

# EXPLORING THE NEXUS BETWEEN CORPORATE SUSTAINABILITY DISCLOSURE AND FIRM TAX BEHAVIOUR: A META-ANALYSIS

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## Abstract

An increasing number of articles published on the nexus between corporate sustainability disclosure (CSD) and tax behaviour (TB) have enriched the academic research landscape. However, they have provided inconclusive results as to the nature of the connection and have not yet adequately examined the sources of variation that might moderate the effect sizes under investigation. This study performs a standard meta-analysis and synthesises the empirical-quantitative results regarding the CSD-TB connection, following Hunter & Schmidt's (1990) research design. Several criteria are employed to collect documents with methodological and content relevance. The selection process results in a final dataset that includes 50 articles covering the period from 2012 to 2022. The findings reveal that the CSD-TB link is not significant enough for practical purposes, while an investigation of moderating variables that can explain the different findings of earlier studies shows either no or little connection. The benefit of such a no-results analysis for the research community is to redirect future researchers, especially PhD candidates, to examine other factors affecting corporations' TB. In terms of limitations, the meta-analysis is based on the availability of the existing corpus of knowledge and consists only of empirical studies with Pearson correlation coefficients and standardised beta coefficients.

**Implications for Central European audience:** The present study provides evidence that may influence policy-making processes at the European and international level, particularly with regard to corporate tax transparency. The findings suggest that the implementation of CSD has not proven to be effective in terms of tax behaviour. A meta-analysis of the available data shows no statistically significant correlation between CSD and the tax behaviour of businesses, thus challenging the assumption that CSD obligations can act as an effective tool to enhance tax compliance, which implies that other means of enhancing tax compliance need to be explored.

**Keywords:** Corporate sustainability disclosure; tax behaviour; tax transparency; meta-analysis; R language

**JEL Classification:** C19, H26, M14

# Introduction

Are corporate sustainability disclosures (CSD) and tax behaviour (TB), such as corporate tax payments, related (e.g., in a complement or substitute relation, or independent)? There has been considerable academic interest in answering the question of the extent of the link between these two variables. The Global Reporting Initiative tax standard (Global Reporting Initiative (GRI), 2019) mandates that all companies must comply with tax laws and their responsibilities to stakeholders and encourages public reporting on taxation. Such reports promote transparency, strengthen confidence in business tax practices and help stakeholders make sound judgments about a business's tax behaviour. Compliance with tax law leads to financially sustainable economies, whereas non-compliance will cause significant damage to the public good (Lanis & Richardson, 2018).

In their survey on tax research in accounting, Hanlon & Heitzman (2010) found that tax and corporate social responsibility (CSR) are important areas in which research could be advanced. Since then, much research has been done and various approaches have been developed to determine how these two variables are related (Mayberry & Watson, 2021). However, a comprehensive understanding of the role of tax in CSD at an empirical level is still lacking and research findings are conflicting.

Some studies have found a substitutive relationship between CSD and corporate income tax (Zeng, 2019; Abdelfattah & Aboud, 2020; Gandullia & Piserà, 2020). In this negative relationship, companies adopt a CSD to attain the lower tax payments that are associated with a higher level of tax avoidance. In contrast, other studies have discovered a complementary association between CSD and tax avoidance. Although they did not directly examine the direction of causality of the positive correlation, they found that CSD is associated with a concomitant decrease in aggressive tax practices (Liu & Lee, 2019; López-González et al., 2019; Ortas & Gallego-Álvarez, 2020). Yet another interpretation of the relation under investigation is that of Mayberry & Watson (2021), who argued that there is no evidence of tax avoidance changing as a result of legislation, while at the same time increased third-party CSD scores are observed, suggesting that firms separate CSD from tax avoidance practices.

Against this backdrop, the purpose of this paper is to examine whether there is a link between CSD and taxation and to emphasise the potential contribution of CSD to TB. To this end, a meta-analysis is performed to systematically synthesise and evaluate the data collected from the existing literature in order to determine the extent of this correlation. A sample of 50 empirical documents (2012–2022) generating 52 estimates are analysed for the research. Various factors which can potentially moderate this link are investigated (e.g., type of disclosure, type of tax behaviour, activity sector, firm location, type of organisation and measures of organisation size). For the analysis of these moderating variables, the sample of selected documents is subdivided into various subsets depending on the variable being examined.

This subgroup strategy is applied following Khelif & Souissi (2010) to address the problem of overweighting individual papers and reduce the heterogeneity of results. In line with the principles articulated by Wagner & Gooding (1987), this approach allows the identification of moderating factors and increases the precision of meta-analysis conclusions by classifying

studies based on differences in the measurement of the variables. Specifically, in the present analysis, the primary studies are categorised as follows:

Firstly, for the analysis of tax behaviour, the primary studies are divided into three subcategories: research focused on tax avoidance, studies focused on tax aggressiveness and documents exploring corporate taxation. Secondly, regarding the type of information disclosed, the primary studies are divided into three categories: studies that analyse corporate social responsibility (CSR), studies that examine non-financial information and works that revolve around economic information. Thirdly, primary studies are grouped into three main categories based on the type of organisation examined: studies focusing on private organisations, studies focusing on public organisations and studies focusing on mixed ownership organisations. Fourthly, to analyse the effect of the activity sector, the relevant studies are classified by sector into two subcategories: studies focusing on environmentally sensitive sectors and those focusing on environmentally non-sensitive sectors. Fifthly, to assess the effect of geographic region, primary studies are categorised according to the region under study into five subgroups: studies focusing on organisations in the United States, studies with samples from Asia and Africa, studies examining European organisations and papers analysing global samples of organisations. Finally, with regard to measures of organisation size, the studies are classified into four subgroups based on the indicators used to assess the size of companies: log of total assets, total assets, log of total equity and log of number of employees.

More specifically, this work focuses on answering two research questions: (i) is there a relationship between CSD and TB, and if so, (ii) what is the nature of this relationship (e.g., positive, negative, non-existent)? To clarify these goals, the following hypotheses are formulated:

*Hypothesis 1 (H1): There is a relationship between CSD and TB.*

*Hypothesis 2 (H2): The specific type of tax behaviour (tax avoidance, tax aggressiveness, corporate tax) moderates the relationship between CSD and TB.*

*Hypothesis 3 (H3): The nature of disclosure (CSR, financial or non-financial) moderates the relationship between CSD and TB.*

*Hypothesis 4 (H4): The category of ownership (private, public or mixed) moderates the relationship between CSD and TB.*

*Hypothesis 5 (H5): The sector of activity (environmentally sensitive or not) moderates the relationship between CSD and TB.*

*Hypothesis 6 (H6): The region under study moderates the relationship between CSD and TB.*

*Hypothesis 7 (H7): The organisation size used moderates the relationship between CSD and TB.*

This study contributes to the scientific landscape in several ways. Firstly, to the best of our knowledge, this is the first approach aiming to explore the nature of the effect of CSD on TB using meta-analysis techniques. This approach applies statistical methods which facilitate a more accurate and detailed analysis of the data, revealing effects that may be overlooked

in other approaches. We hope that the results will highlight the dependencies between these variables to facilitate future studies in this area through the use of more data.

