

DOI: <https://doi.org/10.9771/rcufba.v18i1.62986>**As Instituições Financeiras Praticam Menos Evasão Fiscal do que Outras Empresas?****Do Financial Institutions Practice Less Tax Avoidance than Other Companies?****Rogiene Batista dos Santos**

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[pigearde1@me.com](mailto:pigearde1@me.com)**RESUMO**

Este estudo investiga se as instituições financeiras apresentam maior agressividade tributária em comparação com outros setores, abordando uma lacuna significativa na literatura ao explorar comportamentos fiscais específicos de setores e suas implicações mais amplas. A hipótese sugere que as instituições financeiras apresentam menores GAAP ETRs (Taxas Efetivas segundo os Princípios Contábeis Geralmente Aceitos) e CASH ETRs (Taxas Efetivas de Caixa) do que empresas não financeiras. Utilizando um conjunto de dados robusto com 131.204 observações anuais de empresas públicas dos EUA entre 2000 e 2022, extraído da base de dados Compustat, o estudo emprega métodos avançados de regressão, incluindo regressão quantílica, para analisar essas dinâmicas. Enquanto os resultados da regressão tradicional indicam nenhuma diferença significativa na evasão fiscal entre empresas financeiras e não financeiras, a regressão quantílica revela nuances críticas: em níveis mais altos de agressividade fiscal, as instituições financeiras têm menor probabilidade de adotar práticas agressivas. Os resultados oferecem contribuições importantes para políticas públicas ao destacar o papel dos fatores reputacionais na moderação dos comportamentos fiscais, fornecendo aos formuladores de políticas insights para projetar regulamentações que equilibrem conformidade tributária e competitividade.

**Palavras-chave:** Evasão fiscal. Instituições financeiras. Instituições não-financeiras.

**ABSTRACT**

This study investigates whether financial institutions engage in greater tax aggressiveness compared to other sectors, addressing a significant gap in the literature by exploring sector-specific tax behaviors and their broader implications. The hypothesis suggests that financial institutions exhibit lower GAAP ETRs (Generally Accepted Accounting Principles Effective Tax Rates) and CASH ETRs (Cash Effective Tax Rates) than non-financial companies. Using a robust dataset of 131,204 firm-year observations from publicly traded U.S. companies between 2000 and 2022, sourced from the Compustat database, the study employs advanced regression methods, including quantile regression, to analyze these dynamics. While traditional regression results indicate no significant difference in tax avoidance between financial and non-financial firms, quantile regression uncovers critical nuances. At higher levels of tax avoidance, financial institutions are less likely to engage in aggressive practices. The findings offer significant contributions to public policy by highlighting the role of reputational factors in moderating tax behaviors, providing policymakers with insights for designing regulations that balance tax compliance and competitiveness. For education, this study introduces real-world examples of sector-specific tax strategies, enabling educators to incorporate these findings into accounting and finance curricula to better prepare students for challenges in corporate governance and fiscal policy.

**Keywords:** Tax Avoidance; Financial Institutions; Non-Financial Institutions

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## 1. INTRODUCTION

This paper aims to investigate if financial institutions engage in less tax avoidance than companies from other industries. We hypothesize that they do not, as financial institutions are generally large corporations that receive greater government attention, per Zimmerman (1983).

Consequently, these companies face higher reputation costs. Although numerous studies have been published in recent decades, the outcomes have been inconsistent, and they have yet to specifically examine financial companies. The distinctive structure and composition of financial institutions' balance sheets, central economic functions, and regulatory environment distinguish them from other enterprises. Thus, we extend the literature by examining tax avoidance in the context of financial companies and the presence of high reputation costs.

Using 131,204 U.S. public firm-year observations from Compustat from 2000 to 2022, we conduct regression analysis employing robust standard errors. Our findings indicate that statistically, there is no difference in the level of tax avoidance between financial companies and those from other sectors. This result holds after controlling for variables used in the literature. We can identify the difference in tax avoidance levels between financial and non-financial companies using control variables. The financial company variable captures the distinction in tax avoidance practices between economic and non-financial companies.

This paper contributes to the literature in several ways. Our evidence enhances our understanding of tax avoidance practices among financial and non-financial companies. Many studies have investigated tax avoidance from the agency theory perspective (Desai & Dharmapala, 2008a; Khan et al., 2017). Others have examined the connection between tax avoidance and corporate governance (Hasan et al., 2014; Minnick & Noga, 2010; Yahaya et al., 2024). Some studies have analyzed the link between tax avoidance and reputation (Hanlon & Slemrod, 2009; Rego, 2003; Shackelford & Shevlin, 2001).

Generally, the studies on this topic focus on the CEO level, positing that reputation costs are crucial in limiting CEOs and firms from engaging in tax avoidance. Most studies on tax avoidance focus on non-financial institutions. However, the 2007-2009 financial crisis highlighted the importance of studying financial institutions (Gallemore et al., 2019; Lobo, 2017; Walter, 2016).

Previous studies have suggested that companies refrain from tax avoidance due to reputation concerns, but empirical evidence is scarce (Chyz & Gaertner, 2018). Prior research has focused on non-financial companies, with no studies comparing the tax avoidance levels of financial institutions with those of other companies. This study adds to the literature by providing evidence on how aggressively financial institutions engage in tax avoidance. Finally, Hanlon and Heitzman (2010) called for more studies on financial institutions, which motivated our research.

We contribute to this literature by jointly analyzing data on financial and non-financial institutions. First, we expect that financial institutions will be more aggressive than non-financial institutions. However, our results show that, statistically, there is no difference between the level of tax avoidance for financial institutions and non-financial institutions. One explanation for this result is that being aggressive by practicing tax avoidance can imply reputation costs for financial institutions.

In addition to contributing to the literature on tax avoidance in financial institutions, this study offers significant implications for teaching in accounting and

finance courses. The methodology that combines robust analyses with widely recognized control variables can be integrated into courses such as Tax Analysis or Corporate Finance to demonstrate the practical application of theoretical concepts. Furthermore, the findings can serve as case studies in classrooms, helping students understand the relationship between reputational costs and tax practices and the impact of sector-specific characteristics on tax avoidance. These applications equip future professionals with the skills to tackle complex tax management and corporate reputation issues.

This study contributes to the literature on tax avoidance by examining a critical yet underexplored question: whether financial institutions engage in less tax avoidance compared to non-financial firms. Unlike prior research, which primarily focuses on non-financial firms or uses limited datasets, our analysis encompasses the entire population of publicly traded U.S. companies over a comprehensive period from 2000 to 2022. This broad dataset provides a more representative understanding of sectoral tax practices.

An innovative aspect of this research is quantile regression to capture variations in tax avoidance behaviors across different levels of tax aggressiveness. While traditional methods like OLS regression focus on average effects, quantile regression allows us to uncover patterns specific to firms with high or low tax avoidance tendencies. For example, the findings reveal that financial institutions are less aggressive in the 0.10 quantile, where tax avoidance is highest, but become more aggressive in the 0.50 quantile. This nuanced approach offers insights into the dynamic nature of tax strategies, which has been largely overlooked in the literature.

