

The influence of tax services provided by auditors on tax avoidance: evidence from Brazil

A influência dos serviços tributários prestados pelo auditor na tax avoidance das empresas: evidências do Brasil

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Keywords

Tax avoidance.
Audit.
Tax services.
Effective tax rate.

Abstract

This article investigated the temporal association between the tax services provided by auditors and the tax avoidance of Brazilian companies. A panel of non-financial companies from B3 was analyzed, covering the period from 2010 to 2017, through regressions for panel data. The documented results suggest that companies that use tax services from their auditors have a lower effective tax rate, incur a lower effective tax rate paid in cash and present a greater difference between the profit determined by accounting rules and the profit determined through tax rules when compared with companies that do not use such services.

Palavras-chave

Tax avoidance.
Auditoria.
Serviços tributários.
Taxa efetiva de tributos.

Resumo

O artigo investigou a associação temporal entre os serviços tributários prestados pelo auditor e a tax avoidance das empresas no Brasil. Foi analisado um painel de empresas não financeiras da B3, cobrindo o período de 2010 a 2017, por meio de regressões para dados em painel. Os resultados sugerem que as empresas que utilizam serviços tributários de seus auditores, em comparação com aquelas que não utilizam, têm menor taxa efetiva de tributos, incorrem em menor taxa efetiva de tributos pagos em dinheiro e apresentam maior diferença entre o lucro apurado de acordo com as regras contábeis e o lucro apurado por meio de regras fiscais.

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Practical implications

The findings of this research provide observational evidence of the influence of audit firms in reducing companies' tax burden, which needs to be considered by the government and regulators. The findings contribute to foster the debate about auditors providing auditing and non-auditing services concomitantly since this practice may lead to loss of auditors' objectivity and independence.

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1 INTRODUCTION

Regulators and governments in several countries have sought to limit the amount of non-audit services (NAS) that auditors can provide to their clients. These regulatory actions arise from the debate on whether the joint provision of these services compromises the auditor's independence and the audit quality (Kinney et al., 2004; Zhang et al., 2016). This debate took shape after 2002 with the Sarbanes-Oxley Act (SOX) in the United States, and is currently ongoing. In 2014, the European Union started to regulate the joint provision of audit and NAS through the European Council Directive 2014/56 and the Regulation (EU) 537/2014.

In Brazil, the Supreme Federal Court restored the effects of CVM Instruction 308/1999 of the Brazilian Securities and Exchange Commission in 2020, preventing audit firms from providing NAS to their clients and resuming the debate in the country. This regulatory change has important implications for the Brazilian audit market.

Contrarily, the literature increasingly argues that the synergy generated by the provision of joint services by the auditor (a phenomenon known as knowledge spillover) improves professional judgment and the efficiency of audit firms, bringing indirect benefits to their clients (Kinney et al., 2004; McGuire et al., 2012). Knowledge spillover can help reduce corporate tax costs (Cook et al., 2008; McGuire et al., 2012; Hogan & Noga, 2015; Chyz et al., 2017; Nesbitt et al., 2019; Cook et al., 2019), which is particularly relevant because it suggests that the joint provision of services by the auditor influences companies' tax avoidance practices.

The reduction in tax costs obtained through audit firm consultancy gives rise to the suspicion that the auditor will find reasons not to report relevant events that may be, directly or indirectly, associated with this work. This is aggregated if the gains made during consultancy are positively correlated with the tax cost savings provided to the client.

In the United States, the Public Company Accounting Oversight Board (PCAOB) expressed this concern by issuing Rules 3521, 3522, and 3523 (PCAOB, 2005), from which auditors cease to be independent if they provide services for contingent fees, provide aggressive tax planning services, or provide any tax services to individuals related to supervision in the preparation of financial reports in the audit client.

This discussion is important because aggressive and legally questionable tax practices can increase the risk of errors in the tax estimates in the financial statements, exposing auditors to possible litigation costs and reputational damage (Donohoe & Knechel, 2013). Public policies can also be affected due to their potential impact on fiscal equity (Omer et al., 2006).

