



Corporate tax avoidance and the upper echelon effect: Evidence from segment disclosure choices

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Dates:

Received: 11 Nov. 2024

Accepted: 21 Mar. 2025

Published: 26 May 2025

How to cite this article:

Basson, R. & Van der Spuy,
P.V.A., 2025, 'Corporate tax
avoidance and the upper
echelon effect: Evidence from
segment disclosure choices',
*South African Journal of
Economic and Management
Sciences* 28(1), a5965.
[https://doi.org/10.4102/
sajems.v28i1.5965](https://doi.org/10.4102/sajems.v28i1.5965)

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Background: The determinants of corporate tax avoidance are still not adequately understood, which necessitates an investigation of the influence of the upper-echelon effect as a determinant of corporate tax avoidance.

Aim: To better understand the dynamics involved in the decision-making processes of the upper echelon and its relationship with corporate tax avoidance.

Setting: Financial data from Johannesburg Stock Exchange (JSE)-listed companies are used because those companies should comply with International Financial Reporting Standard (IFRS) 8, which provides the proxy mechanism used for the measurements of upper-echelon behaviour for this quantitative study.

Method: Multiple regression, supported by descriptive statistics, is used to test two hypotheses related to the aim.

Results: The upper echelon's review of the tax expense at the segment level is indeed associated with corporate tax avoidance. Moreover, autocratic decision-making environments are also associated with more tax avoidance.

Conclusion: Upper echelon environments exhibiting autocratic behaviour are more likely to avoid tax. Companies disclosing tax as a segment-level expense, subject to the company's routine internal review processes, are more likely to avoid tax, specifically in upper echelon settings that exhibit autocratic relational behaviour. The involvement of teams in the decision-making and monitoring process attenuates the effect of the internal review of the tax expense at the segment level as a medium to actively manage the tax expense.

Contribution: This study adds to the tax avoidance literature concerning management effects on tax avoidance. It investigates the link between the relational dynamics and cognitive processes of top management teams, mostly hidden from the public purview, and tax avoidance.

Keywords: corporate tax avoidance; segment reporting behaviour; management effects; upper echelon theory; chief executive officer power.

Introduction

Corporate tax is a pivotal source of tax revenue in developing countries (Organisation for Economic Cooperation and Development [OECD] 2022). Corporate tax avoidance may exacerbate inequality by shifting the tax burden onto lower-income individuals and eroding funding for essential public services. Therefore, tax avoidance in developing countries impacts governments' ability to progress towards the United Nations Sustainable Development Goals (OECD 2018). Wang et al. (2020) calls for further investigation into corporate tax avoidance in these regions. The adverse societal impact of tax avoidance resulted in many studies investigating various company characteristics as possible determinants of tax avoidance.

However, several of those studies have produced inconclusive and conflicting results regarding the impact of company characteristics on tax avoidance (Van der Spuy & De Jager 2023). For example, while some studies show a significant positive association between company size and tax avoidance, attributing this to larger companies having more tax planning opportunities (Richardson & Lanis 2007), some studies indicate a significant negative association between size and tax avoidance, attributing this to larger companies being subject to more scrutiny from revenue authorities (Rego 2003). Other studies find no significant association between a company's

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size and its tax avoidance behaviour (Greeff 2019). This gap in the understanding of the impact company characteristics have on tax avoidance spurred a growing body of research exploring other mechanisms to explain varying levels of tax avoidance, including the effect of the executive management of companies (Gul, Khedmati & Shams 2020; Hanlon & Heitzman 2010). The directors of companies listed on the Johannesburg Stock Exchange (JSE) have the obligation to implement transparent and responsible tax policies, in terms of principle three of the King IV code on corporate governance (Institute of Directors in South Africa 2016). Despite this requirement, moderate levels of tax avoidance, indicated by a decline in effective tax rates, are observed for JSE-listed companies (Van der Spuy 2021). However, Greeff (2019) reports that the variation in the effective tax rates of large JSE-listed companies seems not to be explained by company characteristics such as size. The limited ability of company characteristics to explain corporate tax avoidance serves as a prompt to consider the influence of other factors that may explain this variation instead. One such consideration is the influence of a company's top management, including its chief executive officer (CEO), chief financial officer (CFO) and other top management members involved in strategic decision-making. Collectively, these high-ranking individuals in a company are regarded as the upper echelon.

Upper echelon theory proposes that top-level executives have a significant effect on company outcomes (Hambrick 2007). Accordingly, executive directors' characteristics have been reported to have a significant impact on corporate tax avoidance (Dyreg, Hanlon & Maydew 2010). However, a criticism of existing upper echelon research is that it focuses extensively on executive directors' characteristics, with little consideration of executives' cognitive processes, that is, what information executives look for and deem important in decision-making (Neely et al. 2020). Limited research explores how the relationships, interactions and power structures within the top management of a company influence decisions related to tax avoidance. Therefore, the dynamics at play in the upper echelon effect on corporate outcomes is still marred by a black box quality, with little known about how tax avoidance choices are really made within organisations (Wang et al. 2020). While it is known that the upper echelon plays a role in shaping corporate tax behaviour, the exact nature of this influence is not well understood, and the mechanisms through which it is executed remain uncertain. For example, it is unknown whether the effects of executive characteristics observed on tax avoidance are attributable to the general tone that is set at the top, or to the direct involvement of executives in managing the tax function (Van der Spuy 2021; Wang et al. 2020).

