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Corporate Tax Avoidance in Portugal: The Impact of SAF-T, e-invoice and Inventory Report

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Resumo

A evasão e elisão fiscal nas empresas tornou-se um tema fundamental nos últimos anos. As crises financeiras e econômicas, o aumento da literacia dos cidadãos, a perceção do impacto dos impostos na sociedade têm contribuído para uma maior pressão junto das organizações para que medidas e iniciativas sejam tomadas de forma a contribuir com uma maior justiça fiscal para as empresas e cidadãos.

Nos últimos anos, têm sido implementadas diversas decisões e medidas de combate, tornando o tema da evasão fiscal e elisão fiscal, uma prioridade para os Estados. Portugal, desde a crise financeira de 2008, tem vindo a implementar várias medidas que, numa primeira fase, visaram essencialmente o combate às atividades de evasão fiscal nas e, mais recentemente, com o objetivo de combater as atividades de elisão fiscal.

Dentro do contexto dos avanços recentes no combate à elisão fiscal, o objetivo desta tese é enriquecer o entendimento do impacto das medidas anti-evasão fiscal sobre as práticas de elisão fiscal e como esses dois fenômenos estão interligados.

Para tal, organizamos a tese em três estudos que tem como objetivo: (1) Identificar os determinantes e as consequências das atividades de elisão fiscal identificadas durante os anos 2003 a 2022; (2) avaliar o impacto da introdução das ferramentas, SAF-T, e-fatura e comunicação obrigatoria de inventários nas atividades de elisão fiscal; e por último (3) avaliar a perceção dos profissionais que lidam diariamente, com pelo menos uma destas ferramentas, relativamente ao seu impacto nas atividades de evasão fiscal e elisão fiscal e no cumprimento das obrigações contabilisticas e fiscais dos contribuintes.

Os resultados revelam que as atividades de elisão fiscal são influenciadas por diversos factores que podem ser externos ou internos à empresa. A maioria dos factores que influenciam as práticas de elisão fiscal, são factores internos, e estão relacionadas com as características e com a estrutura societária e de governação das empresas. Quanto aos factores externos, verificamos que a legislação, a monitorização e controlo das empresas, assim como, a cultura e as normais sociais contribuem para a diminuição das atividades de elisão fiscal. Por último, verificamos o combate às atividades de evasão fiscal em Portugal, contribuíram também para a diminuição das atividades de elisão fiscal, no entanto, de acordo com a perceção dos profissionais inquiridos, quando existe uma elevada agressividade fiscal as empresas tendem a procurar mecanismos alternativos e, desta forma, tentam manter os seus níveis de planeamento fiscal.

Palavras Chave: Elisão Fiscal, Evasão Fiscal, Planeamento Fiscal, Execução Fiscal, SAF-T, e-fatura, Inventários

Abstract

Corporate tax evasion and corporate tax avoidance have become issues of great importance in recent years. Financial and economic crises, increased literacy among citizens, and the perception of the impact of taxes on society have all contributed to greater pressure on organizations to take measures and initiatives aimed at promoting greater fiscal fairness for companies and citizens.

Numerous decisions and measures have been implemented, making the issue of tax evasion and tax avoidance a priority for states. Since the 2008 financial crisis Portugal has implemented several measures that initially sought mainly to combat tax evasion activities. More recently with the goal of addressing tax avoidance activities has been added.

Within the context of advances in combating tax avoidance, the objective of this thesis is to enhance understanding of the impact of anti-tax evasion measures on tax avoidance practices and how these two phenomena are interconnected. The thesis comprises three studies with the following objectives: (1) identify the determinants and consequences of tax avoidance activities; (2) evaluate the impact of the introduction of tools such as SAF-T, e-invoice, and mandatory inventory reporting on tax avoidance activities; and (3) assess the perceptions of professionals who deal daily with at least one of these tools regarding their impact on tax evasion and tax avoidance activities, as well as on the compliance with accounting and tax obligations of taxpayers.

The results reveal that tax avoidance activities are influenced by various factors, which can be external or internal to the company. Most of the factors influencing tax avoidance practices are internal and are related to the characteristics and corporate governance structure of companies. As for external factors, the legal environment, monitoring, and control of companies, as well as cultural and social norms, contribute to reducing tax avoidance activities. Finally, we found that the efforts to stem tax evasion activities in Portugal also contributed to the reduction of tax avoidance activities. However, according to the perceptions of the professionals surveyed, when there is high tax aggressiveness, companies tend to seek alternative mechanisms to maintain their levels of tax planning.

Keywords: Tax Avoidance, Tax Evasion, Tax Planning, Tax Enforcement, SAF-T, e-invoice, Inventory

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List of Abbreviations

BEPS - Base Erosion and Profit Shifting

BTD - Book Tax Differences

CbCR - Country-by-Country reporting

CEO - Chief Executive Officer

CFA - Committee on Fiscal Affairs

CFC - Controlled Foreign Company

CFO – Chief Financial Officer

CSR – Corporate Social Responsibility

ECB - European Central Bank

EOIR - International Standard of Exchange of Information on Request

ETR - Effective Tax Rate

ETRdif - ETR DFifferential

EU - European Union

GDP - Gross Domestic Product

IDD - Inevitable Disclosure Doctrine

IFRS - International Financial Reporting Standards

IMF - International Monetary Fund

IPO - Initial Public Offering

IRC - Corporate Income Tax

LDA - Private Limited Liability Companies

OECD - Organisation for Economic Co-operation and Development

OLS - Ordinary Least Squares

S.A. - Public Limited Liability Companies

SAF-T - Standard Audit File for Tax

SOE - State-owned Enterprises

USA - United States of America

VAT - Value Added Tax

XBRL - eXtensible Business Reporting Language

Chapter 1

1 Introduction

Benjamin Franklin famously wrote in a letter in 1789: "In this world nothing is certain but death and taxes." While it is undeniable that death and taxes are inevitable, humans have continuously sought ways to evade or postpone both when presented with certain opportunities, attempting to transform the inevitable into the avoidable, at least in the short term.

Taxes serve as the cornerstone of societies, notably in Portugal, where the weight of direct and indirect taxes in state revenue reached 74.2% in 2022[1]. Various entities including the Portuguese Government, European Union (EU), and Organisation for Economic Co-operation and Development (OECD), have made concerted efforts over the years to create and enhance initiatives aimed at fostering a transparent, efficient, and effective fiscal system. Ultimately, these endeavors aim to combat activities such as tax evasion and tax avoidance, thereby ensuring the integrity of the tax system and promoting fairness in society.

According to the Tax Justice Network report, activities of tax evasion and tax avoidance result in global losses of over $480 billion annually due to international tax abuse. Corporate tax avoidance accounts for $311 billion of these losses, while tax evasion by individuals amounts to $169 billion. In the case of Portugal the organization estimates annual losses of €1.131 billion, equivalent to 0.5% of the Portuguese gross domestic product (GDP), with €662 million attributed to companies, particularly multinational corporations, and €422 million to individuals (Tax Justice Network et al., 2023).

Although distinct, both activities (evasion and avoidance) have consequences that translate not only into revenue losses for the state but also undermine the rule of law, particularly in terms of trust, justice, and equality.

In Portugal, the law categorizes tax evasion activities as deserving of intense ethical censure, qualifying them as criminal offenses. Tax avoidance activities, on the other hand, are punishable but not considered criminal. Tax avoidance refers to the legal strategies employed by individuals or businesses to minimize tax liability by exploiting loopholes or ambiguities in tax laws, in contrast to tax evasion activities, which involve illegal acts such as falsification or omission of accounting operations, non-issuance of invoices, or unlawful exploitation of tax benefits (Alstadsæter et al., 2022; Gama, 1999; Slemrod & Yitzhaki, 2002).

[1] Values calculated from the Portuguese Government's Transparency Portal available on the website:https://transparencia.gov.pt/pt/orcamento-do-estado/balanco/despesa-receita-balanco/

One of the significant steps taken by Portugal to combat these types of activities emerged in the aftermath of the 2008 economic crisis. Following the crisis Portugal faced credit scarcity and a debt crisis, prompting the Portuguese government to seek a financial bailout from the EU, International Monetary Fund (IMF), and European Central Bank (ECB). In return, it committed to an unprecedented austerity plan to reduce its deficit and intensify the fight against tax evasion. To do so, the government implemented a series of measures and instruments that contributed to the reduction of tax evasion.

The measures taken by Portugal focused primarily on greater tax enforcement with companies (Gabinete do Secretário de Estados dos Assuntos Fiscais, 2015, 2016, 2017). Among these measures, several directly or indirectly contributed to the reduction of tax evasion:

(i) implementation of SAF-T and subsequent development of e-invoicing;

(ii) certification of invoice software;

(iii) mandatory monthly inventory reports for businesses;

(iv) mandatory advance notification of any goods transportation within the national territory;

(v) mandatory reporting of domestic or cross-border transactions.

Associated with these measures, tax deductions[2] were created that transformed individual taxpayers into third-party agents or tax auditors, as they began reporting information to tax authorities regarding the absence or non-issuance of invoices for their own expenses, thereby contributing to increased tax enforcement (Naritomi, 2019). Tax enforcement has thus been proposed as a solution to deterring tax planning activities and, consequently, enhancing the state's tax collection capabilities (E. Chen & Gavious, 2017; Gupta et al., 2014; Hope et al., 2013; Simone et al., 2020).

However, the adoption of tax enforcement measures does not always result in positive outcomes. Some authors argue that in certain cases it may even lead to unintended consequences, whereby one form of tax planning is simply replaced by another (Antón et al., 2021; Gamannossi degl'Innocenti et al., 2022; Malik et al., 2018). Considering that tax evasion provides immediate cash-flow savings related to non-payment of taxes and in extreme cases may even salvage a company's profitability, companies might hesitate to forgo these advantages and could explore alternative (and more complex) mechanisms to retain their benefits (Gamannossi degl'Innocenti et al., 2022; Gemmel & Hasseldine, 2014).

[2] Partial deduction of personal income tax for VAT paid by consumers on general family expenses or in high-risk sectors (e.g., restaurants, vehicle services, hairdressers).

