginal cost of tax planning, thus are expected to generate higher excess returns for firms facing greater marginal costs of external financing.

Panel E of Table 5.2 uses the decile ranking of the Kaplan-Zingales (KZ) index ($KZINDEX$) as the measure of external financing constraints on new investments. A higher $KZINDEX$ indicates more significant constraints. Consistent with the predictions, the DCETR-ALPHA correlation is more positive among firms that are more financially constrained[5].

5.3.4 Social image and ESG ratings

I extend the analysis to consider ESG ratings' influence on the competitive advantage of tax planning innovations. If ESG ratings are indicative of the societal norm that deems tax planning

[5] In an untabulated analysis, I included indicators for each decile of the KZ index as control variables. The main findings remained robust.

(Continue)

Panel D: Tax service from auditors

	Dependent variable: ALPHA			
	Industry fixed effects		*Firm fixed effects*	
	n=1	n=3	n=1	n=3
	(1)	(2)	(3)	(4)
$\Delta CETRn$	0.0036***	0.0032***	0.0033***	0.0033**
	(4.31)	(4.62)	(3.64)	(2.80)
$TAXFEEn$	-0.0000	-0.0000	-0.0000	0.0000
	(-0.30)	(-1.41)	(-0.41)	(0.11)
$DCETRn \times TAXFEEn$	**-0.0001**	**-0.0000**	**-0.0001**	**-0.0001**
	(-1.26)	**(-0.72)**	**(-0.89)**	**(-0.89)**
Observations	28933	23733	28215	23341
R-squared	0.170	0.048	0.280	0.166
Controls	✓	✓	✓	✓
Year FE	✓	✓	✓	✓
Industry FE	✓	✓		
Firm FE			✓	✓
Cluster	Year & Ind.	Year & Ind.	Year & Firm	Year & Firm

Panel E: Financial constrains

	Dependent variable: ALPHA			
	Industry fixed effects		*Firm fixed effects*	
	n=1	n=3	n=1	n=3
	(1)	(2)	(3)	(4)
$\Delta CETRn$	0.0003	0.0015*	0.0003	0.0013*
	(0.52)	(1.97)	(0.46)	(1.77)
$KZINDEXn$	-0.0001***	-0.0000*	-0.0004***	-0.0004***
	(-3.20)	(-1.87)	(-7.80)	(-5.99)
$DCETRn \times KZINDEXn$	**0.0004*** **	**0.0004*** **	**0.0003*** **	**0.0003*** **
	(4.54)	**(3.12)**	**(3.41)**	**(3.46)**
Observations	39829	34230	38821	33533
R-squared	0.130	0.052	0.255	0.193
Controls	✓	✓	✓	✓
Year FE	✓	✓	✓	✓
Industry FE	✓	✓		
Firm FE			✓	✓
Cluster	Year & Ind.	Year & Ind.	Year & Firm	Year & Firm

This table examines the cross-sectional determinants of the DCETR-ALPHA relation. Panel A uses R&D intensity to proxy for the accessibility to tax-favored projects. Panels B to D investigate generic tax planning knowledge. Panel E studies the effect of financial constraints, proxied by the decile ranking of the KZ index. The sample is restricted to non-singletons with the presence of fixed effects. Columns (1) and (2) use industry fixed effect. Columns (3) to (4) control for firm-fixed effects. n represents the length of the measurement window in calculating long-run ETR and other variables. Standard errors are clustered by Fama-French 30 industries and fiscal years. T statistics are in parentheses. ***, **, and * denote 1%, 5%, and 10% (two-tailed) significance level respectively. The list of the control variables and variable definitions are in Appendix A. Coefficients of interest are in bold.

as shirking civic responsibilities (Hasan et al., 2017), firms with higher ESG ratings will exhibit lower excess returns from tax planning because such ratings signify elevated expectations and the associated costs of breaching social norms.

Table 5.3 Panel A presents the findings using the community score of the social pillar from Refinitiv ESG ratings, a score that explicitly incorporates tax controversies as one of its criteria. I find that firms with higher ratings show less positive DCETR-ALPHA correlation. This is congruent with the notion that firms factor in the societal costs of straying from social norms[6]. Panel B shows the findings using the social pillar scores directly. Due to the extensive range of the social pillar, encompassing elements unrelated to tax, the tests show a weaker statistical power.

5.4 Robustness

5.4.1 Future profitability

Future profitability can either amplify or diminish the DCETR-ALPHA correlation. Thomas and Zhang (2014) show that tax expenses may signal future profitability, implying that decreases in tax expenses might suggest poorer future prospects for the firm, reducing the DCETR-ALPHA correlation. Conversely, managers commit to extensive, long-term tax planning only when confident in the firm's ability to generate substantial future profits. The high costs associated with misaligning with tax clientele—investing in tax strategies without achieving profitability or facing tax exhaustion—mean that incremental tax planning could indicate stronger future performance and increase the DCETR-ALPHA correlation.

Through all specifications, I follow Thomas and Zhang (2014) by incorporating proxies for anticipated future profitability, including current sales, sales growth, and pretax profit margins. Additionally, in a robustness check (untabulated), I include the forward terms of these controls

[6] Given the scant occurrences of tax controversy in the actual ESG data, it is unlikely that the community score merely reflects exposed tax-aggressive activities.

