

# **How Does Media Sentiment Influence the Adjustment of the Level of Tax Avoidance?**

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## **Abstract**

We argue that the tone of media coverage, i.e., media sentiment, shapes firms' publicity, imposing extra costs on managers if they fail to implement efficient tax planning. Supporting our argument, we find that negative media sentiment leads to increases (decreases) in three-year cash effective tax rates (CETRs) for firms whose CETRs are below (above) the target levels. This effect is particularly pronounced for firms highly sensitive to reputation costs, such as those with limited positive press coverage, relatively young CEOs, and negative news reports regarding tax avoidance. However, the effect is insignificant for firms that face heightened scrutiny from tax authorities, suggesting that media sentiment mainly influences tax planning via the reputation costs mechanism. We also find that negative media sentiment prompts firms with CETRs below the target to reduce tax-haven usage but doesn't drive firms above the target to use more tax-haven strategies.

**Keywords:** Tax Planning; Optimal Tax Avoidance; Media Sentiment; Role of the Media; Reputation Cost

# **How Does Media Sentiment Influence the Adjustment of the Level of Tax Avoidance?**

## **1. Introduction**

The existing body of literature suggests that public media plays a crucial role in exerting external monitoring influence on various aspects of corporate decision-making. However, the empirical evidence regarding the media's effectiveness in influencing firms' tax planning remains inconclusive. Dhaliwal, Goodman, Hoffman, and Schwab (2017) have demonstrated that firms facing higher reputation costs, primarily due to negative media coverage during the Occupy Wall Street protest period, tend to engage in lower levels of subsequent tax avoidance. Nevertheless, this association does not hold during non-protest periods. Chen, Schuchard, and Stomberg (2019) have found that although the media is more inclined to discuss aggressive tax planning strategies of firms with lower effective tax rates, there is no sufficient evidence to suggest that firms actively reduce their tax avoidance practices following negative media coverage. These findings raise skepticism regarding the media's role in effectively monitoring firms' tax planning strategies.

The absence of discernible effects of media on tax avoidance, a critical aspect of corporate decision-making, is intriguing given that media is traditionally perceived as a significant force in shaping corporate decisions. In light of this, our study takes a different approach by examining potential adjustments in tax avoidance levels, whether upward or downward, toward what can be considered a "potentially" optimal level, as explored in prior research (e.g., Cook, Moser, and Omer 2017; Chyz and Gaertner 2018).

While achieving tax savings offers several advantages, including increased cash flows, enhanced after-tax earnings performance, and improved financial slack (Graham and Tucker 2006; Desai and Dharmapala 2009), it is important to recognize that excessive tax avoidance may come with non-negligible nontax costs, encompassing both direct implementation costs

and indirect costs such as agency costs, reputation damage and penalties payable to tax authorities (Shackelford and Shevlin 2001; Cook, Moser, and Omer 2017). For instance, prior studies find adverse consequences of aggressive tax planning, such as negative market reaction (Hanlon and Slemrod 2009) and potential loss of consumers (Hardeck and Hertl 2014; Austin and Wilson 2017), indicating implicit reputation costs linked to tax avoidance. In addition, engaging in aggressive tax planning can elevate the risk of detection and trigger potential penalties and sanctions, i.e., noncompliance costs (Carnes and Englebrecht 1995; Hoopes, Mescall, and Pittman 2012; Bozanic, Hoopes, Thornock, and Williams 2017). The combined impact of reputation and noncompliance costs serves as a deterrent, discouraging firms from pursuing overly aggressive tax avoidance strategies.

Prior studies have also highlighted the significant reputation costs associated with inefficient tax planning. As mentioned earlier, effective tax savings can benefit firms and enhance managers' reputations by showcasing their competence to the labor market. Consequently, managers who neglect efficient tax planning may face substantial reputation costs. For example, research indicates that insufficient tax avoidance can result in higher costs of capital and an increased likelihood of forced CEO turnovers (Cook et al. 2017; Chyz and Gaertner 2018). In summary, managers should strive for an optimal level of tax avoidance to mitigate the potential reputation and noncompliance costs incurred at both ends of the tax avoidance spectrum.

We propose that the media plays a monitoring role in influencing firms' tax planning adjustments by impacting reputation and noncompliance costs. Dyck et al. (2008) suggest that negative media coverage undermines firms' or managers' public image, thereby amplifying the adverse reputation outcomes and potential punishments when they conduct wrongdoings. When subjected to media scrutiny, the additional costs imposed by the media may outweigh managers' personal benefits from misconduct, leading them to rectify their behavior (Dyck et

al. 2008; Joe, Louis, and Robinson 2009; Liu and McConnell 2013). In this study, we employ firms' average three-year media sentiment to measure negative news coverage.<sup>1</sup> Building upon previous studies' theoretical framework, we argue that negative media sentiment amplifies potential reputation and noncompliance costs linked to tax avoidance, prompting managers to adjust their tax avoidance levels towards the optimal range. Specifically, for firms with excessive tax avoidance, negative media sentiment imposes reputation and noncompliance costs, compelling managers to reduce their tax avoidance. Conversely, for firms with insufficient tax avoidance, negative media sentiment also incurs reputation costs, motivating managers to increase their tax avoidance levels.

The sample used in this study comprises publicly listed US firms from 2003 to 2016. Tax avoidance is measured using a three-year cash effective tax rate (CETR), which represents the actual cash payment for taxes relative to pre-tax income.<sup>2</sup> Lower CETRs indicate higher levels of tax avoidance. To determine the deviation of current tax avoidance from the optimal level, we estimate the optimal level using Kim et al.'s (2019) model, which predicts an average target level based on various firm characteristics. Media sentiment is obtained from the RavenPack News Analytics, where sentiment scores of each firm's news articles are averaged over a three-year period. Our main finding reveals that negative media sentiment leads to a 1.59 percentage-point increase (or 3.88 percentage-point decrease) in CETRs for the subsequent three-year period when the current CETRs are below (or above) the optimal levels. Moreover, this effect is more pronounced when there is a larger gap between the current and optimal CETR levels. Our results remain robust across various model specifications, alternative measures of tax

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<sup>1</sup> We focus on media sentiment rather than just media's coverage (or attention). Most previous studies suggest that it is the intensity of “negative” news covered by media that imposes additional costs on firms or managers and serves the monitoring role (e.g., Farrell and Whidbee, 2002; Core, Guay, and Larcker 2008). However, media coverage contains not only negative news but also positive news, which has a weaker monitoring power.

<sup>2</sup> The single-year CETR measure often creates the problem of mismatch between actual cash tax paid and pre-tax earnings in the periods (Dyreng, Hanlon, and Maydew 2008; Hanlon and Heitzman 2010). See the detailed discussion of long-run tax avoidance measure in section 3.

avoidance and negative media sentiment, different definitions of the optimal tax avoidance level, and when controlling for negative earnings performance and mean-reverting effects of effective tax rates and earnings. These findings support our argument that negative media sentiment motivates firm managers to improve the efficiency of their tax planning.

Firms' media sentiment and tax avoidance levels can be endogenous, as aggressive tax strategies are more likely to attract negative media reports (Chen et al., 2019). To address this potential endogeneity issue, we employ an instrumental variable (IV) approach. Following the methodology of Cao and Wan (2014), we use the industry average media sentiment as our instrument. The industry-wide media sentiment is positively associated with the media sentiment of the focal firm, but it has no direct relationship with the focal firm's tax planning. By reanalyzing our baseline results using the IV approach, we find that our main finding remains qualitatively unchanged.

We conduct various cross-sectional analyses to further test our hypotheses. We argue that negative media sentiment leads to adjustments in tax avoidance towards optimal levels by increasing reputation and noncompliance costs. Firstly, we examine cases in which firms are more sensitive to reputation losses for not achieving optimal tax avoidance levels. These cases include (1) firms with fewer positive news to counteract the impact of negative media sentiment, (2) firms with CEOs who have higher concerns about their careers and personal reputations (such as shorter-tenured and younger CEOs), and (3) firms with negative tax avoidance news reported by the media. If negative media sentiment indeed amplifies reputation costs related to poor tax planning, we should observe a stronger effect in our baseline results for the identified firms. Our findings support this notion, as we observe a more pronounced effect for both upward and downward adjustments in the first two cases. We find that the effect of negative media sentiment is only significant on downward adjustments of tax avoidance when the firms have negative tax avoidance news. This finding is reasonable, as firms with higher tax

avoidance levels are more likely to be reported by the media regarding tax avoidance, thus facing greater reputation losses. Overall, these results suggest that reputation costs may serve as one of the mechanisms through which negative media sentiment affects adjustments in tax avoidance.

Next, we examine cases where firms may face higher noncompliance costs associated with aggressive tax avoidance: (1) firms with a higher tax audit probability and (2) firms that receive more attention from the Internal Revenue Service (IRS). In these scenarios, aggressive tax avoidance strategies are more likely to be detected by tax authorities, leading to increased potential noncompliance costs. According to our hypotheses, for firms that engage in more aggressive tax avoidance, negative media sentiment may amplify noncompliance costs such as penalties and sanctions, compelling firms to reduce their tax avoidance. If noncompliance costs are the driving mechanism, we would expect the effect of negative media sentiment on reducing tax avoidance to be more pronounced in these two cases. However, our analysis results do not support this argument. Specifically, we do not find significant evidence that firms adjust their tax avoidance in response to negative media sentiment due to considerations of noncompliance costs magnified by the media.

Finally, we conduct an additional analysis to investigate whether firms would increase or decrease their engagement in aggressive tax planning to attain the optimal level of tax avoidance. Aggressive tax planning incurs greater reputation damage from either investors or customers compared to non-aggressive tax planning (Hanlon and Slemrod 2009; Austin and Wilson 2017). Therefore, we predict that negative media sentiment may discourage firms from pursuing more aggressive tax strategies. First, we investigate whether our primary findings exhibit greater significance among multinational firms (MNCs) and companies with subsidiaries in tax havens, which possess greater flexibility in implementing aggressive tax planning strategies, such as income shifting (Klassen and LaPlante 2012; Cheng, Guo, Weng,

and Wu 2021). Our analysis reveals that the impact of negative media sentiment on downward adjustments in tax avoidance is more pronounced among firms with higher flexibility. This finding implies that firms with higher flexibility of tax avoidance may draw more media attention, thereby diminishing their willingness to pursue aggressive tax strategies.

Moving forward, we directly investigate whether negative media sentiment impacts the utilization of tax haven subsidiaries. We find that for firms above the optimal tax avoidance level, negative media sentiment significantly reduces the proportion of tax-haven subsidiaries relative to their total subsidiaries. This finding suggests that, as a response to negative media sentiment, these firms choose to mitigate their tax aggressiveness by diminishing their reliance on tax-haven-related tax strategies. However, we do not find any evidence indicating that firms operating below the optimal tax avoidance levels respond to negative media sentiment by intensifying their efforts to avoid taxes through increased usage of tax havens.

The contribution of this study is twofold. Firstly, it adds to the growing literature concerning the media's influence on corporate tax avoidance decision-making. Our research distinguishes itself from Chen et al. (2019) in terms of its context. In line with many studies that delve into media coverage of specific adverse events involving companies, Chen et al. (2019) focused on news related to firms' tax avoidance but found no discernible evidence of firms reacting to these negative news reports. As they acknowledged in their research, their sample of tax avoidance news may not fully capture the overall impact of media influence. Another possible explanation for the lack of significant effects of tax avoidance news could be the media's attention limited to relatively large and well-known companies. Moreover, the media's attention to tax avoidance issues has not been constant. Their study noted a surge in media coverage of tax avoidance in 2004 and 2014, with comparatively little attention given to such matters before 2000. Therefore, instead of concentrating on a limited sample of tax avoidance news, we look into the average long-term media sentiment, which shapes a firm's

overall public image and, consequently, prompts public scrutiny of managerial behaviors and decisions, including those related to tax planning.

Second, this study is in line with the studies that suggest the existence of an optimal level of tax avoidance (e.g., Cook et al. 2017; Chyz and Gaertner 2018; Kim et al. 2019). While most prior studies have focused on whether media coverage reduces firms' tax avoidance levels, our study provides novel and critical evidence by illustrating that negative media sentiment imposes costs on both firms with tax avoidance below and above the optimal levels. For instance, different from Dhaliwal et al. (2017) who investigated the linear relationship between media sentiment and tax avoidance levels, our research demonstrates that media sentiment plays a role in driving the downward or upward adjustment of tax avoidance, steering it toward the optimal level.

The remainder of the paper is organized as follows: Section 2 provides a literature review and hypothesis development. Section 3 describes the data and research design. Section 4 presents the main empirical results and results of robustness tests. Section 5 provides the results of cross-sectional analyses. Section 6 provides the result of additional analyses. We conclude in Section 7.

## **2. Literature Review and Hypothesis Development**

### **2.1 Media's Governance Role**

The media collects and disseminates firms' information, reducing information asymmetry between firms and stakeholders. Abundant studies have provided evidence on how the media facilitates information being incorporated into stock prices (e.g., Engelberg and Parsons 2011; Drake, Guest, and Twedt 2014; Bushman, Williams, and Wittenberg-Moerman 2017). In addition to disseminating information, the media may also conduct its own analyses and investigations. One well-known example is the media helping uncover the Enron scandal.

Using SEC accounting sanctions, Miller (2006) shows that the media not only rebroadcasts analyst, auditor, and lawsuit information but also provides new information from its own analyses.

Given the media's information intermediary role and its significant impact on the market, the literature posits that it functions as a private source of external corporate governance (Gillan 2006). Dyck et al. (2008) introduce a theoretical framework that explains the media's contribution to corporate governance. They contend that managers engage in wrongdoing or misconduct only when the anticipated benefits exceed the combined expected reputation costs and anticipated penalties associated with such actions. The media, in turn, amplifies managers' perceptions of these reputation costs and penalties, rendering managers more attuned to these factors. Using a Russian firm sample, they show that corporate governance violations draw attention from international media outlets such as the *Financial Times* and *The Wall Street Journal* and are more likely to be rectified following such media coverage.

There is additional empirical evidence that highlights the governance function of the media, particularly in relation to its coverage of adverse events. Farrell and Whidbee (2002) analyze various categories of corporate news in *The Wall Street Journal* preceding CEO turnovers and discover that firms experiencing subsequent forced CEO turnover have a significantly higher number of news articles related to "poor decisions," such as asset sales, layoffs, and downsizing, compared to matched firms without CEO turnover, even when their overall performance is similar. Joe, Louis, and Robinson (2009) argue that adverse publicity places downward price pressure on firms, forcing their boards to correct the wrongdoing and behave with more diligence. Using *Business Week's* List of the Worst Corporate Boards nominated by institutional investors as the proxy for negative media exposure, they find that firms on the list take more actions to improve their monitoring efficacy compared to their industry-performance-matched peers. Dai, Parwada, and Zhang (2015) investigate the media's

role in curbing insider trading and reveal that the degree of news coverage is inversely related to insider trading profits, suggesting that heightened media scrutiny acts as a deterrent.