'What gets measured, gets managed' is the adage, and this study argues that top executives' behaviour in the review of tax expenses at the segment level can provide insight into top executives' decision-making processes regarding tax affairs. Therefore, this study uses regulatory-imposed accounting note disclosures in companies' financial statements to get

insight into the way in which top management reviews divisional information, which is otherwise hidden from the public purview. International Financial Reporting Standard (IFRS) 8 requires the disclosure of operating segment information for business divisions that are regularly reviewed by the company's chief operating decision-maker (CODM) (IASB 2006). The CODM can be an individual executive (such as the CEO) or alternatively a team of top management members. Consequently, the disclosed identity of the CODM provides some insight into decision-making structures within the company. Furthermore, whether the tax expense is disclosed per operating segment or not should be indicative of executives' internal review of and concern with the segment-level tax expense. Thus, this disclosure gives insight into whether executives consider the corporate tax expense as an item to be actively managed from a governance perspective or a profit maximisation perspective, as opposed to a passively derived variable.

This study contributes to the understanding of the role of executive (upper echelon) effects on corporate tax avoidance. The study investigates tax avoidance behaviour at JSE-listed companies by isolating and operationalising elements of executives' internal tax review behaviour and the distribution of decision-making power between executives from financial reporting segment disclosure choices. This enabled an examination of the association between the relational dynamics and cognitive processes of executives and corporate tax avoidance. The study uniquely uses operating segment disclosure practices as its proxy to operationalise upper echelon decision-making behaviour, which is often shielded from academic enquiry. The findings of this study will be useful to tax revenue authorities, policymakers and tax researchers, but also to other stakeholders to better understand or influence top leadership behaviour.

Literature review and hypotheses development

Segment disclosure choices in financial reporting standards

The dynamics and cognitive processes of the upper echelon are not directly observable from outside a company, necessitating the use of proxy variables that are expected to be correlated to the unobservable variable, as an (imperfect) representation of such processes. International Financial Reporting Standard 8 dictates segment reporting requirements to listed companies, providing the mechanism for this study's proxy to measure executives' involvement in the monitoring of tax expenses. International Financial Reporting Standard 8 requires listed companies to disclose disaggregated financial information per reportable operating segment, which is typically disclosed in a segment information note to the consolidated financial statements. An operating segment is a component of an entity that engages in business activities from which it may earn revenues and incurs expenses, whose results are regularly reviewed by the company's CODM, and for which separate financial information is

available (IASB 2006). The CODM is the individual or top management team that allocates resources to, and assesses the performance of, company operating segments (IASB 2006). An individual CODM would typically be a CEO, whereas a top management team fulfilling the CODM role is often the executive committee of the board of directors, including the CEO, CFO and financial director. A company must disclose a measure of profit or loss for each reportable operating segment (IASB 2006). Other line items need only be disclosed per operating segment if those items are regularly reviewed internally on the segment level by the CODM or are included in the measure of profit or loss reviewed by the CODM (IASB 2006).

It is generally hidden from the public purview whether the CODM internally reviews and monitors the detailed tax expense of the company. However, the requirements of IFRS 8 lead to a variation in the disclosure of corporate tax expenses that is used in this study: not all CODMs review the tax expense at a segment level, which results in the omission of the tax expense in the segment report, as it is only a requirement for companies to disclose the tax expense per operating segment if this is reviewed by the CODM (Deng et al. 2021). This alternation between companies is the proxy for management's cognitive processes and the level of their involvement in tax affairs that is used in this article. The review of the tax expense at the segment level may indicate that the CODM views it as a strategic expense that can be actively managed. The CODM may want to manage taxation to ensure accountability and compliance, discharging their duty under the King IV code on corporate governance. On the other hand, the CODM may try to manage the tax expense downwards, to maximise shareholder returns or to maximise executive bonuses that are determined with reference to the after-tax profit of the company. Gaertner, Lynch and Steele (2017) find that companies that are more likely to review segment-level tax expenses internally (because of the presence of after-tax incentives in CEO compensation) are also more likely to disclose tax expense on a per-segment level. Regardless of the CODM's intention in reviewing the tax expense, this study operationalises the disclosure of tax expenses in segment disclosure as a proxy for the CODM's review of the tax expense per segment.

The body of knowledge on segment disclosure and its relationships with tax avoidance has focused on the proprietary cost of disclosing tax information, following from the theory that disclosing disaggregated (more detailed) information may threaten a company's competitive position (Verrecchia 1983). Operating segments are identified based on the internal structure of a company. A company may be primarily structured around different geographic areas or primarily structured around different products or services (non-geographically). There may be a higher proprietary cost to disclosing segment-level tax expenses where a company's segments are defined based on geographic regions, as this disclosure could reveal information about tax planning

strategies to regional revenue authorities (Deng et al. 2021). Hope, Ma and Thomas (2013) have found a significant association between tax avoidance and the choice to disclose segments on a geographic basis. Furthermore, Deng et al. (2021) found that companies with more tax avoidance are less likely to disclose segment-level tax information if they segment on a geographical basis.