Table 5.3: Tax planning competitive advantage and social images

Panel A: Community socore

	Dependent variable: ALPHA			
	Industry fixed effects		*Firm fixed effects*	
	n=1	n=3	n=1	n=3
	(1)	(2)	(3)	(4)
$DCETRn$	0.0028***	0.0025***	0.0025***	0.0016**
	(3.98)	(3.20)	(3.05)	(2.19)
$High\_COMMn$	-0.0002	-0.0003	-0.0003	-0.0005*
	(-1.07)	(-1.38)	(-1.16)	(-1.98)
$DCETRn \times High\_COMMn$	**-0.0019**	**-0.0061****	**-0.0019**	**-0.0060***
	(-1.00)	**(-2.36)**	**(-0.98)**	**(-1.88)**
Observations	11528	8145	11299	7952
R-squared	0.144	0.060	0.281	0.226
Controls	✓	✓	✓	✓
Year FE	✓	✓	✓	✓
Industry FE	✓	✓		
Firm FE			✓	✓
Cluster	Year & Ind.	Year & Ind.	Year & Firm	Year & Firm

Panel B: Social pillar

	Dependent variable: ALPHA			
	Industry fixed effects		*Firm fixed effects*	
	n=1	n=3	n=1	n=3
	(1)	(2)	(3)	(4)
$DCETRn$	0.0027***	0.0025***	0.0024**	0.0016**
	(3.67)	(3.24)	(2.82)	(2.30)
$High\_SOCIALn$	-0.0004*	-0.0001	-0.0003	0.0001
	(-1.77)	(-0.36)	(-1.51)	(0.44)
$DCETRn \times High\_SOCIALn$	**0.0003**	**-0.0076***	**0.0007**	**-0.0068**
	(0.21)	**(-2.08)**	**(0.34)**	**(-1.52)**
Observations	11528	8145	11299	7952
R-squared	0.144	0.060	0.281	0.226
Observations	11528	8145	11299	7952
R-squared	0.144	0.060	0.281	0.226
Controls	✓	✓	✓	✓
Year FE	✓	✓	✓	✓
Industry FE	✓	✓		
Firm FE			✓	✓
Cluster	Year & Ind.	Year & Ind.	Year & Firm	Year & Firm

This table investigates the association between the DCETR-ALPHA relation and ESG ratings. The observations are at the firm-year level. The sample is restricted to non-singletons with the presence of fixed effects. Columns (1) and (2) use industry fixed effect. Columns (3) and (4) control for firm-fixed effects. n represents the length of the measurement window in calculating long-run ETRs and other variables. Standard errors are clustered by Fama-French 30 industries and fiscal years. T statistics are in parentheses. ***, **, and * denote 1%, 5%, and 10% (two-tailed) significance level respectively. The list of the control variables and variable definitions are in Appendix A. Coefficients of interest are in bold.

for up to three years. Despite a considerable reduction in sample size, the findings presented in Table 4.2 are robust. In conclusion, I find no indication that the "proxy for profitability" function of corporate income tax attenuates the observed shareholder excess returns from tax planning.

Chapter 6: Conclusion

This study documents a positive relation between decreases in cash effective tax rates (DCETRs) and common stock alpha (ALPHA), indicating that tax planning leads to excess returns and thereby confers a competitive advantage. A comparative "horserace" regression and the analysis of covariance (ANCOVA) further show that while tax planning innovations yield excess returns, these returns are relatively moderate in scale.

By leveraging a significant statutory rate change introduced by the Tax Cut and Jobs Act (TCJA), which reduces the benefits of tax planning, I document that firms with a stronger DCETR-ALPHA relation experienced more negative market reactions during TCJA legislation events. This finding suggests that the DCETR-ALPHA relation is not merely a byproduct of contemporaneous performance improvements. It also indicates that regulatory changes can diminish tax planning advantages. Further, I explore the idea that the direction in which performance changes bias the DCETR-ALPHA relation depends on the initial effective tax rate (ETR). Firms with historically low ETRs might approach the statutory rate from below, creating a bias against detecting the DCETR-ALPHA relation. Nevertheless, the DCETR-ALPHA relation holds even in samples most likely biasing against discovering it.

The interpretation of my findings relies on several key assumptions. First, it assumes that tax planning activities and comparable performance improvements follow random walk processes. Nonetheless, I provide evidence that the attenuation bias from the expected tax planning does not affect my main conclusions. Second, it presupposes that the market is similarly efficient in assimilating information about various aspects of firm performance, tax planning included. The market efficiency in responding to tax planning innovations remains an under-explored area that could benefit from further empirical investigation.

My dissertation suggests that both market forces and government interventions can curtail tax planning. It has implications for managers who use tax planning to increase shareholder value, as well as regulators who intend to use tax policies to induce socially desirable activities rather than creating shareholder windfalls. The results also imply that ETR estimations may not significantly affect firm valuations. Future research could investigate whether the shareholder excess returns from tax planning detrimentally affect other stakeholders, or explore the roles of tax forecasts in analyst reports.

Bibliography

A. Alstadsæter, S. Godar, P. Nicolaides, and G. Zucman. Global tax evasion report 2024. 2023.

C. S. Armstrong, J. L. Blouin, and D. F. Larcker. The incentives for tax planning. *Journal of accounting and economics*, 53(1-2):391–411, 2012.

A. J. Auerbach and J. Slemrod. The economic effects of the tax reform act of 1986. *Journal of Economic Literature*, 35(2):589–632, 1997.

K. Balakrishnan, J. L. Blouin, and W. R. Guay. Tax aggressiveness and corporate transparency. *The Accounting Review*, 94(1):45–69, 2019.

R. Ball and V. V. Nikolaev. On earnings and cash flows as predictors of future cash flows. *Journal of Accounting and Economics*, 73(1):101430, 2022.

J. M. Barrios and J. Gallemore. Tax planning knowledge diffusion via the labor market. *Management Science*, 2023.

M. E. Barth, W. H. Beaver, and W. R. Landsman. The relevance of the value relevance literature for financial accounting standard setting: another view. *Journal of accounting and economics*, 31(1-3):77–104, 2001.

A. Belnap, K. Kroeger, and J. R. Thornock. Explaining tax avoidance: Insights from thirty years of research. *Available at SSRN 4530437*, 2023.

B. S. Blaylock. Is tax avoidance associated with economically significant rent extraction among us firms? *Contemporary Accounting Research*, 33(3):1013–1043, 2016.

M. Breuer and E. deHaan. Using and interpreting fixed effects models. *Available at SSRN*, 2023.

M. M. Carhart. On persistence in mutual fund performance. *The Journal of finance*, 52(1):57–82, 1997.

K. A. Cook, K. Kim, and T. C. Omer. The cost of independence: Evidence from companies' decisions to dismiss audit firms as tax-service providers. *Accounting Horizons*, 34(2):83–107, 2020.