While combating evasion activities is desirable, it is also essential to understand how taxpayers adapt to the new reality, whether they genuinely reduce their involvement or, conversely, replace one activity with another, specifically, if they replace tax evasion activities by tax avoidance ones.

In light of the above, we consider this study relevant for the following reasons: first, in the international context, our study aims to contribute to the literature on corporate taxation, specifically focusing on tax avoidance activities. To achieve this we performed a systematic review to gather various studies conducted between 2003 and 2022, identifying determinants and consequences associated with tax avoidance activities, highlighting some limitations and suggestions for future research directions.

Second, within the national context, our aim is to investigate whether tax avoidance activities are substitutes or complements to tax evasion activities. To achieve this, unlike earlier investigators, we take a unique approach by examining an exogenous event, specifically, the implementation of Standard Audit File for Tax (SAF-T), e-invoicing, and mandatory inventory reporting, which affected most of the companies in Portugal.

Third, there has been no prior empirical study analyzing professionals' perceptions of the effectiveness of these measures (i.e., SAF-T, e-invoice, and mandatory inventory reporting) in reducing tax evasion and tax avoidance activities and enhancing taxpayer compliance.

Finally, our study helps to reveal the relationship between tax evasion and tax avoidance activities, thereby answering the call by Cross and Shaw (1981) for a comprehensive examination of both evasion and avoidance, as taxpayers may perceive them as either substitutes or complements.

1.1 Research problem

Tax avoidance activities have been studied extensively since the 1990s. Shackelford and Shevlin (2001) were the first to highlight unexplored areas such as the determinants of tax aggressiveness, followed by Hanlon and Heitzman (2010), who also called for an explanation of why some companies avoid more taxes than others. Since then there has been an exponential growth in the number of empirical studies published that examine the determinants and consequences of corporate tax avoidance. We deem it necessary to first gather information on tax avoidance activities, defining our first objective in first article, as follows:

(i) What are the determinants and consequences of tax avoidance activities?

Moving forward, considering recent developments in Portugal regarding the struggle against tax evasion activities, we aim to understand how the measures implemented (SAF-T, e-invoicing, and mandatory inventory reports) impact tax avoidance activities. We consider the possibility of two possible scenarios, which we label the "substitution effect" and the "complementary effect". The substitution effect suggests that the fight against tax evasion may inadvertently lead to lighter tax planning strategies, such as tax avoidance. Due to increased invoicing volume, companies may seek alternative ways to maintain their tax payments at a low level. Conversely, the complementary effect suggests that recent measures might have played a role in diminishing not only tax evasion but also tax avoidance. Therefore, our objective in second article is:

(2) Considering recent developments in tax enforcement measures implemented in Portugal, can these measures effectively address not only tax evasion but also tax avoidance?

Lastly, to verify if the conclusions drawn in the previous articles align with the perceptions of professionals working daily with each of the tools implemented, the final article aims to answer the following question:

(3) Did the implementation of SAF-T, e-invoice, and mandatory inventory reports prompt shifts in taxpayers' conduct concerning adherence to their tax and accounting responsibilities, as well as their engagement in tax avoidance and evasion practices?

1.2 Methodological issues

In first article we conducted a systematic literature review, basing our methodology on recommendations from Fink (2010), Petticrew & Roberts (2006) and Tranfield et al. (2003).

Following their guidelines we formulated the research question, selected literature, databases, and keywords, established selection criteria, and ultimately analyzed and synthesized the selected literature. Opting for a systematic review over traditional literature review allowed us to employ a well-defined methodology to minimize bias in the selection, analysis, and interpretation of the literature. Consequently, we were able to select 368 articles on the topic of tax avoidance and gain a comprehensive understanding of the subject.

Second article utilized an empirical study in which data were collected from Portuguese companies using the Bureau van Dijk's Amadeus database. We obtained 299,062 observations from 85,247 non-financial companies from 2012 to 2018. With these data we measured the tax avoidance activities of Portuguese companies and through ordinary least square panel data regression with firm fixed effects sought to understand whether the measures implemented by the Portuguese government contributed to the reduction of tax

avoidance activities or, conversely, led to their increase, resulting in a replacement of tax evasion activities by tax avoidance activities.

Continuing along this line of inquiry, third article employed an empirical study as well, using a sample of 137 surveyed Portuguese professionals. The objective was to verify whether the professionals' perceptions aligned with the conclusions obtained in second article. To achieve this we conducted a descriptive analysis of the results and performed various tests comparing means to assess whether demographic characteristics (e.g., gender, age, academic status) and professional attributes of respondents (e.g., professional experience, job role) affected or altered our results.

1.3 Thesis structure

The present chapter, the Introduction, frames the research work undertaken, particularly regarding the context and identification of the research topic, the definition of research objectives, and the potential contributions this work may offer to the understanding of the subject under analysis.

Following the Introduction, there are three chapters, each focusing on three articles. Chapter 2, corresponding to the first article, comprises a systematic literature review on the topic of tax avoidance. In Chapter 3, corresponding to the second article, an empirical study is conducted based on data collected from Portuguese companies during the period from 2012 to 2018, allowing for the quantification of tax avoidance activities and their evolution following the implementation of tax enforcement measures (SAF-T, e-invoice, and mandatory inventory reports). Additionally, Chapter 4, corresponding to the third article, presents an empirical study that evaluates the perceptions of professionals and users regarding the effectiveness of SAF-T, e-invoice, and inventory reporting tools in combating tax evasion and tax avoidance.

The fifth and final chapter provides conclusions drawn from the research findings and suggests future research directions.

CHAPTER 2

2 Corporate Tax Avoidance: A Systematic Review and Research Agenda

This paper presents a systematic literature review of the determinants and consequences of tax avoidance activities with the aim of identifying the main themes investigated and discussing potential further developments of the tax avoidance agenda. To do so, 368 scholarly articles published between 2003 and 2022 in 118 scientific journals were examined.

One of the main contributions of this study is the reorganization by topic of various studies related to tax avoidance activities. This reorganization enabled us to identify the main conclusions and limitations of the research: (1) the determinants of tax avoidance activities are studied most, namely ownership structure, corporate governance characteristics, and formal external factors (e.g., tax enforcement); (2) endogenous determinants have a greater number of contradictory conclusions compared to formal exogenous determinants; (3) informal exogenous determinants (i.e., non-tax factors) are underexplored; (4) the main consequence of tax avoidance activities identified is related with firm value and the results are contradictory.

Keywords: tax avoidance, tax planning, tax aggressiveness, tax sheltering.

JEL Codes: M41, M48

2.1 Introduction

Tax avoidance has become a subject of increasing attention in recent years due to the need for states to collect revenues to meet the collective needs of their citizens. However, paying taxes is viewed by companies as a cost, a transfer of wealth from shareholders to the state. Companies therefore engage in tax planning strategies to reduce their tax bill. Strategies range from less aggressive to more aggressive approaches, with tax evasion being regarded as the most aggressive and illegal, while tax avoidance activities are lawful.

The impact of tax avoidance activities is substantial worldwide as it results in considerable erosion of a country's tax base and the shifting of profits to countries with more favorable tax regimes, resulting in losses estimated at about 4% to 10% of total tax revenue (OECD, 2021). This leads to high losses for states, inducing a loss of trust and competitive distortions among companies.

Due to the impact of tax avoidance, there has been growing interest in the topic since the 1990s. Shackelford and Shevlin (2001) were the first to call attention to unexplored areas such as the determinants of tax aggressiveness. Later, Hanlon and Heitzman (2010) also called for an explanation of why some companies avoid more taxes than others. Since then, numerous empirical studies examining the determinants and consequences of corporate tax avoidance have been published.

Due to the large number of studies some literature reviews have been conducted to provide an updated overview of the relevant academic literature. Hanlon and Heitzman (2010) conducted a review of tax research in accounting, finance, and economics, dedicating a chapter to analyzing the tax avoidance topic, defining the concept of tax avoidance, analyzing some of the most used measures, and identifying determinants and consequences. Other reviews have focused on certain types of avoidance or countries associated with tax avoidance, such as corporate governance (Kovermann & Velte, 2019), international corporate tax planning in multinational enterprises (Beer et al., 2020; Cooper & Nguyen, 2020), and tax avoidance in China (T. Y. H. Tang, 2020).

As far as we know, two studies focus exclusively on the overall theme of tax avoidance, namely the studies by Wilde and Wilson (2018) and Wang et al. (2020). Both studies address measures of tax avoidance, determinants, and consequences, and suggest future research directions.

However, according to our research criteria, we have observed an exponential increase in studies conducted since 2020. Of the 368 articles analyzed, 139 were published between the

period of 2021 and 2022. Therefore, we believe that there is significant value in undertaking an updated review of the literature as it now stands.

It is important to note that our study is not a traditional literature review but rather a systematic review of the literature on the topic of tax avoidance. This approach sets our review apart from previous ones by employing a well-defined methodology to minimize bias in the selection, analysis, and interpretation of the literature.

Our goal is to provide assistance to researchers, students, and tax authorities by offering a comprehensive framework of determinants, consequences, and the main measures employed over the last 20 years. Additionally, we highlight contradictions and suggest potential avenues for future research. We believe that this study simplifies the research process, enhances the understanding of the tax avoidance theme, and can serve as a useful tool for tax authorities in the early identification of risk signals associated with tax avoidance.

In Section 2 we outline the methodology employed in this study and in Section 3 we perform a bibliographic analysis. Moving to Section 4, we delve into the diverse concepts of tax avoidance and analyze the principal measures employed to assess tax avoidance activities. In Section 5 we explore the determinants and consequences to address the research question: what are the determinants and consequences of tax avoidance activities? Our objective extends beyond the mere identification of determinants and consequences; we strive to showcase the intricacy of the subject matter and the challenges associated with reaching consistent conclusions. Finally, in Section 6 we present a concise conclusion and provide valuable suggestions for future research avenues.

2.2 Methodology

The primary aim of this systematic review is to examine the current state of research on tax avoidance within the accounting field, including its definition, evaluation, and its main drivers and consequences. Drawing on the frameworks proposed by Fink (2010), Petticrew and Roberts (2006), and Tranfield et al. (2003), we identified seven key tasks for the development of our systematic review: (i) formulating the research question, (ii) bibliography, (iii) selecting appropriate databases, (iv) identifying relevant search terms, (v) establishing selection criteria, (vi) conducting the review, and (vii) synthesizing the findings.