Secondly, this study advances the growing accounting literature on the interplay between CSD and taxation issues by synthesising and analysing the findings from existing academic research. Among a plethora of studies identifying determinants, the study presents the rare finding of no association. Specifically, in response to articles suggesting that CSD influences tax behaviour (Mao, 2019; Kao & Liao, 2021), we provide a counterpoint with findings that contribute to the development of a more objective framework (Bettis et al., 2015) for understanding the topic under investigation, although they do not confirm their initial hypotheses. Specifically, while previous studies mentioned above show that this relationship goes in several directions, our findings suggest that with the standard meta-analysis approach, the evidence supports decoupling.

The absence of statistically significant findings in our analysis offers the research community an opportunity to redirect future research towards investigating alternative factors that may influence the tax behaviour of firms. Thus, academics and PhD candidates could focus on new theoretical approaches or research methodologies to shed light on the complex relationships between these two variables.

With regard to the practical implications of our study for regulators and policymakers, our results contribute to broadening the debate on the establishment of a fairer and more transparent tax system at the European and international level. In the past, global regulators adopted financial transparency strategies as a key tool to tackle corporate tax avoidance, as Kerr (2019) highlighted. This is confirmed by the concerns expressed by regulators such as the European Securities and Markets Authority (ESMA, 2017) about the potential challenges and complexities of a mandatory CSD regime. At the same time, the inclusion of GRI tax subject 207 (Global Reporting Initiative GRI, 2019) is an important step towards tax transparency.

The adoption of standards and regulations significantly enhances the development of non-financial reporting practices (Delegkos et al., 2022; Dumitru et al., 2017; Xanthopoulou et al., 2024) and contributes to the improvement of companies' performance on ESG factors (Aluchna et. al., 2023). Initiatives such as the Corporate Sustainability Reporting Directive (CSRD), the European Sustainability Reporting Standards (ESRS) and GRI standards are expected to lead to a more consistent and rational sustainability (Skordoulis et al., 2022; Radu et al., 2023; Dragomir et al., 2024) and tax disclosure process (Göttsche et. al., 2024) within the European Union as early as 2024. Our findings support the view that CSD regulations can shape corporate tax strategies, adding new evidence to existing research. Indeed, the analyses suggest that CSD regulations can alter firm behaviour – in our case, by affecting corporate tax policy. As such, our results complement the existing literature regarding the relationship between mandatory CSD and tax practices and underline the central importance of tax transparency in enhancing corporate tax compliance at both a European and an international level.

The rest of the study has the following structure. Section 2 presents an overview of the relevant academic research published on the relationship under study. Section 3 provides details of the data collection. Section 4 explains the methodology applied, while Section 5

offers a discussion of the main results. Section 6 presents the conclusions and limitations of the study, as well as suggestions for future research directions in this domain.

## 1 Literature Review

Sustainable development is a primary goal for businesses worldwide, which renders corporate social disclosures (CSD) increasingly important (Bravo & Reguera-Alvarado, 2019; Grishunin et al., 2022). Corporate social disclosure (CSD) is a corporation's disclosure of financial or non-financial information about its activities that affect its social and physical environment through various channels including annual reports and media announcements (Hackston & Milne, 1996). The term is closely related to both corporate social responsibility (CSR) (Meseguer-Sánchez et al., 2021) and integrated reporting (IR) (Hamad et al., 2023), constituting an integrated approach to corporate communication that includes both these concepts (Hoang, 2018). A key indicator of CSD is environmental, social and governance (ESG) disclosures, which confirm the shift towards sustainability (Koroleva et al., 2020).

Tax behaviour (TB) is a complex phenomenon that includes all interactions between taxpayers (individuals, businesses, organisations) and tax systems. The term can be considered an umbrella term (Salhi et al., 2020) that subsumes a variety of concepts used in academic literature and the business world to describe the various aspects of tax behaviour, such as "tax compliance", "tax transparency", "tax avoidance", "tax aggressiveness", "tax evasion", "tax planning" and "tax management". The interpretation of each of these terms is shaped by the research goals and perspectives of the researcher using it (Kovermann & Velte, 2021; Benlemlih et al., 2023).

Many studies, empirical and theoretical, have produced diverse results regarding the association between CSD and TB (Kovermann & Velte, 2019). These results have included findings of a positive, complementary (Lee, 2020; Ortas & Gallego-Álvarez, 2020), negative, that is, substitutive (Elamer et al., 2024; Hashfi, 2024) or negligible relationship (Ding et al., 2022) between the two. Finally, a combination of both a substitutive and a complementary relationship between non-financial disclosure and corporate tax can be seen concurrently and can be theoretically justified (Goerke, 2019). In a substitutive relationship, companies tend to enhance their non-financial involvement as they decrease their corporate tax payments. This type of relationship primarily centres on the function of CSD as a tool for managing perception, aiming to counter the negative image associated with tax avoidance practices. This aligns with shareholder theory, whereby the firm primarily seeks to maximise benefits for its shareholders. In a complementary relationship, companies enhance their CSD activities while concurrently increasing their corporate tax payments. This relation is in line with stakeholder theory, whereby the company strives to create value for all stakeholders, not just shareholders (Hillenbrand et al., 2019). These conflicting relationships suggest a complex interplay between CSD and TB.

This interplay has been examined by several studies that have attempted to test the link between CSR and tax avoidance, tax aggressiveness or corporate tax on an empirical basis (Baudot et al., 2020; Hillenbrand et al., 2019; Xu et al., 2022). Tax avoidance refers to the deliberate attempt by a company to reduce its tax liability by using legal or illegal practices or strategies (Lee et al., 2015; Chytis et al., 2018). Tax aggressiveness is defined as a legal tax

management behaviour aimed at minimising the company's tax obligations, while complying with the rules and, thus, a company may be able to reduce its tax payments and remain within legal frameworks. In some cases, however, if it is against the spirit of the relevant legislation, it can be considered tax evasion (Landry et al., 2013). According to Avi-Yonah (2011), companies may adopt a strategic tax behaviour with the sole objective of minimising their tax burden, disguising tax aggressiveness as CSR. Overall, the previous literature has been inconclusive. Some researchers have suggested that CSR-committed companies may display less tax avoidance (Lanis & Richardson, 2015), while other scholars have found that CSR is positively related to tax avoidance, constituting a substitute for national-level governance (Montenegro, 2021; Zeng, 2019). To clarify the connection between CSD and corporate tax behaviour, we conducted the present meta-analysis.