The upper echelon effect and tax avoidance

Tax avoidance ultimately concerns a human phenomenon (Van der Spuy 2021), which suggests the relevance of sociological theories to understand it better. Upper echelon theory posits that the attributes and skills of CEOs and other executives in top management teams predict organisational outcomes (Hambrick & Mason 1984), including companies' engagement in tax avoidance (Dyregang et al. 2010; Ilaboya & Aronmwan 2023). For example, companies with narcissistic CEOs show more tax avoidance (Araujo et al. 2020; Olsen & Stekelberg 2016), which is also true for CEOs with higher confidence levels (Ilaboya & Aronmwan 2021) and CEOs with a proclivity for personal tax evasion (Chyz 2013). Executives' gender (Francis et al. 2014; Ilaboya & Aronmwan 2023) and political orientation (Christensen et al. 2015) are also reported as predictive of corporate tax avoidance. Prior studies show mixed results regarding the relationship between executives' education, skills and experience and tax avoidance as a corporate outcome. Dyregang et al. (2010) do not find strong associations between the education and experience of executives and tax avoidance, which aligns to the finding by Van der Spuy and De Jager (2023). However, contrary to these studies, other studies considering education and experience have suggested that tax avoidance may be significantly associated to the qualifications (Goh, Lee & Ng 2014), skills (Kabir & Rashid 2023) and experience (Plečnik & Wang 2021) of executives. The level of tax knowledge of a CEO has been found to be positively related to tax avoidance (Aliani 2014) but has also been found to not be associated with tax avoidance (Ilaboya & Aronmwan 2023; Van der Spuy & De Jager 2023).

As explained in the introduction, two points of criticism of upper echelon theory research are that it neglects the relational dynamics of top management teams, and that it focuses mostly on executive characteristics, as opposed to executives' cognitive processes (Neely et al. 2020). Insofar as relational dynamics is concerned, research into the executive effects on tax avoidance has focused mostly on *individual* managers, as opposed to top management *teams* (Plečnik & Wang 2021), which are neglected in the literature, even though upper echelon theory posits that top management teams have the more profound impact on company outcomes (Hambrick 2007). Hanlon and Heitzman (2010) suggest that when executive effects on tax avoidance are investigated, one should consider who makes the tax decisions for the company and how this relates to the balance of power, as either more concentrated or less concentrated in a single individual, such as the CEO (decentralised).

Laguir and Stagliano (2014) find that CEOs with more power (based on CEO's relative remuneration) are significantly associated with more tax avoidance. Conversely, Lee and Kao (2020) find that CEOs with more power are associated with lower levels of tax avoidance, attributing their finding to powerful CEOs being more protective of the firm's reputation. However, when Lee and Kao (2020) distinguish between different types of CEO power (structural, ownership, expert and prestige power), a significant positive association between structural power (proxied by CEO remuneration, *inter alia*) and tax avoidance emerges, supporting the findings of Laguir and Stagliano. Structural power is the influence that an executive exerts on the strategic direction of a company, because of their hierarchical position, privileged access to information and control over resources (Finkelstein 1992). Chief executive officer remuneration, as a proxy for CEO power, does not capture how the CEO uses their power. Specifically, it does not capture whether the CEO acts mostly autocratically or delegates decision-making to a team, which is characteristic of a more consultative approach. Corporate decisions are also influenced by the level of power sharing and delegation of power between CEOs and other executives (Greve & Mitsuhashi 2007). Power concentration enables influential people to establish the norms and values necessary to support their own preferences, thereby enhancing their ability to guide organisations towards their desired outcomes (Greve & Mitsuhashi 2007). A decentralised power distribution results in consensus-based decision-making that depends on compromises among the top management team (Adams, Almeida & Ferreira 2005; Sah & Stiglitz 1986). More diversity in opinions among top management team members makes them more likely to reject inappropriate actions compared to the individual, more autocratic decision-maker (Greve & Mitsuhashi 2007), which may extend to decisions regarding tax avoidance and tax policy.

Various decision-making structures exist in companies. A limitation of this study is that these structures are not readily discernible from external observations of the company. The CODM of a company makes key strategic decisions regarding the allocation of resources and therefore has significant decision-making authority and control over key business decisions. An individual CODM may delegate decisions to subordinates in the company or may rely on the input of others in decision-making. It is an established research practice to use the titles of executives as proxies that indicate and measure their power (Finkelstein 1992; Lee & Kao 2020). There is an intuitive expectation that designating an individual as opposed to a top management team as the CODM would be correlated to a more concentrated decision-making power structure within that company. Therefore, this study operationalises the identity of the CODM in the IFRS 8 operating segment disclosure as the proxy for the distribution of decision-making power of executives for a quantitative study, which is otherwise not directly observable from outside the company. Measuring power distribution through the identity of the CODM, as being either an individual or a team, is a novel proxy to distinguish this

study from the prior literature, allowing this study to test the first hypothesis:

Hypothesis I

H_0 : Having an individual fulfil the role of CODM has no association with tax avoidance.

H_a : Having an individual fulfil the role of CODM will be associated with higher tax avoidance.