Other evidence showing the impact of media coverage and sentiment on firms' investment decisions and disclosure behaviors includes findings by Liu and McConnell (2013), who find that managers are more inclined to abandon value-decreasing projects when their firms draw greater media attention and face more negative media sentiment before announcing an acquisition. In addition, the media can incentivize firms to enhance the quality of their disclosures and financial reporting as stakeholders, such as customers and investors, often assess a firm's regulatory compliance through media scrutiny. Rupley, Brown, and Marshall (2012) argue that firms can mitigate reputation losses stemming from adverse media coverage through voluntary disclosure. Finally, Chen, Cheng, Li, and Zhao (2021) provide empirical evidence of the media's governance effect on earnings management, demonstrating that both accrual earnings management and real earnings management decline with increasing media coverage.

Overall, the studies mentioned above collectively indicate that negative media coverage plays a pivotal role in strengthening corporate governance by elevating the costs (e.g., reputation damage, penalties, and stock price pressures) associated with managerial wrongdoing.

## **2.2 Benefits and Costs of Tax Avoidance**

As tax avoidance can be considered a firm's investment decision (Hanlon and Heitzman 2010; Armstrong et al. 2015), we argue that, similar to evaluating other investment options, managers should carefully assess the benefits and costs when determining the optimal levels of tax avoidance. As a result, in this section, we focus on the discussion of literature about the benefits and costs associated with tax avoidance.

Tax avoidance offers a direct benefit in the form of cash savings, essentially representing a wealth transfer from the government to investors. These savings not only bolster cash flows but also enhance a firm's financial flexibility. A body of previous research underscores the significant implications of tax avoidance, including a reduction in the cost of capital and enhancement of firm value. Notably, Graham and Tucker (2006) show that tax savings derived from tax-sheltering activities outstrip the tax advantages stemming from financial leverage, indicating tax avoidance's potential to decrease reliance on debt financing. Desai and Dharmapala's 2009 findings underscore the value-enhancing aspect of tax avoidance, particularly in firms with robust corporate governance structures. Likewise, Cheng, Huang, Li, and Stanfield (2012) indicates that hedge funds actively target tax-inefficient firms, prompting significant increases in tax avoidance following their interventions, suggesting strong incentives for hedge fund managers to monitor and influence target firms' tax avoidance strategies to enhance investment performance. Consistently, Khan, Srinivasan, and Tan (2017) find that higher levels of quasi-indexer ownership correspond to increased tax avoidance, as quasi-indexers tend to sway target firms' tax strategies through mechanisms such as "say on pay." Collectively, these studies suggest that shareholders tend to favor greater tax avoidance when it aligns with value-enhancing strategies.

However, tax avoidance activities could come with substantial associated costs. These include direct expenses like implementation and consultation fees, which are often unavoidable in tax planning investments. Moreover, excessive tax avoidance can lead to nontax costs, such as heightened agency costs, noncompliance costs arising from IRS audits and potential penalties, and reputation costs (Hanlon and Slemrod 2009; Chen, Chen, Cheng, and Shevlin 2010; Hoopes, Mescall, and Pittman 2012; Austin and Wilson 2017). Following the framework proposed by Dyck et al. (2008), reputation and noncompliance costs are closely tied to the media's role. In the subsequent section, we will predominantly delve into the existing literature

pertaining to these two dimensions of costs that managers must carefully consider when making decisions related to tax avoidance.

The general public typically holds a negative perception of aggressive tax avoidance practices, prompting managers to factor potential reputation damage into their tax-related decision-making.<sup>3</sup> Numerous studies have shed light on managers' concerns regarding reputation using various approaches. For instance, Chen et al. (2010) contend that family-owned businesses are particularly attuned to reputational risks compared to non-family firms, resulting in a reduced likelihood of engaging in aggressive tax avoidance strategies. Graham, Hanlon, Shevlin, and Shroff (2014) conducted a survey and the survey result reveals that executives rank "potential harm to your company reputation" as one of the foremost considerations in shaping tax-planning decisions, followed closely by "risk of detection by the IRS" and "risk of adverse media attention." Using a large sample, Austin and Wilson (2017) demonstrate that companies facing a higher risk of reputation loss among consumers, often attributed to possessing more valuable brands, tend to exhibit higher effective tax rates and industry-adjusted cash effective tax rates compared to their counterparts in matched industries.

Empirical evidence has shown an adverse effect of aggressive tax strategies on a firm's reputation. For instance, Hanlon and Slemrod (2009) conducted an analysis of stock returns surrounding the initial disclosure of tax sheltering in the news and revealed that, on average, firms engaged in tax sheltering experienced negative abnormal stock returns. Their research also highlighted that this negative market response was particularly pronounced in the case of retail firms, which is more sensitive to reputation losses among consumers. Similarly, Hardeck and Hertl (2014) conduct a laboratory experiment, demonstrating that aggressive tax strategies

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<sup>3</sup> For example, a survey conducted by ComRes after the publication of the Paradise Papers finds that nine out of 10 people believe tax avoidance by large UK companies is morally wrong, even if it is legal (Pegg 2017). Also, large multinational companies (e.g., Google, Apple, and General Electric) were widely criticized by the major news outlets when the EU probed their income shifting schemes in 2014.

have an adverse effect on firms' standing with consumers, while responsible tax strategies yield a positive impact on consumer perceptions.

However, not all studies align with this view. For example, Gallemore, Maydew, and Thornock (2014) found insufficient evidence linking tax sheltering to substantial reputation costs. Also, they do not observe a correlation between strong corporate reputations (e.g., those listed on Fortune's "Most Admired Companies") and reduced engagement in tax sheltering. However, Graham et al. (2014) noted a potential limitation in the approach of many such studies, including their study, highlighting that these investigations can only identify tax sheltering instances when they become public knowledge through the IRS or media. This limitation may lead to an incomplete understanding of the reputation concerns associated with tax planning decisions.

Regarding the noncompliance costs associated with tax avoidance, engaging in aggressive tax avoidance typically heightens the likelihood of IRS audits or enforcement actions. Mills (1998) demonstrated that companies with greater book-tax differences, indicative of higher levels of tax avoidance, are more prone to IRS audit adjustments. Bozanic, Hoopes, Thornock, and Williams (2017) took an innovative approach by analyzing the EDGAR server log file to pinpoint the IRS's IP address and gauge IRS attention. Their findings revealed that the IRS pays closer attention to firms engaged in riskier tax planning, characterized by lower GAAP effective tax rates and greater uncertain tax benefits. Additionally, Kubick, Lynch, Mayberry, and Omer (2016) discovered that tax avoidance also escalates the likelihood of receiving SEC tax-related comment letters.

The costs of noncompliance increase with the probability of aggressive tax avoidance being detected and caught by the tax authority. These costs, such as penalties and sanctions,

can be substantial for both firms and their managers.<sup>4</sup> Company executives can be held legally accountable for tax fraud or evasion within their organization if they are found to have willfully engaged in or devised such schemes. In the U.S., unlawful tax avoidance is subject to criminal penalties, sanctions, and civil penalties. According to U.S. Code Section 6662(b), the IRS has the authority to impose penalties when a taxpayer's negligence or disregard for tax rules leads to underpaid taxes or substantial understatement of income tax. Research by Ma and Thomas (2020) indicates that penalties levied on corporate officers significantly diminish their inclination to engage in tax avoidance, highlighting the deterrent effect of penalties on tax avoidance among firm managers.

### **2.3 Optimal Level of Tax Avoidance**

Prior research primarily suggests a linear connection between reputation costs and tax avoidance, concentrating on whether heightened tax avoidance correlates with increased reputation damage and subsequent market repercussions. Nonetheless, emerging evidence suggests a potential nonlinear link between tax avoidance and reputation costs. This nonlinearity arises from the fact that a firm's managers may face significant reputation risks not only when engaging in excessive tax avoidance but also when avoiding too little tax or not engaging in tax avoidance at all. Managers who fail to implement efficient tax planning might be perceived as incompetent, resulting in a loss of reputation within their labor markets. For instance, a study by Duan, Ding, Hou, and Zhang (2018) uncovered that CEOs subject to greater public attention, and consequently more sensitive to reputation loss, are more inclined to engage in tax avoidance strategies to enhance after-tax earnings performance.

In line with the argument for a non-linear relationship between tax avoidance and reputation costs, recent studies have introduced the concept of an optimal tax avoidance level,

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<sup>4</sup> For example, using a hand-collected tax shelters sample, Wilson (2009) estimates that on average, the interest and the penalties represent about 40% and 9% of the tax savings from the tax sheltering activities, respectively.

suggesting that managers should strategically target this level to maximize value. For instance, Cook et al. (2017) have shown that when a firm's tax avoidance deviates from this optimal level, whether exceeding it or falling short, it results in a higher ex ante cost of equity capital. Similarly, Chyz and Gaertner (2018) have documented that firms with tax avoidance levels higher or lower than industry peers are more likely to experience forced CEO turnover. Kim et al. (2019) also document that firms adjust their tax avoidance toward target levels at a rather quick speed. The above studies suggest that the costs to managers for not meeting the optimal tax avoidance level could be substantial.

## 2.4 Hypothesis Development

Based on the aforementioned studies, we contend that managers should carefully consider both costs and benefits when determining the extent of investment in tax avoidance, with a focus on achieving a target level of tax avoidance. Excessive tax avoidance carries the risk of substantial reputation damage, potential penalties, and sanctions that can outweigh the benefits of tax strategies. Managers may be incentivized to curtail tax aggressiveness in light of the sizable costs (Austin and Wilson 2017; Hanlon and Slemrod 2009).

Negative media sentiment amplifies reputation costs (e.g., Dyck et al. 2008; Liu and McConnell 2013), stimulating managers to enhance their performance due to increased turnover risks for underperforming managers (Farrell and Whidbee 2002) and the downward pressure it exerts on stock prices (Joe et al. 2009). In addition to shareholder pressure, negative media sentiment also attracts the attention of various stakeholders, including customers, who may impose additional reputation costs on firms practicing overly aggressive tax avoidance. Moreover, negative media sentiment can elevate detection risk and IRS audits, amplifying the noncompliance costs for firms involved in risky or unlawful tax strategies. In essence, we argue that negative media sentiment escalates both reputation and noncompliance costs for firms exceeding optimal tax avoidance levels. The farther a firm deviates from these optimal levels,

the more likely these costs will surpass the potential benefits of tax avoidance, thereby incentivizing managers to recalibrate their tax avoidance to align with the optimal levels. We state our hypothesis with lower CETRs reflecting higher tax avoidance as follows.

**Hypothesis 1:** Negative media sentiment stimulates firm managers to increase CETRs if the current CETRs are below the optimal levels.

On the other hand, insufficient tax avoidance also imposes reputation costs as managers forego effective tax strategies that contribute to firm value (Desai and Dharmapala 2009; Cheng et al. 2012). Recent research suggests that managers may be motivated to adjust their tax avoidance practices, recognizing the potential harm to their reputations if they fall short of achieving targeted levels of tax avoidance, as evident in studies such as Chyz and Gaertner (2018). Consequently, when a firm's tax avoidance falls short of optimal levels, we anticipate that the influence of negative media sentiment would heighten managers' perception of reputation costs associated with suboptimal tax planning. Negative media sentiment, therefore, stimulates managers of firms with tax avoidance below the optimal levels to improve tax planning. Our second hypothesis is articulated as follows.

**Hypothesis 2:** Negative media sentiment stimulates firm managers to decrease CETRs if the current CETRs are above the optimal levels.

### 3. Research Design

#### 3.1 Data and Sample Selection

We obtain media coverage and sentiment data of U.S. publicly listed firms from the RavenPack News Analytics database. RavenPack is a global media database that has been widely used in recent accounting and finance studies (e.g., Drake et al. 2014; Lai et al. 2014; Dai et al. 2015; Dang et al. 2015; Bushman et al. 2017). It covers news articles from primary national news providers, including Dow Jones Newswires, regional editions of the *Wall Street Journal*, *Barron's*, and *MarketWatch*, and press releases from PR Newswire for the period

beginning from 2000 to the most recent year. One limitation of RavenPack could be that it does not have complete coverage of local news providers. Nevertheless, the focus of this study is the public's attention and opinion, and it is reasonable to assume that the public can easily access news from national providers. Several finance and accounting studies have also argued that DJ Newswire and the *WSJ* are highly correlated with news coverage from other sources (Drake et al. 2014), and *WSJ*-based samples for corporate news items can be representative of non-*WSJ* samples (Yau, Ferri, and Sugrue 1994).

We first retrieve news data for the years 2000 through 2018 from RavenPack. We then merge them with the Compustat database to obtain financial data. RavenPack's coverage starts in 2000, and so do our media-related measures. Due to our main variables being estimated over a three-year period, our sample is composed of U.S. publicly listed firms from 2003 through 2016. The process of the sample selection is described as follows. Firms in the financial service industry (two-digit SIC codes 60~69) and utility industry (two-digit SIC code 49) are deleted. Firms incorporated outside the US are also excluded, as those firms are taxed differently.<sup>5</sup> In addition, firm-year observations with a missing book value of common equity or with total assets averaged over the past three years smaller than one million dollars are also excluded. Following the prior literature, observations with a negative sum of pretax income for the past three years are deleted because this study examines the media's effect on firms' tax-avoidance motives, but loss firms may show less tax-avoidance motivation and create measuring errors. Finally, firm-year observations without media coverage and media sentiment information are deleted. Following this process, the final sample comprises 14,436 firm-year observations on 2,159 firms for estimating the baseline model. To mitigate the outlier effect, we winsorize all continuous variables at both the top and bottom 1 percent level.

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<sup>5</sup> For example, US tax residents' income is taxed on a worldwide basis; however, foreign-incorporated firms' income (non-US tax residents) is taxed on a territorial basis.

