Bachelor Thesis Accountancy

EXPLORING THE VARIABILITY IN TAX AVOIDANCE PRACTICES WITHIN THE HEALTHCARE SECTOR

Joel Cahis Reixach

ARN: 796477

International Business Administration

Supervisor: Sietse Oostra

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I. INTRODUCTION

Over the past decades, research on tax avoidance has expanded and new information has been collected, yet understanding why tax avoidance practices vary among companies within the same industry remains limited. Understanding why this variation occurs could clarify which types of companies in a sector tend to engage in higher tax avoidance practices and what specific dynamics enable these companies to do so, as suggested in the study conducted by Dyreng et al. (2008).

This research aims to build upon the study by Dyreng et al. (2008), with a specific emphasis on understanding the reasons behind the variation in tax avoidance practices among firms operating within the same industry. Given the absence of prior studies on variations in tax avoidance practices within a single industry, it is not possible to observe this variance from reading previous papers. Thus, any sector could serve as a potential pioneer for such research.

This paper will specifically focus on the healthcare sector. The motivation arises from the findings of Dyreng et al. (2008), which indicate that the healthcare sector exhibits considerable variation in tax avoidance practices. Following this brief overview, this study aims to extend the discussion by addressing the following research question: What are the key determinants that explain the variation in tax avoidance between firms within the healthcare sector?

It is important to note that variations in tax avoidance practices among firms within a sector can result in some businesses gaining an advantage over others due to significant differences in tax payments (Cooper & Nguyen, 2020). Firms that adopt more aggressive tax avoidance strategies tend to benefit from increased investments (Liu & Mao, 2019b). This increase is driven by the greater availability of cash flows that would otherwise be paid to the government (Duhoon & Singh, 2023). Understanding the source of this variation could allow policymakers to develop effective regulations that address these inequalities arising from the variation in tax avoidance. For academic relevance, other scholars could study this topic further with more complex and improved models based on the one proposed in this paper and study if this variation in tax avoidance practices is present in other industries.

During the last years, financial constraints in the healthcare sector have escalated (Chen, 2013), potentially inhibiting the necessary investment in new technologies and rapid development that this sector requires due to the surge in demand (Erixon et al., 2015). A record of large healthcare companies submitted for bankruptcy in the United States last year also

highlights the industry struggles (Mathurin, 2024). In light of this scenario, it is observable that the healthcare sector could benefit from an increase in investment, which could be facilitated through tax avoidance strategies (Liu & Mao, 2019b).

The data used is based on financial statement data from COMPUSTAT-CAPITAL IQ, encompassing US healthcare institutions categorized into two groups for differentiation, specifically Health Care Equipment & Services group and Pharmaceuticals, Biotechnology & Life Sciences (GICS® - Global Industry Classification Standard, 2023). These two groups consider all healthcare sector firms and allow for checking if variance in tax avoidance exists within the sector. The dataset spans from 2015 to 2018 to mitigate any irregularities caused by the COVID-19 pandemic, which might distort the true operational and financial performance of companies.

The results of this study support Dyreng et al. (2008) by demonstrating the existence of variability in tax avoidance practices within the healthcare sector. The findings also indicate that this variability can be explained by some of the key determinants suggested by Gupta and Newberry (1997). It is observed that the tax avoidance practices of the two groups are affected differently by the key determinants. The following section will present the literature review and hypotheses development.

II. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

2.1 Tax Impact on Corporate Decision-Making:

Modigliani and Miller (1958) demonstrated that in a perfect world, corporate financial decisions are irrelevant. One of the assumptions made is the absence of corporate taxes, when this assumption is relaxed, corporate taxes significantly affect firm value, especially since taxes are a significant expense that many corporations face. Additionally, taxes can influence aspects of corporate decision-making other than firm value, such as capital structure decisions, risk management, and payout policy (Graham, 2003). These findings demonstrate the importance of understanding how taxes affect businesses.