The second hypothesis of this study is inspired by a further criticism of existing upper echelon theory research, which is its focus on executive characteristics, as opposed to what information executives consider in the decision-making process (Neely et al. 2020). More tax avoidance has been reported for companies incentivising CEOs and business unit managers based on after-tax measures (Phillips 2003), suggesting the incentive for executives to manage the tax expense to result in tax avoidance. It remains unclear how tax avoidance is affected by executives (Aliani 2014), and whether the executive effects observed in prior studies are attributable to the direct involvement of executives in the tax function (Van der Spuy 2021) or through setting of the tone at the top (Gul et al. 2020). Wang et al. (2020) call for investigations into this cognitive black box of corporate tax avoidance that evaluate the extent to which executives either establish a corporate culture that encourages tax avoidance or directly influence tax avoidance. Dyreng et al. (2010) suggest that the influence of executives on tax avoidance is more likely attributable to the overall climate they establish than active involvement in tax planning.

Interview evidence suggests that chief executives in South Africa have varying levels of direct involvement in tax avoidance, ranging from executives who explicitly encourage tax savings by their company's tax departments to executives who show little concern about the effective tax rate as a value driver (Van der Spuy 2021).

It is posited that executives (referred to as CODMs hereafter) who are actively monitoring the tax expense at the segment level as part of their decision-making processes perceive the tax expense as a manageable variable. A CODM with a tax avoidance agenda or a CODM who perceives the tax expense of the company as a manageable variable may be more likely to review the tax expense per segment. This informs the expectation of a positive association between the CODM's internal review of segment-level tax information and tax avoidance. However, a CODM may also review the tax expense to ensure compliance. Hypothesis II is therefore formulated non-directionally as follows, focusing on the association between the cognitive processes of the upper echelon and tax avoidance:

Hypothesis II

H_0 : The CODM's review of tax expense on the segment level has no association with tax avoidance.

H₃: The CODM's review of tax expense on segment level is associated with tax avoidance.

As part of their original conceptualisation of upper echelon theory, Hambrick and Mason (1984) argue that the influence of top management teams on organisational outcomes is more significant than the influence of individual CEOs. Therefore, the impact of whether the CODM is an individual or top management team on Hypothesis II is also explored.

This article proceeds as follows: the following section explains the method, data and regression models used to test the two hypotheses. The section thereafter provides the regression results and accompanying discussion, whereafter the article concludes. Finally, limitations of the study are highlighted along with opportunities for further research.

Method

This study uses a quantitative research methodology through the employment of multiple regression analyses techniques to test the hypotheses developed above, as set out below.

Data

The study uses empirical, quantitative panel data from JSE-listed companies, covering the period from 2015 to 2019. The period was selected to exclude the effect that the coronavirus disease 2019 (COVID-19) pandemic may have had on the recognition of deferred tax assets, and consequently, the accounting effective tax rate (AETR). Deferred tax assets are recognised only to the extent that it is probable that future taxable profits will be available against which the deferred tax asset can be utilised. The pandemic may have influenced the recognition of deferred tax assets, as companies may have faced significantly increased uncertainty about future earnings. The sample period was limited to 5 years because of the hand collection of CODM data. Johannesburg Stock Exchange listing was a prerequisite as the segment disclosure requirements of IFRS 8 apply only to companies listed on a public exchange (International Accounting Standards Board 2006). All the companies listed on the JSE's main board were included in the sample, except for: companies listed for fewer than 4 years during the period of investigation; companies with no segment information disclosure or only one reporting segment; companies with missing data (such as companies who do not disclose the identity of the CODM); real estate investment trusts (because of their differential tax treatment) and companies with a statutory tax rate other than the prevailing South African corporate income tax rate (which remained stable at 28% during the sample period). Company-years in which companies had a net loss before tax were also excluded, as the AETR for these observations would be difficult to interpret (Gupta & Newberry 1997). The final sample consists of an unbalanced panel of 136 companies with 604 company-year observations.

Regression models

Model I (Equation 1) and Model II (Equation 2) specified below are used to test Hypothesis 1 and Hypothesis 2, respectively. The regression variables (variables of interest and control variables) are described and discussed in each instance in the context of previous quantitative studies in corporate tax avoidance literature.

Model I

$$AETR_{it} = \beta_0 + \beta_1 CODM_{it} + \beta_2 SEGBASE_{it} + \beta_3 ROA_{it} + \beta_4 LEV_{it} + \beta_5 CAP_{it} + \beta_6 INTANG_{it} + \beta_7 PTB_{it} + \beta_8 SIZE_{it} + \varepsilon \quad [\text{Eqn 1}]$$

where: AETR, accounting effective tax rate; β_0 , intercept; CODM, chief operating decision-maker; SEGBASE, primary basis of segmentation; ROA, return on assets; LEV, leverage; CAP, fixed asset intensity; INTANG, intangible asset intensity; PTB, price-to-book ratio; SIZE, company size; ε , error term. A negative coefficient on CODM would indicate support for Hypothesis I. The relation between tax avoidance and the CODM's internal review of the tax expense per segment is tested using the following regression model, for two panels stratified according to the identity of the CODM.