A. K. Davis, D. A. Guenther, L. K. Krull, and B. M. Williams. Do socially responsible firms pay more taxes? *The accounting review*, 91(1):47–68, 2016.

L. De Simone and B. Stomberg. Do investors differentially value tax avoidance of income mobile firms? *Available at SSRN 2102903*, 2012.

P. Demeré. Is tax return information useful to equity investors? *Review of Accounting Studies*, 28(3):1413–1465, 2023.

M. A. Desai and D. Dharmapala. Corporate tax avoidance and high-powered incentives. *Journal of financial Economics*, 79(1):145–179, 2006.

M. A. Desai and D. Dharmapala. Corporate tax avoidance and firm value. *The review of Economics and Statistics*, 91(3):537–546, 2009.

M. P. Donohoe, H. Jang, and P. Lisowsky. Competitive externalities of tax cuts. *Journal of Accounting Research*, 60(1):201–259, 2022.

K. D. Drake, S. J. Lusch, and J. Stekelberg. Does tax risk affect investor valuation of tax avoidance? *Journal of Accounting, Auditing & Finance*, 34(1):151–176, 2019.

S. Dyreng, R. Hills, C. Lewellen, and B. P. Lindsey. Endogeneity and the economic consequences of tax avoidance. *Available at SSRN 4412400*, 2023.

S. D. Dyreng and B. P. Lindsey. Using financial accounting data to examine the effect of foreign operations located in tax havens and other countries on us multinational firms' tax rates. *Journal of Accounting Research*, 47(5):1283–1316, 2009.

S. D. Dyreng, M. Hanlon, and E. L. Maydew. Long-run corporate tax avoidance. *The accounting review*, 83(1):61–82, 2008.

S. D. Dyreng, M. Hanlon, and E. L. Maydew. The effects of executives on corporate tax avoidance. *The accounting review*, 85(4):1163–1189, 2010.

S. D. Dyreng, J. L. Hoopes, and J. H. Wilde. Public pressure and corporate tax behavior. *Journal of Accounting Research*, 54(1):147–186, 2016.

S. D. Dyreng, M. Hanlon, E. L. Maydew, and J. R. Thornock. Changes in corporate effective tax rates over the past 25 years. *Journal of Financial Economics*, 124(3):441–463, 2017.

S. D. Dyreng, M. Jacob, X. Jiang, and M. A. Müller. Tax incidence and tax avoidance. *Contemporary Accounting Research*, 39(4):2622–2656, 2022.

A. Edwards, C. Schwab, and T. Shevlin. Financial constraints and cash tax savings. *The Accounting Review*, 91(3):859–881, 2016.

A. Edwards, A. Kubata, and T. Shevlin. The decreasing trend in us cash effective tax rates: The role of growth in pre-tax income. *The Accounting Review*, 96(5):231–261, 2021.

F. M. Fisher and J. J. McGowan. On the misuse of accounting rates of return to infer monopoly profits. *The American Economic Review*, 73(1):82–97, 1983.

M. J. Flannery and K. P. Rangan. Partial adjustment toward target capital structures. *Journal of financial economics*, 79(3):469–506, 2006.

M. Friedman. The social responsibility of business is to increase its profits. *New York Times Magazine*, 1970.

P. J. Frischmann, T. Shevlin, and R. Wilson. Economic consequences of increasing the conformity in accounting for uncertain tax benefits. *Journal of Accounting and Economics*, 46(2-3): 261–278, 2008.

F. B. Gaertner, J. L. Hoopes, and B. M. Williams. Making only america great? non-us market reactions to us tax reform. *Management Science*, 66(2):687–697, 2020.

B. W. Goh, J. Lee, C. Y. Lim, and T. Shevlin. The effect of corporate tax avoidance on the cost of equity. *The Accounting Review*, 91(6):1647–1670, 2016.

J. Green, H. Louis, and J. Sani. Intangible investments, scaling, and the trend in the accrual–cash flow association. *Journal of Accounting Research*, 60(4):1551–1582, 2022.

D. A. Guenther and R. C. Sansing. Implicit tax, tax incidence, and pretax returns. *The Accounting Review*, 98(2):201–214, 2023.

D. A. Guenther, S. R. Matsunaga, and B. M. Williams. Is tax avoidance related to firm risk? *The Accounting Review*, 92(1):115–136, 2017.

M. Hanlon and S. Heitzman. A review of tax research. *Journal of accounting and Economics*, 50(2-3):127–178, 2010.

S. Hanlon. How the Tax Act Embodies the Republican Culture of Corruption — prospect.org. https://prospect.org/power/tax-act-embodies-republican-culture-corruption/, 2018.

I. Hasan, C. K. S. Hoi, Q. Wu, and H. Zhang. Beauty is in the eye of the beholder: The effect of corporate tax avoidance on the cost of bank loans. *Journal of financial economics*, 113(1): 109–130, 2014.

I. Hasan, C.-K. Hoi, Q. Wu, and H. Zhang. Does social capital matter in corporate decisions? evidence from corporate tax avoidance. *Journal of Accounting Research*, 55(3):629–668, 2017.

S. M. Heitzman and M. Ogneva. Industry tax planning and stock returns. *The Accounting Review*, 94(5):219–246, 2019.

E. Henry and R. Sansing. The relation between effective tax rates and firm profitability. Technical report, Working paper, Dartmouth College, 2019.

O.-K. Hope, M. S. Ma, and W. B. Thomas. Tax avoidance and geographic earnings disclosure. *Journal of Accounting and Economics*, 56(2-3):170–189, 2013.

Y. Huang. Government subsidies and corporate disclosure. *Journal of Accounting and Economics*, 74(1):101480, 2022.

K. K. Inger. Relative valuation of alternative methods of tax avoidance. *The Journal of the American Taxation Association*, 36(1):27–55, 2014.