The available international evidence (Cook et al., 2008; McGuire et al., 2012; Hogan & Noga, 2015; Klassen et al., 2016; Chyz et al., 2017; Nesbitt et al., 2019; Choi et al., 2009; Watrin et al., 2019; Garcia-Blandon et al., 2020) is inconsistent regarding the association between the auditor's provision of tax services and the clients' tax avoidance, remaining an open empirical question.

In addition, most research on the topic has been carried out in countries where the risk of litigation for the auditor's work is high. Therefore, little is known about the auditor's role in tax avoidance for companies in environments where the risk of litigation is low, giving rise to the following question: in an institutional environment with low risk of litigation, is the joint use of tax and accounting audit services provided by the same firm associated with the level of clients' tax avoidance?

Taking as a reference the definition proposed by Hanlon and Heitzman (2010), who consider tax avoidance as the reductions (legal or illegal) of explicit taxes by companies, this research investigates this issue in Brazil. Studying the Brazilian case is opportune for a few reasons. First, Brazil is characterized as a country of low risk of litigation for the auditor (Wingate, 1997). Homero Jr. (2014) recalls that in Brazil, the sanctions imposed on auditors are not frequent and are usually low amounts of money. Only recently has a judicial condemnation of significant value been acknowledged, which is not definitive.

At the same time, the country is considered one of the jurisdictions with greater tax complexity in the world (Hoppe et al., 2019). The complex tax laws can create more uncertainty over time (OECD, 2017) and allow some taxpayers to find opportunities to avoid taxes (Krause, 2000; Budak & James, 2018). In this scenario, the tax consultancy provided by the audit firms will assume a relevant role in the list of consultancy services they provide.

In a context of alleged lack of resources to meet the diverse social demands, aggravated by the recent increase in the public deficit, as widely reported in the Brazilian press, it may be important to obtain more knowledge about the influence of the provision of tax services by auditing companies on corporate tax avoidance strategies due to their potential effect in reducing taxes collected by the government.

This article documents evidence that companies that use their auditors' tax services have lower effective tax rates and present a greater difference between the profit determined according to accounting rules and the profit determined through tax rules. This suggests there is a positive temporal statistical association between the use of tax services and the level of tax avoidance in Brazil.

These findings have implications for the ongoing debate because they provide new evidence on the topic in a low-risk litigation environment and can help governments and policymakers understand how tax services provided by auditors influence companies' tax avoidance strategies and their potential consequences for auditing and tax collection.

2 LITERATURE REVIEW AND HYPOTHESIS

Studies carried out in the United States have suggested that the use of auditors' tax services may be associated with the level of companies' tax avoidance. For example, Cook et al. (2008) documented that higher amounts paid for tax services are associated with greater reductions in the effective tax rate on companies' profit.

Likewise, McGuire et al. (2012) found that customers who hire tax services from their auditors report significantly lower effective tax rates on profit, lower effective tax rates paid in cash, and greater difference between taxable income and accounting profit compared to customers whose audit firm is not a tax expert.

Hogan & Noga (2015) examined the association between the auditors' tax services and the long-term behavior of corporate tax avoidance. The authors identified a statistically negative association between taxes paid in cash and the amounts paid for tax services.

Furthermore, Chyz et al. (2017) found that the involvement of auditors in their clients' tax planning and tax compliance services significantly contributes to reducing effective tax rates and increasing tax savings paid in cash, in addition to reducing tax risk.

In turn, Nesbitt et al. (2020) found evidence of a negative and decreasing association between the amounts paid for auditors' tax services and the effective tax rates incurred by their clients.

However, studies carried out in other countries have shown divergent results. Choi et al. (2009), examining the Korean market, identified that discretionary accruals and the difference between accounting and tax results were negatively associated, suggesting a negative association between the audit service and tax avoidance.

Watrin et al. (2019) found a negative association between the tax services provided by the auditor and the level of tax avoidance in Germany, suggesting that the auditor's tax advisory work may not result in aggressive tax strategies. On the other hand, Garcia-Blandon et al. (2020), investigating the same association, found no statistically significant evidence in Spain. Taken together, these results suggest that the effect of auditors' tax services on the clients' tax avoidance can be moderated by the specific institutional characteristics of each country.

