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National culture and tax avoidance: a quantile regression analysis

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Abstract

Purpose – This paper aims to study the effect of Hofstede's cultural dimensions (power distance, individualism, masculinity, uncertainty avoidance and long-term orientation) on corporate tax avoidance as proxied by the effective tax rate.

Design/methodology/approach – A sample of 944 observations during 2016 was analyzed at three different quantiles (Q 0.25, Q 0.50 and Q 0.75) based on a quantile regression approach.

Findings – Using Hofstede's (2001) cultural dimensions (power distance, individualism, masculinity, uncertainty avoidance and long-term orientation), the authors find that individualism and masculinity are negatively associated with effective tax rates, and this negative relationship is more pronounced under low tax aggressiveness regime (third quantile). By contrast, long-term orientation is positively associated with the effective tax rate, and this relationship is more prevailing under aggressive tax regime (first quantile). These findings remain stable when using cash effective tax rate as an alternative measure for tax avoidance.

Originality/value – This study adds to the extant literature a further understanding of the impact of cultural dimensions on tax avoidance. The use of quantile regression approach shows how the effect of masculinity, individualism and long-term orientation on tax avoidance varies under different tax management regimes.

Keywords National culture, Tax avoidance, Quantile regression

Paper type Research paper

1. Introduction

Taxation is an important fiscal revenue for governments and an important cost for companies. Tax planning can reduce the companies' tax burden as well as the government fiscal revenue. This makes tax planning and tax avoidance as an important issue for both companies and governments. Since 2010, tax avoidance has become gaining momentum in accounting research (Huseynov Sardarli, & Zhang, 2017) since policymakers have already taken notice of the issue regarding the media reports about several global firms' tax avoidance practices (Kanagaretnam, Lee, Lim, & Lobo, 2018).

Accounting and economic scholars have taken this matter seriously and proposed several factors believed to affect tax avoidance practices worldwide (Graham & Tucker, 2006; Scholes *et al.*, 2015; Gallemore & Labro, 2015; Bozanic, Hoope, Thornock, & Williams, 2017). In their literature review, Kovermann and Velte (2019) identify diverse types of variables that

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may affect tax avoidance. They include board composition, ownership structure, capital market monitoring, external auditor characteristics, enforcement and government relation.

With regard to national culture, several studies have examined its effect on tax evasion at country level (e.g. Tsakumis, Curatola, & Porcano, 2007; Richardson, 2008) or company level (e.g. Yoo & Lee, 2019). These studies used classic ordinary least square (OLS) regression that supposes uniform linkage patterns between cultural dimensions and tax avoidance, while recent empirical inquiries dealing with the determinants of tax avoidance (e.g. Donkor, Djajadikerta, Mat Roni, & Trireksani, 2022; Jiang, Zheng, & Wang, 2020; Huang & Zhang, 2020) recommend the use of quantile regression that allows the identification different tax regimes. OLS regression is criticized since inferences are based on conditional means, which suggest that an effect remains unchanged at different distributions of the response variable (Gallemore & Labro, 2015). Quantile regression estimates conditional quantiles of a response variable mainly in a linear model and describes the association between independent variables and response variables at any given response variable distribution (Armstrong, Blouin, Jagolinzer, & Larcker, 2015; Donkor *et al.*, 2022).

To fill this gap, the objective of this study is to examine the effect of national culture dimensions (power distance, individualism, masculinity, uncertainty avoidance and long-term orientation) on corporate tax avoidance using quantile regression [1].

Using a cross-country dataset of 944 firms during 2016 from 36 countries, we document that individualism and masculinity are negatively related to effective tax rates, and this negative relationship is more prevailing under low tax aggressiveness regime (third quantile). Nevertheless, long-term orientation is positively related to the effective tax rate, and this association is more prevailing under aggressive tax regime (first quantile). These results are stable when using cash effective tax rate as an alternative proxy for tax avoidance.

This study adds to previous literature dealing with national culture and tax management (e.g. Tsakumis *et al.*, 2007; Richardson, 2008) by considering different tax management behaviors at company level. Policymakers in each country may consider national cultural of their countries when enacting regulations aiming at reducing tax aggressiveness behaviors. Furthermore, policymakers operating in settings characterized by high levels of masculinity and individualism may design regulations restricting the adverse effect of these cultural features on tax compliance. Finally, the use of quantile regression in this study demonstrates how the effect national culture on tax avoidance may vary across different tax aggressiveness regimes.

The rest of this study is structured as follows: Section 2 develops research hypotheses. Section 3 describes the sample selection process and the research design. Section 4 presents and discusses the empirical findings and additional tests. Finally, section 5 concludes.