### 3.2 Media Sentiment Measure

In this study, we use RavenPack's Composite Sentiment Score (CSS), which determines a given story's sentiment using various textual analysis methods and real-time market responses (refer to Appendix A for a more detailed description of CSS scores). The CSS score ranges from 0 to 100, with a score above (below) 50 indicating news articles with a positive (negative) tone. We transform the original CSS score into  $(\text{CSS} - 50)/50$  so that the transformed CSS score ranges from -1 to 1, with 0 equal to neutral sentiment and scores greater (smaller) than 0 indicating (positive) negative tone. In addition, we consider only the news articles that have a relevance score greater than or equal to 75 in RavenPack.<sup>6</sup> This restriction ensures that potential noise is minimized (e.g., firms are sometimes mentioned in the articles only for reference purposes when the relevance score is low). Next, we limit the news articles to those categorized by RavenPack as Full-Article, which consists of both a headline and at least one paragraph of textual material.<sup>7</sup> Finally, the negative media sentiment (*NegSENTIMENT*) is set as the dummy variable equal to one if the mean transformed CSS score of the firm's news articles during the period is less than 0 and zero otherwise.

In addition, we control for sentiment of firm-initiated press releases, which are information generated by firms. Following Bushman et al. (2017), we first define firm-initiated press releases as press release articles with a relevance score of 90 and above in RavenPack. We then calculate press releases' sentiment (*PR\_SENTIMENT*) as the mean transformed CSS score of the firm's press releases during the period.

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<sup>6</sup> RavenPack assigns each pair of firm articles a relevance score ranging from 0 to 100, where a score of 100 suggests that the firm has the strongest relevance with the article. Most of the prior studies using RavenPack limit data to firm articles with a relevance score of at least 75 (e.g. Drake et al. 2014; Dai et al. 2015; Ng et al. 2016; Bushman et al. 2017). A relevance score over 75 means that the firm mentioned is significantly relevant to the news article.

<sup>7</sup> RavenPack classifies all news articles into Hot-News-Flash, News-Flash, Full-Article, Press-Releases, and Tabular-Material.

We also control for media coverage in our model. Similarly, we follow the prior studies and count only news articles with a relevance score greater than or equal to 75. We exclude press release articles, which are usually information disclosures or announcements firms send to media outlets. Specifically, media coverage (*NEWS\_COUNT*) is calculated as the natural logarithm of one plus the number of news articles of the firm during the period.

### 3.3 Estimation of Target Tax-Avoidance Level

For the tests throughout this study, we use the cash effective tax rate (CETR) to measure the outcome of a firm's tax avoidance activities. We define tax avoidance as the activities that lead to a reduction of explicit taxes. As defined in Hanlon and Heitzman (2010), tax avoidance activities could range broadly from the least aggressive (or perfectly legal) strategies to the most aggressive (or noncompliance and evasion) strategies. Our study investigates firms' tendency to approach the optimal levels of tax avoidance; hence, it is not our purpose to measure tax aggressiveness. Specifically, CETR is computed using cash taxes paid divided by pre-tax income net of special items. This measure directly captures the rate of tax payments per income and is not affected by tax-related accrual management (Hanlon and Heitzman 2010). In addition, we measure CETR in a three-year period to mitigate the potential problem of mismatching cash taxes paid and earnings in different periods (Dyreng et al. 2008; Hanlon and Heitzman 2010).

We adopt Kim et al.'s (2019) model to estimate the optimal level of tax avoidance. Kim et al. (2019) models the optimal tax-avoidance level as a function of firms' incentives and abilities to avoid taxes.<sup>8</sup> The determinant model is specified as follows:

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<sup>8</sup> The main model of Kim et al. (2019) is to investigate how quickly firms converge to their optimal tax avoidance levels. In their model (2), they model the optimal level of tax avoidance measured in the period  $t$  to  $t + 2$  as a function of several factors associated with firms' abilities and incentives to avoid taxes in the period  $t - 3$  to  $t - 1$ .

$$\begin{aligned}
CETR_{i,(t,t+2)}^* = & \beta_0 + \beta_1 CETR_{i,(t-3,t-1)} + \beta_2 ROA_{i,(t-3,t-1)} + \beta_3 SPECIAL\_ITEMS_{i,(t-3,t-1)} \\
& + \beta_4 LEVERAGE_{i,(t-3,t-1)} + \beta_5 NOL_{i,(t-3,t-1)} + \beta_6 \Delta NOL_{i,(t-3,t-1)} \\
& + \beta_7 FOREIGN\_INCOME_{i,(t-3,t-1)} + \beta_8 CAPITAL\_INTENSITY_{i,(t-3,t-1)} \\
& + \beta_9 EQUITY\_INCOME_{i,(t-3,t-1)} + \beta_{10} R&D_{i,(t-3,t-1)} \\
& + \beta_{11} ADVERTISING_{i,(t-3,t-1)} + \beta_{12} MTB_{i,(t-3,t-1)} + \beta_{13} SIZE_{i,(t-3,t-1)} \\
& + \beta_{14} LOSS\_INTENSITY_{i,(t-3,t-1)} + \beta_{15} AUDIT\_PROBABILITY_{i,(t-3,t-1)} \\
& + \beta_{16} INDUSTRY\_CETR_{i,(t-3,t-1)} + Year Dummies + Industry Dummies \\
& + \varepsilon_{i,(t,t+2)},
\end{aligned} \tag{1}$$

where  $CETR_{i,(t,t+2)}^*$  is firm  $i$ 's target three-year CETR from year  $t$  to  $t + 2$ . Several firm characteristics measured over the period  $t - 3$  to  $t - 1$  are included in this model by Kim et al. (2019) to estimate the optimal tax-avoidance level. These firm characteristics are found to be correlated to tax avoidance and are used as control variables in previous tax avoidance studies (e.g., Rego 2003; Chen et al. 2010; Hoi et al. 2013; Cheng et al. 2021). Return on assets ( $ROA$ ), special items ( $SPECIAL\_ITEMS$ ), net operating loss carryforward ( $NOL$  and  $\Delta NOL$ ), and the number of loss years during the period ( $LOSS\_INTENSITY$ ) captures the profitability-related impact on tax avoidance. The natural logarithm of total assets ( $SIZE$ ) captures the size effect; the market-to-book ratio ( $MTB$ ) captures the growth option. Some characteristics directly affect the effective tax rate, such as income from foreign operations ( $FOREIGN\_INCOME$ ) and income under equity method ( $EQUITY\_INCOME$ ); some characteristics are related to the tax-shield effect, such as financial leverage ( $LEVERAGE$ ), the intensity of property, plant, and equipment ( $CAPITAL\_INTENSITY$ ); some characteristics are related to the effect of innovation and intangible assets on tax avoidance such as R&D expense ( $R&D$ ) and advertising expense ( $ADVERTISING$ ). Kim et al. (2019) further include the likelihood of being audited by the IRS ( $AUDIT\_PROBABILITY$ ) to control for the effect of regulatory scrutiny on firms' tax avoidance incentives. They include the median level of tax avoidance in the industry ( $INDUSTRY\_CETR$ ) to control for industry-specific effects on firms' optimal levels of tax avoidance. Finally, the  $CETR_{i,(t-3,t-1)}$  are included to control for the persistence of  $CETR$ .

that are not explained by the above firm characteristics. The detailed definition of each variable can be found in Appendix A.

### 3.4 Empirical Model

To test our hypotheses, we estimate the following regression:

$$\begin{aligned}\Delta CETR_i = & \beta_0 + \beta_1 NegSENTIMENT_{i,(t-3,t-1)} + \beta_2 BELOW_{i,(t-3,t-1)} \\ & + \beta_3 NegSENTIMENT_{i,(t-3,t-1)} \times BELOW_{i,(t-3,t-1)} \\ & + \gamma' CONTROLS_{i,(t-3,t-1)} + Year Dummies \\ & + Industry or Firm Dummies + \varepsilon_{i,(t-3,t-1)},\end{aligned}\quad (2)$$

where the dependent variable ( $\Delta CETR$ ) is the change in the three-year CETR, which is computed as  $CETR_{i,(t,t+2)} - CETR_{i,(t-3,t-1)}$ . We use the change form of CETR instead of the level of CETR because the research objective is to show how firms adjust their CETR levels in the next period.  $NegSENTIMENT$  is, as defined in section 3.2, set to one for firms with negative average media sentiment and zero otherwise.  $BELLOW$  is the dummy variable equal to one if the firm's past three-year CETR ( $CETR_{i,(t-3,t-1)}$ ) is below the optimal level of CETR ( $CETR_{i,(t,t+2)}^*$ ) estimated from equation (1), and zero otherwise. In other words, this variable indicates the direction a firm will converge its tax avoidance from the past level to the optimal level in the following years.  $\Delta CETR$  then shows the exact distance a firm manages to adjust the past tax avoidance to the optimal level in the following years. The coefficient  $\beta_1$  on  $NegSENTIMENT$  indicates incremental changes in CETRs for firms with negative media sentiment beyond the changes in CETRs for firms with neutral or positive media sentiment. The coefficient  $\beta_3$  on the interaction between  $NegSENTIMENT$  and  $BELLOW$  then indicates the incremental effect of negative media sentiment on the CETR change for firms with current CETRs below the optimal levels. Accordingly, if negative media sentiment pushes firms to adjust their CETRs toward the optimal levels, we should predict  $\beta_1$  to be negative and  $\beta_3$  to be positive.

In equation (2), we include a set of control variables, including all firm characteristics in equation (1). Following Bushman et al. (2017), we also control for firms' overall news coverage (*NEWS\_COUNT*) and an alternative information source that relates to firms' strategic disclosure decisions, press release sentiment (*PR\_SENTIMENT*). Bushman et al. (2017) argue that firms may issue positive press releases accompanied by negative events to walk up stock prices. Controlling for press release sentiment can mitigate the concerns that firms manage media coverage by releasing more favorable information (Tsileponis, Stathopoulos, and Walker 2020). Industry (defined by the two-digit SIC) fixed effects and year fixed effects are included in equation (2). For robustness, we also estimate equation (2) with firm-fixed effects. The detailed definitions of all variables are provided in Appendix A.

## 4. Empirical Results

### 4.1 Descriptive Statistics

The summary statistics of variables in the baseline model are presented in Panel A of Table 1. Because we exclude firm-year observations without any media coverage, the average media coverage (*NEWS\_COUNT*) is 4.1183, which is equivalent to about 60 articles. The average media sentiment (*SENTIMENT*) is 0.0050, which is lower than the average firm-initiated press release sentiment (*PR\_SENTIMENT*) of 0.0327. This result is predictable, as firms tend to avoid using a negative tone when releasing information in press releases. In addition, around 36.67% of the firms in our sample have negative media sentiment. The mean and median values of three-year CETR in our sample are 26.51% and 25.54%, respectively, which are comparable to those of recent studies that cover the recent period in their sample (e.g., Bird, Edwards, and Ruchti 2018; Duan, Ding, Hou, and Zhang 2018). The other firm characteristic controls have statistics similar to previous studies (e.g., Hoi, Wu, and Zhang 2013; Kim et al. 2019). For example, firms in our sample are, on average, large (*SIZE* = 7.0264,

equivalent to \$1.12 billion of total assets) and profitable ( $ROA = 31.01\%$ ), as we limit our sample of firms with media coverage and exclude firm-year observations with negative pre-tax income.

[Insert Table 1 Here]

Panel B of Table 1 further reports the statistics of the optimal CETR level estimated from equation (1). The mean and median values of  $CETR^*$  are 26.22% and 26.39%, which is lower than those of Kim et al. (2019). The possible reason could be that the firms in our sample are larger and generate more earnings from foreign operations than the firms in their sample. In addition, their sample includes earlier years from 1991 to 1998, with the optimal CETR levels over 30%, but our sample period starts later than theirs. Nevertheless, consistent with their study, our samples also show that firms' current CETR levels are, on average, below their optimal levels.

Table 2 reports the correlation coefficients for all variables in the baseline model. Consistent with Dyring et al. (2008), we document some persistence of CETRs. The result shows a significantly positive correlation (coefficient = 0.31) between  $CETR_{(t,t+2)}$  and  $CETR_{(t-3,t-1)}$ . However,  $\Delta CETR$  is not significantly associated with  $NegSENTIMENT$ . We will tease out the effect of negative media sentiment on adjustments of CETR between firms below and above the optimal tax avoidance levels using the multivariate analysis in the next section.

[Insert Table 2 Here]

#### **4.2 Negative Media Sentiment and Adjustment of Tax Avoidance**

Before showing our baseline result, we plot the mean change in CETR to demonstrate firms' tendency to adjust CETRs toward the optimal levels in Figure 1. The figure shows that the mean  $\Delta CETR$  is around 8% (-6%) for firms with current CETRs below (above) the optimal levels for the whole sample. We further partition firms by media sentiment for the below and above groups, respectively. The figure shows that in both groups, firms with negative media

sentiment demonstrate a higher degree of change in CETR than firms with neutral or positive media sentiment, which provides initial evidence that negative media sentiment is associated with more adjustment of CETRs toward the optimal levels.

[Insert Figure 1 Here]

Next, to examine the hypotheses of whether and how negative media sentiment affects the adjustment of CETRs, we estimate the ordinary least square (OLS) regression of equation (2). Table 3 shows the result. The coefficient is negative (-0.0388,  $t = -6.01$ ) on stand-alone *NegSENTIMENT* and positive (0.0546,  $t = 6.82$ ) on the interaction term *NegSENTIMENT*  $\times$  *BELOW*, respectively. The result is both statistically and economically significant. Specifically, for firms with current CETRs above the target levels, negative media sentiment is associated with a downward adjustment in their CETR levels by 3.88 percentage points in the following three years, which is equivalent to a decrease of \$26.48 million cash payment for taxes on average.<sup>9</sup> In contrast, for firms with current CETRs below the target levels, negative media sentiment is associated with an upward adjustment in their CETR levels by 1.59 percentage points ( $= -0.0388 + 0.0546$ ) in the following three years, which is equivalent to an increase of \$10.85 million on average.<sup>10</sup>

[Insert Table 3 Here]

Kim et al. (2019) document that the speed of tax avoidance adjustment differs in the distance between actual and target levels of tax avoidance. Hence, we conduct a similar procedure to form our sample into four groups. Specifically, for the original “Below” and “Above” groups, as shown in Figure 1, we further separate firms into two subgroups by whether the distance from the target CETR levels is above or below the median. In so doing, all firms in our sample are partitioned into “Far Below,” “Just Below,” “Just Above,” and “Far Above”

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<sup>9</sup>  $26.48 \text{ million} = 0.0388 \times 682.52 \text{ million}$ , where 682.52 million is the three-year average pre-tax income.

<sup>10</sup>  $10.85 \text{ million} = 0.0159 \times 682.52 \text{ million}$ , where 682.52 million is the three-year average pre-tax income.

groups. Figure 2 plots the change in CETR for each group. Consistent with Kim et al. (2019), we find that the degree of change in CETR is larger for the “Far Below” and “Far Above” groups (extreme groups) than for the two middle groups. We also find that negative media sentiment is positively associated with the degree of change in CETR, while the association is concentrated on the two extreme groups. For this result, we conjecture that the cost of not meeting the target level of tax avoidance increases with the distance from the target level, and so does a firm’s incentive to adjust its tax avoidance toward the target level.