For Kanagaretnam et al. (2016), the risk of litigation significantly affects the relationship between the auditor's work and the tax aggressiveness of companies. According to Donohoe & Knechel (2013), aggressive and legally questionable practices can increase the risk of errors in the tax estimates in the financial statements and expose auditors to possible litigation costs and reputational damage.

Kanagaretnam et al. (2016), also state that auditors are likely to impose a more rigorous reporting standard on aggressive tax planning activities if the risk of litigation is high. Thus, by ensuring that accounting and tax results are reported correctly in the financial statements, auditors indirectly influence companies' ability and incentives to avoid taxes, leading to a negative association between audit quality and companies' tax aggressiveness (Kanagaretnam et al., 2016).

However, this is not expected to occur in environments where there is less risk of litigation for the auditor. As documented by Kanagaretnam et al. (2016), there is evidence that the negative relationship between audit quality and tax aggressiveness decreases when there is less risk of litigation for the auditor.

Extending this reasoning, it is likely that in countries with a lower risk of litigation for the auditor, incentives will change in such a way that the joint provision of tax and audit services may be associated with more aggressive tax practices by clients.

Based on the Wingate Index, previous studies have classified Brazil as a low risk litigation country for auditing (eg. Wingate, 1997; Francis & Wang, 2008; Choi et al., 2008). According to Wingate (1997), the Wingate Index measures the risk for the auditor in a particular country and takes into account the experiences of legal disputes of various international audit firms, legal, regulatory, political and economic environments, and the professional accounting environment.

Since the lower risk of litigation can induce the auditor to be more parsimonious in assessing clients' aggressive tax practices, the following hypothesis was formulated for the Brazilian market:

H₁: there is a positive association between the tax services provided by the auditors and companies' tax avoidance.

3 METHODOLOGY

3.1 Empirical model and measurement of variables

To estimate the association between the use of tax services and tax avoidance, and test the research hypothesis, Equation 1 was used, based on McGuire et al. (2012):

$$TAXAVOID_{i,t} = \alpha_0 + \beta_1 CONSULT_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 LEVER_{i,t} + \beta_4 INVAT_{i,t} + \beta_5 ROA_{i,t} + \beta_6 VCASH_{i,t} + \beta_7 DEP_{i,t} + \beta_8 BIG4_{i,t} + \beta_9 BTM_{i,t} + \beta_{10-22} SECTOR_{i,t} + \beta_{23-29} YEAR_{i,t} + \varepsilon \quad (1)$$

The dependent variable TAXAVOID represents tax avoidance and was operationalized through three proxies. The first, the Effective Tax Rate (ETR) for the period, calculated by dividing the total tax expense (TTE) by the accounting profit before taxes (PBT). In Brazil, ETR considers the total tax expense, including corporate income tax and social contribution on income, as well as the income tax additional. This metric arises from permanent tax planning activities, in compliance with current accounting standards, and directly affects the accounting result for the period, but does not reflect tax deferral strategies, calculated using Equation 2.

$$ETR = TTE_{i,t} / PBT_{i,t} \quad (2)$$

Lower ETR values reflect a higher level of tax avoidance (MacGuire et al., 2012). Therefore, a negative association between ETR and the provision of tax services by auditors is expected.

The second proxy is ETR_Cash which represents the effective rate of taxes paid in the period, calculated by dividing the taxes paid by the accounting PBT, as described in Equation 3. Therefore, it can include the payment of taxes recognized as expenses in previous periods, but which are being settled in the current period.

$$ETR_cash = taxes\ paid_{i,t} / PBT_{i,t} \quad (3)$$

According to the literature, lower values of ETR_Cash suggest higher levels of tax avoidance (eg. McGuire et al., 2012). As for ETR, a negative association between ETR_Cash and the provision of tax services by auditors is expected.

Since the amount of taxes paid is not disclosed by publicly-held companies, this amount was calculated by adding the TTE /SCP shown in the liabilities of the previous period and the TTE /SCP expense for the current period, subtracting from this result the value of the TTE /SCP included as liabilities for the current period.