S. N. Kaplan and L. Zingales. Do investment-cash flow sensitivities provide useful measures of financing constraints? *The quarterly journal of economics*, 112(1):169–215, 1997.

S. P. Katz, U. Khan, and A. Schmidt. Tax avoidance and future profitability. *Columbia Business School Research Paper*, (13-10), 2013.

J. Kim, S. T. McGuire, S. Savoy, R. Wilson, and J. Caskey. How quickly do firms adjust to optimal levels of tax avoidance? *Contemporary Accounting Research*, 36(3):1824–1860, 2019.

A. Koester. Investor valuation of tax avoidance through uncertain tax positions. In *2011 American Accounting Association Annual Meeting-Tax Concurrent Sessions*, 2011.

S. P. Kothari and J. B. Warner. Econometrics of event studies. In *Handbook of empirical corporate finance*, pages 3–36. Elsevier, 2007.

M. L. Lemmon, M. R. Roberts, and J. F. Zender. Back to the beginning: persistence and the cross-section of corporate capital structure. *The journal of finance*, 63(4):1575–1608, 2008.

B. Lev and D. Nissim. Taxable income, future earnings, and equity values. *The accounting review*, 79(4):1039–1074, 2004.

E. L. Maydew. Tax-induced earnings management by firms with net operating losses. *Journal of accounting research*, 35(1):83–96, 1997.

S. T. McGuire, T. C. Omer, and D. Wang. Tax avoidance: Does tax-specific industry expertise make a difference? *The accounting review*, 87(3):975–1003, 2012.

M. F. McNichols. Discussion of the quality of accruals and earnings: The role of accrual estimation errors. *The accounting review*, 77(s-1):61–69, 2002.

L. F. Mills. Book-tax differences and internal revenue service adjustments. *Journal of Accounting research*, 36(2):343–356, 1998.

S. Nickell. Biases in dynamic models with fixed effects. *Econometrica: Journal of the econometric society*, pages 1417–1426, 1981.

D. Nissim. Normal tax rate. *Available at SSRN 4514622*, 2023.

J. Novack and L. Saunders. The hustling of x rated shelters. *Forbes*, 162(13):198–+, 1998.

P. Pecorino. Is there a free-rider problem in lobbying? endogenous tariffs, trigger strategies, and the number of firms. *The American economic review*, 88(3):652–660, 1998.

S. H. Penman and X.-J. Zhang. Connecting book rate of return to risk and return: The information conveyed by conservative accounting. *Review of Accounting Studies*, 26:391–423, 2021.

S. A. Ross. Disclosure regulation in financial markets: Implications of modern finance theory and signaling theory. *Issues in financial regulation*, 5(1979):177–202, 1979.

M. S. Scholes, M. A. Wolfson, M. Erickson, E. Maydew, and T. Shevlin. *Taxes & business strategy*. Prentice Hall Upper Saddle River, NJ, 2014.

J. A. Schumpeter. *Capitalism, socialism and democracy*. routledge, 1942.

C. M. Schwab, B. Stomberg, and B. M. Williams. Effective tax planning. *The Accounting Review*, 97(1):413–437, 2022a.

C. M. Schwab, B. Stomberg, and J. Xia. What determines effective tax rates? the relative influence of tax and other factors. *Contemporary Accounting Research*, 39(1):459–497, 2022b.

C. Stigler. *Rates of Return in Manufacturing Industries*. Princeton: Princeton University Press, 1963.

J. E. Stiglitz and J. K. Rosengard. Economics of the public sector. 4th. *Edition. New York and London: Norton & Company*, 2015.

J. Thomas and F. Zhang. Valuation of tax expense. *Review of Accounting Studies*, 19:1436–1467, 2014.

J. L. Zimmerman. Taxes and firm size. *Journal of accounting and economics*, 5:119–149, 1983.

G. Zucman. Taxing across borders: Tracking personal wealth and corporate profits. *Journal of economic perspectives*, 28(4):121–148, 2014.

Appendix A: Variable Definition

Variable	Definition
Tax planning	
$CETRn_t$	Long run cash effective tax rates measured over the window of n fiscal years. Specifically, $$CETRn_{i,t} = \frac{\sum_{k=t-n+1}^{t} TXPD_{i,k}}{\sum_{k=t-n+1}^{t}(PTI_{i,k} - SPI_{i,k})}$$ where $TXPD$ is tax cash paid; PTI is pretax income; and SPI is special items. The values are capped between 0 and 1 (Dyreng et al., 2008).
$CETRn_{Pre}$	Long run cash effective tax rates measured over the window of n fiscal years before TCJA events (i.e., before the fiscal year-end of 2016).
Tax planning innovations	
$DCETRn_t$	Decreases in (long run) cash effective tax rates measured over the window of n fiscal years, without overlapping $CETRn$. Specifically, $DCETRn_{i,t} = -(CETRn_{i,t} - CETRn_{i,t-n})$.
Excess returns	
$ALPHA_{i,t}$	The intercept of the four-factor model estimated using firm i's weekly returns over the window of 52 weeks concluding at the end of the fiscal year t. (Carhart, 1997).
Tax planning competitive advantage	
$DTAR$	The firm-level DCETR-ALPHA association before TCJA events.
Control variables	
$BTPMn$	Pretax profit margin over the window of n fiscal years ending at year t based on operating earnings (Ball and Nikolaev, 2022) (i.e., operating earnings divided by total sales).
VOL_t	The total volatility of the firm's return over the fiscal year t.
$CVSale_t$	The coefficient of variation of total sales over the five-year window ending at year t.
$SIZEn$	The natural log of total sales.
$GROWTHn$	Increases in total sales during the n-year window ending at t scaled by the total sales during the n-year window ending at $t-n$.
$GDWLn$	Goodwill impairment scaled by total sales.
$Leverage$	Leverage ratio, defined as the book value of total liability over the book value of total assets. The values are capped between 0 and 1.
$\Delta LEVERAGEn$	Changes in leverage ratio over the n-year window