2.2 Understanding Tax Avoidance:

After pointing out the role of taxes in corporate decision-making and firm value, it is necessary to define the term tax avoidance. The Internal Revenue Service (IRS) is the division of the United States Treasury Department in charge of collecting federal taxes and enforcing tax laws. The IRS defines tax avoidance as “actions taken to lessen tax liability and maximize after-tax income” (Understanding Taxes, 2002). It is important to distinguish tax avoidance, a

legal practice, from tax evasion, which the IRS defines as the "failure to pay or a deliberate underpayment of taxes", an illegal activity (Understanding Taxes, 2002).

During the study of Dyreng et al.'s (2008) on long-run corporate tax avoidance practices, they utilized the Effective Tax Rate[1] (ETR) as a measure of tax avoidance. The results of this study highlight the presence of variation in tax avoidance practices within the healthcare sector among other sectors. I highly recommend the reading of the article for a deeper understanding of such variation in tax avoidance within sectors. Based on the findings of Dyreng et al.'s (2008), the initial hypothesis is stated as follows:

H.1: Variations in tax avoidance practices exist among firms within the Healthcare sector.

2.3 Determinants of tax avoidance variability:

To study the variability in tax avoidance practices within the healthcare sector, it is necessary to identify different measures that can explain this variability. Previous research presents different measures that can explain the variability in tax avoidance; such as size, capital structure, and asset mix (Gupta & Newberry, 1997). There are two different perspectives on how size can impact tax avoidance. The first argues that companies with larger size have higher visibility and face more regulatory actions, resulting in lower tax avoidance. On the other hand, the second theory argues that larger-size firms have greater resources to engage in tax planning and achieve optimal tax savings, which suggests that larger firms can engage in higher tax avoidance practices (Gupta & Newberry, 1997).

Leverage commonly serves as a proxy for capital structure, which typically explains how a company finances its resources. The decision of how to finance the resources is relevant as it exposes the company to different fiscal treatments that can lead to paying more or less taxes. There are two main options: equity or debt financing. While equity financing may be cheaper in certain cases, it does not offer a tax shield like debt. This tax deductibility may incentivize firms to choose debt financing over equity financing (Kraft, 2014). Based on these arguments, it is expected that higher leverage leads to a greater tax shield, resulting in increased tax avoidance (Armstrong et al., 2012).

Asset mix can be explained with the combination of three proxies: capital intensity, inventory intensity, and research and development intensity. Previous literature shows capital

[1] The term effective tax rate refers to the percent of income that a corporation owes/pays in taxes.

intensity has a positive relationship with tax avoidance practices. This relationship occurs due to nearly all tax regimes allow to deduct depreciation of property, plant, and equipment (tangible fixed assets). From this information, we can conclude that a company with higher levels of fixed assets should have a lower tax burden than companies with low levels (Rodríguez & Arias, 2014). The second proxy is inventory intensity, which according to Derashid and Zhang (2003) states that firms with a greater proportion of inventory, which do not benefit from tax shields like debt or tangible fixed assets, tend to have lower tax avoidance. The third and last proxy to measure asset mix is R&D intensity, which similarly to capital intensity, allows the firm to have a higher tax shield suggesting that such firms with higher R&D can engage in higher tax avoidance practices (Richardson & Lanis, 2007). Finally, the last measure we will use to explain the variability in tax avoidance within the healthcare sector is the return on assets (ROA). Previous literature has found a negative relationship between ROA and tax avoidance, this means that more profitable firms should pay more taxes (Armstrong et al., 2012). Following these arguments, the study presents the following hypothesis:

H.2: Variability in tax avoidance among firms within the healthcare sector can be explained by: firm size, firms' capital structure, and Asset Mix.

Firm's tax avoidance practices could be affected by other factors apart from the firm size, capital structure. and asset mix. An example of a more complete empirical model would include the firm's foreign operations since depending on the countries of operation, they will have higher/lower tax rates which will affect their corporate tax rate. Although this study will not specifically consider the firm's foreign operations, it indirectly takes it into account. Zimmerman, (1983) discovered that larger firms tend to have a higher proportion of income from foreign operations, meaning that foreign income potentially is correlated with firm size.

The ownership structure is another factor that could affect tax avoidance practices. This relationship can be explained by two different effects: the entrenchment effect, which suggests a positive correlation between ownership concentration and tax avoidance at a lower level, and the alignment effect, which implies that concentrated ownership through voting rights is negatively correlated to tax avoidance beyond the minimal threshold required for effective control (Richardson et al., 2016). The empirical model used in this study does not include these variables primarily due to constrained access to the necessary data for proper measurement.