The third proxy is the book-tax-differences (BTD), which essentially represents the difference between the profit determined in accordance with accounting rules and the profit defined through tax rules. This proxy was calculated according to Fonseca and Costa (2017) and Marques et al. (2016), dividing the total difference between the accounting profit before income tax (PBT) and the taxable income (TI), by the lagged total asset - t-1 (TA), according to Equation 4:

$$BTD = (PBT_{i,t} - TI_{i,t}) / TA_{i,t} \quad (4)$$

In Brazil, publicly-held companies do not disclose information related to TI in published financial statements. Therefore, taxable profit was measured by the relationship between total income tax expenses (TTE) (according to Equation 5) and the country's maximum income tax rate of 34%, according to KPMG (2020).

$$TI = TTE_{i,t} / \% \text{ country max } TTE_{i,t} \quad (5)$$

According to McGuire et al. (2012), higher BTD values represent higher levels of tax avoidance. As a result, a positive association between BTD and tax services is expected.

CONSULT is the main variable in this study, representing the use of tax services provided by the same company that audits and will be operationalized by a dummy variable that assumes value 1 if the company has contracted a tax service and value 0 in other cases. In this regard, it is important to highlight that most international studies use the amount paid to auditors for services in the tax area (tax fees) because, generally, the objective is to assess whether tax avoidance varies depending on the amount invested. However, this study qualitatively assesses whether the tax service provided by the auditor is associated with the variation in companies' tax avoidance. This choice was because many companies in the sample informed that they hired their auditors to provide tax services but did not show the specific amount of remuneration paid for this service. Also, inconsistencies were identified in many cases where such values were disclosed (provided in the Reference Form, document submitted to the Brazilian Securities and Exchange Commission – CVM).

Based on previous studies, covariables were used to control several factors that can influence the level of companies' tax avoidance. No predictions were made since there is no consensus in the literature regarding the expected results. Chart 1 presents a summary of all variables in the econometric model.

Variable	Initials	Formula	Description	Source
Tax avoidance	ETR	$ETR = TTE_{i,t} / PBT_{i,t}$	effective tax rate for the period	Hogan and Noga, 2015
	ETR_Cash	$ETR_{cash} = taxes\ paid_{i,t} / PBT_{i,t}$	effective tax rate paid in cash	Rego, 2003; McGuire et al., 2012; Hogan and Noga, 2015
	BTD	$BTD = (PBT_{i,t} - TI_{i,t}) / TA_{i,t}$	book-tax-differences	Fonseca and Costa, 2017; Marques et al., 2016; Hogan and Noga, 2015
Tax services	CONSULT	Dummy variable	Assumes value 1 if the company hired tax services from its auditor and value 0 in other cases	-
Size	SIZE	$SIZE = \log TA$	Natural Log of Total Assets	McGuire et al., 2012; Rego, 2003; Klassen et al., 2016; Hogan and Noga, 2015
Leverage	LEVER	$LEVER = TL_{i,t} / TA_{i,t}$	Ratio between total liabilities and total assets	McGuire et al., 2012; Klassen et al., 2016; Hogan and Noga, 2015
Investment in Assets	INVAT	$INVAT = Net\ fixed\ assets_{i,t} / TA_{i,t-1}$	Property, plant and equipment adjusted for total assets	McGuire et al., 2012. Hogan and Noga, 2015
Return on Assets	ROA	$ROA = operating\ profit_{i,t} / TA_{i,t}$	Ratio between operating profit and total assets	Klassen et al., 2016 Hogan and Noga, 2015 McGuire et al., 2012
Availability	VCASH	$VCASH = Cash_{i,t} / TA_{i,t-1}$	Ratio between availability and total assets	McGuire et al., 2012
Depreciation expense	DEP	$DEP = (DEP_{i,t} + AMORT_{i,t}) / TA_{i,t-1}$	Depreciation expenses for the year	McGuire et al., 2012
Audit by BIG 4	BIG4	Dummy variable	Assumes value 1 if audited by one of the BIG 4 firms and value 0 in other cases	McGuire et al., 2012 Hogan and Noga, 2015
Book-to-market	BTM	$BTM = Book\ value_{i,t} / Market\ value_{i,t}$	Log of the ratio between the book value and the market value of the company	McGuire et al., 2012
Sector	SECTOR	Dummy variable	Fixed effect of the sector based on the classification of the Economatica System	-
Year	YEAR	Dummy variable	Fixed effect of the year	-