[Insert Figure 2 Here]

In Table 4, we report the result of regressing  $\Delta CETR$  on *NegSENTIMENT* conditional on the distance between the current CETR and the optimal CETR. The result shows that for “Far Below” firms, negative media sentiment is associated with a 2.10 percentage point ( $= -0.0040 + 0.0250$ ) increase in CETR, while for “Far Above” firms, negative media sentiment is associated with a 4.96 percentage point ( $= -0.0040 - 0.0456$ ) decrease in CETR.

[Insert Table 4 Here]

The baseline result shown in Table 3 and the result shown in Table 4, taken together, are consistent with our hypotheses that for firms with current tax avoidance below the optimal levels, negative media sentiment would encourage them to avoid more taxes. Previous studies show that average firms demonstrate an “under-sheltering problem,” that is, firms do not utilize their tax-avoidance opportunities (Weisbach 2002; Desai and Dharmapala 2006). The media, as an external monitoring mechanism, encourages firms to improve their tax efficiency. However, for firms with current tax avoidance above the optimal levels, too much tax avoidance may incur reputation and noncompliance costs greater than the benefits of tax savings; therefore, negative media sentiment stimulates firms to reduce tax aggressiveness.

### 4.3 Robustness Tests

#### 4.3.1 Firm Fixed Effects

We perform several tests to verify the robustness of our baseline results. Firstly, in Panel A of Table 5, we present the result of the regression with firm-fixed effects. This robustness test controls for omitted time-invariant firm characteristics, ruling out some endogeneity problems between the independent variables and other firm characteristics. We find that after including firm-fixed effects, the result is similar to the main results in Tables 3 and 4, indicating that our main finding is not mainly attributable to the fundamental difference in firm characteristics.

[Insert Table 5 Here]

#### **4.3.2 Alternative Tax Avoidance Measures**

Following previous studies (i.e., Cheng et al. 2012; Donohoe 2015), we use two alternative tax avoidance measures: the GAAP effective tax rate and the current effective tax rate, which are the measures from financial accounting. The GAAP ETR is widely used in prior studies to measure tax avoidance. Using confidential survey data on firms' tax planning, Mills et al. (1998) document that an investment in tax planning significantly reduces the GAAP ETR. Different from the CETR, the GAAP ETR captures only the permanent book-tax differences created by transaction items such as interest revenue from tax-exempt bonds and income generated in low-tax foreign countries and permanently reinvested in foreign countries (Hanlon and Heitzman 2010; Cheng et al. 2021), reflecting tax strategies that permanently reduce firms' tax liabilities. In contrast, the current ETR measures both permanent and temporary book-tax differences, which are caused by transaction items such as different depreciation methods for book and tax purposes or items recognized at different times that only defer firms' tax liabilities. These two measures help us identify the impact of media sentiment on both tax reduction and deferral strategies. The result is reported in Panel B of Table 5, and we find the main result is robust to both the GAAP ETR and the current ETR.

#### **4.3.3 Alternative Definition of Optimal Tax Avoidance Level**

Next, we identify the optimal tax avoidance level using a different approach. Following Cook et al. (2017) and Chyz and Gaertner (2018), we define the median tax avoidance level of industry peers as the focal firm's optimal tax avoidance level. Chyz and Gaertner (2018) argue that practitioners often compare a firm's effective tax rate to its peers' rates, making the industry benchmark a suitable choice for the optimal tax avoidance level. The result is presented in Panel C of Table 5. *B BELOW\_ALT* is the dummy variable equal to one if a firm's current CETR is below the median CETR of the sample in the same industry and year and zero otherwise. Our main finding still holds for the use of the industry median tax avoidance benchmark.

#### **4.3.4 Controlling for Effects of Past Earnings**

We use different ways to measure negative media sentiment, as shown in Panel D of Table 5. In column (1), we replace *NegSENTIMENT* with the extremely negative media sentiment (*EXT\_NegSENTIMENT*), which equals one if the firm's average media sentiment is below the 10<sup>th</sup> percentile. The result in column (1) shows that extremely negative media sentiment is associated with a 7.23 percentage point decrease (2.86 percentage point increase) in CETR for firms with current CETRs above (below) their target levels. The extent of CETR adjustment in response to extremely negative media sentiment is greater than that in Table 3, meaning that firms' incentives to adjust tax avoidance should increase with the severity of negative sentiment.

In addition, one may be concerned that media sentiment may be related to firms' past tax avoidance activities and that there may be a mechanical relationship among media sentiment, earnings performance, and the change in CETR. In such cases, our result may not support our argument. Therefore, we estimate an abnormal media sentiment (*ABN\_NegSENTIMENT*), controlling for possible confounding effects. Specifically, we first regress *SENTIMENT* on CETR and the change in pretax earnings over the past three years. In this regression, we also control for some fundamental firm characteristics, such as size, market-to-book ratio, and total

media coverage, and include year and industry-fixed effects. Then, *ABN\_NegSENTIMENT* is the dummy variable equal to one if the residual derived from estimating the regression is negative and zero otherwise. The result, as shown in column (2), is similar to our baseline result that abnormal negative media sentiment pushes adjustments of CETRs toward the optimal levels.

Next, we consider a possible alternative explanation for our result that adverse earnings performance drives both negative media coverage and tax avoidance incentives. It is likely that the media will cover bad earnings news, such as announcements of earnings decreases and missing market expectations, in a more negative tone (DiStaso 2012). On the other hand, the literature also suggests that managers with negative earnings news may have more job security or compensation incentives to increase financial performance in the next period. For example, Osma and Young (2009) show that negative earnings or earnings decreases motivate managers to strategically cut R&D spending in the next period to increase earnings. Dhaliwal et al. (2004) further show that firms lower their ETRs when their earnings would otherwise miss the benchmark. Therefore, it is possible that past poor earnings performance, instead of media sentiment, affects managers' incentives to adjust tax-avoidance levels.

To further verify that earnings performance is not the only cause of our main result, we separate the news articles into earnings-related articles and non-earnings-related articles based on RavenPack news categories.<sup>11</sup> Negative media sentiment could result from poor earnings performance or other non-earnings negative news (e.g., lawsuits and insider trading). Therefore, we measure negative media sentiment separately for earnings-related news (*NegSENTIMENT (EARN)*) and non-earnings-related news (*NegSENTIMENT (NONEARN)*). The result is

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<sup>11</sup> Earnings-related news articles focus on earnings guidance, earnings releases, and earnings revision and account for one of the largest proportions of RavenPack's news articles. We partition our sample into firms with negative earnings-related news and firms with neutral or positive earnings-related news. We find that (1) on average, the former firms have lower earnings levels than the latter firms, (2) the former firms experience negative changes in earnings, while the latter firms experience positive changes in earnings, (3) the changes in the former firms' earnings become less negative in the next period.

presented in column (3) of Panel D. We find that both earnings-related and non-earnings-related negative media sentiment drive the adjustment of tax avoidance toward the target level. Besides, the effect of earnings-related news is stronger, and we conjecture this is because a higher frequency of earnings-related news makes it more exposed to the public, leading to higher reputation costs. Nevertheless, the result with non-earnings-related news shows the robustness of our finding, mitigating the concern of the alternative explanation.

Furthermore, in Panel E, we show the result of regression that includes earnings change in the past three years ( $\Delta EARN$ ) and a dummy variable indicating negative earnings change in the past three years ( $EARN\_DECREASE$ ) as additional control variables. This robustness test helps us triangulate our result by directly ruling out the confounding effect of poor earnings performance. After controlling these two earnings variables, our main finding still holds. In columns (3) and (4), we show the result of a subsample test. If poor earnings performance is the main driver of the relationship between negative media sentiment and changes in tax avoidance, the result we found earlier may disappear after we split the sample based on earnings changes. However, our result holds for firms with either negative or positive earnings changes, suggesting that earnings performance cannot completely explain our main finding.

#### **4.3.5 Mean-reverting Explanation**

There may be an alternative explanation of our main finding that the adjustment of tax avoidance levels is a mean reverting process of effective tax rates or earnings, in which negative media sentiment simply speeds up the process. In addition, existing evidence has documented the mean-reversion phenomenon in earnings, so changes in CETR could simply correlate with earnings movements. To rule out the concern, we first include the lagged CETR, averaged over year t-3 to t-1, in the regression. The coefficient on the lagged CETR captures the mean-reverting effect of effective tax rates. In addition, we replace the dependent variable with the abnormal changes in CETR ( $AB\Delta CETR$ ), which is the residual estimated from the regression

of  $\Delta CETR$  on the lagged CETR and ROA.  $A\Delta CETR$  is the portion of changes not explained by the mean-reverting effect of effective tax rates and earnings. The result is presented in Panel F of Table 5. We find that our result holds for both tests, mitigating the concern regarding the mean-reverting explanation.

#### 4.4 Instrumental Variable Approach

There may be some endogeneity problems that are not well addressed by the above robustness tests, e.g., the reverse causality between tax planning and media sentiment or other omitted variable biases. Therefore, we adopt the instrumental variable (IV) approach to reasonably address the endogeneity problem.

Following the prior studies (e.g., Cao and Wan 2014), we use the industry average of media sentiment (i.e., *IND\_SENTIMENT*) as the instrumental variable.<sup>12</sup> First of all, we conduct the Cragg-Donald weak IV test, and the result strongly rejects the null hypothesis of weak IV.<sup>13</sup> The IV also satisfies the relevance requirement. The coefficient on the IV in the first stage, as shown in column (1) of Table 6, is significantly positive, suggesting that firms' media sentiment is highly correlated to the industry-level average media sentiment. Essentially, there is no apparent reason to suspect that the industry-level media sentiment is directly related to firms' tax avoidance, which satisfies the exclusion restriction.

[Insert Table 6 Here]

In the second stage, we define *NegSENTIMENT* as equal to one if the fitted *SENTIMENT* estimated in the first stage is negative and zero otherwise. We then regress  $\Delta CETR$  on *NegSENTIMENT* and the interaction term *NegSENTIMENT*  $\times$  *BELLOW*. The result is reported in column (2). The coefficient on *NegSENTIMENT* is still negative and significant (-0.0708,  $t = -8.28$ ); the coefficient on the interaction term is still positive and significant (0.0886,  $t = 9.80$ ).

<sup>12</sup> The media sentiment of the focal firm is excluded when calculating the average *SENTIMENT* for the industry and year.

<sup>13</sup> The F-statistic for the Cragg-Donald weak identification test is 116.

Overall, the IV result is similar to our main result.

## 5. Cross-sectional Analyses

Our main hypotheses state that media sentiment serves a governance role in corporate tax planning through magnifying reputation costs and noncompliance costs associated with managers' inefficient tax planning, either avoiding too much or too little tax. Specifically, negative public image (i.e., negative media sentiment) may increase the severity of firms' and managers' reputation damages, so managers would try to improve firms' tax efficiency by adjusting tax avoidance to the optimal levels. Similarly, it is possible that a negative public image attracts more attention from regulatory agencies, leading to a higher cost of noncompliance. Therefore, managers would try harder to avoid violations of tax laws, so the tax avoidance level will be adjusted down if it is currently too high. To prove this argument, we provide cross-sectional analyses, examining whether reputation costs and noncompliance costs are the potential mechanisms.

### 5.1 Reputational Cost Mechanism

We implement the following cross-sectional analyses to examine the reputation-cost mechanism. Our idea is that if it is reputation costs through which negative media sentiment affects adjustments of tax planning, then we should observe our main result is more prominent for firms who are more sensitive to reputation costs. Otherwise, we should find that our main result does not significantly vary with firms' sensitivity to reputation costs. As a result, we identify the following cases when managers' tax planning decisions are more subject to reputation costs.

#### 5.1.1 Sentiment of Firm-initiated Press Releases

The first case is when the sentiment of firm-initiated press releases is more negative. Press releases can be used as a strategic disclosure channel for firms to communicate to the public or

the media, and firms can release positive information through press releases to balance the public media's tone and remedy the reputation damage (Bushman et al. 2017). In other words, if firms have fewer opportunities to release positive news, they suffer more reputation damage due to negative media sentiment and should be more cautious in making decisions. Hence, we predict that our main result is more pronounced for firms with more negative press-release sentiment. The result is presented in Column (1) of Table 7, where the moderator, *LOW\_PR\_SENTIMENT*, is a dummy variable equal to one if the firm-initiated press release sentiment over the past three years is below the median in the same period and industry and zero otherwise. Consistent with our prediction, we find that the effect of negative media sentiment on tax avoidance adjustment is more prominent for firms with more negative press releases.

[Insert Table 7 Here]

### **5.1.2 CEO Age and Tenure**

Next, we argue that the CEO attributes such as tenure and age would also be related to CEOs' reputation concerns as well as incentives to adjust tax planning. Previous studies suggest that CEOs value their own reputations and careers when making decisions. For example, Kothari, Shu, Peter, and Wysocki (2009) argue that managers' incentives to disclose corporate news are determined by their career concerns. Baginski, Campbell, Hinson, and Koo (2018) also state that younger CEOs and CEOs in their early tenure are more likely to have higher career concerns, as labor markets may have weaker confidence in their abilities, stimulating those CEOs to show better performance. Related to tax planning decisions, Goldman, Powers, and Williams (2017) show that CEOs in their early tenure tend to report lower GAAP and cash ETRs, implying that newer CEOs would try to please the market with better after-tax financial performance. Overall, the above studies suggest that younger and shorter-tenured CEOs may be more concerned about building their reputation in the labor

market, thereby facing higher reputation costs of poor tax planning. Therefore, we predict that in response to negative media sentiment, younger and shorter-tenured CEOs have higher incentives to adjust tax avoidance levels.

We present the result in columns (2) and (3) of Table 7, where we use short CEO tenure (*SHORT\_TENURE*) and young CEO age (*YOUNG\_CEO*) as the moderators in the regressions, respectively. CEO data is retrieved from the ExecuComp database. *SHORT\_TENURE* is defined as one if the tenure of the firm's CEO is below the median in the year. *YOUNG\_CEO* is equal to one if the age of the CEO is below the median in the year. Consistent with our prediction, we find that our main result is more prominent for firms with shorter-tenured and young CEOs.