2.2.1 Research questions

Papers addressing tax avoidance mostly seek to identify determinants and interactions that may be endogenous or exogenous. They also often aim to build or confirm theories that could help explain the different levels of tax avoidance observed and assess the consequences. To perceive the whole panorama that involves tax avoidance, we conceive the main research question in the following broad way: what determines tax avoidance and what are its consequences? Secondary issues were also defined, such as the definition of tax avoidance and the metrics used to assess the level of tax avoidance.

2.2.2 Bibliography, databases, and keywords.

Three databases were searched for article extraction: the Digital Library B-On, the Business Source Complete, and the Science Direct database. The search was performed using a single keyword, "tax avoidance". In accordance with Hanlon and Heitzman (2010), tax avoidance is defined as the deliberate reduction of taxes.

The advantage of using keywords is that it allows the detection of research areas, namely, the main areas of interest, trends, and possible gaps, which can be an opportunity for future research. We chose to use one keyword because we believe that "tax avoidance" is the one that broadly characterizes the topic. Other words, such as "aggressiveness" or "sheltering", are usually used to describe a specific type of tax avoidance.

2.2.3 Applying practical screening criteria

As selection criteria we considered articles written in English, published between 2003 and 2022, and ranked up to the 3rd quartile according to the Scimago Journal & Country Rank (www.scimagojr.com). Quartile analysis was based on the rankings of December 2022.

As an exclusion criterion we chose to omit papers that investigated tax avoidance in sectors like banking/insurance and state-owned firms, which are subject to unique regulations, thereby complicating cross-sector comparisons. Additionally, papers exploring tax avoidance in a purely theoretical context, those centered on individuals rather than corporations, and those addressing taxes other than corporate income tax were also excluded. Lastly, papers lacking descriptive or inferential statistical analysis were excluded.

2.3 Data analysis

In an initial approach, we conducted a bibliographic analysis, then examined the samples' features, the statistical techniques employed, and ultimately, the outcomes obtained.

2.3.1 Bibliographic data analysis

A total of 1,168 papers were obtained from three databases. Applying the exclusion criteria mentioned above, we arrived at a final selection of 368 articles (Figure 2.1).

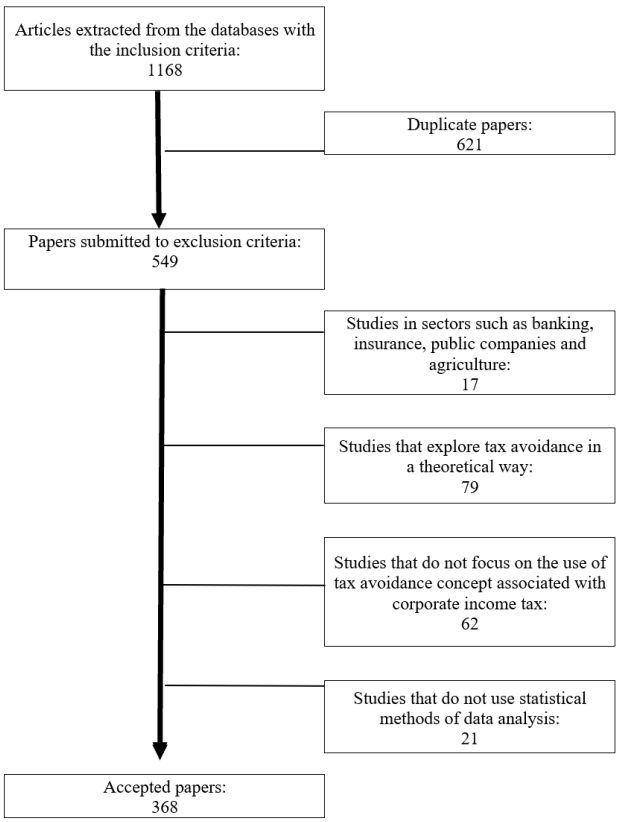

Figure 2.1: Papers selection diagram

Regarding the distribution by year, we observed a consistent rise in the number of publications, with the year 2022 accounting for the highest number of papers published. The rising trend indicates the sustained interest in the topic among academic and scientific communities, as depicted in Figure 2.2.

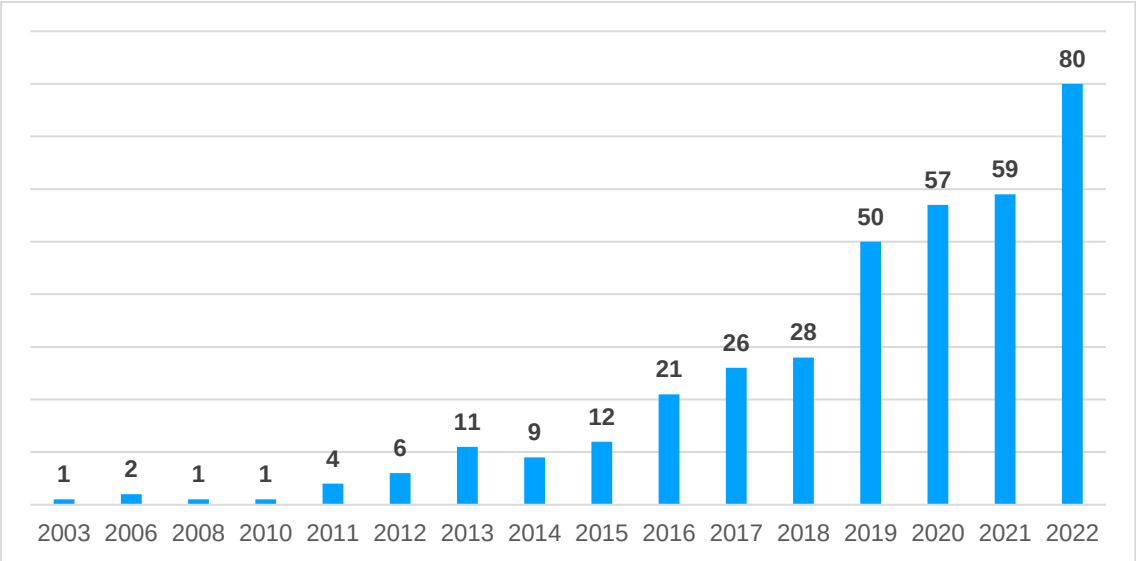

Figure 2.2: Number of publications by year

The papers selected were published in 118 different scholalrly journals. Those with the greatest number of publications were Accounting Review and Journal of the American Taxation Association, both with 30 articles, and Sustainability, with 15 articles. Most of the journals belonged to the accounting and taxation research fields. Interestingly, the analysis revealed that tax avoidance is not limited to accounting and taxation research, as evidenced by its appearance in journals such as Applied Economics, Decisions Support Systems, Journal of Business Ethics, and Journal of Financial Crime, which span diverse research areas.

2.3.2 Samples and methods

In terms of the study settings, 316 papers utilized data from a single country, with the majority (172) being from the United State of America (USA), underscoring its dominance in research on tax avoidance. The remaining works drew data from China (56) and Korea (12). Only 52 papers analyzed samples from more than one country, including both EU and non-EU countries.

The time frame of the studies varied considerably, with the study by Adrian et al. (2022) covering the most extended period of 54 years. On average, the time frame was around 13 years, the most common being 7, 9, and 10 years, with 22, 30, and 36 publications, respectively.

All selected papers employed descriptive or inferential statistics, meeting the screening criteria. Over 80% used multivariate statistical methods, with Multiple Regression and Logistic Regression being the ones used most. Other methods were also used, including the

Two-Stage model of Heckman (1979) in 11 papers, Quantile Regression in 9 papers, Propensity Score Match in 6 papers, Discontinuous Regression in 5 papers, and Linear Probability Model in 2 papers. Additionally, 2 experimental studies, 5 descriptive analysis studies, and 3 articles using surveys were included in the analysis.

2.4 Tax avoidance concept and measures

The concept of tax avoidance has remained relatively consistent over the years, with minor variations resulting from the authors' intentions to characterize or quantify it, either broadly or in a more restrictive sense. In the case of the broad definition of tax avoidance (Table 2.1), some authors proposed original definitions, while others relied on quotes from notable figures in the field, such as Dyreng, Hanlon, and Maydew (2008) and Hanlon and Heitzman (2010).

Table 2.1: Broad tax avoidance definitions

Author(s)	Definition of Tax Avoidance
Dyreng *et al.* (2008, p. 62)	"… we define tax avoidance broadly as anything that reduces the firm's cash effective tax rate over a long time period, i.e., ten years.
Hanlon and Heitzman (2010, p. 137)	If tax avoidance represents a continuum of tax planning strategies where something like municipal bond investments are at one end (lower explicit tax, perfectly legal), then terms such as 'noncompliance', 'evasion', 'aggressiveness', and 'sheltering' would be closer to the other end of the continuum. A tax planning activity or a tax strategy could be anywhere along the continuum depending upon how aggressive the activity is in reducing taxes
Taylor *et al.* (2011, p. 34)	Tax avoidance is defined as any activity or strategy that **reduces a firm's taxes** relative to its pre-tax accounting income.
Lim (2011, p.456)	I define tax avoidance as a tax savings that arises from both the general tax reduction methods and tax shelters that are occasionally of questionable legality to minimize tax liability. In other words, the tax avoidance measure conceptually captures the **cumulative number of transactions to minimize tax liabilities** (Desai and Dharmapala, 2006).
Taylor and Richardson (2014, p.1)	Corporate tax avoidance is defined in this study as any transaction or event ('passive' or 'aggressive') that leads to a reduction in the amount of corporate taxes paid by a firm (see, e.g., Dyreng *et al.*, 2008). Tax avoidance may be achieved through legitimate methods in accordance with tax legislation provisions. In fact, tax reduction methods may be either passive (complying with tax provisions) or aggressive (structuring transactions or activities with one of the principle objectives to decrease the amount of corporate taxes). **Tax avoidance may alternatively be achieved through illegal means or means that are not in compliance with tax legislation provisions. These particular methods constitute tax evasion.**
Li *et al.* (2017, p. 697)	We define tax avoidance broadly as firms' activities to report less taxable income and to reduce taxes paid per unit of accounting earnings. Consistent with the literature (Chen *et al.*, 2010; and Cheng *et al.*, 2012), **we do not distinguish between legal and illegal tax avoidance activities.**

The definition put forward by Hanlon and Heitzman (2010) is widely employed due to its ability to standardize the concept of tax avoidance through a widely accepted definition. Additionally, it enables researchers to account for varying degrees of tax avoidance aggressiveness observed in their studies, facilitating the establishment of a comparable foundation across different research projects.