2.4 Conclusions

The two proposed hypotheses emerge from a extensive review of academic literature, leading to a new research opportunity which is investigating the variability in tax avoidance practices within a specific sector, this study will focus on the healthcare sector. Given that there is no existing literature on such variability in any particular sector, it is not possible to reference previous studies on this topic. The following section will discuss the methodology used in this paper.

III. METHODOLOGY

3.1 Regression Model

During this study, I will use the Effective Tax Rate (ETR) as a measure for tax avoidance to visualize how well a company utilizes tax-advantaged strategies (Kraft, 2014). To investigate the key determinants of ETRs in the Healthcare sector, I will use Gupta and Newberry's (1997) model, which has been widely used in previous research on the topic of variability in effective tax rates. The regression model is as follows:

$$\boldsymbol{ETR_{it} = \beta_1 SIZE_{it} + \beta_2 LEV_{it} + \beta_3 CAPINT_{it} + \beta_4 INVINT_{it} + \beta_5 RDINT + \beta_6 ROA_{it} + Year\ \ FE + \varepsilon}$$

ETR is the dependent variable, representing the effective tax rate for a firm "i" in a year "t". The independent variables are firm size (SIZE), capital structure (LEV), asset mix (CAPINT, INVINT, and RDINT), and firm performance (ROA). A Year indicator is added to account for potential time-related trends and to get a more accurate estimation of the interest variables that are in the regression.

3.1.1 Calculation of the dependent variable

Numerous methods exist for calculating effective tax rates (ETRs), but not all of them are suitable for this particular investigation. Typically, ETRs are computed by dividing tax liability by income. However, there is controversy regarding which numerator and denominator are the most appropriate. For the numerator, the dilemma is to define which taxes should be considered. In this study, I opt to utilize worldwide taxes as the numerator, as segregating a company's overall tax expenditure into domestic and foreign segments presents challenges (Spooner, 1986; Wheeler, 1988). For the denominator, the question is which is the most appropriate measure of income. The available options are taxable income, financial accounting (book) income, and finally the cash flow from operations. In this case, the denominator used will be based on financial accounting income (book) income. While it would also be a

possibility to make use of cash flow from operations, it is not the case with taxable income since if both the numerator and denominator were after-tax preferences, then any variation in ETR due to tax preferences would not be detected (Gupta & Newberry, 1997).

3.1.2 Calculation of the independent variables

This paper measures firm size by calculating the logarithm of total assets. There are various opinions on how firm size affects ETR as previously mentioned in the literature review, so no specific prediction is made. Leverage, defined as long-term debt by total assets, represents the firm's capital structure. A negative relationship between leverage and ETRs is predicted. To measure asset mix, three proxies are used. The first is capital intensity, defined as the ratio of net property, plant, and equipment to total assets, which is expected to have a negative relationship with ETRs. The second proxy is inventory intensity, measured as the ratio of total inventories to total assets, which is predicted to be positively related to ETRs. The last proxy for asset mix is R&D intensity, defined as the ratio of R&D expenditure to total assets, the prediction is that it will have a negative relationship with ETR. The last independent variable is return on assets (ROA), defined as the ratio of Pre-tax income to total assets which is expected to be positively related to ETR. All this information is summarized in Table 1.

Table 1: Variables, definition, databases and expected signs of estimated coefficients

Variable	***Definition***	***Database***	***Predicted sign***
Tax Variable (Dependent variable)			
Effective Tax Rate	Tax expense / book income	Compustat	
Firm-specific variables (Independent variables)			
Size	Log (total assets)	Compustat	+/-
Leverage	Long-term debt/Total assets	Compustat	-
Capital Intensity	Net Property,Plant & Equipment/Total assets	Compustat	-
Inventory Intensity	Total inventories/ Total assets	Compustat	+
R&D Intensity	R&D expense/Total sales	Compustat	-
ROA	Pre-tax income/ Total assets	Compustat	+