Variable	Definition
$Accrual$	Total accrual, which is the changes in working capital accounts as disclosed on the statement of cash from operations (McNichols, 2002), measured as the increase in accounts receivable plus the increase in inventory plus the decrease in accounts payable and accrued liabilities plus the decrease in taxes accrued plus the increase (decrease) in other assets (liabilities), deflated by the market value of equity.
$InsOwn$	The percentage of shares held by institutions for the firm at the fiscal year end or the nearest quarter end before the fiscal year end.
$INOLCF$	An indicator variable equals 1 if $NOLCF$ is positive; 0 otherwise.
$NOLCF$	Net operating losses carry forward.
$\Delta NOLCFn$	The change in $NOLCF$ over the n-year window .
$OPTEXDn$	The total options exercised by managers within the n-year period, scaled by the total shares outstanding at the end of fiscal year t.
Cost leadership	
$\Delta COGSn$	Changes in COGS intensity. COGS intensity is the total cost of goods sold over the n-year window scaled by total sales over the n-year window. Changes are calculated without overlapping windows.
$\Delta SG\&An$	Changes in SG&A intensity. SG&A intensity is the total selling, general, and administrative expenses over the n-year window scaled by total sales over the n-year window. Changes are calculated without overlapping windows.
$\Delta XINTn$	Changes in interest expense intensity. Interest expense intensity is the total interest expense over the n-year window scaled by total sales over the n-year window. Changes are calculated without overlapping windows.
Variables in cross-sectional tests	
$Ascend$	An indicator variable that equals one if the CETR in the previous period is below the combined statutory rate.
$F3.CTP3$	The total tax cash paid for the next three fiscal years scaled by the market value of equity at the end of the current fiscal year.
$Fn.SETTLE1$	The amount of the settlements with tax authorities during the nth year following the current fiscal year-end, scaled by the market value of equity at the end of the current fiscal year.
$F3.SETTLE3$	The total amount of the settlements with tax authorities over the next three years scaled by the market value of equity at the end of the current fiscal year.
$\Delta R\&DINTn$	Changes in R&D intensity. R&D intensity is the total research and development expense over the n-year window scaled by total sales over the n-year window. Changes are calculated without overlapping windows.
ΔFSn	Changes in FSn over the n-year window, defined as $FSn_t - FSn_{t-n}$. FSn is the ratio of foreign sales to total sales over the n-year window.
$NewHaven$	An indicator equals one if the firm established any operation in a tax haven during the past three years. The list of tax havens follows Table 1 of Dyreng and Lindsey (2009).
$TAXFEEn$	The natural log of 1 plus the total tax consulting fees paid to auditors over the n-year window.
$KZINDEXn$	The decile ranking of the average Kaplan-Zingales (KZ) index (Kaplan and Zingales, 1997) over the past n fiscal years.
$High\_COMMn$	An indicator variable equals 1 if the average community score is in the top 5%; 0 otherwise.
$High\_SOCIALn$	An indicator variable equals 1 if the average social score is in the top 5%; 0 otherwise.

Appendix B: Measurement Issues of Accounting-based Returns in Tax Research

In this appendix, I employ two analytical models to demonstrate why accounting rates of return may not accurately capture the value implications of tax planning innovations. Using two setups more comprehensively outlines the strategies firms use to reduce their tax burdens. The first model examines the impact of tax credits received from tax-advantaged investments. The second model posits that managers can reduce the firm's tax burden by reallocating a portion of earnings to a lower-tax category (e.g., shifting incomes to a tax haven) at certain costs. I define "economic value" as the net present value (NPV) of the firm and "economic return" as the percentage change in NPV in a given period.

These models offer crucial, albeit intuitive, insights. Tax planning innovations may reduce contemporaneous ROE or ROA if they necessitate significant upfront costs that cannot be capitalized under GAAP (e.g., R&D and administrative costs to operate in tax havens). As a result, interpreting these immediate impacts on ROE or ROA as reflections of changes in economic value could mistakenly suggest that tax planning innovations are disadvantageous.

If most of the costs of tax planning innovations are recognized upfront, both ROE and ROA are expected to rise in future periods because cash flows from previous tax-saving investments will be realized without incurring additional costs. Therefore, tax planning innovations may be correlated with future increases in accounting earnings. However, this correlation is due to the mechanics of conservative accounting and should not be interpreted as evidence of the "real effect" that firms reinvest tax savings in other value-maximizing activities[1].

Changes in the market-to-book ratio (M2B) generally align with economic returns' reaction

[1] Blaylock (2016) is an example of a paper that infers the "real effect" of tax planning from accounting rates of returns.

to tax planning innovations because the numerator is market-based. However, the changes in M2B may react incorrectly if the firm has a negative book value of equity.

B.1 A model of tax credit

In the first model, the firm has a one-time investment opportunity, such as an R&D project, that offers tax credits[2]. The model unfolds over two periods. In the first period, the firm undertakes the project, incurring costs but also gaining tax savings. In the second period, the cash flows from this investment are realized. I assume this investment is a zero NPV project in the absence of the tax credit and does not influence the firm's discount rate. Hence, the project's value to shareholders lies solely in its tax savings. Aside from the direct costs, there are quadratic administrative or miscellaneous costs associated with managing the complexity of the project. These marginally increasing costs prohibit the firm value from skyrocketing as the manager scales up the investment. The quadratic costs are after-tax for simplicity. The direct cost of the investment, excluding the amount equal to the tax credit, is fully tax-deductible in the implementation period[3].

Furthermore, my model assumes that the firm generates sufficient earnings from its regular operations to support the tax-advantaged investment and ensure positive cash flows for each period, with all resulting net cash inflows immediately distributed as dividends. Thus, the model excludes considerations such as loss-carry-forwards, external financing, or payout policies. Additionally, all parameters are constant over time. As such, this model does not depict a competitive equilibrium but instead portrays a scenario where all tax savings translate into excess shareholder returns, thus providing a competitive advantage.