Regarding the measures, it is observed that over the years, several metrics have been developed to quantify nonconforming tax avoidance, mainly ratios. Currently, there are two large groups: the global indicators of tax avoidance activities (Table 2.2) and the specific indicators of certain tax avoidance activities (Table 2.3).

One of the most used tax avoidance metrics is the effective tax rate (ETR). Rego (2003) demonstrates that companies that avoid taxes tend to reduce their taxable income while maintaining the accounting income, which generates smaller ETR. Recently, some authors have suggested that low ETRs primarily reflect the firm's ability to exploit tax-favored transactions, incentives, or individual agreements rather than indicating a willingness by managers to reduce tax payments (Guenther et al., 2017; Hamzah et al., 2021; Schimanski, 2017; Schwab et al., 2022).

Other indicators, such as CashETR, stem from the ETR. The CashETR ratio reflects any tax avoidance activity that reduces the amount of taxes paid in the current period, including those that differ from the payment of taxes resulting from temporary differences (Dyreng et al., 2008). One of the drawbacks of this measure is its tendency to encompass choices that are not deliberated, such as unanticipated tax benefits from employees' exercise of stock options (Austin, 2019). Additionally, in certain instances, CashETR can reflect tax avoidance associated with earnings management (Guenther et al., 2021).

ETR and CashETR are usually calculated for one year. However, some authors advocate using these measures over longer periods, such as 3 or 5 years. Dyreng *et al.* (2008) used the LongRun CashETR and concluded that companies' behavior is better captured when the time period is extended (*e.g.*, companies that tend to have low CashETR keep these values persistently over time, compared to companies that have high CashETR that end up reversing the situation).

One of the main drawbacks of the measures mentioned so far concerns the difficulty of addressing companies with negative pretax income and/or negative tax expense due to the difficulty of interpreting data obtained. The exclusion of firms with losses was identified as a limitation by Henry and Sansing (2018) and led to the development of the adjusted CashETR. Using this measure Henry and Sansing (2018) were able to replicate the study of Dyreng et al. (2017), which concluded that U.S. multinational firms have exhibited cash effective tax rates similar to those of U.S. domestic firms over the last 25 years, and demonstrated that there is no global tax-favored system for multinational and domestic firms, but an asymmetric treatment that the tax system gives to profits and losses.

Regarding the conclusion of Dyreng et al. (2017) and Henry and Sansing (2018), Drake et al. (2020) showed that the valuation allowances explain part of this downward trend instead of tax avoidance activities. Because of that, the authors recommend adjusting the measures from the valuation allowances effect.

Additionally, a widely used measure for assessing tax avoidance activities is the Book Tax Differences (BTD). A high BTD is associated with tax avoidance and income manipulation, and this indicator may be a good clue to the analysis of the company's future earnings (Blaylock et al., 2012; Jackson, 2015). Based on BTD, Desai and Dharmapala (2006) developed the total discretionary BTD or the abnormal BTD, Frank et al. (2009) the DTAX, and Lampenius et al. (2021) the BTD^{ASTR}.

For Hanlon and Heitzman (2010), DTAX is no more than the differences between rates, and it can be calculated by the difference between the legal tax rate and the effective tax rate (Differential ETR).

Thomsen and Watrin (2018) used Differential ETR and found that although the average value of ETR is higher when compared to the USA's legal rate, the difference between rates is greater in the USA than in European countries. This means that ETR in European countries has fallen due to the decline in each country's legal rate and not due to higher tax avoidance.

Kim et al. (2011) adopted a different strategy for measuring tax avoidance by combining three previously described indicators: the total BTD, the Differential ETR, and the Abnormal BTD. Through factorial analysis it was possible to withdraw the factor common to all and capture the trend of companies that avoid taxes.

Finally, as a metric for very extreme tax planning practices, there are, respectively, the equations of Wilson (2009) and Lisowsky (2010), which measure the probability of companies resorting to tax shelters, and Simone et al. (2019), which measures the extent to which multinationals shift income via intercompany payments – "income shifting". Both models have a disadvantage because their application is limited to USA companies. In Lisowsky's model, this limitation extends to the data needed for predictors that are partly confidential.

Table 2.2: Global tax avoidance metrics

Measure	Formula	Description
GAAP ETR[1,2]	$GAAP\ ETR_{it} = \frac{Tax\ expense_{it}}{Pretax\ income_{it}}$	Total tax expense per monetary unit of pre-tax book income
SubETR[4]	$wSubETR_{gt} = \frac{1}{\sum_{s=1}^{m} Pretax\ income_{st}} * \sum_{s=1}^{m} ETR_{st} * PTI_{st}$	This measure represents the weighted local tax planning within jurisdictions where the subsidiaries are located and where the weight is formed by the level of the subsidiary taxable income.
CashETR [1,2,3]	$Cash\ ETR_{it} = \frac{Cash\ tax\ paid_{it}}{Pretax\ income_{it}}$	Total taxes paid per monetary unit of pre-tax book income
Cash Ratio[5]	$CashRatio = \frac{Cash\ taxes\ paid_{it}}{\left(Pretax\ operating\ cash\ flows_{it} - \begin{matrix}Extraordinary\ items\ and \\ discontinued\ operations\ _{it}\end{matrix}\right)}$	Total taxes paid per monetary unit of pre-tax operating cash-flows
Adjusted CashETR[6] **and Delta MVA**[7]	$CashETR_{adj} - \tau = \frac{\Delta}{Pre\ tax\ income}$ $Delta_{MVA} = \frac{\left(\begin{matrix}Cash\ taxes \\ paid\ _{it}\end{matrix} - \begin{matrix}Statutory\ tax \\ rate\ _{it}\end{matrix} * \begin{matrix}Pretax\ book \\ income\ _{it}\end{matrix}\right)}{Market\ Value\ Assets_{it}}$	Represents the extent to which the CashETR differs from the tax rate.
ASTR[8]	$ASTR_{it} = \sum_{j=1}^{N} \frac{Taxable\ Income_{ijt}}{\sum Taxable\ Income_{ijt}} * Statutory\ Tax\ Rate_{jt}$	ASTR represents the average statutory tax rate of firm i at time t. The taxable income refers to a specific firm (i), time (t) and transaction (j). the statutory tax rate is specific to a particular geographic area, time and transaction.
Total BTD (Hanlon)[9]	$TotalBTD_{it} = Pretax\ book\ income_{it} - \left[\frac{Current\ tax\ expense_{it} + Foreign\ tax\ expense_{it}}{Statutory\ tax\ rate_{it}}\right] - \Delta\ Net\ operating\ loss\ _{it}$	The total differences between book and taxable income
BTD (Manzon e Plesko)[10]	$BTD_{it} = \frac{\left(\begin{matrix}Domestic \\ income\ _{it}\end{matrix} - \begin{matrix}Domestic \\ Taxable\ income_{it}\end{matrix} - \begin{matrix}State \\ income\ taxes_{it}\end{matrix} - \begin{matrix}Other \\ Income\ taxes_{it}\end{matrix} - \begin{matrix}Equity\ in \\ earnings_{it}\end{matrix}\right)}{Assets_{t-1}}$	
BTD[ASTR 11]	$BTDASTR_{it} = Pretax\ book\ income_{it} - \left[\frac{TAX_{it}}{ASTR_{it}}\right]$ $TAX_{it} = \sum_{j=1}^{N} Taxable\ income\ _{ijt} * STR_{jt}$	BTD[ASTR] is the pretax book income minus taxable income, where taxable income is corporate income tax divided by ASTR
Tax avoidance model[12]	$TaxAvoid = \frac{\left(\begin{matrix}pretax\ earnings\ before \\ exceptional\ items\ _{it}\end{matrix} * \begin{matrix}homecountry\ statutory \\ tax\ rate\ _{it}\end{matrix}\right) - Current\ taxes\ paid_{it}}{pretax\ earnings\ before\ exceptional\ items_{it}}$	Total taxes that the company managed to avoid by monetary unit of the pre-tax earnings before exceptional items.
GAAP ETR (> 1 year)	$GAAP\ ETR_{it} = \frac{\sum_{t=1}^{N} Tax\ expense_{it}}{\sum_{t=1}^{N} Pretax\ income_{it}}$	Sum of total tax expense over *n* years, divided by the sum of the pre-tax book income over *n* years
Long-run CASH ETR (> 1 year)[13]	$Cash\ ETR_{it} = \frac{\sum_{t=1}^{N} Cash\ tax\ Paid_{it}}{\sum_{t=1}^{N} Pretax\ income_{it}}$	Sum of cash taxes paid over *n* years divided by the sum of pre-tax book income over *n* years

Table 2.2: Global tax avoidance metrics – Notes *(continued)*

[1] The taxes GAAP ETR and CETR may take other denominators, for example, the use of operational cash flows. (See Guenther et al. (2021) and Salihu et al. (2015)). For Guenther et al. (2021). The use of operational cash flows has the advantage to capture tax avoidance that is unrelated to earnings management (Guenther et al., 2021).

[2] Some authors divide both ratios (GAAP ETR and CETR) by the rates applicable to the companies under analysis since not all countries apply a single tax, which may vary according to industry, region, etc. (see T. Tang, Mo and Chan (2017)). Another alternative may be the adjustment of ratios in relation to the portfolio of companies located in the same quintile of total assets and the same industry. (see Guenther, Matsunaga and Williams (2017).