Model II

$$AETR_{it} = \beta_0 + \beta_1 TAXREVIEW_{it} + \beta_2 ROA_{it} + \beta_3 LEV_{it} + \beta_4 CAP_{it} + \beta_5 INTANG_{it} + \beta_6 PTB_{it} + \beta_7 SIZE_{it} + \varepsilon \quad [\text{Eqn 2}]$$

where TAXREVIEW represents the internal review of tax expense per segment. A statistically significant coefficient on TAXREVIEW would indicate support for Hypothesis II. Model II excludes the variable CODM, because it is applied to two sets of panel data stratified according to the value of CODM.

Accounting effective tax rate (dependent variable): This study defines tax avoidance as anything that may reduce a company's effective tax rate (Dyreg, Hanlon & Maydew 2008). The dependent variable, AETR, is the proxy for tax avoidance. Accounting effective tax rates (also referred to as GAAP ETRs in the literature) are often used in empirical tax research as a proxy for tax avoidance (Greeff 2019; Schwab, Stomberg & Xia 2022) and have been found to capture tax aggressiveness (Lanis & Richardson 2012). Accounting effective tax rate is computed as the total of current taxation (the tax payable for the period) and deferred taxation (the net movement in deferred tax assets and liabilities), divided by profit before tax. Profit before tax is the pre-tax accounting profit reported in the statement of comprehensive income. The inclusion of deferred taxation may capture long-run tax avoidance by including future tax liabilities that arise because of temporary differences (Wang et al. 2020). The AETRs were calculated with the current tax expense, deferred tax expense and profit before tax figures obtained from the IRESS database.

Segment disclosure data (variables of interest): The annual financial statements obtained from IRESS for each company-year were inspected to collect the variables of interest from segment disclosures. Firstly, the identity of the CODM was collected and transformed to a dummy variable that differentiates companies that have an individual fulfilling the role of CODM (coded as 0) from those companies in which the CODM is a top management team (coded as 1). This variable (CODM) captures the level of power distribution between executives within the company.

Secondly, whether the tax expense per segment is disclosed in the segment disclosure is captured as a proxy variable (TAXREVIEW) for whether the CODM reviews the tax expense per segment as part of their internal review process (coded as 1), enabling an investigation of executive effects.

The findings of Deng et al. (2021) as discussed provide support for the current study's choice of proxy, in addition to the link established by IFRS 8 between management reviewing and disclosing the segment-level tax expense. The proxy is further legitimised by the low level of tax disclosure transparency in South Africa (Donkor et al. 2022; Medhioub & Boujelbene 2024; Venter, Stiglingh & Smit 2017), as JSE-listed companies are unlikely to disclose segment-level tax expenses unless required to do so by IFRS 8 following the CODM's review thereof.

Thirdly, the primary basis for segmentation (SEGBASE) as geographic (coded as 1) or non-geographic (coded as 0) was also collected, as the literature suggests that the CODMs of geographically segmented companies that review the tax expense internally may exclude tax expenses from segment disclosures because of proprietary cost concerns (Deng et al. 2021). However, the same was not found for non-geographically segmented companies, suggesting that their managers do not strategically hide or show segment line items, but rather disclose the items that they review internally (André, Filip & Moldovan 2016). Therefore, the present study includes only non-geographically segmented companies in the data when testing Hypothesis II to increase the reliability of the proxy TAXREVIEW.

Control variables: Company characteristics identified as determinants of effective tax rates in prior studies were collected from the IRESS database. Total assets were captured and logged as a proxy for company size (SIZE). Larger companies are associated with lower effective tax rates (Ilaboya & Aronmwan 2023; Olsen & Stekelberg 2016; Richardson & Lanis 2007; Van der Spuy & De Jager 2023) possibly because increased tax planning may be facilitated by their resources and organisational complexity. However, they also face greater scrutiny and reputational risks, which can lead to higher effective tax rates (Rego 2003). Leverage (LEV) has been shown to be positively associated with lower effective tax rates because of the tax-deductibility of interest payments (Lanis & Richardson 2012). The intensity of the use

of fixed assets (CAP) is measured as fixed assets as a percentage of total assets. A higher level of investment in fixed assets is generally correlated to lower effective tax rates (Dyrenge et al. 2017; Richardson & Lanis 2007), as companies take advantage of tax incentives in the form of deductions. Intangible assets intensity (INTANG) was calculated by dividing the intangible assets as a percentage of total assets. A high level of intangible assets may result in lower effective tax rates because of tax incentives (Dyrenge et al. 2017), and because technology companies have greater scope for shifting profits to low-tax jurisdictions. A growth variable consisting of the price to book value (PTB) was also included as Davis et al. (2016) have shown a significant negative association between growth and effective tax rates. Finally, the pre-tax return on assets (ROA) was calculated as profit before tax divided by total assets, as companies that are more profitable are associated with lower effective tax rates (Greeff 2019; Gupta & Newberry 1997).

Statistical analysis and robustness: The study employed Pearson correlation coefficients to examine the relation between the various variables. The hypotheses were tested using panel regression analysis conducted in Statistica. Panel data enabled the use of the time-series component to investigate variations over time in specific companies through year fixed effects. The application of the Hausman test indicated that a random effects model was preferable for Panels A and B, while a fixed effects model was preferable for Panel C. Therefore, Model I was run as a random effects model to test Hypothesis I, on the full panel of companies (Panel A). Model II was employed as a random effects model on the stratified panel of companies that have an individual CODM (Panel B) to test Hypothesis II, while fixed effects were employed to test Hypothesis II for the panel of companies that have a top management team CODM (Panel C). The Breusch-Pagan test for heteroskedasticity was applied where necessary. The variance inflation factors indicated no presence of multicollinearity in the multiple regression variables. The Durbin-Watson test was used to check for autocorrelation to address robustness concerns. The Durbin-Watson test results were between the acceptable threshold of 1.5 and 2.5, which indicated the absence of autocorrelation. Skewness and kurtosis were addressed by winsorising the variables AETR, LEV and PTB based on interquartile range scores, with a 10% limit. The results of the analysis are presented in the next section.