Chart 1. Description of the variables of the econometric model

Source: research data

3.2 Sample selection

The study population consisted of non-financial publicly-held companies listed on the São Paulo Stock Exchange (B3) between 2010 and 2017. The sample was selected from all company-year observations in this period. Data were available in the Economática® system database and the CVM.

The sample was adjusted for the exclusions of privately held companies considered by law as large companies, financial institutions, insurance companies, private pension funds, and public or private foundations considered to be of public interest. In addition, all companies for which data were not available for the entire period were excluded.

All observations with negative results before taxes or with current positive tax expenses were also removed, as well as the observations of companies with negative total assets, as they generally indicated errors in the data.

In addition, the data used as a basis for measuring tax services offered by audit firms between 2010 and 2017 were collected through the CVM website. The analysis begins in 2010 as it was the first year for which the Reference Form (RF) became mandatory for publicly-held companies registered and active with the CVM.

4 RESULTS

4.1 Descriptive statistics

Table 1 presents the descriptive statistics of all variables used in Equation 1. The values were calculated considering 648 observations for each variable in the eight-year interval, referring to the observations of 121 companies included in the estimated regression model defined in Equation 1.

Table 1. Descriptive statistics

	N	Aver.	Med.	SD	Kurtosis	Asym.	Min.	Max.	1st	2nd	3rd
BTD	648	0,035	0,022	0,046	5,633	1,818	-0,152	0,326	0,077	-0,039	0,009
ETR	648	0,237	0,252	0,242	138,793	7,848	-1,317	4,346	0,338	-0,470	0,151
ETR_Cash	648	0,241	0,242	0,285	117,017	7,443	-1,516	4,836	0,339	-0,470	0,142
CONSULT	648	0,412	0,000	0,493	-1,877	0,358	0,000	1,000	1,000	0,000	0,000
SIZE	648	6,606	6,641	0,630	0,006	-0,120	4,937	8,561	7,284	5,130	6,167
LEVER	648	0,287	0,306	0,155	-0,756	-0,050	0,000	0,775	0,451	0,000	0,144
INVAT	648	0,364	0,345	0,288	0,800	0,717	0,000	1,852	0,683	0,000	0,120
ROA	648	0,228	0,179	0,168	2,247	1,365	-0,023	1,111	0,411	-0,018	0,118
VCASH	648	0,105	0,077	0,119	26,221	3,820	0,000	1,361	0,189	0,000	0,025
DEP	648	0,033	0,032	0,024	8,978	1,721	0,000	0,230	0,053	0,000	0,016
BIG4	648	0,830	1,000	0,376	1,113	-1,763	0,000	1,000	1,000	0,000	1,000
BTM	648	-0,269	-0,247	0,359	-0,130	-0,196	-1,272	0,662	0,105	-1,196	-0,507

Source: research data

Notes: N = number of observations, Aver. = average, Med. = median, SD = standard deviation, Assym. = assymetry, min. = minimun, max. = maximun, 1st = first quartile, 2nd = second quartile, e 3rd = third quartile.

According to Table 1, the CONSULT average is 0.41, which indicates that approximately 41% of company-year observations were from companies that hired their auditors to provide tax services. In addition, the average of the variable BIG4 points out that approximately 83% of the observations were derived from companies that were audited by a Big Four company. The averages and medians of tax avoidance proxies are consistent with the results of previous research (e.g. McGuire et al., 2012; Nesbitt, 2020).

4.2 Multivariate analysis

The main analysis was performed using regressions for panel data with robust estimators. Leverage procedures and DFFITS estimates were used to identify influential observations and the analysis of residues to detect outliers, in addition to the 1% -99% and 5% -95% data winsorization procedure. However, since the results of the regression coefficients do not change in terms of significance and sign, it was decided to present them considering all the observations available in the final sample.

