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The Impact of Audit Characteristics on Corporate Tax Avoidance: The Moderating Role of Gender Diversity

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Abstract

The purpose of this paper is to investigate the relation between audit characteristics and corporate tax avoidance and how board gender diversity (BGDs) moderates this relationship. Using a sample of 270 UK firms over the 2005-2017 period, we find that audit characteristics influence the corporate tax avoidance. Two of them (specialization and audit fees) had a negative effect; the other one (audit opinion, audit rotation) Have a positive effect on tax avoidance. We also find that BGDs moderates the effect of audit characteristics on corporate tax avoidance, except for audit opinion. The impact of the BGDs' level increases as the presence of woman in the board escalated from 40 to 60 %, but then weakened at 10 % level. This study contributes to the existing literature and auditing practices by extending the auditing and tax literature on the examination of the moderating effect of board gender diversity on the relation between audit characteristics and corporate tax avoidance using the sensitivity analysis.

Keywords: audit characteristics; tax avoidance; board gender diversity.

JEL classification: H26; M14; M4.

1. INTRODUCTION

In the new global economy, corporate tax avoidance has become a central issue for companies. It is broadly regarded as the reduction of explicit taxes via legal tax planning or illegal sheltering (Hanlon and Heitzman, 2010)[1]. The issue of tax avoidance has received considerable critical attention. Corporate tax avoidance is inherently related to information asymmetry. In fact, the detection risk of concrete tax schemes by tax authorities or shareholders whose interests are not necessarily aligned with managers, could force

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managers to make tax-related transactions more complex and information environments more opaque (Bae, 2017).

In accounting research, there is a widespread interest about the determines, magnitude, and consequences of tax avoidances. Recently, researchers have shown an increased interest in the relation between corporate governance mechanisms and tax avoidance (Desai and Dharmapala, 2006; Minnick and Noga, 2010; Lanis and Richardson, 2012; Armstrong *et al.*, 2015). For example, there is research about the characteristics of corporate governance on tax avoidance (Minnick and Noga, 2010). Kerr *et al.* (2016) show that firms with higher reported governance engage in less tax avoidance. In this context, Armstrong *et al.* (2015) found a positive relationship between independent councils and financial conditions for low Tax Avoidance levels, but a negative relationship for high Tax Avoidance rates. Sunarsih and Oktaviani (2016) show that managerial board ownership variables, independent directors, audit committees, and audit quality effects have an effect on tax avoidance, while institutional ownership variables have no effect on tax avoidance.

Among these governance mechanisms, the external auditor plays the important supervisory role in tax avoidance. In other word, auditors will assist or supervise the audit client's tax avoidance or there exist the different influencing factors (Lee and Kao, 2018). Indeed, an external audit is an important instrument for shareholders to ensure the transparency and credibility of financial reports (Habbash and Alghamdi, 2017). But this mechanism is considered more effective in companies which the percentage of the woman's presence in the board is higher. Despite this, very few studies have investigated the impact of external auditor on corporate tax avoidance by focusing in the role of the woman in the board. This paper will focus on the role and impact of board gender diversity on the relationship between external auditor and tax avoidance. The main purpose of this study is to develop an understanding of the board gender diversity s' role in firms which have tax management activities.

The remaining part of the paper proceeds as follows. In Section 2, we discuss related research on tax avoidance and develop our predictions on the relation between audit characteristics and corporate tax avoidance, and how that relation may vary with board gender diversity level. We describe the measures of our main variables of interest and the research design in Section 3. We discuss the main results in Section 4 and the results of robustness checks in Section 5 and additional analysis in Section 6. We provide our conclusions in Section 7.

2. RESEARCH BACKGROUND AND HYPOTHESES

2.1 Audit characteristics and tax avoidance

Audit fees are the main income source of audit firms (Lee and Kao, 2018). In this context, Caramanis and Lennox (2008) argue that audit hours are regarded as reasonable proxy for audit efforts and mainly determined by factors that are common across different clients such as size, complexity, and specific risk. In case of excessive tax avoidance, the uncertainty is produced to cause the financial statements to have the potential risk of material misstatement (Lee and Kao, 2018). Hanlon (2005) reveals that auditors indirectly reduce firms' abilities and incentives to avoid tax because a large book-tax difference can be a potential red flag which increases the probability of detection by the tax authorities. Kraft and Lopatta (2016) find that audit fees affect only discretionary BTDs, while tax fees indeed

only affect tax avoidance. Omer *et al.* (2006) found that higher fees paid by clients to their external auditors are associated with lower future marginal and effective tax rates. Bae (2017) found that in response to increased audit risk from corporate tax avoidance, auditors increased the number of actual audit hours or devoted more audit hours than normal to achieve a given level of audit risk. In this context, Hu (2018) argue that auditors need to implement additional auditing procedures to control audit risks that may arise from tax avoidance, thus charging higher audit fees. Based on a sample of 55 Tunisian listed companies from 2008 to 2013, Gaaya *et al.* (2017) show that audit quality curbs the incentives of family firms to engage in aggressive tax positions.