### 5.1.3 Negative Tax Avoidance News

Last, we consider negative media coverage of firms' tax avoidance activities. Hanlon and Slemrod (2009) shows that firms face negative market reactions when their aggressive tax planning strategies, such as tax sheltering, are reported by the media. In addition, they show that the market reactions are more negative for firms that are more sensitive to reputation losses among consumers, implying that media coverage of negative tax avoidance news imposes substantial reputation costs on aggressively avoiding firms. Therefore, we predict that firms with current tax avoidance higher than the optimal levels are more likely to reduce tax avoidance if they are reported in tax avoidance news by the media.

Our tax avoidance news articles are also collected from the RavenPack database. Following Hanlon and Slemrod (2009) and Lee (2015), we conduct a full-text search in the news database using the following keywords to identify negative tax avoidance news articles: *tax shelter(s)*, *tax sheltering*, *tax avoidance*, *avoid tax*, *tax evasion*, *evade tax*, *tax loophole(s)*, *tax haven(s)*, *tax transparency*, and *aggressive tax (planning)*. Originally, we obtain 19,995 articles for U.S. firms from 2000 to 2018, and then we match these news articles with our

sample of firms. Finally, there are 6,530 negative tax avoidance news articles involving 193 firms in our sample, which means that about 9% of the firms in our sample have negative tax avoidance news. The description of the sample of tax avoidance news is provided in Appendix B.

The result is presented in column (4) of Table 7. The moderator in the regression, *NEG\_TAX\_NEWS*, is equal to one if the firm has at least one negative tax avoidance news in the past three years and zero otherwise. Consistent with our prediction, the coefficient on the interaction term  $BELOW \times NegSENTIMENT \times NEG\_TAX\_NEWS$  is positive and significant, meaning that firms with both negative media sentiment and negative tax avoidance news are more likely to reduce their tax avoidance toward the optimal levels. However, the coefficient on  $NegSENTIMENT \times NEG\_TAX\_NEWS$  is insignificant, meaning that firms with tax avoidance news do not significantly increase tax avoidance toward the optimal levels in response to negative media sentiment. Overall, the result suggests that negative tax avoidance news may impose reputation costs on firms, curbing firms from further tax avoidance. Also, for firms that are already above the optimal tax avoidance levels, tax avoidance news magnifies the effect of negative media sentiment on downward adjustments in tax avoidance.

## 5.2 Noncompliance Cost Mechanism

Next, we argue that negative media sentiment would also influence firms' tax planning by magnifying noncompliance costs of tax avoidance. Specifically, firms that are above the optimal levels of tax avoidance are more likely to incur costs of noncompliance arising from tax audits and potential penalties. Therefore, we conduct the cross-sectional analyses conditional on noncompliance costs, proxied by the tax audit probability and IRS attention. Higher tax audit probability and more attention from the IRS are associated with a higher likelihood of a firm's tax planning being challenged by the IRS, making firms' tax planning decisions more sensitive to costs of noncompliance. The concept is similar. If the

noncompliance cost is the mechanism, we should observe that our main result is more pronounced when the tax audit probability and IRS attention are higher.

We present the result in Table 8. The moderators are tax audit probability (*AUDIT\_PROBABILITY*) and IRS attention (*IRS\_ATTENTION*) in columns (1) and (2), respectively. *AUDIT\_PROBABILITY* is the audit probability obtained from the Transactional Record Access Clearinghouse (TRAC), averaged over the past three years. We borrow the IRS attention variable from Bozanic et al. (2017).<sup>14</sup> *IRS\_ATTENTION* is the number of times the IRS downloads a company's 10-K filings from EDGAR, averaged over the past three years. The result shows that the coefficients on the interaction term *NegSENTIMENT*  $\times$  *Moderator* and *BELOW*  $\times$  *NegSENTIMENT*  $\times$  *Moderator* are both insignificant, suggesting that our main result is not more prominent for firms more subject to scrutiny from the IRS. Therefore, this result does not support our hypothesis that negative media sentiment affects adjustments in tax avoidance through the noncompliance cost mechanism.

[Insert Table 8 Here]

## 6. Additional Analysis on Tax Aggressiveness

In the preceding sections, our analysis has unveiled a correlation between negative media sentiment and managers' incentives to achieve optimal levels of tax avoidance. However, the mechanisms by which adjustments to CETR are accomplished remain unclear. It remains uncertain whether companies are inclined to adopt more or less aggressive tax strategies in response to unfavorable media scrutiny. On the one hand, aggressive tax planning is usually complex and difficult to be known by outsiders. Additionally, it requires a certain level of opacity in a firm's information environment (Frank, Lynch, and Rego 2009; Balakrishnan,

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<sup>14</sup> The IRS attention data for the period 2004-2015 is downloaded from Dr. Zahn Bozanic's website at <https://business.fsu.edu/person/zahn-bozanic>

Blouin, and Guay 2019), leading managers to perceive it as a low-risk approach when they believe it won't be uncovered. Consequently, one might anticipate that, in the face of negative media sentiment, managers are more inclined to employ or uphold aggressive tax planning. Conversely, managers might view aggressive tax strategies as potentially hazardous and detrimental to their long-term reputation, leading them to opt for less aggressive tax planning, particularly if negative media sentiment heightens their concerns about their long-term reputation (Chen et al. 2010). In such cases, it is plausible that negative media sentiment influences managers' perceptions of long-term reputation risk, making them less likely to embrace aggressive tax planning strategies to meet their objectives.

To investigate this issue, we first conduct a cross-sectional analysis based on firms' flexibility to engage in aggressive tax planning. The objective is to see when firms have more opportunities, whether they adjust tax avoidance levels more in response to negative media sentiment. Empirically, Blouin (2014) defines tax aggressiveness as tax avoidance associated with risky and uncertain tax positions. Earlier studies suggest that multinational companies and those companies with tax-haven subsidiaries are associated with uncertain and aggressive tax avoidance, such as income shifting (Dyreng, Hanlon, and Maydew 2019; Cheng et al. 2021). Therefore, we use the indicators of multinational companies (*MNC*) and tax-haven subsidiaries (*HAVEN*) as the proxy for the flexibility of aggressive tax planning. As shown in Panel A of Table 9, The coefficients on *NegSENTIMENT*  $\times$  *Flexibility* are insignificant, but the coefficients on *BELOW*  $\times$  *NegSENTIMENT*  $\times$  *Flexibility* are positive and significant at the 10% level. That is, to respond to negative media sentiment, firms with higher flexibility do not increase more tax avoidance but decrease more tax avoidance than firms with lower flexibility. This result implies that flexibility is likely irrelevant for firms engaging in less tax avoidance. However, multinational firms with tax haven subsidiaries and higher tax avoidance levels

potentially incur higher nontax costs. If they receive negative media coverage, they are more likely to reduce their tax avoidance levels.

[Insert Table 9 Here]

In Panel B of Table 9, we directly examine whether firms would adjust the use of tax havens in response to negative media sentiment. The dependent variables are  $\Delta HAVEN\%$ , the change in the ratio of tax-have subsidiaries to the total number of subsidiaries, and  $\Delta HAVEN$ , the change in the number of subsidiaries located in tax-haven countries. We find that the coefficients are insignificant on  $NegSENTIMENT$  but negative and significant on  $NegSENTIMENT \times BELOW$ , meaning that for firms above the optimal tax avoidance levels, negative media sentiment is associated with a reduction in the number of tax-haven subsidiaries, hence less tax aggressive. However, for firms below the optimal tax avoidance levels, negative media sentiment is not associated with more use of tax-haven subsidiaries. Combining the results in Panels A and B, the evidence is more consistent with our latter prediction that managers perceive aggressive tax planning as potentially risky in the long run, so they would abandon using more aggressive ways to achieve the optimal tax avoidance levels.

An alternative perspective on our findings could be considered. Dyring, Hoopes, Langetieg and Wilde (2020) find that firms may strategically choose not to disclose information about their subsidiaries located in tax havens, particularly when they are under heightened media scrutiny. Although their research reveals that instances of non-disclosure are generally infrequent, our results could potentially indicate that certain companies are not genuinely diminishing their utilization of tax avoidance strategies. Instead, they might be refraining from disclosing their tax-haven subsidiaries in order to avert further damage to their reputation when subjected to negative media sentiment.

## 7. Conclusion

This study investigates the role of media sentiment in corporate tax planning strategies. We explore whether negative media sentiment exerts pressure on firm managers to fine-tune their tax avoidance strategies, either by increasing or decreasing them towards optimal levels. Previous research has shown that the consequences of either excessive or insufficient tax avoidance can be substantial. We posit that the decision regarding tax planning is analogous to other investment choices, necessitating a trade-off between the costs of more tax avoidance against the costs of less tax avoidance, ultimately reaching an optimal tax avoidance level. Specifically, our hypothesis suggests that firms operating below the optimal tax avoidance level will intensify their tax avoidance efforts when faced with more negative media sentiment, as the media's scrutiny amplifies the reputation costs of forgoing tax benefits. In contrast, firms operating above the optimal tax avoidance threshold will curtail their tax avoidance activities in response to negative media sentiment, as it can magnify both reputation and noncompliance costs associated with tax avoidance.

We estimate the optimal tax avoidance level following Kim et al. (2019). Using the large sample of U.S. public-listed firms from 2003 through 2016, our findings consistently support our argument. Moreover, we demonstrate that it is the reputation cost, rather than the noncompliance cost, that likely serves as the mechanism by which negative media sentiment influences the adjustment of tax avoidance towards optimal levels. Furthermore, we provide evidence indicating that managers do not rely on aggressive tax strategies such as tax havens to elevate tax avoidance to optimal levels in response to negative media sentiment; instead, they tend to reduce their reliance on tax havens when a firm's tax avoidance surpasses the optimal levels.

In summary, this study makes a significant contribution to the body of research on the media's role as a corporate governance tool. It presents novel evidence that a firm's exposure to negative publicity shaped by the media sentiment prompts its managers to fine-tune their tax

avoidance strategies. These findings align with previous research highlighting the presence of an optimal tax avoidance levels. Moreover, the insights from this study hold relevance for investors and stakeholders, particularly in light of the increasing public attention surrounding tax avoidance matters in recent years.

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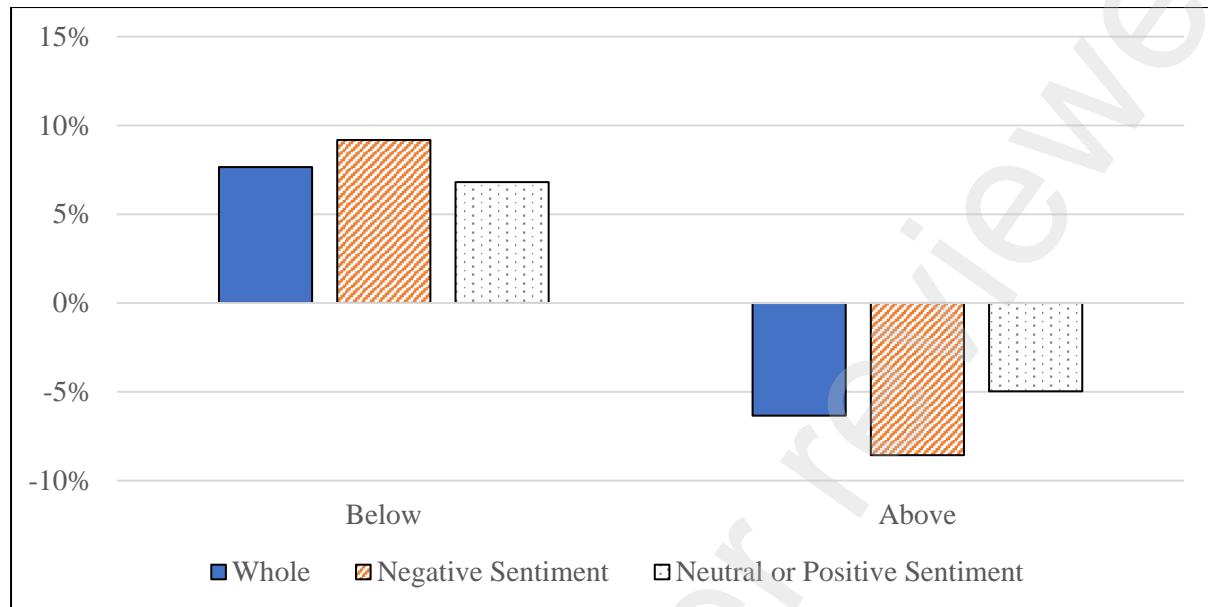
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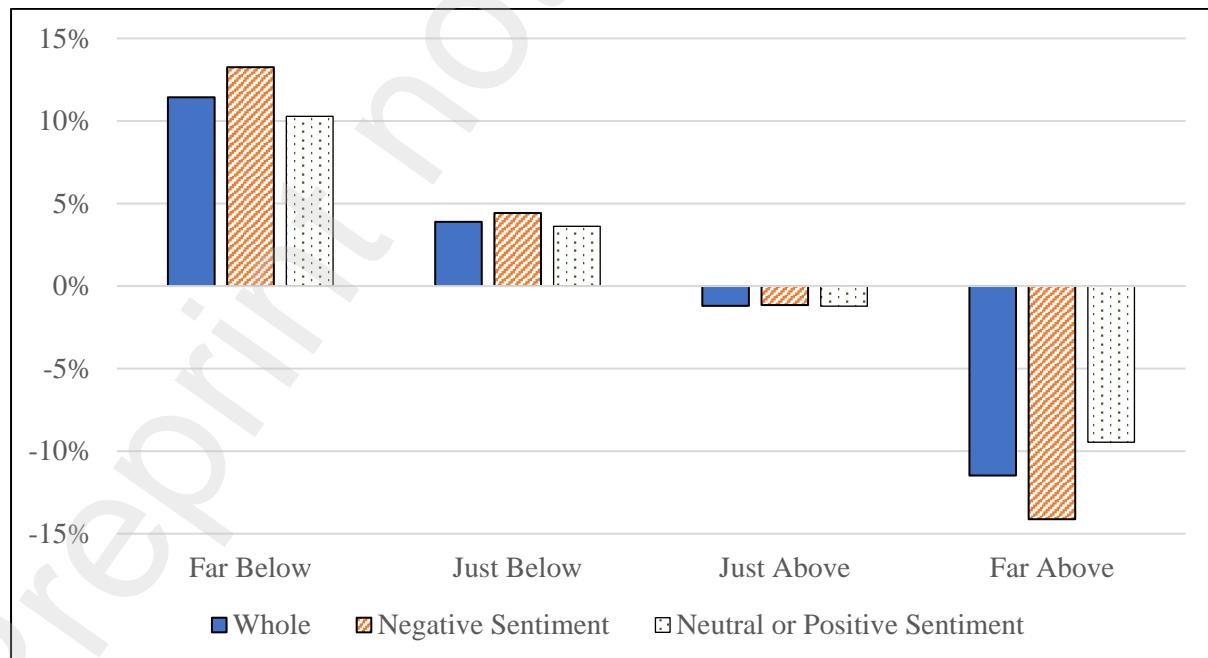
**Figure 1 Change in Cash Effective Tax Rate**

This figure shows the mean change in CETR ( $\Delta CETR$ ) for firms with current CETR levels below and above the optimal levels of CETR.