Table B.1 summarizes how various return measures respond to the implementation of the tax-advantaged investment opportunity. Definitions of the parameters are in the footnote of Table

[2]For simplicity, I only consider tax credits and deductions in this model. The tax advantages of R&D extend beyond these elements. For example, firms can relocate intangible assets generated from R&D projects to a low-tax jurisdiction to facilitate income shifting.

[3]IRC §280C(c)(1).

B.1. The analysis starts with the maximization problem for the manager, under the assumption that there are no agency issues. The manager's objective is to select the optimal investment level I^* to maximize the economic value of the firm[4]. That is,

$$\max_{I} \quad (1-\tau)cI - \frac{\theta I^2}{2}.$$

The first-order condition reveals that the optimal level of investment is given by

$$I^* = \frac{c(1-\tau)}{\theta}. \tag{B.1}$$

The change in ETR in the implementation period due to the tax-advantaged project[5], denoted as ΔETR_1, is

$$\Delta ETR_1 = \frac{I^*\left(etr_0 - c(1-\tau) - \tau\right)}{E - I^*}. \tag{B.2}$$

A negative ΔETR_1 correctly reflects the beneficial effect of the tax-advantaged investment on the firm's tax burden. Given that the denominator $(E - I^*)$ is positive—based on the assumption that E is sufficiently large, the sign of ΔETR_1 depends on the numerator, which will be negative if etr_0 is sufficiently small. A meaningful benchmark for etr_0 is the statutory rate τ: For any $etr_0 \leq \tau$, we have $\Delta ETR_1 < 0$[6].

In the second period, as there are no tax benefits, ETR reverts to etr_0. The increase in ETR suggests not an inferior tax strategy but the temporary nature of the tax planning activities.

[4] The change in the economic value is the sum of the NPVs of the changes in net cash flows in both periods. In the first period, the project incurs costs but also generates tax credits and tax deductibles. Consequently, the after-tax cash flow changes from E by $-I + cI + (1-c)\tau I - \frac{\theta I^2}{2}$. In the second period, the cash inflow from the project $(1+r)I(1-\tau)$ is realized. Its present value is $I(1-\tau)$, which offsets the direct cost of the investment, making this project zero-NPV in the absence of the tax credit.

[5] The tax expense with the tax-advantaged project is $E \times etr_0 - cI^* - (1-c)I^*\tau$, where the first term is the tax payable without any tax-advantaged investment; the second term is the tax credit; the third term is the effect of the tax deductibles. The tax credit is subtracted from the total deductibles so that no tax benefits accrue on another tax benefit. Dividing the tax expense by the pretax earnings $E - I^*$ gives the ETR at the end of the implementation period.

[6] ΔETR_1 may not correctly capture the effect of tax planning innovations when the initial ETR is relatively large compared to the statutory rate for a given c (i.e., $etr_0 \geq c(1-\tau) + \tau = c + (1-c)\tau > \tau$). This scenario appears counter-intuitive but can be explained by considering why the initial ETR is higher. The first possibility is that a portion of pretax income is subject to a rate higher than the statutory rate. Second, a lump sum tax may exist. The deductibles $(1-c)I^*$ reduce the taxable incomes taxed at the statutory rate τ and increase the proportion of income subjected to higher tax rates, thereby elevating the ETR.

Table B.1: Return measures: Tax credit model

Measure	Without the project		With the project	
	$t = 1$	$t = 2$	$t = 1$	$t = 2$
(1)	(2)	(3)	(4)	(5)
Returns	0	0	$\frac{c^2(1-\tau)^2}{2\theta MV_0}$ (B.3)	0
$\Delta M2B$	$\frac{MV_0 D}{(BV_0-D)BV_0}$ (B.4)	$\frac{MV_0 D}{(BV_0-2D)(BV_0-D)}$	$\frac{MV_0 D+\frac{c^2(1-\tau)^2}{2\theta}BV_0}{(BV_0-D)BV_0}$ (B.5)	$\frac{MV_0 D+\frac{c^2(1-\tau)^2}{2\theta}D}{(BV_0-2D)(BV_0-D)}$ (B.6)
ROE	$\frac{E(1-etr_0)}{BV_0}$	$\frac{E(1-etr_0)}{BV_0-D}$	$\frac{E(1-etr_0)}{BV_0} - \frac{c(2-c)(1-\tau)^2}{2\theta BV_0}$ (B.7)	$\frac{E(1-etr_0)}{BV_0-D} + \frac{c(1+r)(1-\tau)^2}{\theta(BV_0-D)}$ (B.8)

This table presents various return proxies' responses to the implementation of a one-time, tax-advantaged project that provides tax credits. The game has an implementation period ($t = 1$) and a fruition period ($t = 2$). Column (1) names the proxies; Column (2) and (3) show the results when no tax-advantaged project is in place; Column (4) and (5) show the results when the project is implemented. Definitions of variables and parameters are as follows:

I: The amount of the tax-advantaged investment.

c: The multiplier for the tax credit, making the total tax credit cI.

r: The discount rate. The investment yields a cash inflow of $(1 + r)I$ in the second period so that the project has zero NPV without the tax credit.

θ: The parameter of the administrative cost, which is $\theta I^2/2$.

E: Earnings from the firm's regular operations.

etr_0: The effective tax rate of the regular earnings E.

τ: The statutory tax rate applied to the investment deductibles.

MV_0, BV_0, and A_0: The present value of the firm, the book value of equity, and the book value of assets, respectively, at the beginning of the implementation period.

D: A consistent depreciation expense for each period, which is included in E.

Consequently, the economic value remains unaffected by the anticipated ETR increase. As such, the ETR reversal can introduce classic measurement errors in an empirical setting[7].

Assume that ETR captures tax planning activities correctly in the implementation period (i.e., $etr_0 < c(1-\tau)+\tau$) and that the government does not fully subsidize R&D (i.e., $c+(1-c)\tau < 1 \rightarrow c < 2$). The results in Table B.1 provide the following observations.