Thus, our study tests the following hypothesis:

***H₁**: Audit fees is negatively related to tax avoidance*.

Perhaps more importantly, McGuire *et al.* (2012) document that auditors who are overall industry experts (i.e. have a large market share of both audit and tax services within an industry) are also associated with lower client book and cash ETRs. They extend this line of research by examining whether auditor expertise is an additional determinant of the tax savings associated with auditor provided tax services. If auditors have the position of industry specialists, it is indicated that the audit firms of industry specialists can better increase the earnings quality of audit client than the audit firms of non-industry specialists (Lee and Kao, 2018). Bianchi *et al.* (2014) also examine two alternative determinants of tax avoidance proposed by prior studies, auditor industry specialization and contagion of tax strategies through ties to low tax firms. O'Reilly and Reisch (2002) published a paper in which they described that the auditing market becomes more competitive. Jihene and Moez (2019) suggest that audit quality is efficient corporate governance, while protecting users against the opportunistic and fraudulent actions of managers. A study by Johnson *et al.* (1991) involved that industry experience can help auditors improve the debugging capability and detect the financial statement error. Audit firm industry specialization provides clients with value for money services to help management achieve efficiency and effectiveness in their operations (Ahmad *et al.*, 2016).

Overall, there seems to be some evidence to indicate that audit specialization decreases corporate tax avoidance. Thus, our study tests the following hypothesis:

***H₂**: Audit specialization is negatively related to tax avoidance*.

We consider the modified auditor opinion as the audit quality. Previous studies have used modified auditor opinion as audit quality, e.g., Chow and Rice (1982); Lennox (2000); Craswell *et al.* (2002). Dedman and Kausar (2012) show that unaudited accounts are associated with less conservative financial reporting and this explains why such companies earn higher profits and yet receive lower credit ratings. Kinnunen *et al.* (2017) argue that if the audit report is unqualified (thereby providing no cause for concern regarding financial statement credibility), they posit that opting for voluntary audit reduces the likelihood of tax adjustments by the tax authority. Their study finds that having a voluntary audit with an unqualified audit opinion decreases the likelihood of the tax authority not accepting taxable income as reported. Other prior empirical studies that document a negative relationship between audit report qualification and the quality of financial statement information. In China,

Chen *et al.* (2001) are consistent with the notion that the likelihood of a qualified audit report increases with earnings management. Thus, our study tests the following hypothesis:

H*$_3$: Audit opinion is negatively related to tax avoidance.*

Nevertheless, few of the studies suggest that audit firm rotation improves the audit quality. For example, Dopuch *et al.* (2001) and Wang and Tuttle (2009) found that audit quality increases in the mandatory audit firm rotation as compared to non-mandatory rotation. Khan and Chen (2017) reveal that when audit firms follow the mandatory audit firm rotation rule, it provides the less of a chance for great tax planning strategies. If the firm does not follow the mandatory audit firm rotation rule, then companies have chance for great tax planning.

H*$_4$: Audit rotation is negatively related to tax avoidance.*

2.2 Effect of board gender diversity on the relationship between audit characteristics and tax avoidance

Recent research has emphasized the practical value of gender diversity. Lai *et al.* (2017) find that firms with gender-diverse boards pay higher audit fees and are more likely to choose specialist auditors compared to their peers. Their findings suggest that boards with female directors are likely to demand higher audit quality. Previous study (Fama and Jensen, 1983; Gilson, 1990; Sahlman, 1990) reveal that the boards with female directors may demand higher audit effort and choose high quality specialist auditors in order to protect the firms' reputation capital and avoid legal liability. Based on resource dependency theory, auditor selection depends on the various attitudes of board of directors. Female directors improve the efficiency of board monitoring functions. In fact, they have strong tendency to hire high quality auditor to protect their reputation. Carcello *et al.* (2002) explain that diversity in board expertise induces greater demand for audit. This is consistent with the female directors self-selecting into monitoring roles in audit and governance committees (Adams and Ferreira, 2009). Compared to men, women show less tolerance to opportunism in their decision making (Ambrose and Schminke, 1999; Schminke and Ambrose, 1997). In this context, Wahl *et al.* (2010) suggest that the differences between men and women can be detected at the level of the tax compliance and the strategies of payments of tax burdens. Hoseini *et al.* (2019) showed that the presence of women on corporate boards reduces corporate tax avoidance. In 2016, Richardson et al., published a paper in which they investigated the impact of women's presence on corporate boards on reducing tax avoidance.

These factors support the hypothesis that the board's gender-diversity results in greater demand for audit quality and in the turn reducing corporate tax avoidance.

H*$_5$: The negative impact of audit characteristics on the tax avoidance is more accentuated in firms with board gender diversity s' level.*

H*$_{5.1}$: The negative impact of audit fees on the tax avoidance is more accentuated in firms with board gender diversity s' level.*

H*$_{5.2}$: The negative impact of audit specialization on the tax avoidance is more accentuated in firms with board gender diversity s' level.*

H*$_{5.3}$: The negative impact of audit opinion on the tax avoidance is more accentuated in firms with board gender diversity s' level.*

H*$_{5.4}$: The negative impact of audit tenure on the tax avoidance is more accentuated in firms with board gender diversity s' level.*

3. RESEARCH METHODS

3.1 Sample and data

Our final sample consists of 3,510 firm-years in the UK from 2005 to 2017. These are the firms that have the required data from the DataStream database. In the first, 300 UK firms excluding banking and insurance sectors from the year of 2005 to 2017 are subject to our sample and 3,900 observations are gathered. Second, we exclude firms which missing variables that affect audit characteristic determination and corporate tax avoidance. Finally, 270 firms and 3510 observations will make up our sample construct, as depicted in Table no. 1 and Table no. 2 presents the distribution of firms by industry.