[3] Some authors choose to change the variable in situations where the result before taxes is negative or in situations where there are refunds for taxes. In these cases the authors choose to equalize CashETR: (1) to zero for companies receiving refunds, (2) to one for companies with positive paid taxes and the result before negative taxes and (3) to one for companies whose ratio value is greater than one in order to mitigate the distortions created by small denominators (See (Jiménez-Angueira, 2018)). There are other authors who choose to transform the variable into a rate, by multiplying by-1 (See Z. Gao, Yi and Yangxin (2017)).

[4] Indicator developed by Beuselinck and Pierk (2022) represents the weighted local tax planning within jurisdictions where the subsidiaries are located (wSubETRg,t) and where the weight is formed by the level of the subsidiary taxable income. The measured was used by the authors in a regression to correlate group level (ETR_{gt}) versus income-weighted subsidiary ETR level ($wSubETR_{gt}$). The correlation serves as an inverse measure of profit shifting and that a lower correlation coefficient indicates more profit shifting, relative to local tax planning as part of the overall tax planning strategy.

$$ETR_{gt} = \beta_0 + \beta_1 * wSubETR_{gt} + Controls_{gt} + Fixed_{Effects} + \varepsilon_{gt}$$

[5] Indicator used by Cen, Maydew, Zhang and Zuo (2017)

[6] Measure developed by Henry and Sansing (2018) represents the difference between the adjusted CETR of the tax refunds claims and the statutory tax rate (τ). The variable (Δ) represents the cash tax avoidance measure scaled by pre-tax book income.

[7] Indicator developed by Henry, Massel and Towery (2016), inspired by the adjusted CashETR of Henry and Sansing (2018).

8 Indicator developed by Lampenius et al. (2021). For the authors ASTR overcomes the challenge of obtaining transaction-specific or country specific statutory tax rates. ASTR captures the reduction in a firm's tax burden due to shifting its income from a jurisdiction with high statutory tax rates to a jurisdiction with low statutory tax rates.

[9] The indicator BTD is sometimes calculated without the variation of losses. However, the variation of losses allows to capture changes in taxable income that are not reflected in the amount of current tax expense (Hanlon & Heitzman, 2010).

[10] Indicator developed by Manzon and Plesko (2012)

[11] Indicator developed by Lampenius et al. (2021)

[12] Indicator developed by Atwood, Drake, Myers and Myers (2012) intends to capture the effect of different tax rates and their possible management.

[13] Measure created by Dyreng et al. (2008). In the analyzed papers, the time period used normally varies between 3 and 5 years. Some authors choose to deflate the pre-tax income by adjusting special items. Jacob and Schütt (2020) developed a measure based on CashETR but capable of measuring the uncertainty:

$$Tax\ Planning\ Score_{i,t} = \frac{1-CETR_{i,t}}{VolCetr_{i,t}} \quad \text{with} \quad VolCetr_{i,t} = \sqrt{\sum_{k=0}^{9}(CashETR_{i,t-k} - Mean(CashETR)_{i-k})^2}$$

Table 2.3: Metrics for specific tax avoidance practices

Measure	Formula	Description
Current ETR[1]	$Current\ ETR_{it} = \frac{Current\ tax\ expense_{it}}{Pretax\ income_{it}}$	Total current tax expense per monetary unit of pre-tax book income.
Current ETR[1] **(> 1 year)**	$Current\ ETR_{it} = \frac{\sum_{t=1}^{N} Current\ tax\ expense_{it}}{\sum_{t=1}^{N} Pretax\ income_{it}}$	Sum of the total current tax expense over *n* years divided by the sum of pre-tax book income over *n* years.
BTD Factor[2]	The main component extracted from three different BTD measures: Total BTD, ETR differential and Abnormal BTD	It consists of the factorial analysis of three indicators simultaneously, where the common factor is removed.
Reported Unrecognized Tax Benefit (UTB)	Value withdrawn from financial statement notes after FIN-48	Tax liability accrued for taxes not yet paid on uncertain positions.
Predicted UTB[3]	$Predicted\ UTB = 0{,}004 + 0{,}011 * PTROA + 0.001 * SIZE + 0.010 * FOR\_SALE + 0.092 * R\&D + 0.002 * DISC\_ACC + 0.003 * LEV + 0.014 * SG\&A - 0.018 * SALES\_GR$	UTB forecasting models.
ETR differential[4]	$ETRdif = Statutory\ Tax\ Rate - GAAP\ ETR$	The difference between the country's tax rate and the company's GAAP ETR.
Temporary BTD	$TempBTD_{it} = \frac{Deferred\ tax\ expense_{it}}{Statutory\ tax\ rate}$	
Permanent BTD	$PermBTD_{it} = TotalBTD_{it} - TempBTD_{it}$	Difference between the total BTD and the temporary BTD
Cushion Tax[5]	$\Delta\ Cushion_{it} = \left(\text{Current tax expense}_{it} - Cash\ Paid\ for\ Taxes_{it} - Tax\ benefit\ from\ stock\ option_{it} - Change\ in\ income\ taxes\ payable_{it}\right)$	Calculation of probable tax liabilities related to tax positions that may be annulled.
Abnormal BTD[6]	The residue of: $\frac{BTD}{TA_{it}} = \beta TA_{it} + \beta m_i + \varepsilon_{it}$	The measure corresponds to the part that is not explained by the differences between accounting and taxation.
DTAX[7]	The error of: $PERMDIFF_{i,t} = \alpha_0 + \alpha_1 INTANG_{i,t} + \alpha_2 UNCON_{i,t} + \alpha_3 MI_{i,t} + \alpha_4 CSTE_{it} + \alpha_5 \Delta NOL_{i,t} + \alpha_6 LAGPERM_{i,t} + \varepsilon_{i,t}$	Residual from regression of total permanent BTD on non-discretionary items that are known to cause permanent differences as well as on other statutory adjustments The regression error reflects the discretionary permanent differences.
Prediction model of tax sheltering de Wilson[8]	$TSprob = ln\ \frac{P_{tax\ shelter}}{1 - P_{tax\ shelter}} = \alpha + \beta X + \varepsilon$ $Shelter = -4{,}86 + 5{,}20 * BTD + 4{,}08 * \lvert DAP \rvert - 1{,}41 * LEV + 0{,}76 * AT + 3{,}51 * ROA + 1{,}72 * Foreign\ income + 2{,}43 * R\&D$	Measure for the use of tax shelter
Prediction model of expanded tax sheltering of Lisowsky[9]	$TSprob = ln\ \frac{P_{tax\ shelter}}{1 - P_{tax\ shelter}} = \alpha + \beta X + \varepsilon$	Measure for the use of tax shelter
Outbound Score	$OS = 0{,}6933 * RD - 1{,}8854 * AD + 0{,}4377 * SGA + 0{,}2634\ Intangibles + 0{,}0197 * Tobin's\ Q + 0{,}4057 * CapEx - 0{,}1447 * Soft\ Assets - 2{,}2314 * GP\% + 0{,}6527 * High\ Tech - 1{,}3845 * Foreign\ Sales\% - 0{,}5382 * DROS + 1{,}4334 * FROS + 0{,}0772 * FSales\ Growth + 0{,}2470 * DSales\ Growth + 0{,}3329 * FTR - 0{,}2477 * Leverage + 1{,}5965 * Interest - 0{,}0414 * Size + 0{,}0451 * Big5 + 0{,}1615 * Non - Crisis + 0{,}0968 * Non - Durables - 0{,}1232 * Durables - 0{,}2811 * Manufacturing - 0{,}2629 * Oil\&Gas - 0{,}5852 * Chemicals + 0{,}0975 * Bus.Equip. - 0{,}1633 * Telecom - 0{,}3829 * Shops + 0{,}2095 * Healthcare$	Measure for the use of income shifting. The measure reflects nontax and tax motivation to income shifting.

Table 2.3: Metrics for specific tax avoidance practices – Notes *(continued)*

[1] Some authors choose to deflate the result before taxes by adjusting the special items.
[2] Technique used by J.-B. Kim et al. (2011).
[3.] Model developed by Rego and Wilson (2012)
[4] The authors Mcguire, Rane, and Weaver (2018) considered the difference between statutory tax rate and the foreign effective tax rate in order to measure the incentives for shift income.
[5] Indicator developed by Blouin and Tuna (2007)
[6] The formula developed by M. A. Desai and Dharmapala (2006) uses the total accruals (TA) to isolate the BTD component that is affected by earnings management. Lim (2011) modified the formula using the discretionary accruals and the performance-matched discretionary accruals, instead of the TA.
[7] The DTAX model was developed by the authors Frank et al. (2009). The PERMDIFF variable represents the difference between the total BTD and the temporary differences and is calculated as follows:

$$PermDiff = Pre\ tax\ book\ income_{it} - \left(\frac{Current\ federal\ tax\ expense_{it} + Current\ foreign\ tax\ expense_{it}}{Statutory\ Tax\ Rate_{it}}\right) - \left(\frac{Deferred\ tax\ expense_{it}}{Statutory\ Tax\ Rate_{it}}\right)$$

[8] Measure developed by Wilson (2009) to measure the probability of a company being associated with a tax shelter. Where:

$$\beta X = \beta_1 BTD_{it} + \beta_2 DAP_{it} + \beta_3 Lev_{it} + \beta_4 Size_{it} + \beta_5 Roa_{it} + \beta_6 Foreign\ income_{it} + \beta_7 R\&D_{it}$$

[9] Measure used by the authors Austin and Wilson (2017), developed by Lisowsky (2010) which, through the confidential data of the Internal Revenue Service, allowed to create a model that measures the probability of a company being associated with a tax shelter. The model was expanded from the model of Wilson (2009), in which:

$$\beta X = \beta_1 BTD_{it} + \beta_2 DAP_{it} + \beta_3 Lev_{it} + \beta_4 Size_{it} + \beta_5 Roa_{it} + \beta_6 Foreign\ income_{it} + \beta_7 R\&D_{it} + \beta_8 Tax\ Havens_{it} + \beta_9 LagETR_{it} + \beta_{10} EqEarn_{it} + \beta_{11} MezzFin_{it} + \beta_{12} Big\ 5_{it} + \beta_9 Litigation_{it} + \beta_{14} NOL_{it} + \sum_{y=15}^{18} \beta_y year_{it} + \sum_{i=19}^{26} \beta_i ind_{it}$$

2.5 Determinants and Consequences of tax avoidance

In this section we report on our in-depth analysis of the factors that may explain or result from tax avoidance. Most of the articles in this study have been divided into two groups, which are the determinants (Sections 2.5.1 and 2.5.2) and consequences of tax avoidance (Section 2.5.3). The determinants of tax avoidance are categorized into internal or external characteristics. The variable tax avoidance is considered as a dependent variable in explanatory statistical models. On the other hand, the consequences of tax avoidance are referred to as models in which tax avoidance is an independent variable.