Meta-analyses prior to ours have summarised research results regarding determinants of tax compliance (Blackwell, 2007; Hofmann et al., 2017; Dularif & Rustiarini, 2022; Titaailla & Fidiana, 2022) or examined corporate taxation within the context of CSR, as in the case of the systematic literature review by Scarpa & Signori (2023). Velte (2019) carried out an extensive review of 63 documents and found a stronger association between board independence and gender diversity with CSR reporting in countries that offer greater shareholder protection and stronger legal enforcement, but no evidence of a moderating effect from code law regimes. Recently, Marques et al. (2023) analysed 117 estimates from 23 studies to investigate the relationship between CSR and corporate tax aggressiveness and found that both CSR and tax avoidance proxies contribute to explaining the variations in estimates observed in the primary studies.

Other researchers examining the interaction between CSD and tax avoidance practices have arrived at the conclusion that companies may decouple these two dimensions of their business activity (Davis et al., 2016; Mayberry & Watson, 2021). This view holds that firms may not incorporate CSD principles into their tax decisions, leading to an independent maximisation of firm value in each sector (Crilly et al., 2012; Davis et al., 2016; Mayberry & Watson, 2021). For instance, Mayberry & Watson (2021) pointed out that conflicting goals between CSD and tax optimisation may lead firms to adopt a decoupling strategy.

To address these conflicting findings, we apply the meta-analytical perspective of Hunter & Schmidt (1990) on the connection between CSD and corporate tax behaviour, examining the impact of various moderating factors, in an effort to provide an enriched research framework that synthesises and evaluates prior research findings and is subject to an extensive series of robustness tests that confirm their reliability and validity.

## 2 Meta-sample

An in-depth and detailed search was conducted to identify the studies that have examined the link between CSD and taxation, on a rolling basis from August to December 2023. The Scopus and Google Scholar databases were used as search resources to build the sample, using keywords relevant to the focus of this research. Keywords related to "corporate sustainability disclosure" in conjunction with "tax behaviour" were used as search criteria simultaneously. The selection of keywords was based on a thorough analysis of the theoretical framework underlying the concepts of CSD and TB, which was presented at the beginning of Section 1. These included: "tax planning" OR "tax avoidance" OR "tax

management" OR "tax aggressiveness" OR "tax evasion" OR "tax transparency" AND "esg" OR "environ\*social\*govern\*" OR "csr" OR "corporate social responsibility" OR "ir" OR "integrated report\*". These keywords were required to be present in any field as well as the full text. For certain keywords such as "environ\*social\*govern\*" or "report \*\*", an asterisk was added to permit variations in the endings of these words. On the day of data collection (5 August 2023), the search terms identified 309 documents. While this aided in identifying scientific works with substantial relevance, a significant portion of them were not grounded in an empirical approach. Therefore, we incorporated three methodological keywords as filters: "empirical" OR "statistical" OR "data", which had to appear in any field.

To be eligible for this meta-analysis, an article had to satisfy the following five criteria (C): (C1) be an empirical paper using firms as the unit of analysis, (C2) study the association between CSD and taxation, (C3) utilise the Pearson correlation coefficients or a comparable metric between the two main variables, (C4) be published in the English language and (C5) be published between 2012 and 2022. The articles resulting from this process were then reviewed for their appropriateness concerning the research questions and the methodology used. Also, the databases had 14 documents in common and three documents that could not be accessed, resulting in a final total of 50 empirical articles that generated 52 estimates.

**Table 1 | Overview of empirical literature used in meta-analysis (in chronological order)**

Author(s)	Year	Region	Sample	Period covered	Correlation	Sector of activity
Lanis & Richardson	2012	Asia	408	2008–2009	-0.017	Publicly listed companies
Lanis & Richardson	2013	Asia	40	2001–2006	0.28	Listed companies
Laguir et al.	2015	Europe	24	2003–2011	0.228	Publicly listed companies
Lanis & Richardson	2015	USA	62	2003–2009	-0.163	Publicly listed companies from the KLD database
Muller & Kolk	2015	Asia	82	2000–2002	0.045	Listed multinationals and local companies
Davis et al.	2016	USA	407	2006–2011	-0.046	Publicly listed companies
Hardeck & Kim	2016	Worldwide	90	2007–2012	-0.1	Listed companies USA & UK & Germany
Zeng	2016	USA	53	2005–2009	0.32	TXT listed companies
Hasan et al.	2017	Worldwide	509	2009–2016	0.129	Unique parent companies and their 6,103 unique foreign subsidiary companies
K. Z. Lin et al.	2017	Asia	288	2008–2012	-0.018	Non-financial listed companies from 12 industries
Kiesewetter & Manthey	2017	Europe	677	2005–2014	0.049	Listed companies
Kim & Im	2017	Asia	491	2005–2007	-0.015	Manufacturing listed companies
Mgbame et al.	2017	Africa	50	2007–2013	0.001	Publicly listed companies
Venter et al.	2017	Africa	45	2013	0.33	Listed companies from 14 industries
Gulzar et al.	2018	Asia	497	2009–2015	-0.042	Listed companies
Wei Ling & Abdul Wahab	2018	Asia	422	2008–2015	0.042	Non-financial listed companies from the industry
Col & Patel	2019	USA	341	1995–2012	0.382	Listed companies from industry
Fallan & Fallan	2019	Europe	92 111	2009–2012	-0.1 -0.17	Publicly listed companies on the Oslo Stock Exchange
Fourati et al.	2019	Europe	614	2002–2015	-0.023	Listed companies from industry
Inger & Vansant	2019	USA	1550	2000–2013	-0.034	Publicly listed companies
Ling & Abdul Wahab	2019	Asia	373	2008–2015	0.148	Non-financial publicly listed companies