Table no. 1 – Sample selection

Sample	Number of firms
Initial sample	400
Financial firms	(100)
Less: the data of variables are incomplete	(30)
Final sample	270
Duration of study	13
Total observations	3510

Table no. 2 – Sample distribution across

Industry	n	%
Aerospace &Defence	14	5.18
Business Support Services	13	4.48
Chemicals	15	5,56
Computer Software & Services	20	7.40
Construction & Building Materials	19	7.04
Distributors	14	5.18
Electronic & Electrical Equipment	19	7.04
Engineering & Machinery	15	5.56
Food Producers & Processors	20	7.40
General Retailers	19	7.04
Health	14	5.18
Leisure Entertainment & Hotels	16	5.92
Media & Photography	18	6.67
Support Services	18	6.67
Transport	16	5.92
Restaurants Pubs & Breweries	20	7.40
Total	**270**	**100%**

3.2 Variables measures

3.2.1 Tax avoidance

The dependent variable in this analysis is the extent of corporate tax avoidance. Tax avoidance is measured by Cash Effective Tax Rate (Cash ETR). Thus, ETR helps to estimate the effectiveness in companies' tax planning activities (Mills, 1998; Phillips, 2003). Lee and Kao (2018) define cash ETR as the proportion of cash taxes paid to the accounting income

before tax. Dyreng *et al.* (2008) explained that the cash amount of tax paid help to minimize the likely effects of items such as valuation allowance and tax cushions. Lanis and Richardson (2012) argue that ETR measures the ability of a company to reduce its tax payments relative to its pre-tax income. In this study, we follow Watson (2015) who indicates that cash effective tax rates are widely accepted in the accounting literature to proxy for tax avoidance in part because they capture both permanent and temporary tax avoidance strategies.

3.2.2 Audit characteristics

- **Audit fees**: we measure Audit Fees by the logarithm of audit fees. It is rated "1" if the total audit fees are greater than the median sample of the company during the study period and the value of "0" otherwise.
- **Audit specialization**[2]: we measure sector specialization as a dummy variable equal to 1 if audit firms has a 20% threshold or more of audit market share in a particular industry and 0 otherwise.
- **Audit opinion**: we measure Audit opinion as a dummy variable equal to 1 if a company receives a going concern opinion and 0 otherwise.
- **Audit rotation**: we measure Audit rotation as a dummy variable equal to 1 if a change of the auditor occurred during the exercise, and 0 otherwise.

3.2.3 Board gender diversity

- **Board gender diversity:** Board gender diversity was measured by calculating the percentage of female directors serving on a company's board, as in Adams and Ferreira (2009) and Campbell and Minguez-Vera (2008). For this variable, data were derived from the DataStream database.

3.2.4 Control variables

- **Firm size (SIZE)**: Lanis and Richardson (2012) find that firm having larger size would be more aggressive in its tax policy rather than small firms. Furthermore, Gupta and Newberry (1997) argue that in some cases size affects the tax avoidance. Therefore, we take size (SIZE) as a control variable in our analysis, measured by the log of total assets.
- **Leverage (LEV**): Lanis and Richardson (2012), Stickney and McGee (1982), Chasbiandani and Martani (2012) used leverage as a control variable. They found that firms having debts would be more aggressive in gaining an opportunity to apply tax reduction as consequence of interest payment (Sari and Tjen, 2017). LEV is measured by total debts divided by total assets.

Table no. 3 – Variables measures

Variable	Symbols	Definition	Authors
Tax avoidance	CETR	cash taxes paid/ Pre-tax accounting income	Chen *et al.* (2001); Dyreng *et al.* (2008); Hanlon and Heitzman (2010); McGuire *et al.* (2012); He *et al.* (2019)

Variable	Symbols	Definition	Authors
Audit fees	AuditFees	Dummy variable equal to 1if the total audit fees are greater than the median sample of the company during the study period and the value of "0" otherwise.	Hanlon *et al.* (2012); Gandia and Huguet (2019)
Audit specialization	AuditSPEC	Dummy variable equal to 1 if audit firms has a 20% threshold or more of audit market share in a particular industry and 0 otherwise.	Palmrose (1986); Krishnan (2003); Richardson *et al.* (2018); Balsam *et al.* (2003)
Audit opinion	AuditOP	Dummy variable equal to 1 if a company receives a going concern opinion and 0 otherwise.	DeAngelo (1981); Paulina (2019)
Audit rotation	AuditROT	Dummy variable equal to 1 if a change of the auditor occurred during the exercise, and 0 otherwise.	Cameran *et al.* (2016); Chi *et al.* (2012)
Board gender diversity	BGD	The percentage of female directors serving on a company's board	Adams and Ferreira (2009); Campbell and Minguez-Vera (2008)
Firm size	SIZE	Natural logarithm of total assets	Lanis and Richardson (2012); Gupta and Newberry (1997)
Leverage	LEV	Total debt / Total equity	Lanis and Richardson (2012); Stickney and McGee (1982)