2. Hypothesis development

Hofstede defines culture as "the collective programming of the mind that distinguishes the members of one category of people from those of another" (Hofstede, 1980, p. 6). He distinguishes between five cultural dimensions, namely, power distance, individualism, masculinity, uncertainty avoidance and long-term orientation. In this section, we develop the hypotheses linking national culture to tax avoidance.

2.1 Power distance

High power distance societies are characterized by an implied consensus where there is an order of inequality in which everyone has his/her place. In such societies, the least powerful members give the most powerful members a privilege and accept that they enhance their wealth. This implies the existence of the large income and wealth differential between

members (Tsakumis *et al.*, 2007). Based on that, companies' managers in such countries are less tolerant of tax payment. Tax systems in high power distance countries are likely to be unequal and inequitable and tend to protect those in power, which enforce the gap of the income differentials (Hofstede, 1980). Under these conditions, people and firms perceive tax system as unfair and then they tend to avoid or evade taxes (Yoo & Lee, 2019). Tsakumis *et al.* (2007) and Richardson (2008) support a positive association between power distance and tax evasion.

Toumi, Khlif and Khelil (2022) suggest that in high power distance countries, managers have the major corporate decision-making authority, and they are more likely to undertake risky actions (e.g. tax avoidance). Accordingly, we expect that firms in high power distance countries tend to avoid more taxes. By contrast, in low power distance countries, people are considered equal and have the same importance and opportunities, and then income and wealth differential between members is reduced. Based on this discussion, our first hypothesis is

H1. Power distance is positively (negatively) associated with tax avoidance (effective tax rate).

2.2 Individualism

In countries characterized by high level of individualism, the firm's management may be less concerned with the broader effect of business on society and focus more in maximizing their own utility and investors' needs through increasing compensations or dividend payout ratio (Ringov & Zollo, 2007). Vitell, Nwachukwu, and Barnes (1993) suggest that people operating in high "individualist" societies will be more concerned with their own self-interest and tend to be less influenced by group norms (Khlif, Hussainey, & Achek, 2015). Frijns, Hubers, Donghoon Kim, Roh, and Xu (2022) document that individualism is positively associated with corporate risk-taking activities, while Aren and Nayman Hamamci (2021) provide evidence that individualism is positively associated with risky investments. Since tax avoidance represents a risky activity (Kovermann, 2018), the firm's management operating under high level of individualism will undertake aggressive tax management to generate additional cash flows that will be used to increase to increase management's compensations or dividends distributed to investors. Based on this discussion, our second hypothesis is

H2. Individualism is positively (negatively) associated with tax avoidance (effective tax rate).

2.3 Masculinity

Vitell *et al.* (1993, p. 758) suggest that: "[. . .] societies that are characterized as masculine encourage individuals, especially males, to be ambitious, competitive and to strive for material success. These factors may contribute significantly to one's engagement in unethical behavior". Jia, Lent and Zeng (2014) state that masculinity is generally characterized by a complex of masculine behaviors, including aggression and egocentrism. In countries characterized by high level of masculinity, the firm's management attributes are less concerned with cooperation and solidarity and managers focus on material success (Ringov & Zollo, 2007). In this regard, Tice and Baumeister (2004) provide evidence that masculinity restrains helping behaviors. More recently, Aren and Nayman Hamamci (2021) and Toumi *et al.* (2022) suggest that masculine societies have preference for aggressive and risky behavior. Accordingly, it is expected masculinity will be associated with high level of tax avoidance. Based on this discussion, our third hypothesis is

H3. Masculinity is positively (negatively) associated with tax avoidance (effective tax rate).

2.4 Uncertainty avoidance

Hofstede (1980) views that high uncertainty avoidance cultures are less tolerant of uncertain and ambiguous situations, which can lead to a higher level of anxiety. Therefore, high uncertainty avoidance societies are rule-oriented societies where many laws and regulations are written to reduce the amount of uncertainty, ambiguity and anxiety (Hofstede, 1980, p. 184). Hofstede (2001) adds that members of these societies feel that the legal system is against them and they are not opposed to break the *"unjust"* laws (Hofstede, 2001, p. 174). Richardson (2008) and Tsakumis *et al.* (2007) document that uncertainty avoidance is positively related to tax evasion. Based on these predictions, a positive association between uncertainty avoidance and tax avoidance is expected.

By contrast, managers operating within countries characterized by strong uncertainty avoidance will adopt a conservative behavior (Toumi *et al.*, 2022), and they are less likely to engage in riskier behaviors (Aren & Nayman Hamamci, 2021). Accordingly, they will reduce aggressive tax behavior to reduce the risk of unexpected challenges by tax authorities (Yoo & Lee, 2019). In the same vein, managers of companies in countries with low levels of uncertainty avoidance will undertake aggressive tax management as they are comfortable with ambiguity in the future (Yoo & Lee, 2019). Therefore, a negative association is expected between uncertainty avoidance and tax avoidance.