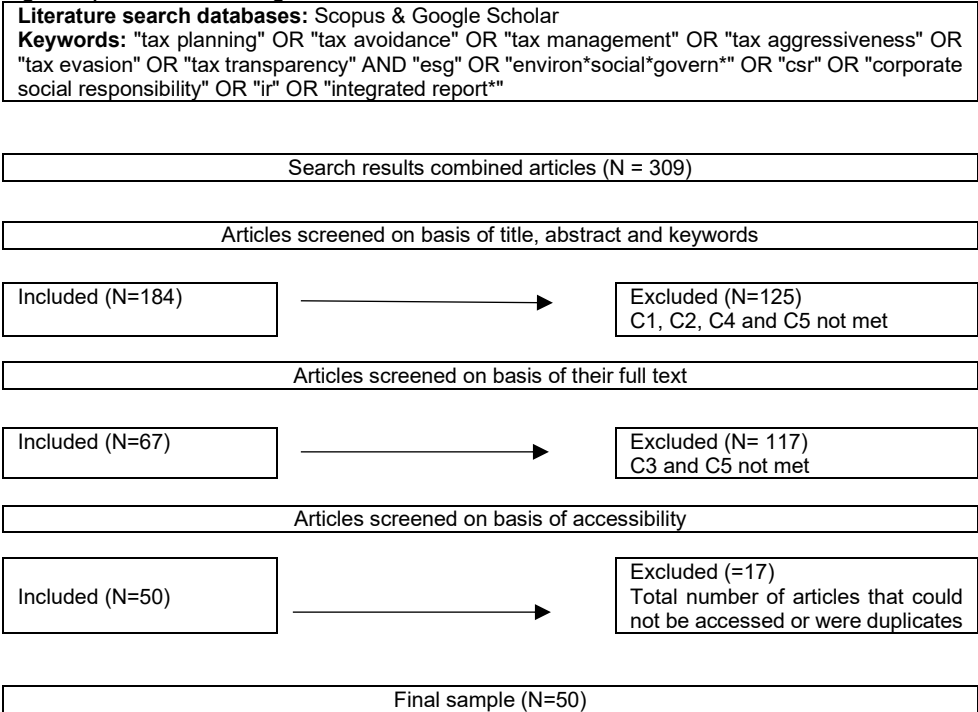
Liu & Lee	2019	Asia	263	2010–2014	0.015	Manufacturing listed companies
López-González et al.	2019	Worldwide	956	2006–2014	-0.014	Listed family-owned companies
Mao & Wu	2019	Asia	94	2009–2016	0.06	Publicly listed companies
X. Lin et al.	2019	Europe	840	1995–2013	-0.082	Listed companies from 48 industries
Zeng	2019	Worldwide	1,799	2011–2015	0.038	Non-financial-listed companies
Abdelfattah & Aboud	2020	Africa	100	2007–2016	0.006	Listed companies
Alsaadi	2020	Europe	214	2008–2016	-0.042	Listed companies
Arianti	2020	Asia	10	2013–2017	0.5	Mining and agricultural listed companies
Gandullia & Piserà	2020	Europe	236	2006–2016	-0.013	Non-financial-listed companies
Jarboui et al.	2020	Europe	300	2005–2017	-0.152	Listed companies
Kristiadi et al.	2020	Asia	67	2008–2019	-0.02	Listed manufacture companies
Mohanadas et al.	2020	Asia	182	2010–2012	0.025	Listed companies
Ortas & Gallego-Álvarez	2020	Worldwide	2,696	2002–2014	0.061	Listed companies from 7 economic sectors
Rudyanto & Pirzada	2020	Asia	443	2014–2017	0.423	Non-financial listed companies
Salhi et al.	2020	Europe	300	2005–2017	0.126	Listed companies
Vacca et al.	2020	Europe	168	2011–2018	-0.053	Listed companies
Awad	2021	Africa	179	2007–2015	0.097	Non-financial listed companies
(Fuadah & Kalsum)	2021	Asia	29	2017–2019	-0.294	Manufacturing listed companies
Kao & Liao	2021	Europe	120	2010–2014	0.143	Listed companies
Montenegro	2021	Worldwide	25	2004–2010	0.11	Listed companies
Pranata et al.	2021	Asia	16	2017–2019	-0.176	Food and beverage companies
Timbate	2021	USA	1,500	2007–2016	0.03	Listed companies
W. L. Lin	2021	USA	162	2008–2017	0.115	Listed companies
Chemingui et al.	2022	Europe	72	2010–2017	-0.815	Listed companies

Dakhli	2022	Europe	200	2007–2018	0.324	Listed companies
Ding et al.	2022	Asia	1,457	2002–2017	-0,.008	Listed companies
Donkor et al.	2022	Africa	74	2011–2017	-0.149	Listed companies
Hajawiyah et al.	2022	Asia	41	2013–2020	0.027	Non-financial listed companies
Khan et al.	2022	Worldwide	91 121	2011–2020	-0.055 0.021	Listed companies

Source: Prepared by authors

Table 1 depicts details on the authors, year of publication, location of companies, sample size, sample period, correlation and sector of activity of each study.

**Figure 1 | PRISMA flow diagram of article selection**



Source: Authors' computation

Figure 1 depicts the flow of methodology and adheres to the guidelines set by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) (Liberati et al., 2009; Moher et al., 2009).

**Table 2 | Number of published documents included in our study**

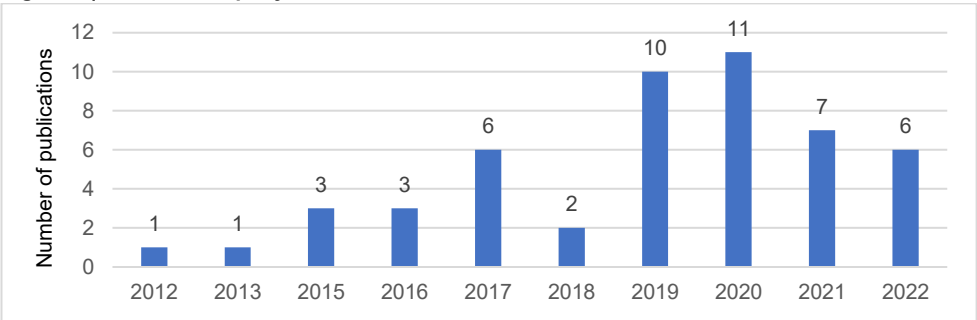
Documents by year		
<b>Total: 50</b>	• 2012: 1	• 2018: 2
	• 2013: 1	• 2019: 10
	• 2015: 3	• 2020: 11
	• 2016: 3	• 2021: 7
	• 2017: 6	• 2022: 6
Documents by region		
<b>Total: 50</b>	• Africa: 5	
	• Asia: 18	
	• Europe: 13	
	• Multiple Countries: 7	
	• USA: 7	
Documents by journal		
<b>Total: 50</b>	• Accounting Perspectives: 1	• Journal of Accounting and Taxation: 1
	• Accounting, Auditing & Accountability Journal: 2	• Journal of Applied Business and Economics: 1
	• Arab Journal of Management: 1	• Journal of Asian Finance, Economics and Business: 1
	• Asia-Pacific Journal of Accounting and Economics: 1	• Journal of Business Ethics: 2
	• Business and Society: 1	• Journal of Cleaner Production: 2
	• Business Research Quarterly: 1	• Journal of Financial Crime: 1
	• Cogent Business and Management: 3	• Journal of Financial Reporting and Accounting: 1
	• Cogent Economics and Finance: 1	• Journal of International Accounting Research: 1
	• Corporate Governance: 2	• Journal of International Accounting, Auditing and Taxation: 1
	• Corporate Social Responsibility and Environmental Management: 3	• Journal of International Financial Management and Accounting: 1
	• EuroMed J. of Management: 1	• Journal of Management Accounting Research: 1
	• Frontiers in Psychology: 1	• Journal of Theory and Applied Management: 1
	• International Journal of Accounting: 1	• Managerial Auditing Journal: 1
	• International Journal of Accounting and Information Management: 1	• Munich Personal RePEc Archive: 1
	• Journal of Accounting and Business Education: 1	• Scandinavian Journal of Management: 1
	• Journal of Accounting and Public Policy: 1	• Social Responsibility Journal: 4
		• Sustainability: 4
		• Sustainability Accounting, Management and Policy Journal: 1
		• The Accounting Review: 1
		• Universal Journal of Accounting and Finance: 1

Source: Authors' computation

An overview of the documents included in this meta-analysis is provided in Table 2. It depicts them by year of publication, countries examined and the journals in which the documents were published.