We categorized descriptive analysis papers according to the topics they cover. Additionally, we analyzed 15 articles that focus exclusively on measures of tax avoidance, which were addressed in the previous section.

2.5.1 Endogenous determinants

We found 190 papers mentioning firms' internal characteristics that may explain tax avoidance, of which 148 papers focus on the firms' characteristics (*i.e*, Company characteristics; Ownership Structure and Corporate Governance; CSR and The role of auditor, internal control, and information transparency) and 45 focus on human resources characteristics. There are 3 articles that are related to firms and human resources characteristics.

2.5.1.1 Company characteristics

Various company characteristics associated with tax avoidance activities have been extensively studied (Table 2.4). Most of the research pertains to multinational corporations, since they possess the financial resources and expertise necessary to pursue tax planning strategies that maximize after-tax returns. This tax planning encompasses not only profit shifting but also the exploitation of cost-effective local tax planning opportunities (Beuselinck & Pierk, 2022). Additionally, we observed that some characteristics identified are moderated by tax risk management, especially internationally (Masri et al., 2019), or influenced by ownership structure.

Rodríguez, Fernández, and Arias, (2019) found that the characteristics of the companies associated with tax avoidance have more impact in private ownership firms than in state-owned companies.

Table 2.4: Tax Avoidance Determinants – Company Characteristics

	Endogenous Determinants	Relation with Tax Avoidance	Authors
Company Characteristics	International activity or multinationalism	+	(Agarwal et al., 2022; Amidu et al., 2019; Cobham & Janský, 2019; M. A. Desai et al., 2006; Dyreng et al., 2013; Hardeck & Wittenstein, 2018; Hong et al., 2022; S. Khan et al., 2022; Kohlhase & Pierk, 2020; Kundelis et al., 2022; S. Park, 2018; Stewart, 2018; Taylor et al., 2015; Yuanita et al., 2020)
	e-commerce business sector	+	(Argilés-Bosch et al., 2020; Fuadah et al., 2022)
	Delisted firms	+	(Y. Shin & Park, 2022)
	Rated firms	+	(T. Chen et al., 2021)
	Profitability	+	(Rego, 2003)
	Intangibles assets and R&D	+	(Cheng et al., 2021; L. Gao, 2016; N. Lee, 2018; Taylor et al., 2015)
	Leverage	+	(Rego, 2003)
	Firm size	+	(Mocanu et al., 2021; Rego, 2003)
	Financial distress and constrains	+	(Akamah et al., 2021; Dang & Tran, 2021)
	Financial derivates	+	(W. Chen, 2022; Donohoe, 2015)
	Tax agressiveness of industry peers firms	+	(Y. Gao et al., 2021; Liang et al., 2021; Liao et al., 2022)
	A high level of organizational capital, *i.e*, firm's stock of knowledge, capabilities, culture, business processes and systems	+	(M. M. Hasan et al., 2021)
	Intra-group geographic proximity	+	(H. Chen et al., 2022)
	Firms operating in sin industries (e.g., alcohol, tobacco, gambling, and firearms)	-	(C. Wang *et al*., 2022)
	Cross-listed firms in USA	-	(R. Chen *et al*., 2022),
	Firms with greater redeployable assets	-	(M. M. Hasan, Habib, *et al*., 2021)
	Firms whose shareholders bear less of the economic burden of corporate taxes	-	(Dyreng *et al*., 2022)
	Business diversification	+/-	(Qin et al., 2022; Vahdani et al., 2019)
	Debt (substituion effet)	+/-	(B. B. Francis et al., 2017; Y. Lim, 2012)

2.5.1.2 Ownership Structure and Corporate Governance.

The ownership structure is one of the essential foundations of the corporate governance effect. The structure of a firm's ownership significantly influences its resource allocation, thereby influencing the firm's financial behavior, specifically its choices concerning tax planning activities. For this reason, several authors have sought to establish connections between the ownership structure and tax avoidance activities (Table 2.5).

In the studies under analysis we observe that two theoretical approaches have been proposed to elucidate the reasons behind the existence of different perspectives regarding tax

avoidance activities. According to the traditional approach, taxes are viewed as an expense to shareholders that reduces the company's value and investment return. Therefore, tax avoidance activities are considered to maximize the company's value or avoid sharing taxes (T. Tang et al., 2017). In these situations managers are encouraged to promote tax planning activities, aligning their interests with shareholders. In these cases, a positive relationship with tax avoidance is expected.

Table 2.5: Tax Avoidance Determinants – Ownership Structure Characteristics

	Endogenous Determinants	Relation with tax avoidance	Authors
Ownership Structure	Pyramidal structures	+	(W.-H. Hsu & Liu, 2018; Mindzak & Zeng, 2020)
	Hedge Funds	+	(Cheng et al., 2012)
	Dual holders	+	(B. Francis et al., 2022; T. Tang et al., 2022)
	Public ownership, *i.e*., general shareholders	+	(Hassan et al., 2022)
	Institutional ownership	+	(Dakhli, 2022; Y. Jiang et al., 2021; M. Khan et al., 2017; B. Li et al., 2021)
	Foreign institutional investors	-	(I. Hasan et al., 2022)
	Dual-class companies	-	(Mcguire et al., 2014)
	Multiple large shareholders	-	(Ouyang et al., 2020)
	Long-term institutional shareholders	-	(Khurana & Moser, 2013; Xiao, 2022)
	Mixed ownership	-	(W. Wang et al., 2021)
	Companies with stock liquidity	-	(Y. Chen, Ge, et al., 2019)
	Concentrated ownership	+/-	(Badertscher et al., 2013; Cabello et al., 2019; Farooq & Zaher, 2020; M. Khan et al., 2017; Richardson, Wang, et al., 2016)
	Companies with classified board structure and family firm status	+/-	(Kovermann & Wendt, 2019; Kuo, 2022; C. H. Lee & Bose, 2021; Moore et al., 2017)
	State-owned enterprises in China	+/-	(Bradshaw et al., 2019; O. Z. Li et al., 2017; T. Tang et al., 2017)

The alternative approach defends that tax avoidance is harmful to shareholders because it promotes protective shields that lead to situations of managerial opportunism and diversion of rents, making the company opaque and with less control of managers' performance (Khurana & Moser, 2013).

According to the principal-agent theory, these situations are more evident in companies with a greater separation between ownership and control. In this situation, the agency problem is compounded, leading to the manager seeking to extract benefits for himself to the detriment of the shareholders. This is referred to as the type I agency problem (executives expropriate shareholders). In the case of the type II agency problem, the controlling shareholders working with managers extract benefits for themselves to the detriment of minority shareholders. This

situation occurs when information asymmetry allows majority shareholders to position themselves in an advantageous position *vis-à-vis* minority shareholders. The conflict creates incentives for tax avoidance activities, namely tunneling activities (W.-H. Hsu & Liu, 2018; Mindzak & Zeng, 2020).

Most of the studies are concerned with the type II agency problem and conclude that in the presence of ownership structures that facilitate managerial entrenchment, agency conflicts are minimized, which means that tax avoidance is low (Badertscher et al., 2013; Farooq & Zaher, 2020; Mcguire et al., 2014; Moore et al., 2017; Ouyang et al., 2020).

In addition to ownership structures, internal factors also play a fundamental role in explaining levels of tax avoidance, specifically concerning issues such as internal governance (Table 2.6) and the incentive system.

Table 2.6: Tax Avoidance Determinants – Internal Governance Characteristics

	Endogenous Determinants	Relation with tax avoidance	Authors
Internal Governance	Companies where shareholder proposals are adopted	+	(Young, 2017)
	Companies with audit committee overlapping	+	(Al Lawati & Hussainey, 2021)
	Large audit committees	+	(Dang & Nguyen, 2022)
	Companies with top managements teams with higher levels of intrapersonal functional diversity	+	(Plečnik & Wang, 2021)
	Companies with geographical and institutional dispersion	+	(Su et al., 2019)
	Companies with less risk of litigation by shareholders	+	(Arena et al., 2021)
	Companies with nationality diversity in the corporate board	+	(Alshabibi et al., 2022)
	Companies with connected directors, which suggested that information diffuses by board interlocks	+	(Chughtai et al., 2021)
	Co-opted CFO's during the CEO's tenure	+	(Campa et al., 2022)
	The level of supervision and control of managers	-	(Choi & Park, 2022)
	Companies with the presence of the founder of family firms	-	(Brune et al., 2019)
	Managerial power	-	(Y. Tang et al., 2019)
	The CEO duality, *i.e.*, when CEO and COB are the same person	-	(Kolias & Koumanakos, 2022)
	Existence of employees on the board	-	(Vitols, 2021)
	A high number of board meetings and attendance	-	(Barros & Sarmento, 2020)
	Career-related apprehensions	+/-	(Bradshaw et al., 2019; T. yuan Chen et al., 2022; N. Li et al., 2022)
	Board's financial sophistication and independence	+/-	(Armstrong et al., 2015)

Regarding internal governance, Armstrong et al. (2015) found that the board's financial sophistication and independence significantly influence a firms tax avoidance behavior. Specifically, their findings suggest that more sophisticated and independent boards tend to increase tax avoidance when it is low and restrain it when it is high. These findings provide evidence that the relationship between tax avoidance and corporate governance can be influenced by a firm's business strategy (P. Hsu et al., 2018), external monitoring environment (Jiménez-Angueira, 2018), or mediated by corporate social responsibility (CSR) (Salhi et al., 2020).

As for the incentive system, we identified three types of incentives: stock options incentives (Zolotoy et al., 2021); inside debt incentives (Kubick et al., 2020); and equity incentives. In all three cases, there were non-linear results with tax avoidance activities.