Based on these conflicting views, the following nondirectional hypothesis is tested:

H4. Uncertainty avoidance is associated with tax avoidance.

2.5 Long-term orientation

Under long-term orientation, companies want to preserve their good performance and reputation (Khlif *et al.*, 2015). This implies that in settings characterized by high long-term orientation, managers need to establish good relationships with diverse types of stakeholders (e.g. state, customers and employees) (Toumi *et al.*, 2022). Khlif *et al.* (2015, p. 301) suggest that "firms operating in high long-term orientation countries need to be in line with social and environmental norms to preserve their reputation among stakeholders and build long-term and strategic competitive advantages." Since tax avoidance may represent a risky activity that can impose costs on both firms and managers (Kovermann, 2018), these costs include additional tax payments, interest and penalties as well as reputational damage (Kovermann, 2018). Li, Shevlin and Zhang (2022, p. 7) suggest that "managers take into account the impact of tax avoidance on their career outcomes when making tax avoidance decisions". Accordingly, it is expected that aggressive tax management behavior will be less prevailing in countries characterized by high long-term orientation as the firm's management wants to preserve reputation among stakeholders and build long-term and strategic relationship with them.

Based on the above discussion, the following hypothesis is tested:

H5. The long-term orientation is negatively (positively) associated with tax avoidance (effective tax rate).

3. Research method

3.1 Data

Two main criteria have guided the choice of countries and companies in this study. The first requires that the five national cultural dimensions are reported for the country of interest in the following website (https://www.hofstede-insights.com/product/compare-countries/). Second, the annual reports of the companies are available for 2016. Based on these two criteria, our final sample includes 944 firms from 36 counties for the year 2016. The data of

this study are hand-collected, and the starting point for data collection was the beginning of 2019. During this period, the annual reports for 2018 and 2017 were not all available for the identified firms. Therefore, we consider only 2016 as almost all annual reports for the chosen firms were available.

3.2 Quantile regression

Quantile regression models allow us to test the existence of nonuniform linkage patterns between the different cultural dimensions and audit tax avoidance describing a division of observations into certain defined intervals based on the values of the data. Analogous to the conditional mean function of linear regressions, this paper aims to capture the relationship between the independent variables and outcome using the conditional median function, where the median is the 50th percentile, or quantile q, of the empirical distribution. From a mathematical perception, a quantile q describes a division of observations into certain defined intervals based on the values of the data.

Armstrong *et al.* (2015, p. 8) add that *"Quantile regression allows us to draw more complete inferences beyond those that can be drawn from traditional ordinary least squares (OLS) regressions, which only describe the relation between independent variables and the conditional mean of the dependent variable of interest. Quantile regression is more general and describes the relation between the independent variables and any specified percentile of the conditional distribution of the dependent variable."* Previous studies (e.g. Armstrong *et al.*, 2015; Chen, Chen, Liu, & Wang, 2021) dealing with the determinants of tax avoidance have used quantile regression in their econometric analysis.

Based on the previous discussion of the research hypotheses, we propose to test the following quantile regression model:

$$\begin{aligned} Q_i(ETR_i|x_i) = {} & \alpha_0 + \alpha_{\theta pdi} PDI_i + \alpha_{\theta ind} IND_i + \alpha_{\theta mas} MAS_i + \alpha_{\theta uai} UAI_i + \alpha_{\theta lto} LTO_i \\ & + \alpha_{\theta size} SIZE_i + \alpha_{\theta roa} ROA_i + \alpha_{\theta ppe} PPE_i + \alpha_{\theta ia} IA_i + \alpha_{\theta ei} EI_i + \alpha_{\theta wc} WC_i \\ & + \alpha_{\theta cf} CF_i + \varepsilon_{\theta i} \end{aligned} \tag{1}$$

where

ETR_i is the effective tax rate of the firm i, PDI_i is the degree of power distance of the country in which firm i operates, IND_i is the degree of individualism of the country in which firm i operates, MAS_i is degree of masculinity of the country in which firm i operates, UAI_i is the degree of uncertainty avoidance of the country in which firm i operates, LTO_i is the degree of long term orientation of the country in which firm i operates, $SIZE_i$ is the natural logarithm of the total assets of a firm i, ROA_i is the profitability measured by the return on assets of a firm i, PPE_i is the property, plant and equipment divided by total assets of a firm i, IA_i is the intangible assets divided by total assets of a firm i, EI_i is the equity income divided by total assets of a firm i, WC_i is the working capital measured by current assets divided by current liabilities and CF_i is the operating cash flows divided by total assets of a firm i.

The slopes of the independent variables are estimated at three different quantiles: the 25th (Q1), 50th (Q2) and 75th (Q3) quantiles. Quantile regression approach allows us to test the impact of national cultural dimensions under different tax aggressiveness levels (e.g. Q1: aggressive tax regime; Q2: medium aggressive taxation regime and Q3: nonaggressive taxation regime).