Ethical considerations

This study was approved as exempt by the Social, Behavioural and Education Research Ethics Committee of Stellenbosch University. Ethical waiver was received on 17 February 2023, with ethical clearance number REC: SBE-2023-26778.

Results

Descriptive statistics

The mean values of the dummy variables captured from the segment disclosure in the financial statements reveal

that the CODM was mostly (81%) a top management team, as opposed to an individual, possibly indicating more consensus-based or decentralised decision-making power in JSE-listed companies. The CODM reviewed segment tax expenses in 38% of cases, suggesting that the majority of CODMs of JSE-listed companies may not strategically prioritise the review of tax expenses. Most segment disclosures were segmented along products or service lines, with only 14% of segment disclosures presented primarily on a geographical basis. This is in line with what has been found in the United States (Deng et al. 2021) and is not unexpected, given that South African investment analysts deem product or service line segments more useful than geographic segments (Hemus 1991). Interestingly, there was no change in the segment-level tax review behaviour of geographically segmented companies after the introduction of country-by-country reporting in 2016, an initiative of the OECD that requires companies to disclose detailed information to tax authorities about the taxes paid in every country where a multinational group operates (OECD 2015). A low standard deviation in the dummy variables within company groups was observed, indicating that CODMs rarely changed the decision to review segment tax expenses over the sample period, and that there is persistence in whether a company's CODM role is fulfilled by an individual or top management team. The Pearson's pairwise correlation results are presented in Table 1.

There is a significant positive association between the size of the company and having a top management team CODM. It is arguably not surprising that larger companies would have a top management team CODM, given that they may have greater organisational complexity requiring a more diverse skill set for decision-making. The significant negative association between having a top management team as CODM and the CODM reviewing segment taxes suggests active management of the tax expense by individual CODMs with greater concentrations of decision-making power. The correlation results support the findings by Deng et al. (2021) that larger companies are more likely to review segment tax expenses. The regression results are discussed in the following section.

TABLE 1: Pearson correlation matrix for continuous variables.

Variables	AETR	TAXREVIEW	SEGBASE	CODM	ROA	LEV	CAP	INTANG	PTB
AETR	1.000	-	-	-	-	-	-	-	-
TAXREVIEW	-0.018	1.000	-	-	-	-	-	-	-
SEGBASE	0.124***	-0.012	1.000	-	-	-	-	-	-
CODM	0.158***	-0.101**	-0.099**	1.000	-	-	-	-	-
ROA	-0.143***	-0.058	-0.002	0.002	1.000	-	-	-	-
LEV	-0.075*	0.197***	-0.034	-0.231***	-0.327***	1.000	-	-	-
CAP	0.056	-0.282***	0.003	0.113***	0.068*	-0.221***	1.000	-	-
INTANG	0.029	-0.020	0.046	0.051	0.100**	-0.201***	-0.184***	1.000	-
PTB	-0.051	-0.010	0.179***	-0.012	0.346***	0.116***	0.005	-0.001	1.000
SIZE	0.065	0.073*	0.117***	0.142***	-0.245***	0.355***	-0.047	-0.201***	0.157***

AETR, accounting effective tax rate; TAXREVIEW, internal review of tax expense per segment; SEGBASE, primary basis of segmentation; CODM, chief operating decision-maker; ROA, return on assets; LEV, leverage; CAP, fixed asset intensity; INTANG, intangible asset intensity; PTB, price-to-book ratio; SIZE, company size.

***, Correlation is significant at the 0.01 level; **, Correlation is significant at the 0.05 level; *, Correlation is significant at the 0.1 level.

Regression results and discussion

Association between distribution of decision-making power (relational effects) and tax avoidance

Hypothesis I stated that having an individual as CODM would be associated with higher tax avoidance. The regression results for Model I are reported in Table 2. The positive and significant association between CODM and AETR suggests that companies with individual CODMs are engaging in more tax avoidance. The null hypothesis for Hypothesis I is therefore rejected. The coefficient of 6.265 indicates an economically significant association. This result is consistent with the expectation that companies with more distributed decision-making are less likely to engage in tax avoidance. The study therefore supports the finding of Laguir and Stagliano (2014) that individual CEOs with very high levels of power are associated with more tax avoidance.

Furthermore, there is a positive and significant association between SEGBASE and AETR. This provides further support for the finding of Hope et al. (2013) that companies engaging in less tax avoidance are more likely to define segments on a geographic basis. The association may be because of companies engaging in tax avoidance opting not to present segment information primarily on a geographic basis, in line with the proprietary cost theory posited by Deng et al. (2021). As multinational groups may arguably be more likely to segment on a geographical basis, the positive association between geographic segmentation and AETR is consistent

TABLE 2: Regression results for Model I on Panel A.