**Figure 2 Change in Cash Effective Tax Rate Conditional on Distance from the Optimal Level**

This figure shows the mean change in CETR ( $\Delta CETR$ ) for the following groups: firms with current CETR levels far below, just below, just above, and far above the optimal levels of CETR.



**Table 1 Summary Statistics**

This table reports the summary statistics of the variables in the baseline regression model. The sample period is from 2003 through 2016. All variables are defined in Appendix A.

Panel A: Descriptive statistics for variables

	<b>Mean</b>	<b>S.D.</b>	<b>P25</b>	<b>P50</b>	<b>P75</b>
<i>CETR</i> $(t, t+2)$	0.2651	0.1721	0.1670	0.2554	0.3326
<i>CETR</i> $(t-3, t-1)$	0.2424	0.1492	0.1452	0.2450	0.3238
$\Delta CETR$	0.0227	0.1904	-0.0528	0.0095	0.0832
<i>SENTIMENT</i>	0.0050	0.0271	-0.0081	0.0075	0.0210
<i>NegSENTIMENT</i>	0.3667	0.4819	0.0000	0.0000	1.0000
<i>ROA</i>	0.3101	0.2057	0.1604	0.2693	0.4148
<i>SPECIAL_ITEMS</i>	-0.0208	0.0468	-0.0298	-0.0085	0.0000
<i>LEVERAGE</i>	0.1767	0.1615	0.0244	0.1553	0.2737
<i>NOL</i>	0.5448	0.4980	0.0000	1.0000	1.0000
$\Delta NOL$	0.0068	0.1145	0.0000	0.0000	0.0037
<i>FOREIGN_INCOME</i>	0.0634	0.0943	0.0000	0.0132	0.1037
<i>CAPITAL_INTENSITY</i>	0.2473	0.2060	0.0927	0.1840	0.3386
<i>EQUITY_INCOME</i>	0.0028	0.0115	0.0000	0.0000	0.0000
<i>RND</i>	0.0745	0.1267	0.0000	0.0040	0.0973
<i>ADVERTISING</i>	0.0395	0.0903	0.0000	0.0000	0.0319
<i>MTB</i>	3.1720	2.6799	1.6430	2.4246	3.6839
<i>SIZE</i>	7.0264	1.8115	5.8205	6.9829	8.2156
<i>LOSS_INTENSITY</i>	0.0694	0.1423	0.0000	0.0000	0.0000
<i>AUDIT_PROBABILITY</i>	0.9600	0.5575	0.5630	0.9410	1.0970
<i>INDUSTRY_CETR</i>	0.2266	0.0625	0.1950	0.2263	0.2614
<i>NEWS_COUNT</i>	4.1183	1.3590	3.1045	4.1130	5.1103
<i>PR_SENTIMENT</i>	0.0327	0.0190	0.0229	0.0320	0.0418
N	14,436				

Panel B: Estimated optimal level of CETR

	<b>Mean</b>	<b>S.D.</b>	<b>P25</b>	<b>P50</b>	<b>P75</b>
Estimated optimal level:					
<i>CETR*</i> $(t, t+2)$	0.2622	0.0637	0.2206	0.2639	0.3037
Gap between actual and optimal levels:					
<i>CETR</i> $(t-1, t-3) - CETR^*(t, t+2)$	-0.0198	0.1041	-0.0842	-0.0238	0.0311

**Table 2 Correlation Coefficients**

This table reports the Pearson correlation coefficients for the variables in the baseline regression model. All variables are defined in Appendix A. Bolded values indicate statistical significance at the 0.05 level.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
1 <i>CETR</i> ( <i>t</i> , <i>t</i> +2)																					
2 <i>CETR</i> ( <i>t</i> -3, <i>t</i> -1)		<b>0.31</b>																			
3 $\Delta$ <i>CETR</i>		<b>0.67</b>	<b>-0.51</b>																		
4 <i>NegSENTIMENT</i>		<b>0.02</b>	<b>0.03</b>	-0.01																	
5 <i>ROA</i>		<b>0.12</b>	<b>0.12</b>	0.01	<b>-0.14</b>																
6 <i>SPECIAL_ITEMS</i>		<b>0.07</b>	<b>0.11</b>	<b>-0.02</b>	<b>-0.12</b>	<b>0.23</b>															
7 <i>LEVERAGE</i>		<b>-0.12</b>	<b>-0.13</b>	-0.00	<b>-0.02</b>	<b>-0.27</b>	<b>-0.07</b>														
8 <i>NOL</i>		<b>-0.10</b>	<b>-0.15</b>	<b>0.02</b>	-0.01	<b>-0.21</b>	<b>-0.08</b>	<b>0.11</b>													
9 $\Delta$ <i>NOL</i>		<b>-0.03</b>	-0.01	<b>-0.02</b>	<b>0.02</b>	<b>-0.06</b>	<b>-0.07</b>	<b>0.04</b>	<b>0.05</b>												
10 <i>FOREIGN_INCOME</i>		<b>-0.04</b>	<b>-0.05</b>	0.00	<b>-0.05</b>	<b>0.20</b>	<b>-0.05</b>	<b>-0.06</b>	<b>0.11</b>	<b>0.02</b>											
11 <i>CAPITAL_INTENSITY</i>		<b>-0.05</b>	<b>-0.03</b>	<b>-0.02</b>	<b>0.03</b>	<b>-0.04</b>	<b>0.09</b>	<b>0.25</b>	<b>-0.11</b>	-0.01	<b>-0.13</b>										
12 <i>EQUITY_INCOME</i>		<b>0.02</b>	0.01	0.01	<b>-0.03</b>	<b>0.04</b>	<b>0.03</b>	<b>0.03</b>	-0.01	-0.02	<b>0.07</b>	<b>0.08</b>									
13 <i>RND</i>		<b>-0.11</b>	<b>-0.17</b>	<b>0.03</b>	<b>0.04</b>	0.01	<b>-0.11</b>	<b>-0.22</b>	<b>0.11</b>	<b>0.05</b>	<b>0.22</b>	<b>-0.30</b>	<b>-0.07</b>								
14 <i>ADVERTISING</i>		<b>0.05</b>	<b>0.08</b>	-0.01	<b>0.03</b>	<b>0.15</b>	-0.02	<b>-0.06</b>	<b>-0.05</b>	0.01	0.01	-0.01	<b>-0.05</b>	<b>-0.09</b>							
15 <i>MTB</i>		<b>-0.03</b>	<b>-0.06</b>	<b>0.02</b>	<b>-0.07</b>	<b>0.43</b>	<b>-0.05</b>	<b>0.09</b>	<b>-0.02</b>	0.00	<b>0.16</b>	<b>-0.08</b>	0.01	<b>0.18</b>	<b>0.14</b>						
16 <i>SIZE</i>		<b>-0.09</b>	<b>-0.05</b>	<b>-0.04</b>	<b>-0.04</b>	<b>-0.06</b>	<b>-0.09</b>	<b>0.32</b>	<b>0.10</b>	<b>0.02</b>	<b>0.28</b>	<b>0.13</b>	<b>0.15</b>	<b>-0.09</b>	-0.01	<b>0.10</b>					
17 <i>LOSS_INTENSITY</i>		<b>-0.07</b>	<b>-0.06</b>	<b>-0.02</b>	<b>0.16</b>	<b>-0.40</b>	<b>-0.24</b>	-0.01	<b>0.13</b>	<b>0.04</b>	<b>-0.13</b>	<b>-0.03</b>	<b>-0.02</b>	<b>0.16</b>	<b>-0.06</b>	<b>-0.10</b>	<b>-0.15</b>				
18 <i>AUDIT_PROBABILITY</i>		<b>-0.05</b>	<b>-0.03</b>	<b>-0.02</b>	<b>-0.04</b>	<b>-0.02</b>	<b>-0.05</b>	<b>0.22</b>	<b>0.05</b>	0.01	<b>0.24</b>	<b>0.11</b>	<b>0.14</b>	<b>-0.06</b>	-0.02	<b>0.07</b>	<b>0.79</b>	<b>-0.13</b>			
19 <i>INDUSTRY_CETR</i>		<b>0.12</b>	<b>0.28</b>	<b>-0.11</b>	-0.01	<b>0.13</b>	-0.02	<b>-0.08</b>	<b>-0.08</b>	<b>-0.04</b>	<b>-0.10</b>	<b>-0.11</b>	<b>-0.04</b>	<b>-0.16</b>	<b>0.16</b>	<b>0.04</b>	<b>-0.03</b>	<b>-0.10</b>	<b>-0.03</b>		
20 <i>NEWS_COUNT</i>		<b>-0.07</b>	<b>-0.02</b>	<b>-0.05</b>	<b>-0.09</b>	<b>0.06</b>	<b>-0.07</b>	<b>0.10</b>	<b>0.19</b>	0.00	<b>0.25</b>	<b>-0.07</b>	<b>0.08</b>	<b>0.06</b>	<b>0.07</b>	<b>0.15</b>	<b>0.56</b>	<b>-0.13</b>	<b>0.51</b>	<b>0.07</b>	
21 <i>PR_SENTIMENT</i>		0.01	<b>-0.04</b>	<b>0.04</b>	<b>-0.23</b>	<b>0.17</b>	<b>0.09</b>	<b>-0.12</b>	<b>-0.05</b>	<b>-0.03</b>	0.00	<b>-0.06</b>	<b>-0.02</b>	<b>0.03</b>	<b>0.02</b>	<b>0.06</b>	<b>-0.18</b>	<b>-0.09</b>	<b>-0.11</b>	<b>0.02</b>	<b>-0.08</b>

**Table 3 Media Sentiment and Adjustment of Tax Avoidance**

This table presents the result of the impact of negative media sentiment on the change in cash effective tax rates. All variables are defined in Appendix A. The t-statistics reported in parentheses are based on standard errors clustered by firm. \*, \*\* and \*\*\* indicate statistical significance at the 0.1, 0.05 and 0.01 levels.

		$\Delta CETR$
<i>NegSENTIMENT</i>	b1	-0.0388*** (-6.01)
<i>BELOW</i>		0.1111*** (22.33)
<i>NegSENTIMENT × BELOW</i>	b2	0.0546*** (6.82)
<i>ROA</i>		0.0104 (0.81)
<i>SPECIAL_ITEMS</i>		-0.1950*** (-4.20)
<i>LEVERAGE</i>		0.0003 (0.02)
<i>NOL</i>		0.0041 (1.08)
<i>ΔNOL</i>		-0.0382*** (-2.67)
<i>FOREIGN_INCOME</i>		-0.0292 (-1.18)
<i>CAPITAL_INTENSITY</i>		-0.0111 (-0.78)
<i>EQUITY_INCOME</i>		0.3332** (2.07)
<i>RND</i>		0.0360* (1.70)
<i>ADVERTISING</i>		-0.0408** (-2.03)
<i>MTB</i>		0.0014* (1.85)
<i>SIZE</i>		-0.0037* (-1.69)
<i>LOSS_INTENSITY</i>		-0.0578*** (-3.13)
<i>AUDIT_PROBABILITY</i>		-0.0026 (-0.51)
<i>INDUSTRY_CETR</i>		-0.4055*** (-6.02)
<i>NEWS_COUNT</i>		0.0014 (0.39)
<i>PR_SENTIMENT</i>		-0.0383 (-0.34)
Intercept		0.0411 (1.46)
Year FE		Y
Industry FE		Y
N		14,436
adj. R-sq		0.1587
F-test on coefficients:		p-value
$H_0: b1+b2 = 0$		0.0007

**Table 4 Adjustments of Tax Avoidance – Extreme Distance from the Optimal Levels**

This table presents the result of the impact of negative media sentiment on the change in cash effective tax rates, conditional on the degree of current CETR deviating from the optimal level of CETR. All variables are defined in Appendix A. The t-statistics reported in parentheses are based on standard errors clustered by firm. \*, \*\* and \*\*\* indicate statistical significance at the 0.1, 0.05 and 0.01 levels.

	$\Delta CETR$
<i>NegSENTIMENT</i>	-0.0040 (-0.66)
<i>FAR_BELOW</i>	0.1162*** (20.56)
<i>NegSENTIMENT</i> $\times$ <i>FAR_BELOW</i>	0.0250*** (2.78)
<i>FAR_ABOVE</i>	-0.0822*** (-11.82)
<i>NegSENTIMENT</i> $\times$ <i>FAR_ABOVE</i>	-0.0456*** (-3.99)
<i>JUST_BELOW</i>	0.0491*** (11.83)
<i>NegSENTIMENT</i> $\times$ <i>JUST_BELOW</i>	0.0067 (0.89)
Intercept	0.0645** (2.35)
All Controls	Y
Year FE	Y
Industry FE	Y
N	14,436
adj. R-sq	0.2064

**Table 5 Robustness Checks**

This table presents robustness checks for the main result. All variables are defined in Appendix A. The t-statistics reported in parentheses are based on standard errors clustered by firm. \*, \*\* and \*\*\* indicate statistical significance at the 0.1, 0.05 and 0.01 levels.