3.3 Tax avoidance measures

Following the previous literature, we use the effective tax rate to measure corporate tax avoidance (Dyreng & Hanlon, 2010; Hope, Ma, and Thomas, 2013; Hasan, Hoi, Wu, &

Zhang, 2014; Yoo & Lee, 2019). ETR is the ratio of total tax expense to pretax income for a firm in a given year. To conduct additional tests using alternative measure of tax avoidance, we use cash ETR, which is measured as the cash paid taxes to the pretax income of a firm in a given year (see Table 1).

3.4 National culture measures

Five national cultural dimensions are used in our study including power distance (PDI), individualism (IND), masculinity, (MAS), uncertainty avoidance (UAI) and long-term orientation (LTO). Hofstede Insights (https://www.hofstede-insights.com) periodically updates Hofstede's cultural dimension scores. We use the most recent scores of Hofstede's cultural dimensions reported by Hofstede in 2010. Table 2 discusses in more details the scores of the dimensions for the 36 countries used in this study (see Table 3).

No.	County	PDI	IND	MAS	UAI	LTO
1	Argentina	49	46	56	86	20,403
2	Australia	38	90	61	51	21,159
3	Belgium	65	75	54	94	81,864
4	Brazil	69	38	49	76	43,829
5	Canada	39	80	52	48	36,020
6	Chile	63	23	28	86	30,982
7	China	80	20	66	30	87,406
8	Denmark	18	74	16	23	34,761
9	France	68	71	43	86	63,476
10	Germany	35	67	66	65	82,872
11	Hungary	46	80	88	82	58,186
12	India	77	48	56	40	50,882
13	Indonesia	78	14	46	48	61,965
14	Iran	58	41	43	59	13,602
15	Ireland	28	70	68	35	24,433
16	Italy	50	76	70	75	61,461
17	Japan	54	46	95	92	87,909
18	Luxembourg	40	60	50	70	63,980
19	Malaysia	104	26	50	36	40,806
20	Mexico	81	30	69	82	24,181
21	Morocco	70	46	53	68	14,106
22	The Netherlands	38	80	14	53	67,003
23	New Zealand	22	79	58	49	32,746
24	Norway	31	69	8	50	34,509
25	Philippine	94	32	64	44	27,456
26	Portugal	63	27	31	104	28,212
27	Russia	93	39	36	95	81,360
28	Singapore	74	20	48	8	71,537
29	South Africa	49	65	63	49	34,000
30	Spain	57	51	42	86	47,607
31	Switzerland	34	68	70	58	73,552
32	Taiwan	58	17	45	69	92,947
33	Thailand	64	20	34	64	31,738
34	Turkey	66	37	45	85	45,592
35	UK	35	89	66	35	51,134
36	USA	40	91	62	46	25,693
	Average	56.33	52.91	51.80	61.86	48.59
	Minimum	18 (Denmark)	14 (Indonesia)	8 (Norway)	8 (Singapore)	13.602 (Iran)
	Maximum	104 (Malaysia)	91 (USA)	95 (Japan)	104 (Portugal)	92.947 (Taiwan)

Table 1.
Hofstede's cultural dimensions' scores

Table 2.
Sample breakdown by country

Country	Number of companies	Percentage of the total sample	Country	Number of companies	Percentage of the total sample	Country	Number of companies	Percentage of the total sample
Argentina	3	0.31	Iran	2	0.20	Russia	8	0.82%
Australia	55	5.66	Ireland	14	1.44	Singapore	8	0.82%
Belgium	8	0.82	Italy	47	4.84	South Africa	6	0.62%
Brazil	8	0.82	Japan	18	1.85	Spain	15	1.54%
Canada	53	5.46	Luxembourg	6	0.62	Switzerland	10	1.03%
Chili	4	0.41	Malaysia	26	2.68	Taiwan	4	0.41%
China	38	3.91	Mexico	24	2.47	Thailand	32	3.29%
Denmark	7	0.72	Morocco	3	0.31	Turkey	5	0.51%
France	37	3.81	The Netherlands	9	0.93	UK	74	7.62%
Germany	24	2.47	New Zealand	12	1.23	USA	302	31.10%
Hungary	6	0.62	Norway	12	1.23			
India	47	4.84	Philippine	17	1.75			
Indonesia	22	2.26	Portugal	5	0.51			