Variable	Coefficient	Standard error	z-value	Probability
CODM	6.265	2.471	2.54	0.011**
SEGBASE	7.185	3.662	1.96	0.050**
ROA	-41.557	20.227	-2.05	0.040**
LEV	-1.284	0.598	-2.15	0.032**
CAP	0.021	0.052	0.41	0.682
INTANG	0.027	0.071	0.39	0.697
PTB	0.127	0.523	0.24	0.808
SIZE	0.119	0.537	0.22	0.825

Note: Dependent variable: AETR (Mean: 28.589, Standard deviation: 17.437); Method: Random-effects panel regression; Total panel (unbalanced) observations: 604 (136 companies); R-squared: Overall: 7%; Between: 14%, Within: 4%.

AETR, accounting effective tax rate; TAXREVIEW, internal review of tax expense per segment; SEGBASE, primary basis of segmentation; CODM, chief operating decision-maker; ROA, return on assets; LEV, leverage; CAP, fixed asset intensity; INTANG, intangible asset intensity; PTB, price-to-book ratio; SIZE, company size.

**, Correlation is significant at the 0.05 level. Values adjusted for heteroskedasticity.

with the finding of Thiart (2022) that multinational groups listed on the JSE had higher effective tax rates than local JSE-listed companies with no foreign subsidiaries.

These results do not give insight into whether individual CODMs can affect tax avoidance though an active involvement in the tax planning of the company, or whether lower AETRs are the result of a company culture with centralised power. The lower AETR for companies with individual CODMs could be because CEOs with narcissistic tendencies may engage in more tax avoidance, as found by Olsen and Stekelberg (2016), while simultaneously centralising decision-making power within themselves. Model II aims to explore the association between an active involvement in tax planning, through the internal review of segment tax expenses, and tax avoidance.

Decision-maker review (cognitive process effects)

The second regression model was run on the sample stratified based on the identity of the CODM and investigated the association between AETR and the CODM's internal review of the segment tax expenses to test Hypothesis II. The observations included in Panel A (individual CODM) and Panel B (top management team CODM) were restricted to companies segmented along product or service lines as opposed to geographic lines, because of the concerns outlined in the method section regarding geographically segmented companies not following the intent of accounting standards regarding disclosing segment-level tax expenses. Table 3 presents the results. The regression coefficient for TAXREVIEW is negative and significantly associated with AETR for Panel B. Thus, tax avoidance may be more likely where an individual CODM takes a more active approach to the tax planning of the company by reviewing the segment tax expenses internally. This association is in line with the expectation formulated in Hypothesis II, for which the null hypotheses is rejected when considering companies with individual CODMs. It is interesting to observe this association with tax avoidance, given firstly, the broad scope of the general anti-avoidance rules found in South African tax legislation (Thiart 2022), and secondly, the scrutiny listed companies are subjected to from

the South African Revenue Service (Van der Spuy 2021). Conversely, there is a positive (yet insignificant) association between TAXREVIEW and AETR for Panel C, indicating that top management team CODMs may engage in less tax avoidance where the CODM reviews segment tax expenses. This positive association may suggest that teams of top executives of JSE-listed companies purposefully ensure responsible tax policies, as required by King IV (IoDSA 2016), resulting in higher AETRs. Indeed, Thiart (2019) found that 94% of JSE-listed companies indicated that they considered their corporate tax liability to be a part of their social corporate responsibility. There is increasing societal pressure on companies to pay their fair share of tax, and tax avoidance is increasingly viewed as unethical (Thiart 2023). Upward management of corporate effective tax rates may indicate attempts to restore social legitimacy. However, as the association is not statistically significant, the result may support new institutional theory and theories derived from population ecology perspectives, which suggest that executives have very little influence on company outcomes, as organisations are also subject to the inertial effects of societal conventions and norms (DiMaggio & Powell 1983; Hannan & Freeman 1977). The positive association between AETR and TAXREVIEW could alternatively exist because companies with higher tax avoidance may be less likely to disclose segment-level tax information; however, prior studies suggest that managers of non-geographically segmented companies do not strategically hide or show segment line items but rather disclose the items that they review internally.

Based on the results of Model II, the study rejects the null hypothesis that the disclosure of tax expense per segment has no association with tax avoidance, but only for companies where the CODM is an individual. However, the fact that the coefficient on TAXREVIEW at Panel C (Table 3) is positive, but not statistically significant in those instances where the CODMs are teams, suggests that the team effect at least acts as an attenuating force to the autocratic CEO that could endeavour to manage the tax expense downwards.

Conclusion

Prior corporate tax avoidance research indicates that the characteristics of executives, as members of the upper echelon,

TABLE 3: Regression results for Model II.