In the case of stock options incentives, the relationship with tax avoidance activities depends on the firm's effective tax rate compared to peer firms. If the firm's effective tax rate is higher than its peers, then the chief executive officer (CEO) engages in further tax avoidance. Regarding inside debt incentives, Kubick et al., (2020) found that the level of inside debt for the chief financial officer (CFO) is associated with less tax avoidance.

Equity incentives hold a prominent position in the literature. Regarding these incentives, Desai and Dharmapala (2006) argue that tax avoidance is complementary to managerial rent extraction, and it is more evident in poorly governed companies. Consequently, increasing equity incentives causes managers' incentives to become better aligned with shareholders, leading to increased cash flow through tax avoidance. Thus, if rent extraction declines, tax avoidance will also decline, given the complementarity between the two.

Conversely, Seidman and Stomberg (2017) replicate Desai and Dharmapala's (2006) study and conclude that the authors' findings could be attributed to tax exhaustion[3] rather than the extraction of rents from high-powered incentives in poorly governed firms.

Lastly, in the remaining studies, contradictory results were found, including a non-linear relationship between equity incentives and tax avoidance (Armstrong et al., 2015; Bird & Karolyi, 2017; Huseynov et al., 2017) and, in some cases, a positive association was found (M.-C. Chen et al., 2020; Taylor & Richardson, 2014).

[3] The tax exhaustion theory argues that as the taxable income approaches zero and the marginal benefits of tax avoidance decrease, taxpayers engage in less incremental tax avoidance (Seidman and Stomberg, 2017)

2.5.1.3 Corporate Social Responsibility

Recent years have seen an increased focus on CSR practices, with several studies investigating the relationship between companies' voluntary contributions to improving social welfare and their tax payments as part of their social responsibility. Chouaibi et al. (2022) report that companies abstaining from CSR activities are prone to tax avoidance. However, for companies undertaking CSR initiatives the impact on tax avoidance reveals a diverse pattern that can be broadly categorized into three theoretical trends: risk management theory, slack resource theory, and stakeholder theory.

The risk management theory and the slack resource theory are used to provide an explanation for the association between tax avoidance and CSR. According to the risk management theory[4], firms engage in CSR activities to mitigate potential reputational risks or adverse events, prioritizing shareholder interests over social responsibility. As a result, companies that prioritize CSR exhibit higher levels of tax avoidance (Col & Patel, 2016; Gulzar et al., 2018; N. Khan et al., 2022; C. W. Mao, 2019).

The slack resource theory[5] posits that during periods of strong performance firms are able to allocate resources to satisfy all stakeholders' needs. As a result, this may lead to increased contributions to CSR and payment of taxes. Watson's (2015) research supports this theory, indicating that the relationship between tax avoidance and CSR is moderated by earnings performance. Specifically, when profitability is lower, companies are less likely to allocate resources to CSR activities, instead relying on tax avoidance to reduce tax payments. However, Davis et al. (2016) suggest that firms with lower tax payments may engage in CSR as a means of compensating for their inability to meet their social contract. Thus, contrary to the notion of complementarity between CSR and tax avoidance activities, CSR and tax avoidance appear to be substitutes.

The stakeholder theory[6] emphasizes that companies have societal obligations and should pay fair taxes to meet collective needs. Consequently, a negative relationship between CSR and tax avoidance has been reported in previous studies (Hoi et al., 2013; H. H. Huang et al., 2017; Lanis & Richardson, 2015; H. Liu & Lee, 2019; Ravenda et al., 2015). However, this negative connection seems to be moderated by family ownership (González et al., 2019) and is more pronounced when investors have a stronger stakeholder orientation (Emerson et al., 2020).

[4] See Godfrey (2005) and Minor and Morgan (2011)
[5] See Penrose (1959)
[6] See Clarkson (1995)

Additionally, C. Mao & Wu (2019) demonstrated CSR performance indirectly affects tax avoidance. Timbate (2021) found that firms performing far above the aspiration level are less likely to engage in CSR activities than other firms as they are less motivated to bring changes. Furthermore, specific dimensions of CSR, such as corporate legality (Ginesti et al., 2020) and business ethics (Abdelmoula et al., 2022) show a negative association with tax avoidance, indicating firms' consideration of the social costs of not paying taxes, even if this concern is only temporary and strategic (Adrian et al., 2022).

In China the implementation of mandatory CSR disclosure has yielded conflicting findings regarding its impact on tax avoidance activities. W. Jiang et al. (2022) report a substantial increase in corporate tax avoidance, whereas Ding et al. (2022) observe a decrease.

N. A. Wahab et al. (2022) argue that CSR and tax are unrelated, based on their study of companies in Malaysia. Similarly, Mayberry and Watson (2021) found no relationship between CSR and tax avoidance in certain US states. Additionally, Gavious et al. (2022) observe that CSR firms in Israel exhibited heightened tax reporting aggressiveness, fearing a potential loss of resources to sustain their CSR initiatives.

Considering these contradictory results, it is important to highlight the study conducted by Zeng (2018), which analyzed data from 35 countries, finding Zeng (2018) a positive association between CSR and tax avoidance. Nevertheless, this association is contingent upon the country's legal and institutional environment.

2.5.1.4 Human Resources

Collective and individual characteristics[7] (Table 2.7) of human behavior and personal characteristics contribute strongly to explaining tax avoidance due to their ability to influence company management. For this reason, some authors seek to understand the impact resulting from the admission of new executives. They reveal that in certain cases this admission is accompanied by an increase in tax avoidance (J. Chen et al., 2021; M.-C. Chen et al., 2020; Dyreng et al., 2010; C. Jiang et al., 2018; Lismont et al., 2018), while in other cases there is a decrease (J. Chen et al., 2021; Wen et al., 2020). These differences could be explained through the different contexts of the studies. Nonetheless, the way that executives perceive and accept these practices from ethical and legal perspectives are, in the end, the main determinants (DeZoort et al., 2018; Evertsson, 2016; Hjelström et al., 2020; C. Jiang et al.,

[7] Studies that tend to focus on the personality of top leaders are based on the theory of upper echelons. The central idea of this theory is that the organization is the reflection of its top managers and, as such, the organization's strategies and the results are strongly influenced by them, notably by their personal characteristics.

2018).

At the firm level, employees' characteristics or human resources management also affect the firm's tax avoidance level. A high ratio of female employees is associated with less tax avoidance (Rhee et al., 2020). On the opposite, the existence of labor unions with strong negotiation power (I. Shin & Park, 2020), high employee satisfaction (J. Li, 2022), and/or labor investment inefficiency (Taylor et al., 2019) are all associated with high levels of tax avoidance.

Finally, Salehi, Mirzaee, and Yazdani (2017) investigated the relationship between tax avoidance and spiritual and emotional intelligence, but their findings did not yield statistically significant results. However, we acknowledge and emphasize the significance of these authors' study as an effort to explore the spiritual and emotional aspects of executives.

Table 2.7: Tax Avoidance Determinants – Individual Characteristics of Executives

	Endogenous Determinants	Relation with tax avoidance	Authors
Individual Characteristics	Overconfidence	+	(Chyz et al., 2019; Duan et al., 2018; Hsieh et al., 2018; Kubick & Lockhart, 2017; Sutrisno et al., 2022)
	Narcissism	+	(García-Meca et al., 2021; Olsen & Stekelberg, 2016)
	High acquisitive managers	+	(Gul et al., 2018)
	Background and experience on tax avoidance	+	(Alstadsæter & Jacob, 2017; H. Huang & Zhang, 2020),
	Political connections	+	(Y. Chen, Huang, et al., 2019; Firmansyah et al., 2022; J. H. Kim & Lee, 2021; Y. Shen et al., 2019)
	High political sentiment	+	(Y. Liu et al., 2022)
	Risk-seeking tendencies	+	(Baghdadi et al., 2022)
	The existence of irrational expectations	+	(L. Li & Wu, 2022)
	Men executives	+	(B. B. Francis et al., 2014)
	Women CFOs in China	+	(X. Liu et al., 2022),
	Women executives	-	(B. B. Francis et al., 2014; Hoseini et al., 2018; Richardson, Taylor, et al., 2016; Su et al., 2019; X. Zhang et al., 2022)
	Military experience	-	(L. H. Chen et al., 2017; Law & Mills, 2017)
	Managerial ability	-	(J. Park et al., 2016; Seifzadeh, 2022)
	Religion	-	(Boone et al., 2013; Hofmann & Schwaiger, 2020)
	Sustainability concerns	-	(Jarboui et al., 2020)
	Gender diversity	+/-	(L. H. Chen et al., 2017; Cortellese, 2022; X. Zhang et al., 2022)

2.5.1.5 The role of auditor, internal control, and information transparency

Companies that use the same audit firm for audit and tax services can benefit from cost savings and concentration of knowledge into a single entity[8]. However, potential drawbacks including a loss of auditor independence can affect audit quality. As a result, some researchers have sought to understand the impact of audit firms providing tax services on tax avoidance, but the results are mixed. While some studies have found that this concentration of services does not increase levels of tax avoidance (Garcia-Blandon et al., 2021; D. Huang & Chang, 2016; Krishnan & Visvanathan, 2011; Watrin et al., 2019), others suggest the opposite (Chyz et al., 2021; Cook et al., 2020; Evertsson, 2016; Finley & Stekelberg, 2016; Mcguire et al., 2012). A possible explanation could be associated with the auditors' background. Bianchi et al. (2019) and Wei and Chen (2016) find that auditors with industry or tax expertise appear to be associated with higher levels of tax avoidance, indicating that their understanding of tax-saving opportunities is used to influence clients' tax policies for their benefit.

Considering auditors' impact on certain company choices, some countries have expressed concerns regarding issues such as mandatory *vs.* voluntary audits or audit firm rotation. Regarding mandatory audits, Dong et al. (2022) show that firms exhibit lower levels of corporate tax avoidance under the mandatory audit regime. As for audit firm rotation, C. Liu et al. (2021) report that companies generally increase their ETR after the audit partner's mandatory rotation.