Variable	Source	Definition
ETR	Firm's annual report	ETR is the ratio of total tax expanse to pre-tax income for a firm in a given year
Cash ETR	Firm's annual report	Cash ETR is the ratio of cash paid taxes to the pre-tax income of a firm in a given year
PDI	Hofstede Insights	The degree of power distance of a country
IDV	Hofstede Insights	The degree of individualism of a country
MAS	Hofstede Insights	The degree of masculinity of a country
UAI	Hofstede Insights	The degree of uncertainty avoidance of a country
LTO	Hofstede Insights	The degree of long-term orientation of a country
SIZE	Firm's annual report	Natural logarithm of total assets
ROA	Firm's annual report	Operating income divided by total assets
LEV	Firm's annual report	Total debt divided by total assets
PPE	Firm's annual report	The value the property, plant and equipment scaled by total assets
IA	Firm's annual report	The value of intangible assets scaled by total assets
EI	Firm's annual report	The value of equity income scaled by total assets
WC	Firm's annual report	The value current assets divided by the value current liabilities
CF	Firm's annual report	Operating cash flows scaled by total assets

Table 3.
Data sources and definitions

3.5 Control variable

Previous literature has used extensive ranges of variables to control for known determinants of tax avoidance. First, firm size (*Size*) is commonly included as a control for tax avoidance since large firms can use their resources and power to influence fiscal legislation in their favor (Gupta & Newberry, 1997). However, Zimmerman (1983) suggests that larger firms are subject to greater scrutiny in the media, and this may limit the benefits available for corporate tax avoidance. Thus, we expect that corporate size is associated with tax avoidance. Second, profitable firms have incentives to engage in aggressive tax practices to minimize tax payments (Gupta & Newberry, 1997). Third, Richardson *et al.* (2015) find a positive association between leverage and tax avoidance since interests payments represent tax deductible expenses. Thus, we control for leverage ratio, and we expect a negative association between this ratio and effective tax rate. Following Higgins, Omer, and Phillips (2015) and Huang, Sun, and Zhang (2017), we also control for a firm's tax-related characteristics, such as foreign income, property, plant and equipment (*PPE*), intangible assets (*IA*) and equity income in earnings (*Equity Income*), each of which is scaled by lagged total assets. We include two other measures, *Working Capital (WK)* and *Cash Flow (CF)*. Finally, we control for WK and CF since firms with less liquid asset structure and lower cash flows may be inclined to aggressively reduce tax payments to achieve higher financial flexibility (Edwards *et al.*, 2016; Graham, Hanlon, Shevlin, & Shroff, 2014).

4. Results

4.1 Descriptive statistics and correlation matrix

Table 4 present the descriptive statistics for all variables included in the model. The mean value of effective tax rate accounts for 0.258 and ranges from 0.001 to 0.373. The cash effective tax rate has an average of 0.231 and varies from 0.001 to 0.386. For the cultural

Variable	*N*	Mean	Std. Dev	Minimum	Maximum
ETR	944	0.258	0.137	0.001	0.373
Cash ETR	944	0.231	0.165	0.001	0.386
PDI	944	51.100	19.260	18	104
IDV	944	68.757	26.049	14	91
MAS	944	58.048	13.250	8	95
UAI	944	52.727	17.819	8	104
LTO	944	42.467	20.552	13.602	92.947
SIZE	944	5.966	1.790	2.249	12.946
ROA	944	1.498	15.901	0.050	45.018
LEV	944	0.221	0.211	0.001	2.796
PPE	944	0.304	0.250	−0.259	0.976
IA	944	0.202	0.225	0.003	0.92
EI	944	0.479	0.218	−0.283	1.182
WC	944	0.165	0.221	−1.336	0.98
CF	944	1.880	2.230	0.066	4.190

Note(s): ETR**:** effective tax rate, Cash ETR: cash effective tax rate, PDI: power distance index, IDV: individualism index, MAS: masculinity index, UAI: uncertainty avoidance index, LTO: long-term orientation index, SIZE: log (total assets), ROA: return on assets, Lev: leverage ratio, PPE: property, plant and equipment, IA: intangible assets, EI: equity income scaled by total assets, WC: working capital scaled by the value current liabilities and CF: operating cash flows divided by total assets

Table 4.
Descriptive statistics

dimensions, power distance (PDI) has an average of 51.100. Individualism presents a relatively high average score for the sample 68.750. The mean value of masculinity accounts for 58.040. The mean value of uncertainty avoidance is 52.720. Finally, the mean value of long-term orientation variable is 42.460.

Table 5 shows the results of matrix correlations between continuous variable in our model. The effective tax rate is negatively associated with individualism and masculinity, while it is positively associated with long-term orientation. However, there is no significant association between effective tax rate and the remaining two cultural dimensions, namely power distance and uncertainty avoidance. These findings provide preliminary support for H2, 3 and 5. It should be noted here that cash effective tax rate is highly correlated with effective tax rate with a Pearson coefficient accounting for 0.832, and similar results are found for the univariate relationship between this alternative measure of tax avoidance and individualism, masculinity and long-term orientation.