Figure 2 illustrates the increasing number of publications per year. It is important to emphasise that the data presented in this figure do not necessarily reflect the absence of empirical research into the determinants of TB during this specific period. Rather, it signifies that no pertinent empirical research specifically focusing on CSD as a determinant of TB was found.

**Figure 2 | Publications per year**



Source: Authors' computation

Empirical research in this field is largely focused on studies conducted with samples from Asia (18) and Europe (13). TB is now a subject of international scientific interest, with researchers examining the factors that determine it in both developed and developing countries, such as the USA (7) and Africa (5) respectively. Indeed, the fact that these studies were published in both CSD-focused journals (e.g., *Corporate Social Responsibility and Environmental Management*, *Social Responsibility Journal*, *Sustainability*) and traditional accounting and finance journals (e.g., *International Review of Financial Analysis*, *Journal of Accounting and Public Policy*, and *Accounting, Auditing & Accountability Journal*) highlights the interdisciplinary nature and significance of the topic. Although there is a growing interest in investigating the relation under study globally, the majority of existing articles focus on Asian and European samples, suggesting an asymmetry in the scientific output. Future research should expand its geographical scope, including countries from Latin America, Africa and Oceania.

### 3 Methodology

The diversity of findings in previous studies examining the CSD-TB relationship makes it difficult to draw clear conclusions as they have led to conflicting results, attributed to differences in samples, variables and methodologies. To address these limitations, we adopted the meta-analysis approach in order to provide a more nuanced and comprehensive understanding of the relationship between CSD and corporate tax behaviour, contributing to a more robust body of knowledge in this area.

In particular, we adopted the meta-analysis methodology of Hunter & Schmidt (1990), which has been established as a reliable tool for integrating and evaluating findings across multiple investigations. A typical example of its application is the study by Majumder et al. (2017), which explored the relationship between corporate governance (CG) and corporate social disclosures (CSD). Analysing data from 29 previous studies, the authors included a wide range of corporate governance variables (e.g., board independence, size, gender diversity) in order to better understand the factors influencing CSD. However, the study focused exclusively on CG variables, ignoring other important factors such as company size, leverage and profitability.

Applying the same steps as the above survey, Eddine et al. (2015) investigated the relationship between intellectual capital disclosure (ICD) and various firm characteristics. Collecting data from 19 previous studies, the analysis demonstrated that size, profitability and the industry in which a firm operates significantly affect the level of ICD. In contrast, leverage and firm age do not appear to have a significant effect. However, the study had some limitations. It did not consider the determinants of CG, while its dataset was limited, which may have affected the reliability of its results. Furthermore, the meta-analysis did not distinguish between different types of ICD indicators.

Building on the pioneering research initiated by Hunter & Schmidt (1990), Siddiqui (2015) conducted a meta-analysis of 25 studies to investigate how corporate governance affects firm performance. Focusing on three main axes (legal systems, governance mechanisms and performance measures), the study demonstrated that external governance mechanisms, such as anti-takeover provisions, and specific performance measures, such as Tobin's Q, play an important role in this relationship. However, the study had a number of limitations, namely the limited number of studies on some variables and the bias of the sample towards civil law countries and specific governance mechanisms.

The common element in existing accounting meta-analyses is that they have sought to determine the correlation between specific accounting variables (e.g., Everse et al., 2016). Similarly, the present study employs the meta-analytic approach to investigate the association between CSD and TB and to quantify its magnitude and direction. However, it improves on previous approaches by considering other important moderating factors influencing the CSD-TB relationship. Our approach is based on the calculation of mean and overall effect sizes (Lipsey & Wilson, 2001), which capture the strength of the link between the dependent variable and an independent variable of interest, as well as on conducting homogeneity analyses, such as the Q-statistic test. In case the results of the studies are not homogenous, we look for variables that might explain these differences. To this end, we investigate the existence of moderating variables by creating subgroups of studies and comparing results within each subgroup.

The main effect size metric used was the Pearson correlation coefficient ( $r$ ) or related transformation in each document. This measure was chosen because it is widely applied in accounting research as well as previous meta-analyses (Eddine et al., 2015; Siddiqui, 2015; Majumder et al., 2017). Papers providing only standardised regression coefficients (i.e., beta [ $\beta$ ]) were converted into correlation coefficients using Equation (1), based on the example of Peterson & Brown (2005).

$$r = 0.98 \beta + 0.05 \lambda \quad (1)$$

After obtaining the coefficients, the specific methodology consisted of the six following step:

Step 1: We first calculated the mean correlation ( $\bar{r}$ ), a statistical indicator that gives us a general picture of the relationship between the variables in the studies examined. This mean correlation is based on the sample size ( $N_i$ ) of each study and the corresponding Pearson correlation coefficient ( $r_i$ ). The ( $\bar{r}$ ) is computed using the following equation:

$$\bar{r} = \frac{\sum N_i r_i}{\sum N_i} \quad (2)$$

Step 2: To calculate the 95% confidence interval, we used the unbiased estimate of the population standard deviation ( $S_p$ ) and the mean correlation ( $\bar{r}$ ) according to the following equation:

$$\bar{r} \pm 1.96 \frac{1 - \bar{r}^2}{\sqrt{\sum N_i - k}} \quad (3)$$

Confidence intervals are a useful tool for evaluating the statistical significance of an association. If the confidence interval contains zero, then the underlying association in the population is considered not statistically significant.