IV. SAMPLE SELECTION

All data in this paper came from Wharton Research Data Services (WRDS), specifically from the compustat database. The study focuses on North American firms from 2015 to 2018. This timeframe was chosen to reduce the impact of extraordinary events like COVID-19. To investigate the existence of variations in effective tax rates within the healthcare sector, two distinct groups within the Healthcare Sector will be compared. These two groups are identified using the Global Industry Classification Standard (GICS), which is an industry analysis framework, this system is divided into 11 sectors, 25 industry groups, 74 industries, and 163 sub-industries. MSCI and S&P Dow Jones developed this classification to categorize major public companies according to industry taxonomy (GICS® - Global Industry Classification Standard, 2023). This study focuses on the healthcare sector (code:35), divided into two industry groups: Healthcare Equipment & Services (code:3510) and Pharmaceuticals, Biotechnology, and Life Sciences (code:3520). These two groups cover the entire healthcare sector.

To ensure the quality of our data, we first need to clean the data of the original datasets. The Healthcare Equipment & Services dataset (code: 3510) originally contained 1193 firm unique observations, while the Pharmaceuticals, Biotechnology & Life Sciences dataset (code: 3520) had 823 observations. Our first step involves cleaning the data by removing Inactive firms. A firm is considered inactive if is not currently operational. Following this process, we find that the Healthcare Equipment & Services dataset now comprises 268 firm unique observations, the Pharmaceuticals, Biotechnology & Life Sciences dataset still contains 823 observations since all the dataset contained active companies.

Gupta & Newberry (1997) highlight potential distortions in certain scenarios, particularly when firms report negative income or receive tax refunds. This distortion can occur, for instance, when a firm with a book loss (negative denominator) and a tax refund (negative numerator) calculates a positive Effective Tax Rate (ETR), despite not paying taxes. To mitigate such distortions, we only include firms with both positive Book income and positive tax expenses. This approach ensures the integrity of our results and eliminates potential distortions caused by negative values. Consequently, the sample size of the group 3510 is reduced to 140 firm unique observations, and group 3520 to 123.

Ultimately, accounting for missing data to compute independent variables further refines the dataset. The final sample comprises a total of 75 firm unique observations for the

3510 group and 58 for the 3520 group. You can find the summarized version in Table 2. Taking into account data collected over multiple years, group 3510 comprises 138 observations. Similarly, group 3520 includes a total of 145 observations. All this process is summarized in table 2.

Table 2: Sample selection

	Healthcare Equipment & Services (3510)	Pharmaceuticals, Biotechnology & Life Sciences (3520)
All firms unique observations	1193	823
Less		
Inactive Firms	925	-
Negative book income or tax expense	128	700
Missing data	65	65
Final sample (firm unique observations)	75	58

V. RESULTS

In this section, we will examine and analyse the findings of our research between the two industry groups: The Healthcare Equipment & Services group(3510) and Pharmaceuticals, Biotechnology & Life Sciences (3520). To accomplish this, I'll begin by conducting two distinct studies, each accompanied by its own set of descriptive statistics, correlation matrix, and multivariate analysis. Following this, I will examine the difference in coefficients between the two groups to ascertain whether there are differences in the effects observed in each group. Lastly, I will interpret and discuss the most relevant findings, focusing on those that contribute to addressing the two proposed hypotheses.

5.1 Descriptive statistics

Descriptive statistics in Tables 3 and 4 show the mean, standard deviation, minimum, maximum, and median for all dependent and independent variables. In such tables, it is observed that the mean ETR for group 3520 is 23.5%, and for the 3510 group is 20.6%. This implies that for example, a company that pertains to group 3510 pays 21 (20.6) cents in taxes for every dollar of taxable income. The study conducted by Dyreng et al. (2008) found an average ETR of 30.4%, which is larger than the one reported in this study. This difference

could be attributed to the temporal gap between studies since previous research has found that corporate effective tax rates have decreased significantly over the last 25 years (Dyreng et al., 2017).