4.2 Hypothesis testing

Table 6 presents our main results regarding the relation between national culture dimensions and tax avoidance. The quantile regression allows us to test the existence of nonuniform linkage patterns between the national culture dimensions and tax avoidance. The quantile regression provides a division of the observations into three defined intervals based on the values of the data. The first quantile (Q 0.25) includes the lowest values of the ETR, and it represents the sub-sample characterized by high level of tax aggressiveness. The second quantile (Q 0.50) represent the median values of ETR of the sample. The third and highest quantile (Q 0.75) includes the highest values of ETR in the sample and represents the sub-sample characterized by low level of aggressive tax management or acceptable level of tax compliance.

Findings show that individualism is negatively and significantly associated with effective tax rate, and this negative relationship becomes stronger and more significant under low tax aggressiveness regime. For instance, the coefficients (*t*-statistics) account for −0.001 (−2.070) and −0.002 (−2.530) for the first and second quantiles, while the coefficient (*t*-statistic)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
ETR(1)	1														
Cash	0.832***	1													
ETR(2)															
PDI(3)	−0.026	0.059	1												
IDV(4)	−0.310***	−0.269***	−0.827***	1											
MAS(5)	−0.364***	−0.288***	−0.152*	0.261**	1										
UAI(6)	−0.017	0.023	0.168*	−0.179*	−0.065	1									
LTO(7)	0.297**	0.245**	0.335***	−0.443***	0.087	0.229**	1								
Size(8)	−0.035	0.019	0.508***	−0.559	−0.185*	0.108*	0.045	1							
ROA(9)	0.069	0.107*	0.048	−0.067	−0.023	−0.013	0.022	0.048	1						
LEV(10)	0.003	−0.052	−0.061	0.115*	−0.048	0.006	−0.087	−0.085	−0.003	1					
PPE(11)	−0.016	−0.034	−0.072	0.105*	−0.017	−0.039	−0.251**	−0.004	0.002	−0.045	1				
IA(12)	−0.004	0.009	−0.346***	0.372***	0.058	−0.041	−0.129	−0.265**	−0.036	0.155*	−0.169*	1			
EI(13)	−0.105*	0.003	0.102*	−0.141*	−0.016	−0.087	0.031	0.179*	0.026	−0.486***	0.200**	−0.092	1		
WC(14)	0.018	0.059	0.064	−0.028	0.056	−0.120*	−0.027	0.121	−0.008	−0.312***	−0.047	−0.244**	0.475	1	
CF(15)	−0.066	0.037	0.118*	−0.176*	−0.076	−0.022	0.077	0.305***	−0.005	−0.018	−0.007	0.074	0.009	0.010	1

Note(s): ETR: effective tax rate, Cash ETR: cash effective tax rate, PDI: power distance index, IDV: individualism index, MAS: masculinity index, UAI: uncertainty avoidance index, LTO: long-term orientation index, SIZE: log (total assets), ROA: return on assets, Lev: leverage ratio, PPE: property, plant and equipment, IA: intangible assets, EI: equity income scaled by total assets, WC: working capital scaled by total assets and CF: operating cash flows divided by total assets

Table 5.
Correlation matrix

Variable	Quantile regression Q 0.25	Q 0.50	Q 0.75
Intercept	0.217*** (3.070)	0.054 (1.040)	0.024 (0.530)
Cultural dimension variables			
PDI	0.001 (1.590)	0.002 (1.060)	0.002 (1.510)
IDV	−0.001* (−2.070)	−0.002** (−2.530)	−0.003*** (−6.850)
MAS	−0.001* (−1.960)	−0.001** (−1.990)	−0.005*** (−3.750)
UAI	−0.001 (−0.300)	0.001 (0.600)	0.001 (1.140)
LTO	0.003 (3.490)***	0.001(1.990)**	0.001 (0.190)
Control variables			
Size	−0.002 (−0.490)	0.007** (2.420)	0.006** (2.380)
ROA	0.001*** (12.080)	0.001*** (16.110)	0.001*** (18.980)
LEV	−0.127*** (−4.760)	−0.072*** (−3.240)	0.001 (0.060)
PPE	−0.039 (−1.550)	0.016 (0.900)	0.043*** (2.900)
IA	0.020 (0.860)	−0.015 (−0.740)	−0.006 (−0.310)
EI	−0.141 (−1.000)	−0.113 (−0.570)	−0.097 (−1.500)
WC	0.075 (1.420)	0.047 (1.060)	0.038 (0.890)
CF	−0.220 (−1.550)	−0.187 (−1.090)	−0.210 (−1.470)
No. of obs.	944	944	944
Pseudo R^2	0.036	0.061	0.057
Fisher tests between different quantiles	[q25] IDV − [q50] IDV = 0 *F = 7.987***	[q50] IDV − [q75] IDV = 0 *F = 5.678**	[q25] IDV − [q75] IDV = 0 *F = 6.578***
	[q25] MAS − [q50] MAS = 0 *F = 0.987*	[q50] MAS − [q75] MAS = 0 *F = 7.897***	[q25] MAS − [q75] MAS = 0 *F = 7.987***
	[q25] LTO − [q5] LTO = 0 *F = 8.897****	[q 50] LTO − [q75] LTO = 0 *F = 12.590****	[q25] LTO − [q75] LTO = 0 *F = 13.789****