Step 3: This methodology offers a more reliable estimate of the population mean association by using information from multiple studies. The observed heterogeneity between correlation coefficients ( $S_r^2$ ) in different studies is estimated using an average squared error weighted by each sample size. The observed variance is calculated as follows:

$$S_r^2 = \frac{\sum N_i (r_i - \bar{r})^2}{\sum N_i} \quad (4)$$

Step 4: This statistic estimates the total observed variance ( $S_r^2$ ) of each correlation around the mean estimate ( $\bar{r}$ ). In contrast to other meta-analytic approaches, Hunter & Schmidt (1990) argued that the observed variance between individual correlations ( $\bar{r}$ ) is not equalised with the population variance. They also claimed that the total observed variance ( $S_r^2$ ) is the sum of the variance due to errors ( $S_e^2$ ) and the variance reflecting the true state in the population ( $S_p^2$ ). Therefore, the most accurate estimate of the population variance is not simply the observed variance *per se*, but the observed variance reduced by an estimated value of the sampling error variance ( $S_e^2$ ). Sampling error variance is computed as follows:

$$S_e^2 = \frac{(1 - \bar{r}^2)^2}{N - 1} \quad (5)$$

Step 5: Publication bias was assessed by constructing a funnel plot (Figure 2) of the distribution of the estimates of the papers in the meta-analysis in terms of precision, that is, the reciprocal of the standard errors. Both trim-and-fill technique and the Begg and Mazumdar test were applied for this purpose (Rothstein et al., 2005). The homogeneity of correlations was then examined, involving a statistical test using the Q-statistic Equation (6).

$$Q = k \left( \frac{S_r^2}{S_e^2} \right) \quad (6)$$

Step 6: Robustness tests were performed to assess the validity of the findings. Specifically, comparative analyses were performed between the primary models and the robustness models. These analyses were implemented in the R environment, using the metafor package

(Viechtbauer, 2010). Through this function, estimates for robust cluster tests and confidence intervals of model coefficients for objects of class "rma" are obtained. In addition, this function produces a robust estimate of the variance-covariance matrix of the model coefficients, using a sandwich estimator. The tests and confidence intervals of the model coefficients are then calculated (Cameron & Miller, 2015).

We used R language to analyse the dataset and performed the following calculations: (i) in order to assess the impact of large samples on the research results, estimates were made both with and without large samples; (ii) based on various moderating variables (e.g., tax dimensions, CSD dimensions, sector of activity, region, type of organisation and measures of organisation size), subgroup analyses were conducted.

## 4 Results and Discussion

Table 3 depicts the results concerning the link between the antecedent and moderating variables of the relationship. The relationship between CSD and TB shows an average effect size of 0.01 for the 52 effect sizes in the sample, corresponding to 19,981 organisations.

Five large samples, representing a total of 9,002 organisations, were examined for their effect on the average  $r$  coefficient. We found that including these samples reduced the sampling error variance (i.e., less homogeneity). Thus, the five samples were removed from the outcomes. After the exclusion of the large samples, the correlation coefficient in the general data was 0.035, not large enough to be considered significant for practical purposes according to the scale established by Cohen (1988), whereby correlations with values of  $r$  close to 0.1, 0.3 and 0.5 correspond to small, medium and large effect sizes respectively (< 0.1).

Table 3 | Meta-analysis results

Type of relationship								
Link	Number of effects	Sample	Effect size <sup>1</sup>	Confidence intervals		Observed total variance	Sampling error variance	Q-statistic <sup>2</sup>
				Lower bound	Upper bound			
CSD – TAX	52	19,981	0.011	-0.02	0.04	0.015	0.003	286.31***
CSD – TAX (without large samples)	47	10,979	0.035	-0.02	0.08	0.025	0.004	263.02***
Measures or types of tax behaviour								
Tax avoidance	25	7,297	0.055*	-0.01	0.12	0.024	0.003	163.03***
Tax aggressiveness	16	2,355	-0.070	-0.16	0.02	0.029	0.007	62.45***
Corporate taxation	2	326	-0.037	-0.53	0.46	0.003	0.006	1.00
Type of disclosure								
CSR	33	8,330	0.012	-0.04	0.06	0.021	0.004	167.94***
Non-financial	10	2,456	0.086*	-0.05	0.22	0.036	0.004	80.83***
Economic	4	193	0.082*	-0.20	0.36	0.031	0.021	4.34*
Type of organisation								
Private	22	6,733	-0.043	-0.06	0.06	0.017	0.003	109.27***
Public	23	3,540	0.039	-0.03	0.11	0.024	0.007	79.45***
Mixed	2	706	0.271*	-1.00	1.00	0.078	0.002	32.11***
Sector of activity								
Environmentally sensitive	39	9,511	0.034	-0.02	0.09	0.028	0.004	254.28***
Non-environmentally sensitive	8	1,468	0.007	-0.06	0.07	0.006	0.006	8.13**
Countries								
Asia	17	3,746	0.065*	-0.01	0.14	0.024	0.005	82.84***
Africa	5	448	0.049	-0.13	0.23	0.020	0.011	7.23**
Europe	14	3,968	-0.020	-0.11	0.07	0.026	0.004	95.52***
USA	5	1,025	0.097*	-0.21	0.41	0.061	0.005	50.89***
Worldwide	6	1,792	0.024	-0.06	0.11	0.006	0.003	9.09**
Measures of organisation size								
Log of total assets	30	7,735	0.033	-0.03	0.10	0.031	0.004	232.31***
Total assets	9	2,401	0.005	-0.05	0.06	0.005	0.004	10.30**
Log of total equity	2	493	0.147*	0.12	0.17	0.000	0.004	1.00
Log of number of employees	2	203	-0.139*	-0.58	0.31	0.002	0.010	1.00

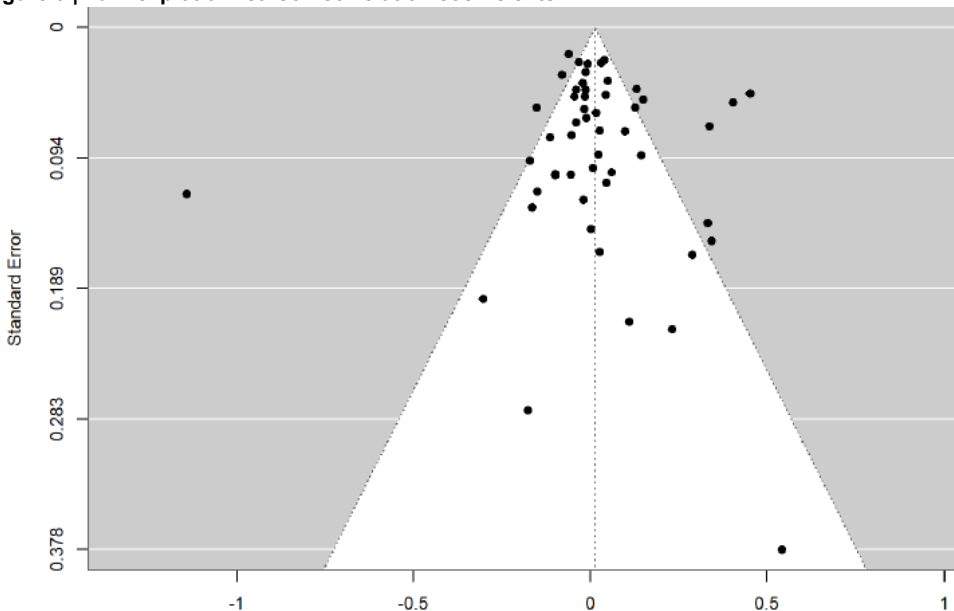
Note: <sup>1</sup>\* The effect size column indicates that mean correlation is significant. <sup>2</sup>\*, \*\* and \*\*\* in the Q-statistic column indicates significance at  $p < 0.1$ ,  $p < 0.05$  and  $p < 0.01$ , respectively.