Table 2 presents the results of the pooled regressions (OLS) with fixed effect. The estimation with random effect was performed but not tabulated, as there was no qualitative change in the variable of interest. All models presented problems of heteroscedasticity and cross-sectional dependence. However, only in the BTM model was a serial autocorrelation problem detected. Therefore, robust estimates were made using the feasible generalized least squares estimator (models ETR and ETR_cash) and Driscoll-Kraay (model BTM).

Table 2. Result of regressions

Variables	Pooled			Fixed Effect			VIF
	ETR	ETR_cash	BTM	ETR	ETR_cash	BTM	
CONSULT	-0.0464** (0.0212)	-0.0509** (0.0248)	0.0120*** (0.00361)	-0.0245*** (0.00785)	-0.0272*** (0.00993)	0.0103*** (0.00185)	1.572
SIZE	-0.0150 (0.0168)	-0.0248 (0.0193)	0.00138 (0.00407)	0.0133 (0.00921)	0.0118 (0.0112)	-0.0255*** (0.00395)	2.204
LEVER	0.339*** (0.0992)	0.307*** (0.112)	-0.141*** (0.0189)	0.118*** (0.0362)	0.112** (0.0448)	-0.0941*** (0.0151)	2.187
INVAT	0.0650 (0.0443)	0.0720 (0.0503)	-0.0179** (0.00751)	0.0410** (0.0167)	0.0406** (0.0200)	-0.00355 (0.0112)	2.049
ROA	0.106* (0.0587)	0.0560 (0.0738)	-0.0149 (0.0150)	0.0498 (0.0325)	0.0614 (0.0421)	-0.0356 (0.0298)	3.108
VCASH	0.0724 (0.0558)	0.0759 (0.0919)	-0.0296*** (0.0111)	0.126*** (0.0260)	0.0730 (0.0464)	0.0320*** (0.0119)	1.288
DEP	-1.633** (0.791)	-1.944** (0.856)	0.186 (0.125)	-0.272 (0.249)	-0.256 (0.330)	0.570*** (0.154)	2.766
BIG4	-0.0390 (0.0304)	-0.0478 (0.0384)	0.0105** (0.00527)	-0.0441*** (0.0123)	-0.0439*** (0.0164)	0.00321 (0.00280)	1.712
BTM	-0.0155 -0.0464**	-0.0146 (0.0399)	-0.0318*** (0.00641)	-0.00384 (0.0126)	0.00378 (0.0166)	-0.0234*** (0.00512)	2.434
CONSTANT	0.237** (0.120)	0.279* (0.144)	0.0785*** (0.0260)	0.0729 (0.0642)	0.0591 (0.0789)	0.213*** (0.0321)	-
Observations	648	648	648	648	648	648	
Number of groups	-	-	-	83	83	83	
F	5.63 (0.00)	4.67 (0.00)	9.74 (0.00)	-	-	93.64 (0.00)	
Wald chi2	-	-	-	647.16 (0.00)	387.73 (0.00)	-	
R ²	0.104	0.278	0.40	0.28	0.27	0.68	
Durbin-Watson	1.62	1.67	0.78	2.00	1.97	1.37	
Fixed sector-year effect	Yes	Yes	Yes	Yes	Yes	Yes	
Pesaran test for cross-section dependence				11.64 (0.00)	18.23 (0.00)	2.305 (0.02)	

Source: research data

Notes: i) *, **, *** indicate statistical significance at 10%, 5%, and 1%, respectively; ii) standard error in parentheses; iii) the description of all variables can be found in Chart 1.

As shown in Table 2, the Variance Inflation Factors (VIF) values are all less than 10, showing the absence of a multicollinearity problem in the estimates.

The value of the CONSULT variable coefficient is significant in all models, negative in the ETR and ETR_Cash models and positive in BTD, as expected. These results are compatible with the literature and suggest that companies that use tax services from their auditors have a higher tax avoidance level than those that do not, probably due to the spillover of knowledge created with the joint provision of services. Therefore, no evidence was found to lead to the rejection of the hypothesis formulated in this work.