After testing for the difference in means between groups 3510 and 3520. The results in table 5 reveal that the pharmaceuticals, biotechnology & life sciences group (3520) displays a significantly higher ETR mean compared to the healthcare equipment & services group (3510) by 2.81%. Importantly, the significance level of 0.034 underscores the statistical significance of this difference in means. This result aligns with the suggestion of Dyreng et al.'s (2008) study, further validating the presence of variation in effective tax rates within the healthcare sector. The results support hypothesis one, which suggests a variance in effective tax rates among firms within the healthcare sector.

The descriptive statistics tables 3 and 4 also indicate that the pharmaceuticals and biotechnology sector (group 3520) has a greater size than the healthcare equipment and services sector (group 3510), both in terms of average magnitude and the largest company within each sector.

Table 3: Descriptive statistics 3520

	Pharmaceuticals, Biotechnology & Life Sciences (3520) N=145				
	Mean	**Std.deviation+**	**Minimum**	**Maximum**	**Median**
ETR	0.235	0.124	0.001	0.4945	0.229
Size	8.323	1.899	4.765	12.06	8.11
Leverage	0.253	0.151	0.001	0.615	0.244
Cap.intensity	0.133	0.103	0.004	0.459	0.103
Inv.intensity	0.074	0.059	0.002	0.304	0.0577
R&D. intensity	0.136	0.116	0.003	0.636	0.095
ROA	0.119	0.088	0.002	0.428	0.954

Table4: Descriptive statistics 3510

	Healthcare Equipment & Services (3510) N=138				
	Mean	**Std.deviation**	**Minimum**	**Maximum**	**Median**
ETR	0.206	0.135	0.002	0.4881	0.206
Size	7.640	2.193	1.410	11.939	7.789
Leverage	0.257	0.214	0.001	1.072	0.215
Cap.intensity	0.177	0.132	0.004	0.514	0.127
Inv.intensity	0.099	0.085	0.002	0.338	0.083
R&D. intensity	0.038	0.042	0.003	0.177	0.025
ROA	0.084	0.067	0.002	0.415	0.072

Table 5: Difference in means between groups 3510 and 3520

	Mean difference	**Significance**	**Observations**
ETR	0.028	0.034	283

5.2 Correlation matrix

Tables 5 and 6 present the correlation matrix of groups 3520 and 3510 respectively. The correlation matrix examines the relationship between the dependent variable (DV), the Effective Tax Rate (ETR), and different independent variables (IVs). In the 3520 group, a positive correlation is observed between ETR and inventory intensity, suggesting that companies with lower inventories tend to have lower ETRs. This finding aligns with Gupta and Newberry's (1997) research. Conversely, a negative correlation is found between ETR and R&D intensity, consistent with the view of Richardson & Lanis (2007).

In the 3510 group, a positive correlation is present between ETR and Size, which aligns with Watts and Zimmerman's (1986). Additionally, there's a positive correlation between ETR and inventory intensity within this group, mirroring the pattern observed in group 3520.

Table 6: Correlation matrix 3520

	Pharmaceuticals, Biotechnology & Life Sciences (3520)						
	ETR	**Size**	**Lev.**	**Cap.int**	**Inv.int**	**R&D.int**	**ROA**
ETR	1.000						
Size	0.167	1.000					
	(0.22)						
Lev.	-0.10	0.180*	1.000				
	(.451)	(0.014)					
Cap.int	0.81	-0.07	0.006	1.000			
	(.163)	(0.195)	(0.471)				
Inv.int	0.271**	-0.13	0.161*	0.385**	1.000		
	(0.000)	(0.055)	(0.026)	(0.000)			
R&D.int	-3.04**	0.059	-0.15*	-0.151	-0.363**	1.000	
	(0.000)	(0.239)	(0.033)	(0.340)	(0.000)		
ROA	-0.79	-0.03	-0.17*	-0.015	-0.049	0.034	1.000
	(0.169)	(0.338)	(0.019)	(0.429)	(0.278)	(0.340)	