Observation 1. *In the implementation period ($t = 1$), the economic value increases, and the economic return is positive. The ETR decreases. The reactions of accounting-based return measures are as follows:*

(i) The change in the market-to-book ratio ($\Delta M2B$) is higher than that of a scenario without

[7] To address the limitations of ETR, researchers could consider excluding the observations with relatively high ETR (i.e., $etr_0 \geq c(1-\tau)+\tau$) based on the discussion of the previous footnote. Researchers may also include lag changes in ETR to control for the anticipated ETR reversals.

the tax-advantaged investment, provided that the book value of equity (BV_0 and $BV_0 - D$) stays positive.

(ii) ROE is lower than it would be without the tax-advantaged investment, assuming that BV_0 is positive.

(iii) ROA is lower than it would be without the tax-advantaged investment.

Observation 1 underscores that using ROE or ROA[8] as proxies for economic returns may lead to the incorrect conclusion that tax planning innovations are disadvantageous because of the contemporaneous decreases in these metrics.

Observation 2. *In the period after the implementation ($t = 2$), the economic value does not change. The ETR reverts, showing a positive period-to-period change. The response of accounting-based return measures is as follows:*

(i) M2B changes only due to depreciation.

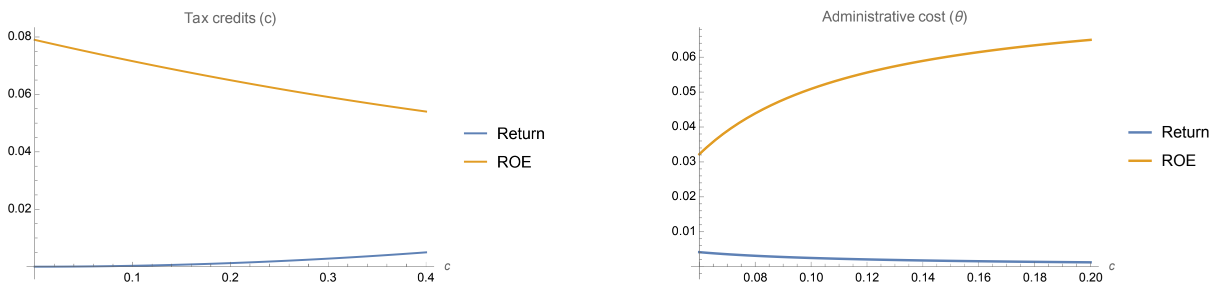
(ii) ROE is higher than that of a scenario without the tax-advantaged investment, provided $BV_0 - D$ remains positive.

(iii) ROA is higher than it would be without the tax-advantaged investment.

Observation 2 highlights that, in the period following the implementation of the tax-advantaged investment, accounting rates of return (such as ROE and ROA) will be higher than those of a scenario without the tax-advantaged investment. Consequently, researchers might observe an association between current decreases in ETR and higher future accounting rates of return. However, this association is not driven by any "real effects," such as reinvesting tax savings into profitable projects. Instead, it is an accounting phenomenon. GAAP often treats tax-saving investments (e.g., R&D expenses) conservatively and requires immediate expensing, while the subsequent cash flows are recognized in later periods without any matching costs. Thus, this association may occur even if the tax-saving project has a negative NPV (i.e., a negative "real effect") as long as the project generates some future cash inflows.

[8] Table B.1 omits the results for ROA because one can easily obtain them by replacing the book value of equity with the book value of assets using the ROE results.

Figure B.1 contrasts the reactions of ROE and returns to changes in the miscellaneous cost parameter (θ) and the tax credit ratio (c). As either θ decreases or c increases, the firm becomes more incentivized to scale up its tax-advantaged investments, leading to greater shareholder value and more positive economic returns. However, compared to returns, ROE reacts in the opposite direction to the changes in these parameters.



(A) w.r.t. Tax credit

(B) w.r.t. Administrative cost

Figure B.1: Comparative statics of ROE and returns. This figure shows the comparative statics of return (Equation B.3) and ROE (Equation B.7) in the implementation period. The left (right) graph is with respect to tax credit parameter c (administrative cost parameter θ). The parameter values for the left (right) graph are as follows: $\theta = 0.2$; $\tau = etr_0 = 0.21$; $E = 4$; $r = 0.08$; $BV_0 = 40$ ($c = 0.2$; $\tau = etr_0 = 0.21$; $E = 4$; $r = 0.08$; $BV_0 = 40$).

B.2 A model of income allocation

The second model illustrates the possibility that accounting rates of return correctly reflect the economic returns from tax planning. Under this setup, the firm can allocate a fraction of its pretax earnings to a low-tax category by incurring a quadratic cost. This model applies to firms whose incomes are taxed at different rates or those who can defer taxable income recognition. The key insight from this model is that accounting rates of return will react in the same direction as the return does if the costs of allocating incomes and the corresponding tax savings are recognized in the same accounting period. If the costs and tax savings do not match perfectly, intuitions from the tax credit model will apply. The feasibility of achieving such a perfect match hinges on the presence of substantial setup costs associated with reallocating income.

B.2.1 Income allocation with no setup costs

In this model, a perpetual firm can allocate a portion $0 < f < 1$ of its earnings to a low-tax category in each period by incurring a cost of $\frac{\mu f^2}{2}$, where $\mu > 0$. For simplicity, this cost is after-tax. Let τ represent the tax rate for fully taxable income and τ' for tax-advantaged income, with $\tau > \tau'$. All parameters remain constant over time. Therefore, in each period, the manager faces the same problem of maximizing the after-tax cash flow:

$$E(1-f)(1-\tau) + E \times f(1-\tau') - \frac{\mu f^2}{2}.$$

Solving the first-order condition yields the optimal proportion f^* of income to allocate to the tax-advantaged category: $f^* = \frac{E\tau - E\tau'}{\mu}$, which is strictly positive. The corresponding ETR is then given by $(1-f^*)\tau + f^*\tau' < \tau$, demonstrating that the firm's ETR is effectively reduced through strategic income allocation.