3.3 Models specification

We have specified five econometric models for estimation. Equation (1) summarize the first panel data model:

$$\mathrm{CETR_{it}} = \beta_0 + \beta_1 \mathrm{AuditFees_{it}} + \beta_2 \mathrm{AuditSPEC_{it}} + \beta_3 \mathrm{AuditOP_{it}} + \beta_4 \mathrm{AuditROT_{it}} + \beta_5 \mathrm{SIZE_{it}} + \beta_6 \mathrm{LEV_{it}} + year\ fixed\ effect_{it} + firm\ fixed\ effect_{it} + \varepsilon_{it} \quad (1)$$

Equation (1) allows the estimation of the main effects of audit characteristics (audit fees, audit specialization, audit opinion, audit tenure) on corporate tax avoidance. According to Hypothesis 1, 2, 3 and 4 we expect that β1, β2, β3, β4 are negative in model (1).

To examine the proposed hypothesis, that the impact of audit characteristics on the tax avoidance is more important in firms with board gender diversity s' level, we estimate four equations, which includes board gender diversity. According to Hypothesis 5, we estimate four models as described below:

$$\mathrm{CETR_{it}} = \beta_0 + \beta_1 AuditFees_{it} + \beta_2 BGD_{it} + \beta_3 \mathrm{AuditFees_{it}} * \mathrm{BGD_{it}} + \beta_4 \mathrm{AuditSPEC_{it}} + \beta_5 \mathrm{AuditOP_{it}} + \beta_6 \mathrm{AuditROT_{it}} + \beta_7 \mathrm{SIZE_{it}} + \beta_8 \mathrm{LEV_{it}} + year\ fixed\ effect_{it} + firm\ fixed\ effect_{it} + \varepsilon_{it} \quad (2)$$

$$\mathrm{CETR_{it}} = \beta_0 + \beta_1 \mathrm{AuditFees_{it}} + \beta_2 AuditSPEC_{it} + \beta_3 BGD_{it} + \beta_4 \mathrm{AuditSPEC_{it}} * \mathrm{BGD_{it}} + \beta_5 \mathrm{AuditOP_{it}} + \beta_6 \mathrm{AuditROT_{it}} + \beta_7 \mathrm{SIZE_{it}} + \beta_8 \mathrm{LEV_{it}} + year\ fixed\ effect_{it} + firm\ fixed\ effect_{it} + \varepsilon_{it} \quad (3)$$

$$\mathrm{CETR_{it}} = \beta_0 + \beta_1 \mathrm{AuditFees_{it}} + \beta_2 \mathrm{AuditSPEC_{it}} + \beta_3 AuditOP_{it} + \beta_4 BGD_{it} + \beta_5 \mathrm{AuditOP_{it}} * \mathrm{BGD_{it}} + \beta_6 \mathrm{AuditROT_{it}} + \beta_7 \mathrm{SIZE_{it}} + \beta_8 \mathrm{LEV_{it}} + year\ fixed\ effect_{it} + firm\ fixed\ effect_{it} + \varepsilon_{it} \quad (4)$$

$$\mathrm{CETR_{it}} = \beta_0 + \beta_1 \mathrm{AuditFees_{it}} + \beta_2 \mathrm{AuditSPEC_{it}} + \beta_3 \mathrm{AuditOP_{it}} + \beta_4 AuditROT_{it} + \beta_5 BGD_{it} + \beta_6 \mathrm{AuditROT_{it}} * \mathrm{BGD_{it}} + \beta_7 \mathrm{SIZE_{it}} + \beta_8 \mathrm{LEV_{it}} + year\ fixed\ effect_{it} + firm\ fixed\ effect_{it} + \varepsilon_{it} \quad (5)$$

Equations are estimated using a panel data methodology, applying the generalized least squares regression (GLS).

4. EMPIRICAL RESULTS

4.1 Descriptive statistics

Table no. 4 presents the summary descriptive statistics of the dichotomous variables used in this study. This table provides summary statistics for the firms in this sample.

The percentage of firms which change the auditor occurred during the exercise represents just 32, 93% of our studied sample whereas 67, 07% which not change the auditor during the fiscal year. As table indicates, from a total of 3510 audit opinions, 8, 77% were unqualified and 0, 91,23% were qualified with matters of emphasis. The average percentage audit fees paid by the companies is 95, 53%, indicating that most fees paid by companies are high and greater than the median sample while 4, 47% of the sample companies paid for non-audit fees. Finally, the variable of sector specialization shows that 86,70% of companies are audited by a specialist auditor and 13,30% are audited by non-specialist auditor.

Also, Table no. 4 provides descriptive statistics for the regression variables such as the dependent variable and the independents variables. The panel presents descriptive statistics for the entire sample, including the mean, minimum, median, maximum and standard deviation.

The mean value of CETR is 0.237, the 25th (0.16), 50th (0.23), and 75th (0.28) percentiles as well as the standard deviation is 0.501, are closely to Hoi *et al.* (2013) (25.3 percent). In fact, Hoi *et al.* (2013) report descriptive statistics of the remainder of their variables in a larger sample that includes loss firms, they are difficult to compare; however, the proximity of the cash ETR descriptive statistics indicates a closely matching sample.