**(*) denotes significance at the SIG.(1-tailed) <0.01(0.05)

Table 7: Correlation Matrix 3510

	ETR	Size	Lev.	Cap.int	Inv.int	R&D.int	ROA
ETR	1						
Size	0.288**	1					
	(0.000)						
Lev.	0.042	0.403**	1				
	(0.314)	(0.000)					
Cap.int	0.073	0.104	0.471**	1			
	(0.198)	(0.112)	(0.000)				
Inv.int	0.188*	-0.03	-0.33**	-0.397**	1		
	(0.013)	(0.350)	(0.000)	(0.000)			
R&D	-0.05	-0.21**	-0.85	-0.239**	0.075	1	
.int	(0.289)	(0.006)	(0.162)	(0.002)	(0.191)		
ROA	-0.92	-0.96	-0.16*	0.068	-0.010	0.072	1
	(0.141)	(0.133)	(0.030)	(0.213)	(0.453)	(0.202)	

**(*) denotes significance at the SIG.(1-tailed) <0.01(0.05) level

5.3 Multivariate analysis

Examining Tables 8 and 9 enables us to assess how various "key determinants" influence Effective Tax Rates (ETRs) within their respective firm groups. It's observed that certain key determinants have a different effect on ETRs depending on whether firms belong to the 3520 or 3510 group.

In our multivariate analysis, it is observed a positive and significant impact of size on both 3510 and 3520, consistent with Gupta & Newberry's (1997) findings. However, financing decisions, measured by leverage, were not identified as significant, contrary to Gupta & Newberry's (1997) results, which identified leverage as a significant determinant of ETR.

When examining the Asset mix, consisting of capital intensity (Cap.int), inventory intensity (inv.int), and research & development intensity (R&D.int), the significance of these factors varies across groups. For group 3520 (Table 8), it's observable that inventory intensity significantly impacts the effective tax rate (ETR), with an increase of 0.470 units for every one-

unit change of inventory intensity, assuming all other variables remain constant. Additionally, R&D intensity shows significance, exerting an opposite effect on the ETR. Specifically, for each unit increase in R&D.int, the ETR decreases by -0.231 units, holding other variables constant. On the other hand, the multivariate analysis for Group 3510 (Table 9) reveals that within asset mix variables, only inventory intensity is significant. Similarly to Group 3520, it has a positive effect on the effective tax rate (ETR). However, the unstandardized beta coefficient is slightly smaller than that of Group 3520, specifically, for every unit change in inventory intensity, the ETR is expected to change by 0.338 units for group 3510. The outcomes align with those reported by Gupta & Newberry (1997), not only in terms of statistical significance but also regarding the direction of the relationship between the variables.

Another important observation regarding Tables 8 and 9 is that the variance inflation factor (VIF) test results indicate there is no multicollinearity among the variables. Multicollinearity occurs when the independent variables are highly correlated with each other, which can be problematic for regression analysis. To conclude, the R^2 is an indicator of how well the model explains the variance of a dependent variable (ETR), the R^2 for group 3520 is 0.305 and 0.304 for group 3510. So, for example the model for group 3520 explains 30.5% of the variance of ETR.

Table 8: Multivariate analysis 3520

	Pharmaceuticals, Biotechnology & Life Sciences (3520)				
	Predicted sign	**Unstandarized B**	**T-statistic**	**P-value**	**VIF**
(Constant)		0.162**	3.057	0.003	
Size	?	0.016**	3.321	0.001	1.077
Leverage	-	-0.092	-1.460	0.147	1.161
Cap.int	-	0.046	-0.487	0.627	1.191
Inv.int	+	0.470**	2.680	0.008	1.372
R&D.int	-	-0.231**	-2.750	0.007	1.195
ROA	+	-0.133	-1.292	0.199	1.036
$\boldsymbol{R^2}$	0.305				

[a] **dependent variable: ETR** **(*) denotes significance at the SIG <0.01(0.05) level

Table 9: Multivariate analysis 3510

	Healthcare Equipment & Services (3510)				
	Predicted sign	**Unstandarized B**	**T-statistic**	**P-value**	**VIF**
(Constant)		0.116	1.557	0.122	
Size	?	0.021**	3.731	0.001	1.298
Leverage	-	-0.065	-1.000	0.319	1.707
Cap.int	-	0.194	1.916	0.058	1.566
Inv.int	+	0.338**	2.406	0.018	1.253
R&D.int	-	0.291	1.055	0.293	1.204
ROA	+	-0.169	-1.022	0.309	1.079
R^2	0.304				