Additionally, this study challenges existing assumptions about the role of reputational costs in influencing tax avoidance. Previous research, such as Hasan et al. (2014) and Gallemore et al. (2019), emphasizes the reputational risks faced by financial institutions, suggesting these risks deter aggressive tax planning. However, our findings indicate that the impact of reputational costs may vary significantly across different levels of tax avoidance, introducing a new perspective to this debate.

Another distinctive contribution is the focus on the societal and policy implications of tax avoidance in financial institutions. While earlier studies have highlighted firm-level outcomes, this research extends the discussion by considering the broader effects on public resources, regulatory frameworks, and economic equity. By linking sector-specific characteristics to macroeconomic consequences, this study provides a holistic understanding of the implications of tax behaviors.

Finally, the study responds directly to calls for further exploration of tax practices in financial institutions, as highlighted by Hanlon and Heitzman (2010). By addressing this gap and employing innovative methodologies, this research advances theoretical understanding and offers practical insights for policymakers and corporate managers.

The rest of this section is structured as follows: Section 2 reviews the related literature; Section 3 describes the sample and research design; Section 4 presents the empirical analysis; and Section 5 concludes.

## 2. LITERATURE REVIEW

In recent decades, the issue of tax avoidance has garnered significant attention from academics and practitioners due to its significant cost to corporations. Intuitively, corporations and their shareholders aim to employ tax avoidance strategies to minimize the impact of taxes.

However, this intuition often overlooks companies' potential reputational costs when deciding whether to engage in tax avoidance. Studies on tax avoidance have primarily focused on agency theory, corporate governance, and reputation. Most academic research has yet to examine financial corporations specifically. This paper attempts to address this gap in the literature by comparing tax avoidance practices between financial and non-financial companies.

## **2.1 TAX AVOIDANCE AND CORPORATE GOVERNANCE**

Other studies have investigated the relationship between tax avoidance and corporate governance. As an illustration, Desai et al. (2007) examined the correlation between corporate taxes and corporate governance. They found that the design of a company's tax system significantly impacts its members' benefits and that corporate governance significantly impacts gains from tax changes.

Minnick and Noga (2010) investigated the compensation of mid-level managers and directors.

Their research demonstrated that remuneration strongly encourages managers and directors to pursue long-term high performance. They also emphasized strategies for reducing taxable income and extending payments over a longer duration to enhance tax planning efficacy, ultimately leading to higher shareholder returns. Hasan et al. (2014) examined the relationship between corporate social responsibility (CSR) and tax evasion. They found a positive correlation between corporate irresponsibility and tax evasion, suggesting that the more irresponsible a company is, the more likely it is to engage in tax evasion. Thus, company culture significantly affects the level of tax evasion.

Lastly, Özbay, Adgüzel, and Karahan Gökmen (2023) studied the link between CSR and tax avoidance, particularly in family firms. Based on 1,156 firm-year observations from 94 companies listed on the Istanbul Stock Exchange, they discovered that family firms tend to engage in more aggressive tax planning than non-family firms. The study also emphasized the significance of external factors, such as influential institutional investors or creditors monitoring, in influencing the correlation between Corporate Social Responsibility (CSR) and tax avoidance in family enterprises.

## **2.2 TAX AVOIDANCE AND REPUTATION**

Dyreng, Hanlon, and Maydew (2010) conducted a fascinating study into the influence of tax avoidance at the CEO level. Their comprehensive analysis of 908 executives highlighted the significant role of executives in shaping a company's tax avoidance practices, resulting in a significant economic impact.

Rego and Wilson (2012) approached tax avoidance from the perspective of capital risk incentives, focusing on capital risk incentives. Their investigation revealed a direct correlation between the aggressiveness of tax avoidance strategies and equity risk. This finding emphasizes the trade-offs and uncertainties inherent in tax avoidance, necessitating incentives for managers to adopt more aggressive tax avoidance practices.

Chyz (2013) investigated whether executives could signal their propensity to engage in tax avoidance. He discovered a correlation between the presence of such executives and the level of tax protection the company provides, revealing that executives inclined towards tax avoidance result in significant tax savings for their organizations.

Lanis et al. (2019) investigated the impact of tax avoidance on the reputation of the board of directors and CEO. Interestingly, companies and their CEOs are often rewarded for engaging in tax avoidance, establishing a link between tax avoidance and CEO reputation.

Most of the previous literature has focused on non-financial institutions, despite the 2007-2009 financial crisis highlighting the significance of studying the banking sector (Gallemore et al., 2019; Walter, 2016). Walter (2016) defines reputational risk and its determinants for large international financial institutions within the context of transaction costs and imperfect information. He defined reputational risk and its determinants for large international financial institutions within the context of transaction costs and imperfect information.

Gallemore et al. found that financial institutions facilitate their clients' tax planning. They have identified a correlation between a client's tax planning and the tax planning of the bank's other clients, indicating that financial institutions serve as intermediaries in the tax planning process.

While the existing literature offers valuable insights, several gaps remain. Most studies focus on non-financial firms, with limited exploration of financial institutions despite their distinct regulatory environments and economic functions. Furthermore, the societal implications of tax avoidance, such as its impact on public policy and economic equity, often need to be explored. This study addresses these gaps by examining financial institutions' and non-financial firms' tax avoidance practices, providing a sector-specific analysis that integrates reputational and governance perspectives.

By critically evaluating these contributions and limitations, this paper extends the literature on tax avoidance, offering a nuanced understanding of how financial institutions navigate the trade-offs between tax efficiency and reputational costs.

Based on these findings, we propose that financial institutions are less likely to engage in tax avoidance than other companies due to their larger size and greater scrutiny by the IRS, society, and the media. Therefore, financial companies face higher reputational costs for practicing tax avoidance. For instance, in February 2015, The Guardian reported that HSBC's deliberate facilitation of tax avoidance significantly harmed its reputation. Therefore, our hypothesis is that:

**H<sub>1</sub>:** Financial institutions practice less tax avoidance than companies from other sectors.

This hypothesis states that financial institutions engage in different tax avoidance behaviors compared to non-financial firms, which can be substantiated by integrating established theories and empirical findings. Agency theory explains the conflicts of interest between managers (agents) and shareholders (principals), where tax avoidance strategies may balance short-term gains and long-term reputational risks. For financial institutions, agency conflicts are moderated by regulatory oversight and stakeholder scrutiny, which deter aggressive tax behaviors. Rego and Wilson (2012) demonstrated how equity-based incentives influence corporate tax aggressiveness, providing evidence that managerial motivations impact tax decisions.