Regarding the BGD, the mean value is 13.840 and the standard deviation is 11.512. The 25th percentile is still 0, while the median is 12.3 and the 75th percentile 22.20. This is higher than the number given in, for instance, Adams and Ferreira (2009), who reported a value of 8.5%.

Table no. 4 – Descriptive statistics

Variables	Mean	Min	Median	Max	SD	P^{er} 25	P^{er} 75
CETR	0.237	0	0.23	11.59	0.501	0.16	0.28
BGD	13.840	0	12.3	62.3	11.512	0	22.20
Size	6.942	4.822	6.722	8.412	1.650	5.09	8.29
LEV	0.257	0	0.241	0.858	0.141	0.162	0.33

Notes: CETR, cash effective tax rate; BGD, board gender diversity: the percentage of female directors serving on a company's board; SIZE is the natural logarithm of total assets; and LEV is the ratio total debt to total equity.

Variables	Modality	Frequencies	Percentage
AuditFees	0	157	4.47%
	1	3,353	95.53 %
AuditSPEC	0	467	13.30%
	1	3,043	86.70%
AuditOP	0	308	8.77%
	1	3,202	91.23%
AuditROT	0	2,354	67.07%
	1	1,156	32.93%

Note: AuditFEES - audit fees, AuditSPEC - audit specialization, AuditOP - audit opinion, AuditROT - audit rotation.

4.2 Correlation analysis

Based on Soliman and Ragab (2014), cited in Bryman and Cramer (1997), to decide on a serious problem of multicollinearity between the independent variables, the Pearson's correlation between independent variables should exceed 0.8.

As shown in Table no. 5, the highest correlation is between audit fees variable and the firm size variable with the amount of and this shows that there is no multicollinearity problem between the independent variables used in this research model, as it does not exceed the 0.8.

Table no. 5 – Pearson correlations for independent variables in UK firms

	CETR	AuditROT	AuditOP	AuditFEES	AuditSPEC	LEV	SIZE	VIF
CETR	1.000							
AuditROT	0.021	1.000						1.04
AuditOP	0.039*	0.030*	1.000					1.01
AuditFEES	-0.025***	-0.162***	-0.057**	1.000				1.32
AuditSPEC	-0.023**	-0.045*	0.001	0.319***	1.000			1.25
LEV	0.036	-0.214**	-0.014*	-0.246	-0.113	1.000		1.43
SIZE	0.122	0.025***	0.223**	0.061***	0.124*	0.042	1.000	1.66

Notes: CETR, cash effective tax rate; BGD, board gender diversity: the percentage of female directors serving on a company's board; SIZE is the natural logarithm of total assets; LEV is the ratio total debt to total equity. AUDIT FEES is audit fees, AuditSPEC is audit specialization, AUDIT OP is audit opinion, AUDIT ROT is audit rotation. *, **, *** indicate significance at the 0.10, 0.05, and 0.01 levels, respectively.

4.3 Regression results

4.3.1 Test of H1, H2, H3 and H4

In this section, we report the results for the test of four hypotheses, which examines the association between auditor characteristics and tax avoidance measured by CETR. Table no. 6 reports the results of the tax avoidance regression on the explanatory variables.

Testing H1, Table no. 6 presents evidence of negative and significant coefficient on audit fees at the level of 1%. The empirical result still supports H1, meaning the higher the auditor's fees is, the lower of the audit client's tax avoidance will be. These findings further support the idea of Omer *et al.* (2006) who found that higher fees paid by clients to their external auditors are associated with lower future marginal and effective tax rates. Our findings are consistent with Kinney *et al.* (2004) who showed that higher tax fees paid to auditors are associated with fewer earnings restatements.

Table no. 6 – Regression results

Variables	Model (1) CETR		Model (2) CETR		Model (3) CETR		Model (4) CETR		Model (5) CETR	
	Coeff	**P>Z**	**Coeff**	**P>Z**	**Coeff**	**P>Z**	**Coeff**	**P>Z**	**Coeff**	**P>Z**
AuditFEES	-1.035	0.002***	-0.012	0.015**	-0.116	0.020**	-0.214	0.054*	-0.370	0.023**
AuditSPEC	-0.095	0.024**	-0.029	0.041**	-0.126	0.035**	-0.230	0.012**	-0.131	0.001***
AuditOP	0.074	0.087*	0.173	0.049**	0.275	0.048**	0.147	0.421	0.072	0.053*
AuditROT	0.044	0.871	0.121	0.327	0.038	0.325	0.232	0.075*	0.149	0.155
BGDs			-0.083	0.003***	-0.196	0.005***	-0.129	0.012**	-0.047	0.004***
AuditFEES*BGD			-0.301	0.004***						
AuditSPEC*BGD					-0.121	0.000***				
AuditOP*BGD							-0.119	0.330		
AuditROT*BGD									-0.102	0.001***
LEV	0.158	0.028**	0.132	0.085*	0.126	0.042**	0.222	0.095*	0.172	0.025**
SIZE	-0.042	0.161	-0.142	0.087*	-0.241	0.264	-0.113	0.067*	-0.125	0.077*
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
R^2	0.542		0.632		0.565		0.494		0.458	
N-obs	3510		3510		3510		3510		3510	

Notes: *Dependent variable*: CETR, cash effective tax rate; *Independent variables*: AuditFEES is audit fees, AuditSPEC is audit specialization, AuditOP is audit opinion, AuditROT is audit rotation; *Moderating variable*: BGD: board gender diversity: the percentage of female directors serving on a company's board; *Control variables*: SIZE is the natural logarithm of total assets; LEV is the ratio total debt to total equity.
*, **, *** indicate significance at the 0.10, 0.05, and 0.01 levels, respectively.