Source: Author's computation using R



A funnel plot of the 52 effect sizes was used to assess whether publication bias might threaten the validity of the meta-analysis results (Figure 3). The lack of obvious asymmetries in the graph can be regarded as evidence against publication bias, which illustrates no clear asymmetry on its left side. Additionally, when the trim-and-fill procedure was applied, no imputation of missing data was made to summarise the funnel plot. Subsequently, the variances from each sample size for the respective correlations (Table 1) were calculated using the Begg and Mazumdar statistical test. However, while this test presented statistically significant results ( $\tau = 0.0505$ ,  $p = 0.5970$ ), very little correlation was indicated between the observed effect sizes and the corresponding sampling variances.

**Figure 3 | Funnel plot of Pearson correlation coefficients**



Note: Fisher's  $r$ -to- $z$  transformation of the correlation coefficients was used for the construction of this figure.

Source: Authors' computation using R

Following the Hunter & Schmidt (1990) process estimating the magnitude of the homogeneity of the effect sizes, we performed the following two tests: (i): the tau squared test ( $\tau^2 = 0.012$ ), which showed low similarity among effect sizes in studies, and (ii) Cochran's Q test (Cochran, 1950) (Q statistic = 286.311 and  $I^2 = 82.187\%$ ), which reflected high heterogeneity. Therefore, due to the high variability in the correlations between them, the documents included in the final sample were grouped according to their similar characteristics with regard to the moderating variables.

The first group reflected how the findings on a CSD-TB link are likely to be influenced by the type of tax measure employed. The three taxation measures considered – tax avoidance, tax aggressiveness and corporate taxation – have different effect sizes, which are slightly lower than the global effect size, except tax avoidance (TA) ( $-0.070$ ,  $-0.037 < 0.035$ ). By Cohen's

scale, these correlations were deemed not strong enough to be considered significant for practical purposes ( $< 0.1$ ).

For the second group of studies in this meta-analysis, the CSD-TB relationship is also likely to be influenced by the type of CSD information. The results show that the size of the non-financial disclosure effect is higher than the effect sizes obtained using economic and CSR disclosure ( $0.086, 0.082 > 0.012$ ). As in the previous case based on the scale developed by Cohen, these correlations are not strong enough to be considered significant for practical purposes ( $< 0.1$ ). Furthermore, the non-financial disclosure shows a mean correlation of 0.086 among 10 independent documents with a 95% interval of -0.05 and 0.22. The Q-statistic implies heterogeneity and entails that TB is not significantly related to CSD measured by non-financial disclosure.

Regarding the third group, Table 3 displays the moderation of the three different types of organisations (e.g., private, public, mixed) and depicts that, with the exception of private ones, organisations have effect sizes higher than the overall effect size ( $0.039, 0.271 > 0.035$ ). According to Cohen's scale, the mixed effect size is the only type that is strong enough to be considered significant for practical purposes ( $> 0.1$ ). The private result shows a negative significant mean correlation  $\bar{r}$  of -0.043 and a 95% confidence interval crosses the zero point. In contrast, mixed organisations show a positive significant mean correlation of 0.271 with a 95% confidence interval between -1.00 and 1.00. However, the Q-statistic is high, which implies high heterogeneity. In terms of the fourth group, we observe the moderation of the CSD-TB relationship by two sectors of activity (e.g., environmentally and non-environmentally sensitive). The results report that both types have low effect sizes ( $0.034, 0.007 < 0.035$ ), which indicates that these correlations are not strong enough to be considered significant for practical purposes ( $< 0.1$ ). More specifically, the overall results for the frequency of the sectors of activity illustrate mean correlations  $\bar{r} = 0.034; 0.007$  with 95% confidence intervals between -0.02\_0.09 and -0.06\_0.07 respectively.

In the fifth group, which is moderated by the variable region, three regions (e.g., Asia, Africa and the USA) exhibit larger effect sizes than the general effect size ( $0.065, 0.049, 0.097 > 0.035$ ), which are statistically significant. Nevertheless, these regions' correlations are not strong enough to be considered significant for practical purposes ( $< 0.1$ ). Specifically, the general results for country moderators reflect an insignificant positive association ( $\bar{r} = 0.0065; 0.049; 0.097; 0.024$  and 95% confidence intervals -0.01\_0.14; -0.13\_0.23; -0.21\_0.41; -0.06\_0.11) except for Europe, which has an insignificant negative association ( $\bar{r} = -0.020$  and a 95% confidence interval between -0.11\_0.07. The fact that the confidence intervals include zero means that the association observed is insignificant.

As for the last group, the CSD-TB relationship is also likely to be influenced by the measures of the organisation size utilised. Only the logs of total equity show a large effect size, which renders them significant enough for practical purposes ( $> 0.1$ ). The other measures considered (i.e., log of total assets, log of employees, 0.033, -0.139) present lower effect size than the general effect size. The correlations of these metrics are not statistically strong enough for practical purposes ( $< 0.1$ ). The choice of firm size measures has a significant effect on the results of studies on the relationship between CSD and tax behaviour. Thus, the log measures of total equity prove to be particularly important in explaining the variability of the results. However, our meta-analysis indicates that the use of the "log of total equity" metric

provides the greatest explanatory power and is recommended as the preferred size indicator in future research.

Table 4 presents the restricted maximum likelihood (REML) estimator along with the sampling error variance to confirm that the results remain unchanged despite the application of additional techniques. The REML method is a widespread statistical parameter estimation technique in mixed effects models, as it improves the estimation of random factors compared to simple maximum likelihood (ML). In particular, REML estimates variance by removing the effect of fixed factors from the outset, which leads to less biased variance estimates. The findings show that the coefficient estimates for all the study variables are consistent, in both direction and statistical significance, with those of the original analysis. Therefore, the results of the study are further confirmed as reliable and durable.

Specifically, we fitted the (random effect) model with an “rma” object and then ran a robustness test by employing the metafor package. We observed the following:  $\tau^2$  (estimated amount of total heterogeneity) was 0.0339 (SE = 0.0083),  $\tau$  (square root of estimated  $\tau^2$  value) was 0.1842 and  $I^2$  (total heterogeneity / total variability) was 92.56% (92.56% of variation reflected actual rather than coincidental differences in the population mean). The heterogeneity test shows the Q-statistic with the degrees of freedom as well as the p-value of the test, suggesting that the included studies do not share a common effect size:  $Q (df = 51) = 345.6325$ ,  $p\text{-value} < 0.0001$ . We received similar model robustness results based on two variance estimators: cluster-robust inference and sandwich estimator.