Stakeholder theory emphasizes the role of firms in addressing the expectations of various stakeholders, including customers, regulators, and society. Financial institutions often avoid aggressive tax strategies to preserve trust and legitimacy. Hanlon and Slemrod (2009) provided evidence that involvement in tax shelters negatively affects stock prices, reflecting stakeholder disapproval and highlighting the reputational risks associated with aggressive tax planning.

Institutional theory highlights the role of external pressures, such as regulations and societal norms, in shaping corporate behavior. Financial institutions operate in stricter regulatory environments, which makes aggressive tax planning less viable. Hasan et al. (2014) demonstrated how reputational concerns and regulatory scrutiny influence



banking sector tax practices, underscoring institutional factors' role in tax avoidance strategies.

Finally, resource dependence theory explains how firms manage external dependencies to maintain access to critical resources such as capital and public trust. Financial institutions rely heavily on customer deposits and investor confidence, making the reputational risks associated with tax avoidance more consequential. Gallemore et al. (2019) discuss how the tax practices of financial institutions are influenced by their need to maintain credibility with stakeholders, reinforcing the importance of conservative tax strategies in the financial sector.

### 3. SAMPLE AND RESEARCH DESIGN

#### 3.1 DATA AND SAMPLE SELECTION

Our study examines all publicly listed U.S. firms, utilizing data from the Compustat database spanning 2000 to 2022. The final dataset comprises 131,204 firm-year observations, of which 9.7% pertain to financial institutions and 90.3% to non-financial institutions. To ensure robustness, firms with missing or incomplete data for key variables, such as GAAP ETR or CASH ETR, were excluded.

Continuous variables, such as GAAP ETR and CASH ETR, were winsorized at the 2.5% and 97.5% levels to mitigate the influence of outliers. Missing values for specific variables, such as Research and Development (XRD), were treated by assigning a value of zero, following previous literature (e.g., Atwood et al., 2012; Cen et al., 2017).

To test the hypothesis that financial institutions engage in less tax avoidance than non-financial firms, we employed a panel data regression model with robust standard errors. The dependent variables were GAAP ETR and CASH ETR, two widely recognized measures of tax avoidance. The independent variable used in this study is Finance, a dummy variable coded as 1 for financial institutions and 0 for non-financial institutions. The model incorporates the following control variables to account for firm-specific characteristics: Size, Leverage, R&D, Foreign Operations, Market-to-Book Ratio: Market value of equity divided by book value of equity (CEQ), Intangibles, Gross PPE and ROA: Operating income before depreciation (OIBDP) scaled by total assets (AT).

As depicted in Table 1, 9.70% of the firm-year observations pertain to financial enterprises, whereas 90.30% pertain to non-financial enterprises.

TABLE 1 - Sample selection

Year	Observations - Non- Financial institutions	%	Observations - Financial institutions	%	Total
2000	6.059	5%	570	4%	6.629
2001	5.838	5%	541	4%	6.379
2002	5.692	5%	532	4%	6.224
2003	5.604	5%	542	4%	6.146
2004	5.658	5%	551	4%	6.209
2005	5.629	5%	558	4%	6.187
2006	5.686	5%	595	5%	6.281
2007	5.705	5%	605	5%	6.310

2008	5.322	4%	578	5%	5.900
2009	5.109	4%	569	4%	5.678
2010	5.125	4%	567	4%	5.692
2011	5.067	4%	576	5%	5.643
2012	5.173	4%	601	5%	5.774
2013	5.161	4%	611	5%	5.772
2014	5.132	4%	605	5%	5.737
2015	4.849	4%	590	5%	5.439
2016	4.633	4%	549	4%	5.182
2017	4.546	4%	555	4%	5.101
2018	4.526	4%	517	4%	5.043
2019	4.399	4%	488	4%	4.887
2020	4.480	4%	485	4%	4.965
2021	4.898	4%	491	4%	5.389
2022	4.190	4%	447	4%	4.637
<b>Total</b>	<b>118.481</b>	<b>100%</b>	<b>12.723</b>	<b>100%</b>	<b>131.204</b>

Table 2 presents the sample composition by sector. Sectors with the highest number of observations are Manufacturing (39.67%), Services (17.05%), and Mining (13.86%). The finance sector accounts for 9.70% of our sample, and accounts for 9.70% of our sample. Prior research has indicated that effective tax rates differ across various sectors. Therefore, we have clustered the sample to account for the effects of industry and year.

**TABLE 2 - Sample selection by sectors**

<b>2-Digit SIC Industry</b>	<b>Industry</b>	<b>No. of Observations</b>	<b>%</b>
01; 02; 07; 08 and 09.	Agriculture	492	0,37%
10; 12.; 13 and 14.	Mining	18.186	13,86%
15; 16 and 17.	Construction	1.262	0,96%
20; 21; 22; 23; 24; 25; 26; 27; 28; 29; 30; 31; 32; 33; 34; 35; 36; 37; 38 and 39.	Manufacturing	52.054	39,67%
40; 41; 42; 43; 44; 45; 46; 47; 48 and 49.	Transportation	12.144	9,26%
50 and 51.	Wholesale Trade	3.769	2,87%
52; 53; 54; 55; 56; 57; 58 and 59.	Retail Trade	6.482	4,94%
60; 61; 62; 63; 64; 65 and 67.	Finance	12.723	9,70%
70; 72; 73; 75; 76; 78; 79; 80; 81; 82; 83; 84; 86; 87; 88 and 89.	Services	22.371	17,05%
99.	Nonclassifiable establishments	1.721	1,31%
	<b>Total</b>	<b>131.204</b>	<b>100%</b>

### 3.2 Research design

In this section, we provide an overview of our research design. We utilized a fictitious variable, Finance, to ascertain whether financial institutions engage in fewer tax avoidance than other enterprises. Additionally, we utilized two proxies to measure tax

avoidance: GAAP ETR and CASH ETR.

Our examination of the hypothesis is based on a meticulous research methodology. We use the effective tax rate (ETR) as a measure of tax avoidance, a method supported by Hanlon and Heitzman (2010). This study defines tax avoidance as broad tax planning practices, and the GAAP ETR and CASH ETR measures are utilized to precisely capture these practices.

According to Hanlon and Heitzman (2010), GAAP ETR is calculated by dividing the total income tax expense by accounting profit before taxes, thereby presenting the total income tax liability. A tax strategy that defers taxes will not affect GAAP ETR, although GAAP ETR can be affected by items unrelated to tax avoidance practices.

The choice between GAAP and cash ETR measures is a crucial decision in our study. According to Hanlon and Heitzman (2010), CASH ETR is calculated by dividing taxes paid by accounting profit before taxes, and is influenced by deferred taxes, but not by accrual changes. This decision is crucial, given the exogenous variation in reputation costs between financial and non-financial institutions. It underscores the critical decision-making involved in our study.