Panel A: Firm fixed effects

		(1) $\Delta CETR$	(2) $\Delta CETR$
<i>NegSENTIMENT</i>	b1	-0.0438*** (-5.76)	-0.0039 (-0.58)
<i>BELOW</i>		0.1470*** (23.42)	
<i>NegSENTIMENT × BELOW</i>	b2	0.0586*** (6.36)	
<i>FAR_BELOW</i>			0.2051*** (28.02)
<i>NegSENTIMENT × FAR_BELOW</i>			0.0190** (1.99)
<i>FAR_ABOVE</i>			-0.1173*** (-15.56)
<i>NegSENTIMENT × FAR_ABOVE</i>			-0.0531*** (-4.45)
<i>JUST_BELOW</i>			0.0848*** (17.84)
<i>NegSENTIMENT × JUST_BELOW</i>			0.0069 (0.88)
Intercept		-0.3807*** (-5.36)	-0.4469*** (-6.25)
All Controls		Y	Y
Year FE		Y	Y
Firm FE		Y	Y
N		14,436	14,436
adj. R-sq		0.3161	0.4063
F-test on coefficients:		p-value	
H <sub>0</sub> : b1+b2 = 0		0.0063	

Panel B: Alternative tax avoidance measures

		(1) $\Delta GAAP\_ETR$	(2) $\Delta GAAP\_ETR$	(3) $\Delta CURR\_ETR$	(4) $\Delta CURR\_ETR$
<i>NegSENTIMENT</i>	b1	-0.0253*** (-5.54)	-0.0184*** (-3.50)	-0.0258*** (-4.73)	-0.0285*** (-4.44)
<i>BELOW</i>		0.1208*** (20.87)	0.1504*** (18.76)	0.0983*** (22.29)	0.1301*** (22.02)
<i>NegSENTIMENT × BELOW</i>	b2	0.0373*** (4.74)	0.0280*** (3.22)	0.0340*** (4.89)	0.0404*** (5.00)
Intercept		0.0445* (1.95)	0.1486** (2.30)	0.0333 (1.32)	-0.0840 (-1.20)
All Controls		Y	Y	Y	Y
Year FE		Y	Y	Y	Y
Industry FE		Y	N	Y	N
Firm FE		N	Y	N	Y
N		14,436	14,436	13,821	13,821
adj. R-sq		0.1487	0.3461	0.1371	0.3073
F-test on coefficients:		p-value	p-value	p-value	p-value
H <sub>0</sub> : b1+b2 = 0		0.0717	0.2021	0.0656	0.0223

Panel C: An alternative definition of the optimal level of tax avoidance

	(1)	(2)
	$\Delta CETR$	$\Delta CETR$
<i>NegSENTIMENT</i>	b1 -0.0317*** (-5.93)	-0.0312*** (-4.88)
<i>BELOW_ALT</i>	0.0989*** (22.46)	0.1420*** (23.48)
<i>NegSENTIMENT</i> $\times$ <i>BELOW_ALT</i>	b2 0.0542*** (7.24)	0.0491*** (5.66)
Intercept	0.1267*** (4.45)	-0.2937*** (-4.21)
All Controls	Y	Y
Year FE	Y	Y
Industry FE	Y	N
Firm FE	N	Y
N	14,436	14,436
adj. R-sq	0.1547	0.3123
F-test on coefficients:	p-value	p-value
H <sub>0</sub> : b1+b2 = 0	<0.0000	0.0033

Panel D: Alternative Measures of Negative Sentiment

	(1)	(2)	(3)
	$\Delta CETR$	$\Delta CETR$	$\Delta CETR$
<i>BELOW</i>	0.1203*** (26.43)	0.1166*** (21.48)	0.0960*** (18.35)
<i>EXT_NegSENTIMENT</i>	b1 -0.0723*** (-6.05)		
<i>EXT_NegSENTIMENT</i> $\times$ <i>BELOW</i>	b2 0.1009*** (6.74)		
<i>ABN_NegSENTIMENT</i>	b3	-0.0166*** (-2.78)	
<i>ABN_NegSENTIMENT</i> $\times$ <i>BELOW</i>	b4	0.0318*** (4.34)	
<i>NegSENTIMENT (EARN)</i>	b5		-0.0439*** (-6.13)
<i>NegSENTIMENT (EARN)</i> $\times$ <i>BELOW</i>	b6		0.0578*** (6.57)
<i>NegSENTIMENT (NONEARN)</i>	b7		-0.0188** (-2.49)
<i>NegSENTIMENT (NONEARN)</i> $\times$ <i>BELOW</i>	b8		0.0259*** (2.88)
Intercept	0.0410 (1.47)	0.0337 (1.19)	0.0477 (1.45)
All Controls	Y	Y	Y
Year FE	Y	Y	Y
Industry FE	Y	Y	Y
N	14,436	14,436	11,309
adj. R-sq	0.1487	0.1557	0.1631
F-test on coefficients:	p-value	p-value	p-value
H <sub>0</sub> : b1+b2 = 0	0.0010		
H <sub>0</sub> : b3+b4 = 0		0.0003	
H <sub>0</sub> : b5-b7 = 0			0.0253
H <sub>0</sub> : b6-b8 = 0			0.0159

Panel E: Additional controls

			$\Delta EARN < 0$	$\Delta EARN \geq 0$	
		(1) $\Delta CETR$	(2) $\Delta CETR$	(3) $\Delta CETR$	
<i>NegSENTIMENT</i>	b1	-0.0354*** (-5.50)	-0.0363*** (-5.58)	-0.0293*** (-2.87)	-0.0371*** (-4.36)
<i>BELOW</i>		0.1096*** (22.17)	0.1102*** (22.35)	0.1222*** (13.50)	0.1075*** (20.12)
<i>NegSENTIMENT</i> $\times$ <i>BELOW</i>	b2	0.0532*** (6.66)	0.0540*** (6.74)	0.0382*** (2.95)	0.0566*** (5.77)
$\Delta EARN$		0.1116*** (4.94)			
<i>EARN_DECREASE</i>			-0.0138*** (-3.51)		
Intercept		0.0432 (1.54)	0.0484* (1.73)	0.0705 (1.40)	0.0178 (0.65)
All Controls		Y	Y	Y	Y
Year FE		Y	Y	Y	Y
Industry FE		Y	Y	Y	Y
N		14,436	14,436	4,858	9,578
adj. R-sq		0.1612	0.1596	0.1587	0.1548
F-test on coefficients:		p-value	p-value	p-value	p-value
b1+b2=0		0.0001	0.0001	0.2751	0.0002

Panel F: Controlling for mean-reverting effects

		(1) $\Delta CETR$	(2) $\Delta A\Delta CETR$
<i>NegSENTIMENT</i>	b1	-0.0111** (-2.01)	-0.0135** (-2.46)
<i>BELOW</i>		-0.0290*** (-5.58)	-0.0169*** (-3.75)
<i>NegSENTIMENT</i> $\times$ <i>BELOW</i>	b2	0.0187*** (2.73)	0.0218*** (3.16)
<i>CETR</i>		-0.7393*** (-33.76)	
Intercept		0.2826*** (10.98)	0.1605*** (6.45)
All Controls		Y	Y
Year FE		Y	Y
Industry FE		Y	Y
N		14,436	14,436
adj. R-sq		0.3146	0.0132
F-test on coefficients:		p-value	p-value
b1+b2=0		0.0884	0.0626

**Table 6 Instrumental Variable Approach**

This table reports the baseline results using instrumental variables for negative media sentiment. All variables are defined in Appendix A. The t-statistics reported in parentheses are based on standard errors clustered by firm. \*, \*\* and \*\*\* indicate statistical significance at the 0.1, 0.05 and 0.01 levels.

		(1) First Stage <i>SENTIMENT</i>	(2) Second Stage $\Delta CETR$
<i>IND_SENTIMENT</i>		0.2299*** (5.59)	
<i>BELOW</i>			0.1034*** (21.56)
<i>NegSENTIMENT</i>	b1		-0.0708*** (-8.28)
<i>BELOW</i> $\times$ <i>NegSENTIMENT</i>	b2		0.0886*** (9.80)
<i>ROA</i>		0.0157*** (7.64)	0.0030 (0.23)
<i>SPECIAL_ITEMS</i>		0.0375*** (5.38)	-0.2208*** (-4.57)
<i>LEVERAGE</i>		0.0065*** (2.96)	-0.0043 (-0.29)
<i>NOL</i>		0.0009 (1.39)	0.0034 (0.89)
$\Delta NOL$		-0.0013 (-0.57)	-0.0367** (-2.54)
<i>FOREIGN_INCOME</i>		-0.0023 (-0.62)	-0.0235 (-0.95)
<i>CAPITAL_INTENSITY</i>		-0.0054*** (-3.10)	-0.0071 (-0.50)
<i>EQUITY_INCOME</i>		0.0285 (1.04)	0.3123* (1.90)
<i>RND</i>		-0.0079** (-2.48)	0.0379* (1.79)
<i>ADVERTISING</i>		-0.0158*** (-3.30)	-0.0415** (-2.04)
<i>MTB</i>		0.0005*** (3.35)	0.0010 (1.43)
<i>SIZE</i>		0.0015*** (3.60)	-0.0047** (-2.16)
<i>LOSS_INTENSITY</i>		-0.0169*** (-6.37)	-0.0436** (-2.33)
<i>AUDIT_PROBABILITY</i>		0.0003 (0.44)	-0.0018 (-0.35)
<i>INDUSTRY_CETR</i>		-0.0147** (-2.57)	-0.3721*** (-5.76)
<i>NEWS_COUNT</i>		-0.0021*** (-2.87)	0.0024 (0.69)
<i>PR_SENTIMENT</i>		0.4660*** (18.58)	-0.1588 (-1.25)
Intercept		-0.0155*** (-5.46)	0.0467* (1.67)
Year FE		Y	Y
Industry FE		Y	Y
N		14,361	14,361
Adj. R-sq		0.2148	0.1645
F-test on coefficients: b1+b2=0			p-value 0.0038

**Table 7 Cross-Sectional Tests - Reputation Cost Mechanism**

This table reports the results of cross-sectional analyses regarding the reputation cost mechanism. The dependent variable is  $\Delta CETR$ . The moderator is low press release sentiment, short-tenured CEO, young CEO, and negative tax avoidance news in columns (1), (2), (3), and (4), respectively. All variables are defined in Appendix A. The t-statistics reported in parentheses are based on standard errors clustered by firm. \*, \*\* and \*\*\* indicate statistical significance at the 0.1, 0.05 and 0.01 levels.

	(1)	(2)	(3)	(4)
<i>Moderator =</i>	<i>LOW_PR_SENTIMENT</i>	<i>SHORT_TENURE</i>	<i>YOUNGCEO</i>	<i>NEG_TAX_NEWS</i>
<i>Moderator</i>	0.0103 (1.34)	0.0112 (1.48)	0.0046 (0.64)	-0.0241*** (-2.84)
<i>NegSENTIMENT</i>	b1 -0.0083 (-0.88)	-0.0231** (-2.47)	-0.0251** (-2.50)	-0.0285*** (-3.97)
<i>NegSENTIMENT × Moderator</i>	b2 -0.0517*** (-3.97)	-0.0244* (-1.73)	-0.0232* (-1.65)	-0.0176 (-1.40)
<i>BELOW</i>	0.1155*** (19.01)	0.1085*** (15.73)	0.1038*** (15.87)	0.0952*** (16.30)
<i>BELOW × Moderator</i>	-0.0100 (-1.22)	-0.0170* (-1.87)	-0.0071 (-0.79)	0.0368*** (3.94)
<i>BELOW × NegSENTIMENT</i>	b3 0.0279** (2.43)	0.0333*** (2.84)	0.0429*** (3.40)	0.0313*** (3.47)
<i>BELOW × NegSENTIMENT × Moderator</i>	b4 0.0441*** (2.81)	0.0366** (2.15)	0.0220 (1.27)	0.0393*** (2.62)
Intercept	0.0391 (1.35)	0.0484 (1.38)	0.0408 (1.16)	0.0555* (1.92)
All Controls	Y	Y	Y	Y
Year FE	Y	Y	Y	Y
Industry FE	Y	Y	Y	Y
N	14,436	9,229	9,375	14,436
adj. R-sq	0.1602	0.1653	0.1656	0.1631
F-test on coefficients:	p-value	p-value	p-value	p-value
b1 + b3 = 0	0.0024	0.1296	0.0137	0.6328
(b1 + b2) + (b3 + b4) = 0	0.0511	0.0030	0.0198	0.0001

**Table 8 Cross-Sectional Tests - Noncompliance Cost Mechanism**

This table reports the results of cross-sectional analyses regarding the noncompliance cost mechanism. The dependent variable is  $\Delta CETR$ . The moderator is the tax audit probability and the attention from the IRS in columns (1) and (2), respectively. All variables are defined in Appendix A. The t-statistics reported in parentheses are based on standard errors clustered by firm. \*, \*\* and \*\*\* indicate statistical significance at the 0.1, 0.05 and 0.01 levels.

	(1)	(2)
<i>Moderator =</i>	<i>AUDIT_PROBABILITY</i>	<i>IRS_ATTENTION</i>
<b><i>Moderator</i></b>	0.0197*** (2.84)	-0.0583*** (-2.65)
<i>NegSENTIMENT</i>	b1 -0.0433*** (-3.43)	-0.0839** (-2.11)
<i>NegSENTIMENT × Moderator</i>	b2 0.0054 (0.51)	0.0460 (1.14)
<i>BELOW</i>	0.1506*** (16.59)	0.0495** (1.99)
<i>BELOW × Moderator</i>	-0.0407*** (-5.90)	0.0592** (2.34)
<i>BELOW × NegSENTIMENT</i>	b3 0.0594*** (3.67)	0.1361** (2.47)
<i>BELOW × NegSENTIMENT × Moderator</i>	b4 -0.0067 (-0.50)	-0.0920 (-1.64)
Intercept	0.0192 (0.68)	0.1629*** (4.50)
All Controls	Y	Y
Year FE	Y	Y
Industry FE	Y	Y
N	14,436	9,695
adj. R-sq	0.1621	0.1487
F-test on coefficients:	p-value	p-value
b1 + b3 = 0	0.0895	0.1987
(b1 + b2) + (b3 + b4) = 0	0.0013	0.2908

**Table 9 Analysis of Aggressive Tax Planning Strategies**

This table presents the results of analyses regarding the use of tax havens. Panel A reports the result of the cross-sectional analyses based on firms' flexibility to conduct aggressive tax planning. The moderator is the multinational companies and the use of tax haven in columns (1) and (2), respectively. Panel B reports the result of the effect of negative media sentiment on the use of tax haven. All variables are defined in Appendix A. The t-statistics reported in parentheses are based on standard errors clustered by firm. \*, \*\* and \*\*\* indicate statistical significance at the 0.1, 0.05 and 0.01 levels.