Table 4 | Results based on cluster-robust inference

Estimate	se <sup>1</sup>	t-value <sup>1</sup>	df <sup>1</sup>	p-value <sup>1</sup>	ci.lb <sup>1</sup>	ci.ub <sup>1</sup>
0.0134	0.0287	0.4664	51	0.6429	-0.0442	0.0709

Significance codes: 0 ‘\*\*\*’ 0.001 ‘\*\*’ 0.01 ‘\*’ 0.05 ‘.’ 0.1 ‘.’ 1

Source: Authors' computation using R

The overall coefficient estimate takes a value of 0.0134 when we sum the 51 effect sizes (standardised mean difference effect size). The se is the robust standard error of the coefficients with a value of 0.0287, indicating a relatively precise estimate. The t-value of 0.4664 is the test statistic of the coefficients. The corresponding p-value suggests that there is a significant association between CSD and tax practices and *ci.lb* and *ci.ub* are the lower and upper bounds respectively of the confidence intervals for the coefficients.

Table 5 | Results based on sandwich estimator

Estimate	se <sup>1</sup>	t-value <sup>1</sup>	df <sup>1</sup>	p-value <sup>1</sup>	ci.lb <sup>1</sup>	ci.ub <sup>1</sup>
0.0134	0.0287	0.4666	48.28	0.6429	-0.0442	0.0710

Significance codes: 0 ‘\*\*\*’ 0.001 ‘\*\*’ 0.01 ‘\*’ 0.05 ‘.’ 0.1 ‘.’ 1

Source: Authors' computation using R

The results calculated using the sandwich estimator are presented in detail in Table 5. The overall estimate (0.0134) is very close to zero and the high p-value (0.6429) suggests that the result is not statistically significant. Both variance estimators (cluster-robust and sandwich

estimator) yielded nearly identical results (low t-values, high p-values); thus, the estimates obtained do not show statistically significant differences. This suggests that the models are reasonably well specified and that the robust estimator is not significantly different in asymptotic terms (Greene, 2012).

The robustness tests confirmed the validity of the meta-analysis findings. The coefficient estimates for all the study variables remained consistent in direction and statistical significance when compared to the original analysis, which supports the reliability of our findings.

All in all, the results suggest that the relationship under investigation is insignificant for all practical purposes, suggesting that, on average, there is no connection between these two variables; therefore, hypothesis H1 is rejected. Also, the hypotheses related to the specific type of TB (H2), type of disclosure (H3), type of organisation (H4), sector of activity (H5), region (H6) and organisation size (H7) have no moderation effect on the relation under investigation and are also rejected.

## Conclusion

Over the past decade, scholars investigating the linkage between CSD and tax practices have sought to better understand the extent to which companies' corporate sustainability policies incorporate paying their legal and fair share of tax obligations. The evidence deriving from empirical research is inconclusive on two grounds. Firstly, the previous relevant bibliography lacks consensus as to whether CSD is related to tax activities. Secondly, when a form of relationship is detected, conclusions regarding its magnitude are complex.

By employing the meta-analysis toolbox, we attempted to shed light on this overall connection by synthesising and evaluating the findings of primary studies, making a substantial contribution to the advancement of knowledge in this field. Specifically, our paper is grounded in a large sample (i.e., 50 documents), allowing a robust estimation of the population value for the relationship under consideration. Furthermore, it enriches the existing scientific landscape by means of the examination of various variables that may potentially moderate this relationship. By providing a retrospective review, drawing data from empirical studies and examining the potential role of various moderators, this paper presents how the meta-analytic method influences research findings, revealing the increasingly prominent role of the CSD-tax nexus in the academic field. It is also of particular importance for academics because it lays the foundations for further research into issues that may affect tax and business practices to maximise the overall welfare of stakeholders. In addition, we hope that our paper will be a useful introduction for young academics who are planning to enter the field of tax research. The results of this study will be of interest to policy makers, international and European organisations, as they can enrich the scientific debate on the effectiveness of anti-tax evasion policies by highlighting the positive correlation between tax transparency and economic growth.

The outcomes uncover a strong identification method common in management and accounting research, producing a no-result finding on a topical topic, which seems to corroborate Mayberry & Watson (2021), who found similar no-result findings, arguing that companies fail to incorporate CSD into corporate tax practices. According to Crilly et al. (2012), companies decouple when they encounter competing goals and there is no strong

consensus as to the most effective strategy. This study contributes to the existing literature on corporate TB by proposing a new, non-deterministic factor affecting it. In contrast to previous research that has focused on determinants, the present paper expands the theoretical framework by adopting the view of Bettis et al. (2015) that the lack of statistically significant results does not detract from the importance of a study, but instead highlights the need for a more holistic approach to understanding tax compliance. Thus, this article complements and enhances the existing theoretical background. Our meta-analysis captures a complex landscape regarding the relationship under study. Although we did not detect a generalised and statistically significant association, the results do not rule out the possibility of more specialised relationships under specific conditions. The complexity of the factors influencing the TB of firms, combined with the dynamic nature of CSD, suggests the need to direct academic research towards examining other critical factors that affect firms' tax behaviour. At both the European and global levels, the results of our research have important implications for the formulation of policies related to tax transparency and corporate accountability, as they provide a strong argument for the need to define internationally accepted reference standards.

Regarding the limitations of this study, it is important to stress that meta-analytic studies have inherent weaknesses (Rosenthal & DiMatteo, 2001). Firstly, to achieve the main research objectives, we chose the standard meta-analysis method, in which the effect size index used to measure the relationships between the variables studied is the Pearson correlation coefficient. Since this association does not imply causality, we did not need to include any empirical treatment to address the endogeneity problem. However, if a study wishes to examine causality, it should consider the suggestions made by Li (2016) on how to minimise the endogeneity problem where possible. Secondly, only studies that reported Pearson correlation coefficients as well as standardised beta coefficients were included in the analysis. Future research could also include studies that provide sufficient information for adequate processing, although they do not include these types of statistical analysis. Alternatively, future research could focus on examining competing directions in the CSD-TB relationship using a multivariate model and regression analysis, which might better reflect the complex, dynamic relationship of the two concepts.

In contemporary accounting research, there has been a shift from traditional meta-analysis techniques to meta-regressions (Marques et al., 2023). This shift is motivated by the recognition of the limitations of classical methods, particularly regarding the simultaneous assessment of multiple moderators. The hierarchical structure of the meta-regressions allows the exploration of interactions between moderators, reducing the risk of misleading conclusions that might arise from independent analyses. Incorporating multiple explanatory variables in meta-regressions (Harbord & Higgins, 2008) provides a more comprehensive framework for understanding the heterogeneity of results across primary studies. While the present paper focused on the most widely studied dimensions of these variables, future research could explore other, less explored dimensions as well. The heterogeneity of results observed in this study, even after controlling for various moderating factors, suggests that it is likely that there are other factors influencing the relationship under investigation. For example, corporate profitability, as argued by Mao & Wu (2019), can play an important role

in tax behaviour and information dissemination. Nevertheless, these limitations are a fertile field for further scientific investigation.

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