The GAAP ETR represents tax avoidance achieved through permanent book-tax differences. This measure enables managers to make more informed decisions by incorporating the total tax expense incurred, both current and deferred. One way to improve a company's profitability is to reduce its total tax expense, which GAAP ETR measures as the total expense per dollar of book income. Equation (1) presents the calculation of this variable.

$$GAAP\ ETR = \frac{Total\ income\ tax\ expense\ (TXT)}{Pre - tax\ book\ income\ (PI)\ before\ special\ items\ (SPI)} \quad (1)$$

Another measure is the Cash Effective Tax Rate. This measure is affected by deferred taxes, but not by changes in tax accounting accruals. Therefore, it captures the amount the company disbursed to pay taxes. The CASH ETR is the tax paid per dollar of book income. Equation (2) depicts the computation of this variable.

$$Cash\ ETR = \frac{Cash\ tax\ paid\ (TXPD)}{Pre - tax\ book\ income\ (PI)\ before\ special\ items\ (SPI)} \quad (2)$$

For example, if the company reports a tax rate of 20% based on its GAAP ETR but pays only 10% according to its Cash ETR. This discrepancy suggests using tax planning strategies to defer taxes or reduce its immediate cash tax burden. Deferred taxes often arise when a company takes advantage of accelerated depreciation or tax credits, which lower cash taxes now but defer the tax liability to future periods. Additionally, permanent differences, such as deductions for tax-exempt income or notable credits, can lower the Cash ETR without affecting the GAAP ETR.

GAAP ETR captures strategies that influence the tax expense reported in financial statements, reflecting both short-term and long-term tax planning. In contrast, Cash ETR highlights immediate tax savings achieved by the company. When there is a significant difference between these two rates, it serves as a clear indicator of tax avoidance practices, such as deferring income, claiming deductions, or effectively leveraging tax credits.

To test our hypothesis, we perform the following regression and incorporate control variables from previous studies, including Leverage, foreign operations, Size, Intangibles, Gross PPE, and Market-to-Book. Equation (3) presents the regression model.



$$\begin{aligned}
 TaxAvoid_{i,t} = & \alpha_0 + \beta_1 Finance_{i,t} + \beta_2 R\&D_{i,t} + \beta_3 Leverage_{i,t} & (3) \\
 & + \beta_4 Foreign\ Operations_{i,t} + \beta_5 Size_{i,t} + \beta_6 NOL_{i,t} \\
 & + \beta_7 Intangibles_{i,t} + \beta_8 Gross\ PPE_{i,t} + \beta_9 ROA_{i,t} \\
 & + \beta_{10} Market - to - Book_{i,t} + \epsilon_{i,t}
 \end{aligned}$$

Where  $TaxAvoid_{i,t}$  is the tax avoidance measures discussed above; (1)  $Finance_{i,t}$  is a dummy variable coded as one for financial firms; and zero otherwise; (2)  $R\&D_{i,t}$  is calculated as Research and Development expense (XRD) divided by net sales (SALE); when missing, reset to 0; (3)  $Leverage_{i,t}$  is defined as the sum of long-term debt (DLTT) and current liabilities (DLC) divided by total assets (AT); (4)  $ForeignOperations_{i,t}$  indicates pre-tax income from foreign operations (PIFO); (5)  $Size_{i,t}$  is the natural log of total assets (AT); (6)  $NOL_{i,t}$  is a dummy variable indicating if the firm has a non-missing value of tax loss carry-forwards (TLCF); (7)  $Intangibles_{i,t}$  is the ratio of intangible assets (INTANG) to total assets (AT); (8)  $GrossPPE_{i,t}$  is Gross property, plant, and equipment (PPEGT) divided by total assets (AT); (9)  $ROA_{i,t}$  is Operating income before depreciation (OIBDP) scaled by total assets (AT); and (10)  $Market-to-Book_{i,t}$  is the market value of equity (PRCCF x CSHO) scaled by book value of equity (CEQ). Continuous variables are winsorized at the 2.5% and 97.5% levels.

If financial institutions are less tax-aggressive than non-financial ones, we expect a negative coefficient for the **Finance** variable. If financial firms are more tax aggressive, we expect a positive coefficient. We adjust for firm characteristics reported in the prior literature for firm characteristics (Atwood et al., 2012; Cen et al., 2017; Chyz, 2013; Gallemore et al., 2019; Lanis et al., 2018) The definitions of these variables are outlined in Appendix 1.

## 4. EMPIRICAL ANALYSIS

### 4.1 Descriptive statistics

Table 3 presents the descriptive statistics for the variables employed in the analyses. The average GAAP ETR is 0.13 and the average cash ETR is 0.135. Average firms have an R&D ratio of 0.43, a leverage ratio of 0.20, and an average size of \$5.73 million. The average net operating loss is 0.73, and the intangible assets ratio is 0.15. Moreover, the average firm possesses a Gross PPE to Total Assets ratio of 0.49 and an average Return on Assets of -0.009, indicating that, on average, firms possess the potential to be more profitable. Additionally, the average market-to-book ratio for firms in the sample is 3.92.

TABLE 3 - Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
GAAP ETR	131,204	0.130	0.511	-3.930	3.933
CASH ETR	131,204	0.135	0.384	-2.385	3.399
R&D	131,204	0.432	2.898	0	50.833
Leverage	131,204	0.200	0.199	0	0.790
Foreign Operations	131,204	0.326	0.469	0	1
Size	131,204	5.730	2.498	0.372	12.207

NOL	131,204	0.725	0.447	0	1
Intangibles	131,204	0.145	0.198	0	0.841
Gross PPE	131,204	0.492	0.448	0	2.645
ROA	131,204	-0.009	0.300	-1.952	0.482
Market to book	131,204	3.918	7.305	0.087	92.176

Appendix 2 shows the Pearson correlations of the regression variables utilized in this comprehensive study. The correlation between GAAP ETR and CASH ETR is not evident with the Finance variable. However, the CASH ETR and finance show a positive and statistically significant correlation (0.013\*), though the magnitude is not high. Research and development has a significant negative correlation with GAAP ETR (-0.034) and CASH ETR (-0.035), indicating that firms that invest less in research and development engage in more tax avoidance.

Leverage has a significant positive correlation with GAAP ETR (0.020) and a significant negative correlation with CASH ETR (-0.007). Foreign operations have a significant positive correlation with GAAP earnings (0.018\*) and CASH earnings (0.047\*), suggesting that firms with higher pre-tax income from foreign operations engage in less tax avoidance. The significant and positive correlation between size and GAAP ETR (0.108\*) and CASH ETR (0.117\*) indicates that larger firms exhibit less aggressive tax avoidance strategies.

Firms with higher tax loss carryforwards are less aggressive from a cash ETR perspective. Intangible assets show a significant positive correlation with GAAP ETR (0.022\*) and CASH ETR (0.049\*), suggesting that firms with more intangible assets engage in less aggressive tax avoidance.