CONSULT's negative and statistically significant associations with ETR and ETR_Cash suggest that the joint provision of services makes tax planning more efficient in promoting a reduction in the effective tax rate and savings in the payment of taxes in cash. The results also show that companies tend to adopt strategies that directly affect net income without incurring the postponement of the payment of taxes until a later period. This finding is congruent with those of other studies (Cook et al., 2008; Hogan & Noga, 2015; Chyz et al., 2017; Nesbitt et al., 2019).

In addition, in general, the control variables show results consistent with previous studies. Thus, the main results of this research are compatible with those registered in studies carried out in the USA, even though both countries have quite different institutional environments.

Considering that the risk of litigation and investor protection are greater in the USA, it is curious that the sign of the association between the tax service provided by the auditor and tax avoidance is the same in Brazil. An alternative explanation for the similarity in the results may be the fact that the Big Four audits (around 80% of firm-year observations) are predominant in the samples analyzed in the reviewed studies. There is a significant association between the tax avoidance activities of large companies and the Big Four companies (Jones & Cobham, 2018), and there is evidence that in the USA, companies audited by a Big Four tend to have higher levels of tax avoidance compared to those audited by a non-Big Four (McGuire et al., 2012).

Another explanation may be the tax complexity. Despite having a lower level of complexity than Brazil, the USA has a complex tax system (Lassila & Smith, 1997). In the American environment, large companies deal with greater tax complexity (Slemrod & Blumenthal, 1996), and evidence shows that they are prone to tax avoidance practices (Nesbitt et al., 2020).

4.3 Additional analysis

Robust quantile regressions of the median were run for the ETR, ETR_cash, and BTD models to check the sensitivity of the results for a semi-parametric econometric procedure robust to the presence of outliers, errors that are not normally distributed, and heteroscedasticity in the data.

Kanagaretnam et al. (2016) suggest that the Big Four audit is significantly associated with the companies' tax avoidance but do not distinguish whether this is due to the joint provision of audit and tax services or other factors. We implemented another test to assess whether, among the companies audited by a Big Four, the tax consultancy has an effect. Table 3 shows the results of the new regressions using the same parameters as the models previously, but only for the variables of interest.

Table 3. Results of additional tests

Part 1 - quantile regression			
	ETR	ETR_CASH	BTD
CONSULT	-0.0206** (0.0082)	-0.0170** (0.0084)	0.0054*** (0.0005)
Part 2 - sample result only with companies audited by Big Four			
	ETR	ETR_CASH	BTD
CONSULT	-0.0239*** (0.0088)	-0.0272*** (0.0105)	0.01059*** (0.0014)

Source: research data

Notes: i) *** indicates statistical significance at 1%; ii) standard error in parentheses; iii) the description of all variables can be found in Chart 1.

Part 1 of Table 3 shows that the CONSULT coefficient remains significant in all regressions, even using a non-parametric estimate. In addition, part 2 shows that in the companies audited by a Big Four, the CONSULT variable remains significant in all models and with the expected sign, positive or negative, suggesting that tax services have a marginal effect on the tax avoidance activities of these companies.

5 CONCLUSION

Companies that jointly contract tax and audit services from the same audit firm present a lower effective tax rate and a greater difference between the profit determined in accordance with accounting rules and tax rules, suggesting the existence of a statistically positive association with the levels of tax avoidance.

Since most of the literature on the topic reflects the reality of the American market, these results gain greater significance because they help to understand this association in an institutional environment with a highly complex tax system and where the auditor has less risk of litigation and investors are not as protected compared to economically more developed countries.

Therefore, the findings of this research are helpful to government and regulators, offering observational evidence of the influence of audit firms in reducing companies' tax burden. They contribute to the debate about auditors providing auditing and non-auditing services concomitantly to the same client, which may lead to loss of auditors' objectivity and independence. This work also contributes by provoking reflections on this issue and may result in legislation improvement.