Panel A: Cross-sectional difference in tax-avoidance flexibility

	(1) <i>Flexibility</i> = MNC	(2) HAVEN
<i>Flexibility</i>	0.0084 (1.24)	0.0247*** (3.93)
<i>NegSENTIMENT</i>	-0.0391*** (-4.49)	-0.0340*** (-4.49)
<i>NegSENTIMENT</i> × <i>Flexibility</i>	0.0001 (0.01)	-0.0092 (-0.94)
<i>BELOW</i>	0.1270*** (18.59)	0.1329*** (22.35)
<i>BELOW</i> × <i>Flexibility</i>	-0.0231*** (-2.84)	-0.0380*** (-4.95)
<i>BELOW</i> × <i>NegSENTIMENT</i>	0.0386*** (3.46)	0.0411*** (4.29)
<i>BELOW</i> × <i>NegSENTIMENT</i> × <i>Flexibility</i>	0.0234* (1.74)	0.0240* (1.91)
Intercept	0.0341 (1.44)	0.0276 (1.17)
All Controls	Y	Y
Year FE	Y	Y
Industry FE	Y	Y
N	14,436	14,436
adj. R-sq	0.1592	0.1601

Panel B: Adjustment of tax haven subsidiaries

	(1) $\Delta$ HAVEN%	(2) $\Delta$ HAVEN
<i>NegSENTIMENT</i>	0.0020 (1.07)	0.0170 (1.62)
<i>BELOW</i>	-0.0005 (-0.35)	-0.0099 (-1.18)
<i>NegSENTIMENT</i> × <i>BELOW</i>	-0.0042* (-1.84)	-0.0320** (-2.48)
Intercept	-0.0124 (-1.29)	-0.1528*** (-2.80)
All Controls	Y	Y
Year FE	Y	Y
Industry FE	Y	Y
N	9,928	9,928
adj. R-sq	0.0090	0.0087

## Appendix A: Variable Definition

<b>Variable</b>	<b>Definition</b>
<i>CETR</i>	= The three-year cash effective tax rate, computed as the sum of cash taxes paid ( <i>txpd</i> ) over three years divided by the sum of pre-tax book income less special items ( <i>pi</i> – <i>spi</i> ) over the same period.
$\Delta CETR$	= The three-year CETR over the period $t$ to $t + 2$ minus the three-year CETR over the period $t - 3$ to $t - 1$ .
$\Delta GAAP\_ETR$	= The three-year GAAP ETR over the period $t$ to $t + 2$ minus the three-year GAAP ETR over the period $t - 3$ to $t - 1$ . GAAP ETR is computed as the sum of total income tax expense ( <i>txt</i> ) over three years, divided by the sum of pre-tax book income less special items ( <i>pi</i> – <i>spi</i> ) over the same period.
$\Delta CURR\_ETR$	= The three-year current ETR over the period $t$ to $t + 2$ minus the three-year current ETR over the period $t - 3$ to $t - 1$ . Current ETR is computed as the sum of current income tax expense ( <i>txt</i> – <i>txdi</i> ) over three years, divided by the sum of pre-tax book income less special items ( <i>pi</i> – <i>spi</i> ) over the same period.
<i>BELOW</i>	= The dummy variable equal to one if the CETR for the period $t - 3$ to $t - 1$ is below the optimal levels of CETR estimated from equation (1) and zero otherwise.
<i>BELOW_ALT</i>	= The dummy variable equal to one if the CETR for the period $t - 3$ to $t - 1$ is below the median CETR in the same industry over the same period and zero otherwise.
<i>SENTIMENT</i>	= The average media sentiment over the period $t - 3$ to $t - 1$ . The media sentiment is retrieved from the RavenPack News Analytics database, where the Composite Sentiment Score (CSS) is assigned to each news article of a given firm. CSS combines five sentiment scores provided by the PEQ, BEE, BMQ, BCA, and BAM classifier. The five classifiers give sentiment scores based on the specialization in identifying positive and negative words and phrases in articles about global equities, in news stories about earnings evaluations, in short commentary and editorials on global equity markets, in reports on corporate action announcements, and in news stories about mergers, acquisitions, and takeovers, respectively.  CSS ranges from 0 to 100. CSS = 50 represents neutral sentiment; CSS > 50 represents positive sentiment; CSS < 50 represents negative sentiment.  <i>SENTIMENT</i> is the average $[(CSS - 50)/50]$ of the firm's news articles over the period $t - 3$ to $t - 1$ .
<i>NegSENTIMENT</i>	= The dummy variable equal to one if <i>SENTIMENT</i> is less than 0 and zero otherwise.
<i>EXT_NegSENTIMENT</i>	= The extremely negative media sentiment, which is a dummy variable equal to one if <i>SENTIMENT</i> is below the 10 <sup>th</sup> percentile in the year and zero otherwise.
<i>ABN_NegSENTIMENT</i>	= The abnormal negative media sentiment. We first estimate the following regression:  $SENTIMENT_{i,(t-3,t-1)} = \beta_0 + \beta_1 CETR_{i,(t-3,t-1)} + \beta_2 \Delta EARN_{i,(t-3,t-1)} + \beta_3 NEWS\_COUNT_{i,(t-3,t-1)} + \beta_4 SIZE_{i,(t-3,t-1)} + \beta_5 MTB_{i,(t-3,t-1)} + Year\ Dummies + Industry\ Dummies + \epsilon_{i,(t-3,t-1)}.$ <i>ABN_NegSENTIMENT</i> is the dummy variable equal to one if the residual from the above regression is negative, and zero otherwise.
<i>IND_SENTIMENT</i>	= The average <i>SENTIMENT</i> of all firms but the focal firm in the industry.
<i>ROA</i>	= The sum of pre-tax income less extraordinary items ( <i>pi</i> – <i>xi</i> ) over the period $t - 3$ to $t - 1$ , divided by total assets ( <i>at</i> ) averaged over the same period.
<i>SPECIAL_ITEMS</i>	= The sum of special items ( <i>spi</i> ) over the period $t - 3$ to $t - 1$ , divided by total assets ( <i>at</i> ) averaged over the same period.

<b>Variable</b>	<b>Definition</b>
<i>LEVERAGE</i>	= The ratio of long-term debt (dltt) to total assets (at) averaged over the period $t - 3$ to $t - 1$ .
<i>NOL</i>	= The dummy variable equal to one if the firm's tax loss carryforward (tlcf) is positive at any year during the period $t - 3$ to $t - 1$ and zero otherwise.
$\Delta NOL$	= The change in tax loss carryforward (tlcf) from the beginning of year $t - 3$ to the end of year $t - 1$ , divided by total assets (at) averaged over the period $t - 3$ to $t - 1$ .
<i>FOREIGN_INCOME</i>	= The sum of pre-tax foreign income (pifo) over the period $t - 3$ to $t - 1$ , divided by total assets (at) averaged over the same period.
<i>CAPITAL_INTENSITY</i>	= The average net PP&E (ppent) over the period $t - 3$ to $t - 1$ , divided by total assets (at) averaged over the same period.
<i>EQUITY_INCOME</i>	= The sum of equity income (esub) over the period $t - 3$ to $t - 1$ , divided by total assets (at) averaged over the same period.
<i>RND</i>	= The sum of research and development expense (xrd) over the period $t - 3$ to $t - 1$ , divided by total assets (at) averaged over the same period.
<i>ADVERTISING</i>	= The sum of advertising expense (xad) over the period $t - 3$ to $t - 1$ , divided by total assets (at) averaged over the same period.
<i>MTB</i>	= The average of the market value of equity ( $prcc_f \times csho$ ) divided by the book value of equity (ceq) over the period $t - 3$ to $t - 1$ .
<i>SIZE</i>	= The natural logarithm of total assets (at) averaged over the years $t - 3$ to $t - 1$ .
<i>LOSS_INTENSITY</i>	= The number of years the firm has negative pre-tax income (pi) from year $t - 4$ to $t - 1$ , scaled by 4.
<i>AUDIT_PROBABILITY</i>	= The IRS audit probability averaged over years $t - 3$ to $t - 1$ . Following Hoopes et al. (2012), the audit probability in each asset class is obtained from the Transactional Record Access Clearinghouse (TRAC).
<i>INDUSTRY_CETR</i>	= The median <i>CETR</i> in the firm's SIC 2-digit industry over the period $t - 3$ to $t - 1$ .
<i>NEWS_COUNT</i>	= The natural logarithm of (1 + number of news articles) averaged over the period $t - 3$ to $t - 1$ .
<i>PR_SENTIMENT</i>	= The average sentiment [(CSS - 50)/50] of the firm's self-initiated press releases over the period $t - 3$ to $t - 1$ .
$\Delta EARN$	= Pretax earnings (pi) in year $t - 1$ less pretax earnings (pi) in year $t - 3$ , divided by total assets (at) averaged over the period $t - 3$ to $t - 1$ .
<i>EARN_DECREASE</i>	= The dummy variable equal to one if $\Delta EARN$ is negative and zero otherwise.
<i>LOW_PR_SENTIMENT</i>	= The dummy variable equal to one if <i>PR_SENTIMENT</i> over the past three years is below the median in the same period and industry and zero otherwise.
<i>SHORT_TENURE</i>	= The dummy variable equal to one if the tenure of the firm's CEO is below the median tenure in the year and zero otherwise.
<i>YOUNG_CEO</i>	= The dummy variable equal to one if the age of the CEO is below the median age of the CEOs in the year and zero otherwise.
<i>NEG_TAX_NEWS</i>	= The dummy variable equal to one if the firm has at least one negative tax avoidance news article over the period $t - 3$ to $t - 1$ and zero otherwise.
<i>IRS_ATTENTION</i>	= The number of times the IRS downloads a company's 10-K filings from EDGAR averaged over the period $t - 3$ to $t - 1$ .

## Appendix B: Description of the Sample of Negative Tax Avoidance News

Figure B1 shows the number of tax avoidance news articles by year. There was an apparent surge of articles in 2012. Since then, there have been a lot of discussions on multinational companies such as Google Inc., Apple Inc., and Starbucks Co. regarding their profit-shifting tax schemes. The number of news articles reached the highest point in 2016, which is in line with huge global attention to tax base erosion issues. For example, in 2016, the OECD established the Inclusive Framework on Base Erosion and Profit Shifting (BEPS). Table B1 documents the number of tax avoidance news by the two-digit SIC industry. The media's attention was concentrated on some industry sectors. More than 65% of the observations are within the top three industries, Electronic & Other Electric Equipment, Miscellaneous Retails, and Business Services. Finally, we show the top 20 companies that have the greatest amount of tax avoidance news articles in Table B2. Most of those companies are either big or renowned companies in the U.S. This reflects the fact that more public attention is paid to tax avoidance of large multinational companies.

Figure B1 Number of Tax Avoidance News by Year

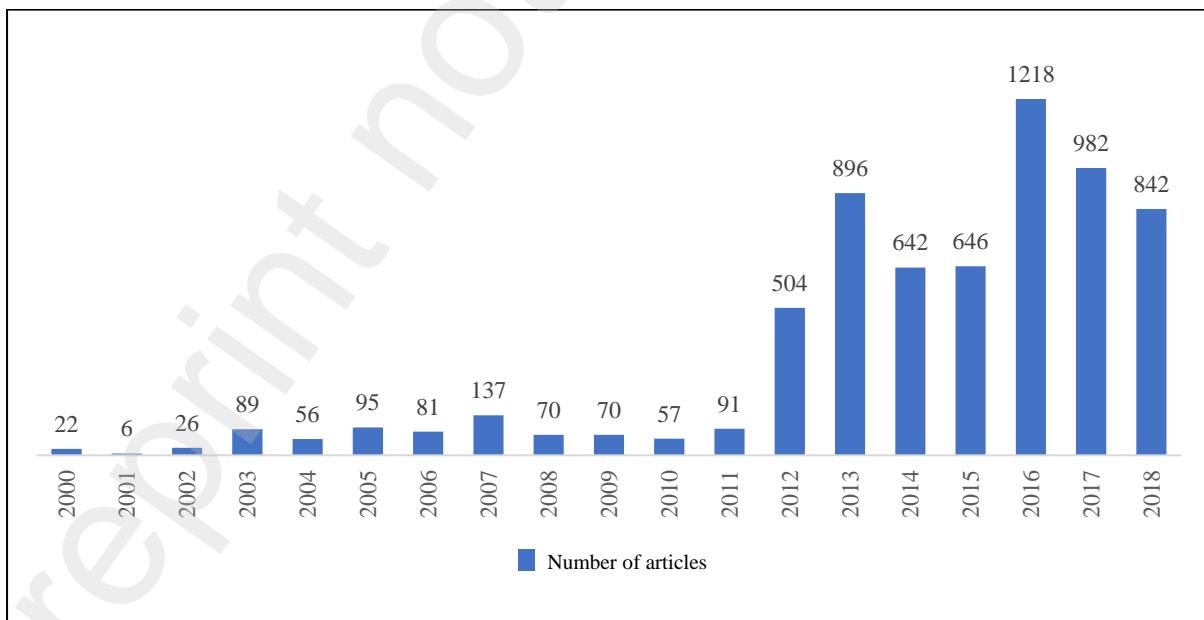


Table B1 Number of Tax Avoidance News by Industry

Industry Name	Number of Articles	Percent
Electronic & Other Electric Equipment	2,318	35.50%
Miscellaneous Retail	969	14.84%
Business Services	963	14.75%
Eating & Drinking Places	590	9.04%
Chemical & Allied Products	278	4.26%
Communications	267	4.09%
General Merchandise Stores	229	3.51%
Industrial Machinery & Equipment	150	2.30%
Petroleum & Coal Products	144	2.21%
Food & Kindred Products	123	1.88%
Rubber & Miscellaneous Plastics Products	105	1.61%
Transportation Equipment	84	1.29%
Motion Pictures	46	0.70%
Oil & Gas Extraction	35	0.54%
Construction - Special Trade Contractors	28	0.43%
Building Materials & Gardening Supplies	24	0.37%
Tobacco Products	20	0.31%
Agricultural Production - Crops	19	0.29%
Printing & Publishing	16	0.25%
Home Furniture, Furnishings and Equipment Stores	12	0.18%
Instruments & Related Products	11	0.17%
Wholesale Trade - Nondurable Goods	10	0.15%
Apparel and Accessory Stores	10	0.15%
Other	79	1.21%
Total	6,530	100%

Table B2 Top20 Firms with Tax Avoidance News

Rank	Company Name	Number of Articles	Percent
1	Apple Inc.	2,289	35.05%
2	Amazon.com Inc.	958	14.67%
3	Meta Platforms Inc.	548	8.39%
4	Starbucks Corp.	450	6.89%
5	Pfizer Inc.	211	3.23%
6	Microsoft Corp.	182	2.79%
7	Walmart Inc.	164	2.51%
8	McDonald's Corp.	128	1.96%
9	NIKE Inc.	100	1.53%
10	eBay Inc.	99	1.52%
11	Chevron Corp.	88	1.35%
12	Cisco Systems Inc.	80	1.23%
13	Comcast Corp.	80	1.23%
14	Coca-Cola Co.	59	0.90%
15	Kohl's Corp.	56	0.86%
16	Exxon Mobil Corp.	54	0.83%
17	TWDC Enterprises 18 Corp.	53	0.81%
18	Caterpillar Inc.	49	0.75%
19	Netflix Inc.	44	0.67%
20	Sprint Corp.	40	0.61%