Property, Plant, and Equipment exhibit a significant positive correlation with GAAP ETR (0.033\*) and a significant negative correlation with CASH ETR (-0.012\*). The return on assets shows a significant positive correlation with GAAP ETR (0.119\*) and CASH ETR (0.115\*), suggesting that more profitable firms are less aggressive in their tax avoidance practices. Ultimately, the Market-to-Book ratio exhibits a significant negative correlation with GAAP ETR (-0.028\*) and CASH ETR (-0.026\*), indicating that firms with higher market valuations relative to book value practice more tax avoidance.

Table 4 presents the results of the Wilcoxon rank-sum test comparing Financial and Non-Financial institutions. GAAP ETR and CASH ETR were higher for financial institutions, suggesting that financial institutions generally paid more taxes than non-financial institutions. Financial institutions tend to be larger than non-bank institutions. The higher CASH ETR indicates that financial institutions disbursed more funds for tax payments. Non-financial institutions, on the other hand, invest more in R&D than financial institutions. Additionally, financial institutions exhibited higher levels of leverage. Interestingly, non-financial institutions were found to be more profitable than financial institutions.

We performed Equation 3 using ordinary least squares and panel data. Due to the sample's characteristics, this study utilized panel data analysis as an alternative econometric strategy. The dataset comprises cross-sectional and temporal dimensions, including observations of companies over time ( $t = 2000, \dots, 2022$ ).

In this study, the panel data was utilized as unbalanced because each unit has a distinct number of observations (Gujarati & Porter, 2011). We conducted three

econometric tests, namely the Chow test to verify the sufficiency of variables, the Hausman test to examine the correlation between unobserved heterogeneity and explanatory variables, and to compare estimates from fixed and random effects approaches, and the Breusch-Pagan test to verify the homoscedasticity.

**Table 4 - Wilcoxon rank-sum test**

Variables	Non-financial institutions				Financial institutions				Wilcoxon rank-sum test
	Mean	Median	Std. dev.	Obs.	Mean	Median	Std. dev.	Obs.	
GAAP ETR	0.129	0.125	0.515	118.481	0.137	0.127	0.466	12.723	-2.072**
CASH ETR	0.133	0.079	0.382	118.481	0.149	0.100	0.396	12.723	-8.291***
R&D	0.475	0	3.041	118.481	0.030	0	0.549	12.723	76.494***
Leverage	0.196	0.156	0.193	118.481	0.229	0.132	0.246	12.723	-6.361***
Foreign Operations	0.341	0	0.474	118.481	0.180	0	0.384	12.723	36.869***
Size	5.672	5.603	2.470	118.481	6.260	6.249	2.682	12.723	-22.916***
NOL	0.721	1	0.448	118.481	0.757	1	0.428	12.723	-8.842***
Intangibles	0.150	0.053	0.199	118.481	0.090	0.003	0.176	12.723	43.596***
Gross PPE	0.526	0.406	0.445	118.481	0.170	0.026	0.326	12.723	118.026***
ROA	-	0.078	0.309	118.481	0.050	0.047	0.180	12.723	7.408***
Market to book	3.987	2.015	7.289	118.481	3.267	1.277	7.423	12.723	40.547***

\*\*\* p<0.01, \*\* p<0.05, \* p<0.10

Table 5<sup>1</sup> presents the results regarding the relation between financial firms and tax avoidance from perspective of GAAP ETR. The OLS estimate of the conditional mean of tax avoidance and panel data provide no evidence of a relationship between Finance and tax avoidance GAAP ETR. In both regressions, the Finance coefficient is negative but insignificant, with GAAP ETR being -0.00209 and CASH ETR being -0.00211. Therefore, we could not discover evidence that the degree of tax avoidance differs between the two groups.

Our research, consistent with previous studies (Dyrenge et al., 2008; Atwood et al., 2012), identified a negative association between R&D expenditures and tax avoidance, which was not statistically significant. This contradicts the positive association between tax avoidance and leverage in previous research. Our unique finding of a negative association in both regressions adds a new dimension to this study.

Previous results concerning foreign operations have yet to be conclusive. Rego (2003) and Atwood et al. (2012) found that multinationals practice less tax avoidance than domestic firms, while Wilson (2009) reported that firms with foreign income are more likely to participate in tax shelters. Our results are more consistent with those of Armstrong et al. (2015) and Rego (2003), which show a negative and significant coefficient for the Foreign Operations variable.

In the same way that Rego (2003) found a positive and significant relationship between Size and tax avoidance, we find a positive and significant relationship between Size and GAAP ETR. This suggests that larger firms engage in more significant tax avoidance. We find a positive and significant coefficient regarding the NOL in both regressions.

We find a positive and significant coefficient in both regressions when

<sup>1</sup> Following the results from the tests: Chow test: 0.000 - we find that panel data is preferable over pooled model. Hausman test: 0.000 - we find that the appropriate model is fixed effects. Breusch-Pagan test: 1.000 - we find confirm that the observations are homoscedastic. Moreover, we used robust errors.

examining the relationship between the intangibles and GAAP ETR. We also find a positive and significant coefficient for the GAAP ETR in both regressions for PPE. Regarding ROA, we observe a positive and significant coefficient in both regressions. Furthermore, we find a positive and significant coefficient between the market-to-book and GAAP ETR.

**TABLE 5 - Tax avoidance of Financial and Non-financial firms (GAAP ETR)**

Variables	(1) OLS	(2) Fixed Effects
<b>Finance</b>	<b>-0.00209</b>	<b>-0.00211</b>
	<b>[0.00508]</b>	<b>[0.00510]</b>
R&D	-0.000496	-0.000497
	[0.000505]	[0.000506]
Leverage	-0.0783***	-0.0784***
	[0.00795]	[0.00796]
Foreign Operations	-0.0164***	-0.0165***
	[0.00322]	[0.00321]
Size	0.0166***	0.0165***
	[0.00069]	[0.000697]
NOL	-0.0114***	-0.0115***
	[0.00313]	[0.00314]
Intangibles	0.0178**	0.0178**
	[0.00802]	[0.00802]
Gross PPE	0.0215***	0.0216***
	[0.00366]	[0.00367]
ROA	0.148***	0.148***
	[0.00558]	[0.00558]
Market to book	0.000415**	0.000416**
	[0.000201]	[0.000200]
Constant	0.0516***	0.0517***
	[0.00507]	[0.00507]
<b>Observations</b>	<b>131,204</b>	<b>131,204</b>
<b>R-squared</b>	<b>0.019</b>	<b>0.021</b>
<b>Number of gvkey</b>	<b>16,649</b>	<b>16,649</b>
<b>Year dummies</b>	<b>Yes</b>	<b>Yes</b>

Robust standard errors in brackets

\*\*\*p<0.01, \*\*p<0.05, \*p<0.10

Table 6<sup>2</sup> presents the results regarding the relationship between financial firms and tax avoidance from the perspective of CASH ETR. From the perspective of CASH ETR, we find that both regressions have a positive but insignificant coefficient. Therefore, there is no evidence to suggest that the level of tax avoidance for financial companies differs. One possible explanation for our findings in both GAAP ETR and CASH ETR regressions is that financial companies are not motivated to engage in aggressive tax avoidance practices due to their higher reputation costs.