Note(s): ETR**:** effective tax rate, Cash ETR: cash effective tax rate, PDI: power distance index, IDV: individualism index, MAS: masculinity index, UAI: uncertainty avoidance index, LTO: long-term orientation index, SIZE: log (total assets), ROA: return on assets, Lev: leverage ratio, PPE: property, plant and equipment, IA: intangible assets, EI: equity income scaled by total assets, WC: working capital scaled by total assets and CF: operating cash flows divided by total assets. *, ** and *** significant at 10, 5 and 1% significance levels

Table 6.
The effect of national culture dimensions on tax avoidance

accounts to (*t*-statistics) −0.003 (−6.850) in the third quantile. Significant Fisher statistics indicate that the coefficients do not have the same weight at the three quantiles, and the negative effect of individualism on the effective tax rate is more significant in the third quantile as compared to the first and the second quantiles. In other words, management of companies operating under high levels of individualism will adopt an aggressive tax management when seeing that effective tax rates are high.

Similarly, masculinity is negatively and significantly related to the effective tax rate, and this negative association is more prevailing under low tax aggressiveness regime. For instance, the coefficients (*t*-statistics) account for −0.001(−1.960) and −0.002 (−1.990) for the first and second quantiles, while the coefficient (*t*-statistic) accounts to (*t*-statistics) −0.005 (−3.750) in the third quantile. Significant Fisher statistics indicate that the coefficients do not have the same weight at the three quantiles, and the negative impact of masculinity on the effective tax rate is more significant in the third quantile as compared to the first and the second quantiles. This implies that managers operating in countries with high levels of masculinity will try to reduce tax payments when they operate under tax compliant regime. The results reported with respect to individualism and masculinity confirm H2 and H3.

By contrast, long-term orientation is positively and significantly associated with effective tax rate, and this positive relationship becomes stronger and more significant under high tax aggressiveness regime. The coefficient (*t*-statistic) accounts for 0.003 (3.490) for the first quantile. The association remains positive and significant in the second quantile 0.001 (1.990), while it becomes insignificant in the third quantile. Significant Fisher statistics indicate that the coefficients do not have the same weight at the three quantiles, and the positive impact of long-term orientation on the effective tax rate is more significant in the first quantile as compared to the second and third quantiles. This implies that companies operating in countries characterized by high levels of long-term orientation tend to increase tax payments under aggressive tax regimes to preserve their reputation among stakeholders and build long-term and strategic relationship with them. Findings provided with respect to long-term orientation confirm H5. It should be noted here that neither power distance nor uncertainty avoidance has a significant impact on tax avoidance as proxied by the effective tax rate.

For the control variable, we find a significant positive relation between company size and tax avoidance for the medium and highest quantiles (Q 0.50 and Q 0.75). Therefore, large firms tend to have higher effective tax rate and thus engage less in tax avoidance. Return on assets (ROA) has a significant positive association with tax avoidance at the three different quantiles. This means that profitable firms tend to adopt less tax aggressiveness practices. Finally, the leverage ratio has a significant negative effect on effective tax rate for the two first quantiles (Q 0.25 and Q 0.50), suggesting that firms use interest payments to reduce taxable incomes. For the remaining control variables, the associations with effective tax rate are mixed.

4.3 Alternative proxy for tax avoidance (cash effective tax rate)

To ensure the reliability and robustness of our results, we use alternative measure of tax avoidance as a robustness check. Following previous studies (Dyreng & Hanlon, 2010), we used cash ETR as an alternative measure of tax avoidance. Table 7 shows the results of the relationship between the five cultural dimensions examined in our study and the cash ETR. The results reported using this alternative proxy for tax avoidance remain stable indicating also that individualism and masculinity are negatively related to cash effective tax rates, and this negative relationship is stronger (coefficient and significance) under low tax aggressiveness regime (third quantile), while long-term orientation is positively associated with the cash effective tax rate, and this relationship is more prevailing under aggressive tax regime (first quantile). Fisher statistics also confirm that the impacts of individualism, masculinity and long-term orientation on the cash effective rate are significantly different across the three quantiles as for effective tax rate. As for Table 6, findings reported in Table 7 show that neither power distance nor uncertainty avoidance is significantly associated with tax avoidance as proxied by the cash effective tax rate.

5. Conclusion

The purpose of this paper is to examine the effect of national culture dimensions (power distance, individualism, masculinity, uncertainty avoidance and long-term orientation) on corporate tax avoidance using quantile regression to evaluate how different tax avoidance regimes may affect the above associations.