Variable	Panel B (individual CODM, non-geographically segmented) [†]				Panel C (team CODM, non-geographically segmented) [‡]			
	Coefficient	Standard Error	z-value	Probability	Coefficient	Standard Error	t-statistic	Probability [§]
TAXREVIEW	-17.321	5.069	-3.42	0.001***	16.124	12.142	1.33	0.188
ROA	45.628	26.907	1.70	0.090*	-81.697	36.727	-2.22	0.029**
LEV	1.788	1.291	1.39	0.166	-2.316	2.323	-1.00	0.321
CAP	0.083	0.122	0.68	0.498	-0.150	0.177	-0.85	0.399
INTANG	0.244	0.206	1.19	0.236	-0.435	0.279	-1.56	0.123
PTB	0.106	1.087	0.10	0.922	1.240	1.128	1.10	0.274
SIZE	1.404	0.878	1.60	0.110	-3.248	4.133	-0.79	0.434

Note: A negative coefficient on the TAXREVIEW-variable supports the contention that closely monitored tax in segments should be associated with more tax avoidance, as presented by effective tax rates (AETR).

AETR, accounting effective tax rate; TAXREVIEW, internal review of tax expense per segment; ROA, return on assets; LEV, leverage; CAP, fixed asset intensity; INTANG, intangible asset intensity; PTB, price-to-book ratio; SIZE, company size; CODM, chief operating decision-maker.

***, Correlation is significant at the 1% level; **, Correlation is significant at the 5% level; *, Correlation is significant at the 10% level.

[†], Dependent variables: AETR (Mean: 21.76, Standard deviation: 18.395), Method: Random-effects panel regression, Total panel (unbalanced) observations: 84 (19 companies), *R*-squared: Overall: 33%, Between: 62%, Within: 4%; [‡], Dependent variables: AETR (Mean: 28.506, Standard deviation: 15.398), Method: Fixed-effects panel regression, Total panel (unbalanced) observations: 404 (87 companies), *R*-squared: Overall: 3%, Between: 3%, Within: 9%; [§]Values adjusted for heteroskedasticity

influence corporate tax avoidance. Some of those characteristics include gender, political disposition, qualifications, expertise, level of structural power and narcissism, to name but a few. Yet, there is little known about executives' cognitive processes surrounding tax avoidance decisions. This gap also extends to a dearth of understanding about the effect of relational dynamics on corporate tax avoidance, including whether decision-making in the upper echelon is autocratic or more consensus-based.

This study investigated these two issues. For this purpose, it identifies two areas of discretionary variation in companies' financial statement disclosure. Some companies disclose that the CODM is an individual, whereas others identify that this role is performed by a top management team. The latter suggests a more consultative approach to decision-making, also regarding decisions about tax avoidance. Furthermore, some companies disclose the tax expense on the segment level, because the CODM chooses to regularly review tax per segment internally, whereas the decision-makers of other companies choose not to do so. This variation is used for measurement purposes to test the association between these choices and tax avoidance quantitatively.

The results of this study indicate that companies in which the upper echelon takes a more autocratic decision-making approach are more likely to avoid tax, as opposed to companies where the upper echelon follows a consultative, or a team-based approach for monitoring tax expenses and making tax decisions. The results further indicate that companies where an individual CODM chooses to regularly review the tax expense of the companies' business segments tend to exhibit more tax avoidance on average, compared to companies where the upper echelon do not regularly review the tax expense per segment. This is interpreted as evidence that the former group's cognitive process is aligned to view tax as a manageable variable and, therefore, subject it to more monitoring scrutiny, to increase profits, whereas the other group's cognitive process is anchored to see tax as a passively derived variable. This is the contribution of this article: it adds to further understanding of the processes in the upper echelon, showing that who makes the decisions matter for corporate outcomes, including tax affairs.

Limitations and opportunities for further research

A limitation of the study is that it relies on a proxy variable to capture the decision-making behaviour of top executives, which is not directly observable from outside the company. The possible existence of reverse causality in the regression results is admitted, although the use of fixed effect regression partially mitigates this concern. There is a lack of an appropriate instrument variable to address endogeneity, and a natural experiment is not available. Admittedly, the disclosure of tax expenses per segment, forming the mechanism under examination in this study, may be compromised where companies fail to comply with IFRS 8. This can occur, for example, when a company reviews tax at

the segment level but does not disclose this information because of concerns about proprietary costs. This limitation is partially addressed by the exclusion of geographically segmented firms at Model II, as prior studies have found that companies that are segmented along non-geographic lines appear to present segment information in accordance with the intent of IFRS 8 and not according to proprietary cost concerns. A relatively small sample size for Panel B, given the few JSE-listed companies that have an individual fulfilling the role of CODM, is also acknowledged as a possible limitation of the study. Further research to advance the ideas and analyses presented in this study could investigate, through qualitative methods such as interviews, why some CODMs review the tax expenses per segment, while others do not.

Acknowledgements

The authors want to thank the attending delegates at the Stellenbosch University Corporate Governance in 2023, as well as the delegates of the 2024 ATINER-conference in Greece for their helpful comments and points of critique after our presentation of this article, which have helped us to improve this article in its present form. We also extend our thanks to Profs Martin Kidd and Daan Nel from the Centre for Statistical Consultation at Stellenbosch University for their contribution to the analysis of data.

Competing interests

The authors declare that they have no financial or personal relationships that may have inappropriately influenced them in writing this article.

Authors' contributions

R.B. and P.V.A.v.d.S. contributed to the design and implementation of the research, analysis of the results and writing of the manuscript.

Funding information

This research received no specific grant from any funding agency in the public, commercial or not-for-profit sectors.

Data availability

The data that support the findings of this study are available on request from the corresponding author, R.B.

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