We discovered a positive coefficient for R&D in both regressions. However, it was only significant for GAAP ETR. This outcome is like previous studies (Dyreng et al., 2008; Atwood et al., 2012). Previous research indicated a negative correlation between tax avoidance and leverage, and we also observed a negative correlation in both regressions. We observed a positive but insignificant coefficient regarding foreign

<sup>2</sup> Following the results from the tests: Chow test: 0.000 - we find that panel data is preferable over pooled model. Hausman test: 0.000 - we find that the appropriate model is fixed effects. Breush-Pagan test: 0.000 - we find did not confirm that the observations are homoscedastic. However, by using robust errors we deal with this issue.

operations in both regressions. For Size, we find a positive and significant coefficient in both regressions, indicating that larger firms practice more tax avoidance.

Our regression results consistently show a positive and significant coefficient for the NOL variable, which underscores the robustness of our research. Our results indicate a significant positive and significant relationship between both GAAP ETR and cash ETR for intangibles. Similarly, we observe a negative and significant relationship between PPE and GAAP and CASH ETR. We find a positive and significant coefficient between ROA, GAAP ETR, and CASH ETR, suggesting that more profitable firms engage in more tax avoidance, supported by previous studies (Rego, 2003; Wilson, 2009). Finally, we observe a positive and significant coefficient between the market-to-book and the cash ETR in both regressions.

It is important to emphasize that our results, which differ significantly from previous studies, were obtained through a meticulous process of separate data analysis. When we solely focused on non-financial institutions, our findings aligned with prior research. However, when we combined non-financial and financial institutions into our analysis, we found results that differed from the norm. This discrepancy is attributed to the unique characteristics of financial institutions, which distinctly impact the results.

**TABLE 6 - Tax avoidance of Financial and Non-financial firms (CASH ETR)**

Variables	(1) OLS	(2) Fixed Effects
<b>Finance</b>	<b>0.00625</b>	<b>0.00594</b>
	<b>[0.00458]</b>	<b>[0.00596]</b>
R&D	0.000597**	0.000345
	[0.000236]	[0.000256]
Leverage	-0.101***	-0.0932***
	[0.00695]	[0.00834]
Foreign Operations	0.00402	0.00186
	[0.00271]	[0.00332]
Size	0.0125***	0.0128***
	[0.000576]	[0.000738]
NOL	0.00619**	0.00596*
	[0.00269]	[0.00314]
Intangibles	0.0445***	0.0381***
	[0.00655]	[0.00817]
Gross PPE	-0.0132***	-0.0127***
	[0.00314]	[0.00383]
ROA	0.213***	0.188***
	[0.00356]	[0.00472]
Market to book	0.000476***	0.000448***
	[0.000128]	[0.000140]
Constant	0.0614***	0.0565***
	[0.00432]	[0.00517]
<b>Observations</b>	<b>102,442</b>	<b>102,442</b>
<b>R-squared</b>	<b>0.031</b>	<b>0.035</b>
<b>Number of gykey</b>	<b>13,445</b>	<b>13,445</b>
<b>Year dummies</b>	<b>Yes</b>	<b>Yes</b>

Robust standard errors in brackets

\*\*\*p<0.01, \*\*p<0.05, \*p<0.10

The inclusion of control variables in the econometric model enhances the analysis's robustness and accounts for confounding factors, such as firm size, leverage, and market-to-book ratio. These variables are critical in isolating the effects of the main variables of interest: Finance, and ETR—allowing for a clearer understanding of their



relationship. However, the primary focus of the results section must remain on analyzing the connection between Finance (representing financial institutions) and ETR (effective tax rates), which directly addresses the core research question.

Beyond simply describing the direction of the relationship between Finance and ETR, it is essential to delve into the underlying reasons for this relationship and its broader implications. As indicated by the coefficient for Finance, financial institutions exhibit distinct tax avoidance behaviors compared to non-financial firms. These differences can be attributed to factors such as heightened regulatory scrutiny, reputational risks, and operational complexity in financial institutions, all of which influence their tax strategies. For instance, the more conservative tax behavior observed in specific quantiles might reflect the deterrent effects of reputational costs or the constraints imposed by stricter regulatory oversight.

The magnitude of the coefficient further highlights the economic significance of this relationship. For example, suppose the coefficient indicates a 2% difference in ETR between financial and non-financial firms. In that case, this translates into a substantial economic impact when applied to the total pre-tax income of these institutions. Consider a hypothetical financial institution with a pre-tax income of \$1 billion—this 2% difference would represent \$20 million in additional taxes paid, a figure that underscores the tangible economic consequences of the observed relationship. Such "back-of-the-envelope" calculations illustrate not only the statistical but also the real-world implications of the findings.

Furthermore, these differences in tax behaviors carry important consequences for stakeholders. For policymakers, understanding the economic effects of this relationship can guide the design of more effective tax regulations tailored to address sector-specific dynamics. For managers, the results emphasize the need to align tax strategies with broader organizational goals while balancing compliance and efficiency. For investors, the findings provide insights into how tax practices might influence financial institutions' long-term sustainability and reputation.

By focusing on the reasons behind the observed relationship, interpreting the magnitude of the coefficients, and exploring the economic and practical implications, the analysis offers a deeper and more comprehensive understanding of the connection between Finance and ETR. This approach ensures that the results address the research question and provide actionable insights for decision-makers and stakeholders.

## 4.2 SENSITIVITY ANALYSIS

In this section, we examine whether tax avoidance varies across various quantiles by employing two robust regression techniques: Quantile Regression and Ordinary Least Squares (OLS) regression. OLS regression minimizes the least squares of the parameters, whereas quantile regression minimizes the weighted absolute errors, rendering it particularly advantageous for handling non-normally distributed data and outliers. Quantile regression provides more accurate estimates of the distribution's central position (Clout et al., 2015; Koenker et al., 2007).

This research employs three quantiles, namely 0.10, 0.50, and 0.90. According to our interpretation, the 0.10 quantile encompasses firms that exhibit greater aggressiveness, the 0.50 quantile represents the median, and the 0.90 quantile encompasses firms that exhibit less aggressiveness.

According to Table 7, financial institutions have a higher tax expense than other sectors in the GAAP ETR quantile regression for the 0.10 quantile, which includes the more aggressive companies in tax avoidance. Therefore, financial institutions are less

aggressive than other companies. Nevertheless, in the 0.50 quantile, the negative and statistically significant coefficient indicates that financial companies have lower tax expenses than median tax-avoiding companies. Finally, the coefficient for the Finance variable is positive but not statistically significant in the 0.90 quantile, which consists of less aggressive tax-avoiding companies.