Also, the results show a negative and significant relationship between auditor industry specialization and corporate tax avoidance (β= -0.095, P>Z= 0.024). This study produced results which corroborate the findings of a great deal of the previous work in this field. In fact, Kanagaretnam *et al.* (2016) observe that both measures of auditor industry specialization are significantly associated with lower likelihood of corporate tax aggressiveness among firms audited by the Big N auditors. However, the findings of the current study do not support the previous research. Lee and Kao (2018) found that the auditor industry specialization has the positive assisting impact on clients' tax avoidance; if the relative importance of audit client to auditor is higher, the auditor will alleviate the clients' tax avoidance. The empirical results show that if the degree of auditor industry specialization is higher, it will have the helping effect on audit client's tax avoidance.

Table no. 6 shows that there is a positive and significant relationship between the audit opinion and corporate tax avoidance at the 10% level. In their results, Herbohn and Ragunathan (2008) show that management's propensity to manipulate earnings is positively associated with modified audit opinions reported by auditors.

Testing H4, Table no. 6 presents evidence of positive and insignificant coefficient of audit rotation. In the same context, Khan and Chen (2017) find strong evidence that voluntary and no-audit firm's rotation increase tax avoidance via modified auditor opinions in non-SOEs.

The coefficients of the control variables are consistent with expectations. Contrary to Lanis and Richardson (2012), we find larger (SIZE) firms are less likely to be tax aggressive, possibly due to additional political scrutiny of such firms. We also find that firms with higher leverage (LEV) are more likely to be tax aggressive, consistent with greater opportunities to avoid taxes for firms with more debt.

4.3.2 Test of H5.1, H5.2, H5.3 and H5.4

In this section, we are interested in whether the presence of woman in the board affects the relationship between audit characteristics and tax avoidance. In H5.1, we examine the moderating role of board gender diversity. The results of our tests are presented in Table no. 6.

The results indicate that the negative association between auditor fees and the tax avoidance is accentuated in firms with higher board gender diversity level (at the level of 1%). Our results are consistent with Lai *et al.* (2017) who found that firms with gender-diverse boards (audit committees) choose industry-specialist auditors and demand higher audit effort from them, after controlling for self-selection bias and other variables that are known to affect audit fees or auditor choice as the case may be. In this area, the presence of woman in the board encourage the demand of higher audit quality which help to reduce the opportunistic behavior of managers.

In H5.2, we examine the moderating role of BGD on the relation between audit specialization and tax avoidance. The results presented in Table no. 6 indicate that the coefficient on the interaction between BGD*AuditSPEC is negative and significant at conventional level. This result may be explained by the fact that woman in the board demand an audit specialization to ensure the transparency and credibility of financial reports which will indirectly dampen tax avoidance.

In H5.3, the result indicates that the coefficient on the interaction BGD*AuditOP is negative but not significant. This result shows that the presence of woman in the board has no moderation effect on the relationship between audit opinion and corporate tax avoidance.

Concerning H5.4, we find that BGD moderates the relationship between audit rotation and tax avoidance (P>Z = 0.001) at the level of 1%. This result may be explained by the fact that the presence of woman insists auditor change because auditors will assist or supervise the audit client's tax avoidance or there exist the different influencing factors.

5. ROBUSTNESS TEST

To check the robustness of our main results, we verify whether the moderating role of board gender diversity remains intact if we replace the cash effective tax rate (CETR) with the effective tax rate Differential (DETR) which is measured by the difference of between the statutory tax rate and the firm's ETR[3]. Following Hanlon and Heitzman (2010), we re-estimate regressions (1) -(2) - (3) -(4) -(5) using the effective tax rate Differential (DETR) as proxy for the tax avoidance. Table no. 7 show that the results are similar to those previously reported, as displayed in Table no. 6.

6. ADDITIONAL TEST

To further assess how BGD may influence the relationship between audit characteristics and tax avoidance, we subdivide the total sample into five subsamples of low and high BGD s' level group. In this study, we use the sensitivity level analysis for examine the important woman's' role in the board for reducing opportunistic behavior essentially tax aggressiveness by choosing a high audit quality. Especially, we just test the audit fees and audit specialization to prove their significant effect on corporate tax avoidance in firms with BGDs' level.