A tax planning innovation occurs in the form of a reduction in the cost parameter μ. Let $\mu + \Delta\mu$ denote the new, lower level of the cost parameter, where $\Delta\mu < 0$. Observation 3 summarizes the responses of ETR and return measures to the tax planning innovation:

Observation 3. *When the firm reduces the cost of allocating earnings to a tax-advantaged category, it increases the portion of earnings diverted to this category and lowers its ETR*[9]*. Firm value and returns increase. Concurrently:*

(i) M2B increases, provided that the book value of equity remains positive.

(ii) ROE and ROA exceed those in scenarios without such a tax planning innovation, assuming a positive initial book value of equity[10]*.*

Observation 3 indicates that when there are no setup costs so that tax savings perfectly match the associated costs, accounting rates of return can correctly capture the effect of tax planning on the economic value.

[9] The new equilibrium f^* is $\frac{E\tau - E\tau'}{\mu + \Delta\mu}$. The corresponding change in ETR is $\frac{E\Delta\mu(\tau-\tau')^2}{\mu(\Delta\mu+\mu)} < 0$.

[10] The change in the firm value is determined by the changes in the after-tax cash flow, which is $-\frac{E^2\Delta\mu(\tau-\tau')^2}{2\mu(\Delta\mu+\mu)} > 0$. Therefore, the economic return is positive. Since ROE and ROA are based on the same after-tax cash flow, they increase if their denominators remain positive.

B.2.2 Income allocation with setup costs

In this model, the firm must pay a lump-sum setup cost to "unlock" the ability to allocate earnings. The action of "unlocking" is considered the tax planning innovation. The setup follows the baseline income allocation model but introduces a setup cost parameter s, and all other parameters are held constant.

The manager decides whether to "unlock" income allocation. Therefore, the present value of the potential net tax savings must justify the setup cost:

$$\left(E \times f^*(\tau - \tau') - \frac{\mu f^{*2}}{2}\right)/r \geq s, \tag{B.9}$$

where r is the discount rate. As long as this participation constrain holds[11], "unlocking" income allocation will be a positive NPV project, and ETR will decrease upon the "unlocking." Observation 4 summarizes the reactions of ROE and ROA to the "unlocking" decision.

Observation 4. *If a firm incurs uncapitalized setup costs to initiate income allocation, a sufficiently large setup cost may lead to a lower ROE and ROA during the period of initiation, compared to scenarios where no "unlocking" action is taken*[12].

Observation 4 underscores that the failure of accounting rates of return to reflect the competitive edge gained through tax planning arises not from the nature of tax benefits (e.g., tax credits, deductions, or income shifting). Instead, it relates to whether the investments tied to tax planning are capitalized and if the costs and benefits of tax planning adhere to the matching principle.

[11]To avoid the complexity from loss-carry-forward and external financing, I introduce another technical assumption that pretax earnings E are large enough to cover all costs associated with tax planning. This assumption imposes another participation constrain when the manager decides whether to "unlock" income allocation:

$$E(1-f^*)(1-\tau) + E \times f^*(1-\tau') - \frac{\mu f^{*2}}{2} - s \geq 0 \Leftrightarrow \left(E \times f^*(\tau - \tau') - \frac{\mu f^{*2}}{2}\right) + E(1-\tau) \geq s. \tag{B.10}$$

Expression B.10 will bind if

$$\frac{1}{r} > \frac{E(1-\tau)}{E \times f^*(\tau - \tau') - \frac{\mu f^{*2}}{2}} + 1, \tag{B.11}$$

meaning that if investors are patient, "unlocking" will always be optimal given sufficient internal funding.

[12]Let BV_0 be the initial book value of equity. Upon "unlocking," the ROE for that period is:

$$ROE = \left(E(1-f^*)(1-\tau) + E \times f^*(1-\tau') - \frac{\mu f^{*2}}{2} - s\right)/BV_0.$$

B.3 Relation to existing theoretical work

These analyses apply Penman and Zhang (2021) to corporate taxation contexts. Penman and Zhang (2021) argue that with conservative accounting, investments may lower short-run ROE or ROA because they are under-capitalized (the "numerator effect"). On the other hand, future ROE and ROA are higher because conservatism reduces the book value of equity and assets (the "denominator effect"). Under the tax credit model, both the numerator and the denominator effects come into play, making ROA and ROE potentially reflect shareholder benefits from tax planning more by chance than by design. The income allocation model crafts a case where neither effect exists, making the accounting rate of returns align with economic returns from tax planning innovations. In practice, firms engage in transactions that align with both the tax credit and income allocation models, leading to biases inherent in accounting rates of return that remain prevalent and challenging to unravel.

While Guenther and Sansing (2023) focuses on biases in accounting returns due to statutory rate changes in a competitive equilibrium, my analysis differs by examining firm-specific tax planning strategies that offer excess returns to shareholders. The notion that book value distorts the value of economic resources stems from Fisher and McGowan (1983).

Without the "unlocking" initiative, ROE is $\frac{E(1-\tau)}{BV_0}$. The difference between the two is therefore

$$-\frac{-2E \times f^*(\tau - \tau') + f^2\mu + 2s}{2BV_0},$$

which decreases as s increases. Thus, when s is large enough, ROE will be lower than if no "unlocking" initiation was in place.

On the other hand, a large s may violate the two participation constraints, and hence these constraints set the upper bounds for s. The minimum value of s that triggers a negative response in ROA and ROE to the "unlocking initiative" is given by

$$-\frac{-2E \times f^*(\tau - \tau') + f^2\mu + 2s}{2BV_0} = 0 \Leftrightarrow s = E \times f^*(\tau - \tau') - \frac{f^2\mu}{2}. \quad \text{(B.12)}$$

If Equation B.10 is binding, the corresponding upper bound of s exceeds the solution given by Equation B.12. However, if Equation B.9 is the binding and $r > 1$ as indicated by Expression B.11, the upper bond for s will fall below the solution to Equation B.12, meaning that there is no feasible s such that ROA and ROE exhibit a negative response to the "unlocking" initiative.