Based on a sample of 944 observations from 36 countries for the year 2016, we provide evidence that individualism and masculinity are negatively associated with effective tax rates, and this negative association becomes stronger for the third quantile characterized by high effective tax rates (tax compliant companies). However, long-term orientation is positively related to the effective tax rate, and this relationship is more pronounced under

Variable	Quantile regression Q0.25	Q0.50	Q0.75
Intercept	0.192*** (2.840)	0.045 (0.940)	0.017 (0.450)
Cultural dimension variables			
PDI	0.001 (1.570)	0.002 (1.590)	0.002 (1.250)
IDV	−0.003* (−2.130)	−0.005** (−2.560)	−0.006*** (−7.850)
MAS	−0.001* (−1.850)	−0.001** (−1.977)	−0.003*** (−3.890)
UAI	−0.001 (−0.190)	−0.001 (−0.350)	0.001 (1.010)
LTO	0.004 (4.360)***	0.001(1.690)*	0.001 (1.390)
Control variables			
Size	−0.001 (−0.370)	0.007* (1.920)	0.004* (1.930)
ROA	0.001*** (11.050)	0.001*** (14.340)	0.001*** (6.850)
LEV	−0.127*** (−3.670)	−0.072*** (−2.950)	0.001 (0.080)
PPE	−0.024 (−1.390)	0.012 (0.640)	0.0390 (1.300)
IA	0.019 (0.760)	−0.013 (−0.540)	−0.004 (−0.280)
EI	−0.128 (−1.120)	−0.112 (−0.750)	−0.0790 (−1.490)
WC	0.0690 (1.555)	0.0340 (1.590)	0.0220 (0.970)
CF	−0.224 (−1.019)	−0.157 (−1.203)	−0.202 (−1.204)
No. of obs.	944	944	944
Pseudo R^2	0.029	0.076	0.052
Fisher tests between different quantiles	[q25] IDV – [q50] IDV = 0 *F = 7.590***	[q50] IDV – [q75] IDV = 0 *F = 1.567*	[q25] IDV – [q75] IDV = 0 *F = 10.590****
	[q25] MAS – [q50] MAS = 0 *F = 5.567**	[q50] MAS – [q75] MAS = 0 *F = 7.998***	[q25] MAS – [q75] MAS = 0 *F = 11.959****
	[q25] LTO – [q50] LTO = 0 *F = 6.678**	[q 50] LTO – [q75] LTO = 0 *F = 11.987****	[q25] LTO – [q75] LTO = 0 *F = 19.789****

Note(s): ETR**:** effective tax rate, Cash ETR: cash effective tax rate, PDI: power distance index, IDV: individualism index, MAS: masculinity index, UAI: uncertainty avoidance index, LTO: long-term orientation index, SIZE: log (total assets), ROA: return on assets, Lev: leverage ratio, PPE: property, plant and equipment, IA: intangible assets, EI: equity income scaled by total assets, WC: working capital scaled by total assets, and CF: operating cash flows divided by total assets. *, ** and *** significant at 10%, 5%, and 1% significance levels

Table 7.
The effect of national culture dimensions on tax avoidance

aggressive tax regime (first quantile). Using cash effective tax rate, as an alternative measure of tax avoidance, the findings of our study remain stable.

Our study may contribute to both managers of multinational firms and fiscal authorities. On the one hand, multinational firms should be aware about cultural forces prevailing in one country and their impacts on tax avoidance and how to manage them to be able to confront severe competitive obstacles or blockages (Bame-Aldred, Cullen, Martin, & Parboteeah, 2013). On the other hand, fiscal authorities and international lawmakers may have a clearer picture of why some countries experience greater levels of tax aggressiveness than others. Fiscal authorities may respond, for example, by reducing nominal tax rates in countries characterized by high levels of masculinity and individualism to avoid aggressive tax management and tax evasion behavior. Finally, our findings may have policy implications for firms that continue to outsource accounting and tax work in order to reduce audit costs. For instance, the outsourcing for countries characterized by high levels of masculinity and individualism may lead tax aggressiveness behavior and higher noncompliant rates. Therefore, if managers integrate cultural values in their choice of countries to which the work is being

outsourced, they will avoid aggressive tax behaviors and thus future fiscal penalties leading to lower audit costs and higher tax conformity.

Future research may integrate other countries' features such as the strength of audit and reporting standards, religiosity, political connections and the strength of investor's protection to build a more complete international tax avoidance model. By doing so, international tax authorities may be able to take adequate decisions concerning the reduction of aggressive tax management behaviors and tax avoidance.

Note

1. It should be noted that Yoo and Lee (2019) have examined only the effect of power distance, individualism, masculinity and uncertainty avoidance on tax avoidance.

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