The results indicate no statistical difference between the 0.10 and 0.50 quantiles. However, financial institutions pay about 1.90% more taxes than companies from other sectors, indicating that they are less aggressive in tax avoidance than other sectors.

These results are relevant, highlighting an unexplored issue in the literature. Despite the lack of variation in tax avoidance practices utilizing the OLS method and panel data, quantile regression presents a novel perspective by revealing how GAAP ETR and CASH ETR variables alter across the quantiles. This provides invaluable insights for professionals in the fields of finance and taxation.

TABLE 7 - Quantile regression GAAP ETR and CASH ETR

Variables	GAAP ETR (1)						CASH ETR (2)					
	Quantile	0.10	Quantile	0.50	Quantile	0.90	Quantile	0.10	Quantile	0.50	Quantile	0.90
	Coef.	p-value	Coef.	p-value	Coef.	p-value	Coef.	p-value	Coef.	p-value	Coef.	p-value
<b>Finance</b>	<b>.0146669</b>	<b>0.000</b>	<b>-.0199467</b>	<b>0.000</b>	<b>.0018736</b>	<b>0.438</b>	<b>-.0024822</b>	<b>0.382</b>	<b>-.0023705</b>	<b>0.348</b>	<b>.0194579</b>	<b>0.005</b>
R & D	.0003031	0.000	-.0010665	0.000	-.00381	0.000	.0017395	0.000	.0002309	0.180	-.0030586	0.000
Leverage	-.1078055	0.000	-.0897916	0.000	.0623691	0.000	-.1018865	0.000	-.1204255	0.000	.0013403	0.916
Foreign Operations	-.0680028	0.000	.0002506	0.869	.0029181	0.169	-.0302629	0.000	.015489	0.000	.012199	0.002
Size	.0075709	0.000	.0245349	0.000	.0010823	0.021	.0083786	0.000	.0180105	0.000	.0032543	0.010
NOL	.0043841	0.129	-.012418	0.000	-.008068	0.000	.0110714	0.000	.004867	0.000	-.0013742	0.628
Intangibles	-.0667421	0.000	.0685389	0.000	.0253049	0.000	.0223321	0.000	.0753304	0.000	.01046	0.179
Gross PPE	-.0115734	0.003	.0388378	0.000	.0276853	0.000	-.0101796	0.000	-.011679	0.000	-.0077267	0.128
ROA	-.0248658	0.000	.1206478	0.000	.1926567	0.000	.1036704	0.000	.1465427	0.000	.2033384	0.000
Market to Book	.000648	0.000	.0006109	0.000	-.0020681	0.000	.0013805	0.000	.0013368	0.000	-.0022362	0.000
<b>N° of observations</b>	<b>131,204</b>						<b>N° of observations 102,442</b>					
<b>0.10 Pseudo R2</b>	<b>0.0082</b>						<b>0.10 Pseudo R2 0.0082</b>					
<b>0.50 Pseudo R2</b>	<b>0.0941</b>						<b>0.50 Pseudo R2 0.0841</b>					
<b>0.90 Pseudo R2</b>	<b>0.0275</b>						<b>0.90 Pseudo R2 0.0215</b>					

\*\*\* p<0.01, \*\* p<0.05, \* p<0.10

\*\*\* p<0.01, \*\* p<0.05, \* p<0.10

The observed lower tax aggressiveness in financial institutions compared to non-financial firms can be attributed to several factors. One significant factor is regulatory scrutiny. Financial institutions operate under stringent regulatory oversight, which discourages aggressive tax planning. Regulatory bodies such as the Federal Reserve and the SEC impose strict transparency and compliance requirements, making it riskier for these firms to engage in aggressive tax strategies.

Hasan et al. (2014) emphasize that financial institutions face higher reputational and regulatory risks than other sectors, leading to more conservative approaches to taxation. Another important factor is reputational concerns. Tax aggressiveness can carry significant reputational costs for financial institutions, highly dependent on public trust and client relationships.

Gallemore et al. (2019) highlight how financial institutions often avoid aggressive tax planning to maintain their reputation and avoid public backlash, especially in an industry where customer trust is vital for operations. Additionally, operational complexity plays a role in moderating tax behavior. Financial institutions handle a variety of complex instruments and activities, which might reduce their ability to engage in aggressive tax planning. Khan et al. (2017) suggest that institutional ownership and regulatory frameworks further constrain tax avoidance strategies in financial firms.

The lower tax aggressiveness of financial institutions has several implications. From a policy perspective, policymakers may interpret this behavior as a success of regulatory oversight. However, Shackelford and Shevlin (2001) caution that overly restrictive tax policies could inadvertently reduce financial firms' competitiveness, particularly in international markets. Another implication relates to economic equity. The conservative tax strategies of financial institutions might contribute positively to societal equity by ensuring a fairer distribution of tax burdens.

However, Dyreng et al. (2008) note that this behavior could create competitive disparities between financial and non-financial firms, potentially distorting market competition. Lastly, stakeholder trust is an important consequence of lower tax aggressiveness. This behavior may enhance the stability and resilience of financial institutions by fostering greater stakeholder trust. Hanlon and Slemrod (2009) argue that the signaling effects of tax behavior significantly impact stock price reactions and investor confidence.

The findings of this study have significant implications for decision-making within financial institutions, particularly regarding risk assessment and opportunity evaluation. Understanding the nuanced relationship between tax avoidance behaviors and sector-specific dynamics enables financial institutions to adopt more informed and strategic approaches to tax planning.

This study highlights that financial institutions face unique reputational and regulatory risks associated with tax avoidance. Aggressive tax practices can lead to heightened scrutiny from regulators, potential penalties, and damage to stakeholder trust. Financial institutions should implement comprehensive tax reporting frameworks that align with regulatory requirements and stakeholder expectations to mitigate these risks, thereby reducing the likelihood of reputational damage.

They should also establish robust tax governance policies integrating risk assessment tools to monitor and control exposure to aggressive tax strategies. This includes ensuring board oversight and aligning tax planning with ethical standards. Furthermore, regular compliance training for tax and finance teams can help ensure that tax strategies remain within the boundaries of evolving regulations, mitigating the risk of non-compliance.

The findings also reveal opportunities for financial institutions to align their tax

strategies with broader organizational goals and societal expectations. By adopting conservative and socially responsible tax practices, financial institutions can enhance their reputation, attract ethically conscious investors, and build stronger customer relationships. While avoiding aggressive practices, institutions can still optimize tax efficiency by leveraging tax incentives, credits, and deductions available for specific investments, such as green energy initiatives, to reduce tax liabilities sustainably. Additionally, using data-driven insights from tax planning can help identify areas where the institution can reinvest savings into innovation, customer service, or compliance systems, thereby generating long-term value.