Table no. 7 – Robustness test

Variables	Model (1) CETR		Model (2) CETR		Model (3) CETR		Model (4) CETR		Model (5) CETR	
	Coeff	**P>Z**	**Coeff**	**P>Z**	**Coeff**	**P>Z**	**Coeff**	**P>Z**	**Coeff**	**P>Z**
AuditFEES	-1.030	0.003***	-0.014	0.018**	-0.020	0.035**	-0.117	0.057*	-0.125	0.043**
AuditSPEC	-0.054	0.042**	-0.032	0.039**	-0.125	0.040**	-0.152	0.024**	-0.342	0.004***
AuditOP	0.082	0.085*	0.081	0.048**	0.521	0.049**	0.123	0.547	0.084	0.061*
AuditROT	0.057	0.257	0.034	0.224	0.214	0.114	0.156	0.088*	0.355	0.258
BGDs			-0.085	0.002***	-0.244	0.002***	-0.466	0.042**	-0.067	0.005***
AuditFEES*BGD			-0.241	0.001***						
AuditSPEC*BGD					-0.131	0.001***				
AuditOP*BGD							-0.110	0.225		
AuditROT*BGD									-0.111	0.003***
LEV	0.147	0.039**	0.157	0.095*	0.224	0.049**	0.128	0.097*	0.347	0.035**
SIZE	-0.015	0.421	-0.174	0.089*	-0.235	0.188	-0.322	0.087*	-0.156	0.088*
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
R^2	0.511		0.631		0.525		0.510		0.524	
N-obs	3510		3510		3510		3510		3510	

Notes: *Dependent variable*: DETR, defferential effective tax rate; *Independent variables*: AUDIT FEES is audit fees, AuditSPEC is audit specialization, AuditOP is audit opinion, AuditROT is audit rotation; *Moderating variable*: BGD: board gender diversity: the percentage of female directors serving on a company's board; *Control variables*: SIZE is the natural logarithm of total assets; LEV is the ratio total debt to total equity.

*, **, *** indicate significance at the 0.10, 0.05, and 0.01 levels, respectively.

Results of panels D and E were consistent with the preceding findings. Panel D clearly demonstrated that BGD moderates the relationship between audit specialization and corporate tax avoidance and its influence is strong at the higher level of BGD. The results presented in Table no. 8 indicate that the coefficients on the interaction between Audit FEES*BGD and Audit SPEC*BGD are all negative and significant at conventional levels. The evidence indicates that the negative relation between audit characteristics and the tax avoidance is more pronounced in firms with higher BGDs' level (panel D and E). We find that firms with higher percentage of woman's' presence in the board are more likely to employ specialist auditors, and this relation is more pronounced.

We show that as the percentage of woman's' presence increases, the role of audit fees and audit specialization are more pronounced in influencing tax avoidance.

The impact of the BGD s' level on the relation between audit characteristics and corporate tax avoidance, strengthened at a BGD s' level of 40%, 50% and 60%, but weakened at a BGD s' level of 20% or less.

Table no. 8 – Results of analysis model moderation with different levels of BGD

$$\mathbf{CETR_{it}} = \beta_0 + \boldsymbol{\beta_1 AuditFees_{it}} + \boldsymbol{\beta_2 BGD_{it}} + \beta_3 \mathbf{AuditFees_{it}} * \mathbf{BGD_{it}} + \beta_4 \mathbf{AuditSPEC_{it}} + \beta_5 \mathbf{AuditOP_{it}} + \beta_6 \mathbf{AuditROT_{it}} + \beta_7 \mathbf{SIZE_{it}} + \beta_8 \mathbf{LEV_{it}} + \boldsymbol{year\ fixed\ effect_{it}} + \boldsymbol{firm\ fixed\ effect_{it}} + \varepsilon_{it}$$

	Panel A Sample>10%		Panel B Sample>20%		Panel C Sample>40%		Panel D Sample>50%		Panel E Sample>60%	
Variables	**Coeff**	**P>Z**	**Coeff**	**P>Z**	**Coeff**	**P>Z**	**Coeff**	**P>Z**	**Coeff**	**P>Z**
AuditFEES	-0.012	0.034**	-0.125	0.024**	-0.463	0.015**	-0.567	0.004***	-0.546	0.000***
AuditSPEC	-0.065	0.096*	-0.361	0.088*	-0.434	0.001***	-0.632	0.004***	-0.461	0.000***
AuditOP	0.054	0.123	0.543	0.118	-0.364	0.022**	-0.721	0.017**	-0.533	0.001***
AuditROT	0.123	0.453	0.125	0.231	-0.289	0.034**	-0.811	0.018**	-0.634	0.005***
BGD	-0.254	0.097*	-0.227	0.025**	-0.364	0.036**	-0.547	0.049**	-0.352	0.004***
AuditFEES*BGD	-0.012	0.036**	-0.114	0.022**	-0.125	0.018**	-0.113	0.012**	-0.147	0.002***
LEV	0.321	0.125	0.364	0.030**	0.104	0.003***	0.344	0.003***	0.574	0.015**
SIZE	-0.234	0.226	-0.017	0.226	-0.114	0.524	-0.127	0.034**	-0.125	0.088*
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
R^2	0.472		0.485		0.515		0.584		0.641	