It is important to note that the research results have some limitations. It is noteworthy that the study used a qualitative variable as a proxy to operationalize the tax services instead of the amount paid. Consequently, it is not possible to infer the influence of the intensity of investments in tax services in the companies' tax avoidance activities.

Finally, new studies could separate tax services and extend the analysis on the knowledge spillover. Another suggestion is to assess whether the rotation of auditors has implications for the association that was studied.

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ADDITIONAL MATERIALS

Table 4. Quantile regressions for all observations

Variables	ETR	ETR_Cash	BTD
CONSULT	-0.0206** (0.00818)	-0.0169** (0.00842)	0.00544*** (0.00204)
SIZE	0.00392 (0.00872)	0.00197 (0.00946)	-0.000459 (0.00211)
LEVER	0.133*** (0.0345)	0.114*** (0.0363)	-0.0946*** (0.00916)
INVAT	0.0695*** (0.0126)	0.0594*** (0.0142)	-0.00629** (0.00261)
ROA	0.125*** (0.0247)	0.115*** (0.0285)	-0.0295*** (0.0105)
VCASH	0.128*** (0.0341)	0.0729* (0.0426)	-0.0293*** (0.0104)
DEP	-0.416*** (0.158)	-0.190 (0.235)	-0.0397 (0.0343)
BTM	-0.0361*** (0.0114)	-0.0353*** (0.0118)	-0.0149*** (0.00380)
CONSTANT	-0.00182 (0.0134)	0.00383 (0.0153)	0.0539*** (0.0129)
Observations	648	648	648
Pseudo R2	0.1597	0.1406	0.0772

Table 5. Fixed effect regressions for companies audited by the Big Four

Variables	ETR	ETR_Cash	BTD
CONSULT	-0.0239*** (0.0088)	-0.0272*** (0.0106)	0.0106*** (0.0014)
SIZE	0.0375*** (0.0101)	0.0390*** (0.0123)	-0.0240*** (0.00655)
LEVER	0.0849** (0.0415)	0.0489 (0.0502)	-0.101*** (0.0169)
INVAT	0.0556*** (0.0191)	0.0489** (0.0238)	-0.00114 (0.00885)
ROA	-0.0170 (0.0373)	0.0101 (0.0490)	-0.0409 (0.0347)
VCASH	0.0867* (0.0492)	0.0611 (0.0610)	0.0295*** (0.00950)
DEP	-0.144 (0.288)	0.0260 (0.374)	0.611*** (0.134)
BTM	-0.0147 (0.0150)	-0.0107 (0.0196)	-0.0239*** (0.00712)
CONSTANT	-0.175** (0.0720)	-0.212** (0.0886)	0 0
Within R-squared	-	-	0.1525
Wald chi2(28)	490.27	330.56	-
Observations	538	538	538
Number of groups	75	75	75

Table 6. Correlation

	BTD	ETR	ETR_Cash	CONSULT	SIZE	LEVER	INVAT	ROA	VCASH	DEP	BIG4	BTM
BTD	1											
ETR	-0.51**	1										
ETR_Cash	-0.46**	0.90**	1									
CONSULT	-0.00	-0.03	-0.04	1								
SIZE	-0.03	-0.02	-0.04	0.39**	1							
LEVER	-0.40**	0.17**	0.14**	0.32**	0.42**	1						
INVAT	-0.15**	0.05	0.03	0.26**	0.11**	0.26**	1					
ROA	0.15**	0.01	-0.03	0.02	-0.17**	-0.31**	0.08*	1				
VCASH	-0.11**	0.05	0.06	0.03	-0.10*	-0.01	-0.03	-0.03	1			
DEP	-0.11**	-0.01	-0.04	0.08*	0.21**	0.19**	0.59**	0.21**	0.03	1		
BIG4	0.15**	-0.04	-0.06	0.35**	0.44**	0.23**	0.01	0.06	-0.13**	0.01	1	
BTM	-0.13**	-0.05	-0.01	-0.20**	-0.19**	-0.12**	-0.11**	-0.56**	-0.09*	-0.20**	-0.39**	1

Notes:** Correlation is significant at the 0,01 level (2-tailed), * Correlation is significant at the 0,05 level (2-tailed).