Financial institutions should integrate tax planning into their broader strategic frameworks to effectively balance risks and opportunities. This involves viewing tax decisions not as isolated financial tactics but as integral components of organizational strategy that impact sustainability, governance, and competitive positioning. From a policy perspective, regulators could design frameworks that reward financial institutions for transparent and responsible tax practices. Such incentives include reduced audit frequency or recognition programs for companies demonstrating leadership in tax governance. By aligning regulatory expectations with strategic opportunities, institutions can navigate the complexities of tax compliance while fostering public trust.

## 5. CONCLUSION

Our study addresses a novel research question: Do financial companies engage in less tax avoidance than their counterparts in other sectors? We offer comprehensive insights into this inquiry by employing GAAP ETR and CASH ETR as tax avoidance measures and analyzing a sample of 131,204 firm-years from U.S. publicly traded companies spanning 2000 to 2022. Our findings challenge the initial hypothesis that financial companies engage in less tax avoidance by using methodologies such as OLS regression, panel data models, and quantile regression. Instead, the results reveal nuanced behaviors that vary across quantiles, suggesting a more complex relationship between industry characteristics and tax practices.

This study makes significant theoretical contributions by addressing gaps in literature and responding to the call by Hanlon and Heitzman (2010) to investigate tax avoidance practices in financial institutions. Unlike prior research, our analysis encompasses the entire population of publicly traded companies, allowing for a broader and more representative understanding of tax behaviors. The findings suggest that reputational costs, often emphasized in the literature, may have a limited impact on financial institutions' tax practices. This observation challenges traditional assumptions and opens avenues for further research on sector-specific drivers of tax avoidance. Additionally, the quantile regression results, which show varying degrees of tax aggressiveness across different quantiles, provide a new lens to examine the intersection of tax planning, industry constraints, and firm-level strategies.

The findings hold valuable implications for policymakers, managers, and educators. For policymakers, the study underscores the need for regulatory frameworks that consider the nuanced tax behaviors of financial institutions. Designing policies that balance compliance incentives with competitiveness is critical, particularly for financial firms operating in global markets. For corporate managers, the results highlight the importance of aligning tax strategies with organizational goals while managing reputational and regulatory risks. Educators can also benefit from the study by incorporating its findings into accounting and finance curricula, using real-world examples to help students understand how industry-specific characteristics influence tax practices and decision-making.

The study also illuminates the broader societal impact of tax practices in financial



institutions. Aggressive tax avoidance strategies in any sector can reduce resources available for public services, such as education, healthcare, and infrastructure. However, the higher reputational costs associated with financial institutions may serve as a deterrent, promoting more transparent and socially responsible behavior. These dynamics highlight the critical role of financial institutions in shaping societal equity and economic welfare.

While this study provides significant insights, it also allows future research to explore the long-term economic and societal effects of tax avoidance practices across industries. Comparative studies between jurisdictions with varying regulatory intensities could offer deeper insights into how institutional frameworks shape tax behaviors. Additionally, examining the evolving interplay between reputation, regulation, and tax strategies in financial institutions will further enrich the understanding of this critical area.

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**Appendix 1 - Variable measurement**

Item	Variable	Proxy	Definition	Used by	Database
1	Dependent	GAAP ETR	GAAP ETR= $\frac{\text{Total income tax expense (TXT)}}{\text{Pre-tax book income PI before special items (SPI)}}$	Cen et al. (2017); Dyreng et al. (2008); Armstrong et al. (2015).	Compustat
2	Dependent	Cash ETR	CASH ETR = $\frac{\text{Cash tax paid (TXPD)}}{\text{Pre-tax book income (PI) before special items (SPI)}}$	Cen et al. (2017); Dyreng et al. (2008); Armstrong et al. (2015).	Compustat
3	Interest	Finance	A dummy that split the sample between financial companies and non-financial companies		
4	Control	R & D	Research and development expense (XRD) divided by net sales (SALE); when missing, reset to 0.	Atwood et al. (2012); Hoi et al. (2013); Dyreng et al. (2008); Lanis et al. (2018).	Compustat
5	Control	Leverage	The sum of long-term debt (DLTT) and current liabilities (DLC) divided by total assets (AT)	Cen et al. (2017); Atwood et al. (2012); Hasan et al. (2014); Dyreng et al. (2008); Armstrong et al. (2012); Lanis et al. (2018).	Compustat
7	Control	Foreign operations	The firm has non-missing, non-zero value for pre-tax income from foreign operations (PIFO)		Compustat
6	Control	Size	Natural log of total assets (AT)	Armstrong et al. (2015); Atwood et al. (2012); Hasan et al. (2014); Dyreng et al. (2008); Lanis et al. (2018).	Compustat
7	Control	Net Operating Loss	An indicator if the firm has a non-missing value of tax loss carry-forwards (TLCF)	Cen et al. (2017); Hoi et al. (2013);	Compustat
8	Control	Intangibles to total assets	The ratio of intangible assets (INTANG) to total assets (AT)	Cen et al. (2017); Hasan et al. (2014); Dyreng et al. (2008);	Compustat
9	Control	Gross PP&E to total assets	Gross property, plant, and equipment (PPE GT) divided by total assets (AT)	Cen et al. (2017); Hasan et al. (2014);	Compustat
10	Control	ROA	Operating income before depreciation (OIBDP) scaled by total assets (AT)	Cen et al. (2017); Atwood et al. (2012); Hasan et al. (2014); Dyreng et al. (2008); Armstrong et al. (2015); Lanis et al. (2018).	Compustat
11	Control	Market-to-Book	Market value of equity (PRCC_F x CSHO) scaled by book value of equity (CEQ)	Cen et al. (2017); Hasan et al. (2014);	Compustat

**Appendix 2 - Pearson correlations**

Variables	1	2	3	4	5	6	7	8	9	10	11	12
GAAP ETR	1.000											
CASH ETR	0.169*	1.000										
Finance	0.005	0.013*	1.000									
R&D	-0.034*	-0.035*	-0.045*	1.000								
Leverage	0.020*	-0.007*	0.050*	-0.070*	1.000							
Foreign Operations	0.018*	0.047*	-0.102*	-0.022*	0.023*	1.000						
Size	0.108*	0.117*	0.070*	-0.094*	0.358*	0.277*	1.000					
NOL	-0.017*	0.006	0.024*	0.039*	-0.031*	0.044*	-0.036*	1.000				
Intangibles	0.022*	0.049*	-0.089*	-0.043*	0.181*	0.200*	0.219*	0.016*	1.000			
Gross PPE	0.033*	-0.012*	-0.235*	-0.102*	0.204*	-0.101*	0.096*	-0.057*	-0.287*	1.000		
ROA	0.119*	0.155*	0.065*	-0.280*	0.180*	0.144*	0.458*	-0.035*	0.127*	0.149*	1.000	
Market to book	-0.028*	-0.026*	-0.029*	0.060*	0.077*	0.023*	-0.134*	0.031*	0.007*	-0.092*	-0.216*	1.000

\*\*\* p<0.01, \*\* p<0.05, \* p<0.10