^{a}**dependent variable: ETR** **(*) denotes significance at the SIG <0.01(0.05) level

In order to make comparisons of how the independent variables affect the dependent variable differently across the two groups we need to conduct a difference in coefficients. A significant difference in coefficients indicates that the relationship between the variables changes between the groups. In order to find this difference, I conducted a regression analysis that included both groups and all variables from the previous regression model Eq (1) used to analyze each group individually. Additionally, I added a new dummy variable to differentiate between group 3510 (coded as 1) and group 3520 (coded as 0) which is the base group. Furthermore, to test whether there is a significant difference in coefficients, I included interaction terms between the independent variables and the group dummy variable in the regression model.

The difference in coefficients analysis results indicates borderline significance for the interaction terms, with values of 0.092 for capital intensity and 0.053 for R&D intensity. Even though it is necessary to be cautious of the significance levels, the results indicate that there are differences in how the two variables impact the effective tax rate (ETR) depending on the group. Considering group 3520 as the reference group (coded as 0), the positive coefficients of 0.234 for capital intensity and 0.520 for R&D intensity indicate that the effect of these independent variables is larger for group 3510 (coded as 1) compared to group 3520. These

findings again support the presence of differences between groups and support the idea that key determinants, such as capital intensity and R&D intensity, contribute to the variability in ETR.

VI. CONCLUSIONS

This research intended to address an unanswered question suggested by Dyreng et al. (2008): why do tax avoidance strategies vary among companies within one sector, and what key determinants contribute to these differences? The study was specifically focused on the healthcare sector due to the expected variability within the industry suggested by Dyreng et al.'s (2008), as well as the lack of prior research in any other sector, which meant that any sector could be a pioneer since it was impossible to simply explain the variance based on other sectors from other studies.

Based on previous research, the initial hypothesis proposed that variations in tax avoidance practices existed within the healthcare sector. Following the empirical analysis, the results showed a 2.81% effective tax rate (ETR) difference between Pharmaceuticals, Biotechnology & Life Sciences group (3520) and the Healthcare Equipment & Services group (3510). This finding supports Dyreng et al.'s (2008) claim about the presence of differences in effective tax rates within a sector. An important limitation is that the economic size of each group is not available, without this information it is not possible to translate the 2.81% ETR difference to monetary terms, which could provide the economic relevance of this finding and if this 2.81% actually is translated into a considerable amount of money.

The second hypothesis proposed that the key determinants of variability in tax avoidance within a sector are firm size, capital structure, and asset mix. The findings of this study support this notion, demonstrating that effective tax rates of groups 3510 and 3520 respond differently to these key determinants. To summarize the findings, (1) variations in tax avoidance practices in the healthcare sector exist, and (2) the key determinants can contribute to the variability in corporate effective tax rates within the sector.

The primary limitation of this study lies in the limited number of observations and the specificity of the study. Despite beginning with a big dataset, the application of required filters recommended by prior literature, such as Gupta & Newberry's (1997), resulted in a final sample size that was very reduced. Consequently, this restriction prevented the inclusion of certain dummy variables, such as firm fixed effects, as their incorporation absorbed a significant portion of the variance and substantially altered the study's outcomes. Secondly, the difference

in coefficients test was borderline significant which means that the results should be interpreted with caution. Finally, the model proposed by Gupta & Newberry (1997) does not account for factors such as a firm's foreign operations or ownership structure. Adding those would make the model more elaborate and realistic.

For future research, it is advisable to select a sector with more available data to ensure the relevance of the findings. Furthermore, analysing the effects of new regulations could be interesting to know if tax avoidance practices of companies within the same sector react differently. This investigation could reveal potential disparities in benefits among firms within the same industry, incentivizing policymakers to develop more equitable regulations. Moreover, exploring different sectors could provide insights into whether the healthcare sector exhibits unique variability in tax avoidance practices compared to other industries. This comprehensive approach to future research would contribute to a deeper understanding of the dynamics of tax avoidance and its implications across various sectors. Finally, this thesis contributes to the limited research on the variability of tax avoidance practices among companies in the same industry. The findings can be used to better understand why some firms are able to engage in more aggressive tax avoidance practices than others, as well as the factors that allow these companies to do so.

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