Notes: *Dependent variable*: CETR, cash effective tax rate; *Moderating variable*: BGD: board gender diversity: the percentage of female directors serving on a company's board; *Independent variables*: AuditFEES is audit fees, AuditSPEC is audit specialization, AuditOP is audit opinion, AuditROT is audit rotation; *Control variables*: SIZE is the natural logarithm of total assets; LEV is the ratio total debt to total equity.
*, **, *** indicate significance at the 0.10, 0.05, and 0.01 levels, respectively.
Split Sample: Panel A: BGD1 (cutoff 10%), Panel B: BGD2 (cutoff 20%), Panel C: BGD3 (cutoff 40%), Panel D: BGD4 (cutoff 50%), Panel E: BGD5 (cutoff 60%)

$$\mathrm{CETR_{it}} = \beta_0 + \beta_1 \mathrm{AuditFees_{it}} + \boldsymbol{\beta_2 AuditSPEC_{it}} + \boldsymbol{\beta_3 BGD_{it}} + \beta_4 \mathrm{AuditSPEC_{it}} * \mathrm{BGD_{it}} + \beta_5 \mathrm{AuditOP_{it}} + \beta_6 \mathrm{AuditROT_{it}} + \beta_7 \mathrm{SIZE_{it}} + \beta_8 \mathrm{LEV_{it}} + \boldsymbol{year\ fixed\ effect_{it}} + \boldsymbol{firm\ fixed\ effect_{it}} + \varepsilon_{it}$$

	Panel A Sample>10%		Panel B Sample>20%		Panel C Sample>40%		Panel D Sample>50%		Panel E Sample>60%	
Variables	**Coeff**	**P>Z**	**Coeff**	**P>Z**	**Coeff**	**P>Z**	**Coeff**	**P>Z**	**Coeff**	**P>Z**
AuditFEES	-0.125	0.049**	-0.178	0.024**	-0.247	0.015**	-0.117	0.003***	-0.544	0.001***
AuditSPEC	-0.324	0.097*	-0.247	0.088*	-0.361	0.001***	-0.521	0.002***	-0.279	0.002***
AuditOP	0.147	0.158	0.447	0.123	-0.225	0.022**	-0.645	0.020**	-0.468	0.004***
AuditROT	0.246	0.631	0.154	0.453	-0.324	0.034**	-0.533	0.022**	-0.762	0.003***
BGD	-0.257	0.043**	-0.447	0.033**	-0.156	0.023**	-0.234	0.013**	-0.463	0.007***
AuditSPEC*BGD	-0.155	0.045**	-0.244	0.030**	-0.118	0.007***	-0.253	0.001***	-0.443	0.004***
LEV	0.247	0.147	0.364	0.027**	0.124	0.004***	0.147	0.002***	0.254	0.018**
SIZE	-0.117	0.547	-0.067	0.423	-0.214	0.472	-0.157	0.036**	-0.228	0.089*
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.487		0.499		0.557		0.587		0.633	

Notes: *Dependent variable*: CETR, cash effective tax rate; *Moderating variable*: BGD: board gender diversity: the percentage of female directors serving on a company's board; *Independent variables*: AUDIT FEES is audit fees, AuditSPEC is audit specialization, AUDIT OP is audit opinion, AUDIT ROT is audit rotation; *Control variables*: SIZE is the natural logarithm of total assets; LEV is the ratio total debt to total equity.
*, **, *** indicate significance at the 0.10, 0.05, and 0.01 levels, respectively.
Split Sample: Panel A (cutoff 10%), Panel B (cutoff 20%), Panel C (cutoff 40%), Panel D (cutoff 50%), Panel E (cutoff 60%)

7. CONCLUSION

This study examined the effect of audit characteristics on tax avoidance moderated by BGD levels' companies. Moderating regression analysis was used in this study to examine the impact of BGD on the relationship between audit characteristics and corporate tax avoidance. The examination was conducted on sub-samples based on the level of BGD, i.e. 10, 20, 40, 50, 60 %.

Using a large sample of firm-year observations from 270UK firms and estimation, we find that audit characteristics influence the corporate tax avoidance. Two of them (specialization and audit fees) have a negative effect; the other one (audit opinion, audit rotation) gave positive effect on tax avoidance. BGD moderates the relation between audit characteristics and corporate tax avoidance, except for audit opinion. The impact of the BGDs' level increases as the presence of woman in the board escalated from 40 to 60 %, but then weakened at 10 % level. In additional analyses, we find that audit characteristics have a more pronounced relation with the corporate tax avoidance when BGDs' level is higher. We subject our results to a number of robustness tests, including another alternate measures of tax avoidance. Our main inference that audit characteristic is associated with lower tax avoidance is robust to these additional tests.

This study finding has an important recommendation for multinational firms, auditors, policy makers and financial report users. Future research can investigate the mediation effect of board gender diversity on the relationship between audit characteristic and tax avoidance.

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Notes

[1] Hanlon and Heitzman (2010) state that "if tax avoidance represents a continuum of tax planning strategies where something like municipal bond investments are at one end (lower explicit tax, perfectly legal), then terms such as "noncompliance," "evasion," "aggressiveness," and "sheltering" would be closer to the other end of the continuum.

[2] According to Krishnan (2003), this research adopted the ratio of clients in specific industries in the client portfolio of audit firms as one of the measurement methods of industry specialist auditor.

[3] Hanlon and Heitzman (2010) list 12 measures of tax avoidance commonly used in the literature.

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