Other control mechanisms, including internal control systems and information quality, exhibit a nonlinear relationship with tax avoidance. For under-sheltered firms or those with a low level of tax avoidance, internal control is positively associated with tax avoidance, contrary to situations with high levels of tax avoidance or with over-sheltered firms (H. Chang et al., 2020; H. Chen et al., 2020) Similarly, high internal information quality is associated with greater tax avoidance (Gallemore & Labro, 2015; Laplante et al., 2021), whereas external information is less informative and more ambiguous at the same levels of tax avoidance (Deng et al., 2021; Mayberry et al., 2015; Schmal et al., 2021). These findings suggest that companies adjust their information and internal control levels according to their tax objectives. Therefore, it is not surprising that companies with voluntary disclosure in their annual reports are associated with lower levels of tax avoidance (Boubaker et al., 2022).

[8] Authors designate this accumulation of knowledge as knowledge spillover. Proponents of this accumulation of functions argue that by performing tax services, auditors become more familiar with clients' strategic decisions regarding tax planning – a feature that benefits the auditors in uncovering tax avoidance policies (Habib & Hasan, 2016)

Finally, the findings obtained by Donkor et al. (2022) emphasize the implementation of mandatory integrated reporting as a key factor in reducing firms' tax avoidance practices. This stands at odds with the inevitable disclosure doctrine (IDD), which diminishes information transparency by increasing the benefit of nondisclosure, consequently creating greater opportunities for firms to engage in more aggressive tax avoidance (Ding et al., 2021).

2.5.2 Exogenous determinants

In addition to internal factors, external factors may account for firms' degree of tax avoidance. External factors can be formal or informal, with the former encompassing all aspects of the tax system and tax enforcement and the latter encompassing circumstances related to the surrounding environment. Of the papers reviewed, 46 fell into the former category and 44 into the latter.

2.5.2.1 Formal Factors - Tax system and tax enforcement

Our investigation into the formal factors' determinants of tax avoidance revealed that the level of BTD[9], tax enforcement, control mechanisms, the existence of policies restricting tax avoidance practices, and the legal framework collectively contribute substantially to shaping this behavior.

BTD refers to the differences between the accounting and tax systems that can be exploited by managers to engage in tax avoidance. Some scholars argue that reducing the differences between the two systems discourages opportunistic tax avoidance behaviors (Atwood et al., 2012; E. Chen et al., 2013; Simone et al., 2014). For other authors, the solution to reducing or preventing tax avoidance practices involves increasing tax enforcement, requiring more tax and accounting information disclosure, and improving control mechanisms (*e.g.*, regulatory quality, control of corruption) (Atwood et al., 2012; Cao et al., 2020; Frank et al., 2018; Hasegawa et al., 2013; Majeed & Yan, 2019; Zeng, 2019). Studies have shown that stronger perceptions of tax enforcement, monitoring mechanisms, and investor protection usually diminish tax avoidance (Adams et al., 2022; Donohoe & McGill, 2011; Frank et al., 2018; Gaertner et al., 2016; Green & Plesko, 2016; Guenther et al., 2019; Gupta et al., 2014; Henry et al., 2016; Hope et al., 2013; Kubick et al., 2016, 2017; Y. J. Lee, 2021; Nessa et al., 2020; Salihu et al., 2015; Simone et al., 2014). Conversely, managers are likely to increase their fiscal aggressiveness when they perceive tax

[9] See M. Desai (2005) and T. Y. H. Tang (2015)

enforcement to be weak (Finley, 2019; Shevlin et al., 2017) or ineffective (Abernathy et al., 2013; Borkowski & Gaffney, 2021; Henry et al., 2016).

Another aspect is the existence of a legal environment that allows restricting tax avoidance activities through policies and laws (*e.g.*, dividends imputation system, the anti-avoidance rule, the Country-by-country reporting (CbCR), the international standard of exchange of information on request (EOIR), and the existence of penalties to the officer) (Amiram et al., 2019; Cho, 2020; Clausing, 2020; Joshi, 2020; Leung et al., 2019; Y. Li & Ma, 2022; Ma & Thomas, 2020; McClure et al., 2018; S. Park, 2018). However, some legal instruments may have a perverse effect (*e.g.*, the adoption of more aggressive alternatives, such as tax evasion), a reduced/negative effect (*e.g.*, CbCR, on profit shifting, the increase of bureaucracy, or innovation/investment restrictions) (Joshi, 2020; Laplante et al., 2019; Q. Li et al., 2020; Malik et al., 2018; Pham, 2019) or even a contradictory effect among different countries (*e.g.*, eXtensible Business Reporting Language - XBRL) (J. Z. Chen et al., 2021; Saragih & Ali, 2022).

Apart from the local legal environment, international tax requirements also play a role in restricting tax avoidance activities, *e.g.*, to take advantage of certain tax deductions or exemptions/deferrals, companies must provide a high level of information (Clifford, 2019; Overesch et al., 2020; Schenkelberg, 2020).

Finally, other legal aspects influence tax avoidance activities, namely, the impact of different legal systems (common law *vs.* code law) on tax avoidance practices, for which contradictory results have been reported (Salhi, Jabr, et al., 2020; Yuanita et al., 2020). Additionally, the mandatory adoption of International Financial Reporting Standards (IFRS) standards also has an impact. According to H. Sun et al. (2022), the effect of an IFRS mandate on corporate tax avoidance is conditional, whereby firms with a lower initial level of tax avoidance tend to become more tax aggressive after IFRS adoption, while those with a higher initial level of tax avoidance tend to become less tax aggressive.

2.5.2.2 Informal factors

The phenomenon of tax avoidance can also be associated with informal factors, which may act alone or in combination with formal factors. In the current study we categorize informal factors into three dimensions: social-cultural, economic-political, and customer-supplier relationship.

As social-cultural characteristics, we include all of the community's values, social norms, and customs that influence tax avoidance activities. In the context of the customer-supplier

relationship, we consider all of the factors involved in the client-supplier interaction. The determinants identified for each dimension and their relationship with tax avoidance activities are described in Table 2.78.

Table 2.78: Tax Avoidance Determinants – Informal Factors

	Exogenous Determinants	Relation with tax avoidance	Authors
Socio-cultural	Gambling culture	+	(Alharbi et al., 2020)
	A culture oriented toward success and achievement	+	(Yoo & Lee, 2019)
	A high crime rate	+	(Cho et al., 2020)
	Air pollution	+	(Y. Shen et al., 2022)
	Corruption	+	(Al-Hadi et al., 2022; Y. Sun, 2021)
	A culture of trust	-	(Kanagaretnam et al., 2018)
	Religion	-	(Boone et al., 2013)
	Confucian culture	-	(S. Chen et al., 2021)
	Cultural diversity	-	(Lei et al., 2022)
	A high individualism, *i.e.*, the degree to which people in a society are integrated into groups	-	(Yoo & Lee, 2019)
	Political status	-	(Deng et al., 2020)
	The way tax avoidance is perceived	-	(DeZoort et al., 2018)
	A high cost for violating social norms	-	(Z. Gao et al., 2017)
	The language, *i.e.*, the impact of future versus present tense orientation	+/-	Cheng et al. (2022) and Na and Yan (2022) J. W. Chang et al. (2022)
Customer-Supplier relantionship	High concentration of customers	+	(Cao et al., 2020; H. H. Huang et al., 2016; J. Wang & Mao, 2021)
	Close relationship between customers and suppliers	+	(Cen et al., 2017)
	Products with unique characteristics	+	(Kanagaretnam et al., 2018; Karamshahi et al., 2018; Kubick et al., 2015)
	Customer proximity within a geographic region	-	F. Huang and Gao (2022),
	Valuable brands or high advertising spending	-	(Austin & Wilson, 2017; Mansi et al., 2020)

Regarding the economic context, it has been observed that in times of financial distress and uncertain environment, strategies that were viewed as risky and costly become more appealing and viable, which means that in situations of financial distress or financial constraints (Elbannan & Farooq, 2020; Kong et al., 2021; Luo et al., 2020; Richardson et al., 2015) and environment uncertainty, *i.e.*, competition, market, and technological uncertainties (Arieftiara et al., 2020) high levels of tax avoidance are expected.

Concerning financial constraints, we emphasize the factors contributing to these difficulties, including terrorism risk (H. Xu & Moser, 2022); climate risk (Ni et al., 2022); the implementation of environmental regulation (Feng et al., 2022; Geng et al., 2021; Yu et al.,

2021), and firing restrictions (De Vito, 2022).

Conversely, tax avoidance is less prevalent in liberalized markets (D. Jiang et al, 2020), in situations where the local gross domestic product is distorted upward (Li, Cai, et al., 2020), or in the presence of deteriorations in land finance due to revenue losses from land transfers in China (T. Chen et al., 2022).

Regarding economic policy uncertainty, we encountered contradictory findings (M. Nguyen & Nguyen, 2020; H. Shen et al., 2021). At the political level we found that corporate lobbying activity (Hill et al., 2013) is positively associated with tax avoidance, while political turnovers in China are negatively associated (Chen, Tang, et al., 2021; Tsai et al., 2021).

2.5.3 Consequences

Tax avoidance is a widely studied phenomenon with implications that extend beyond its immediate impact on tax revenues. In this section we analyze 80 research papers that use tax avoidance as an explanatory factor for a range of different topics.

Using the framework we use in this review; we present the next topics as consequences of tax avoidance practices. We find that the consequences of tax avoidance are multilayered and can affect various levels, including the state and companies.

2.5.3.1 Consequences for the State

The main consequence of tax avoidance is the reduction of tax revenues, which affects the taxes that compliant taxpayers face and the public services that citizens receive. In addition to revenue losses, states must also allocate resources toward detecting, measuring, and penalizing noncompliance instead of investing in vital public services such as education and healthcare.

Recent estimates suggest that worldwide tax revenue losses due to tax avoidance could reach up to $280 billion, with low and lower-middle-income countries suffering the most from corporate tax revenue losses (Janský & Palanský, 2019). In the USA tax revenue losses are estimated to range from $77 to $111 billion, which corresponds to 30% of the country’s corporate income tax revenues (Clausing, 2016).

According to several authors the losses in tax revenue can be attributed to favorable tax regimes and weak enforcement systems that facilitate profit shifting, (Alexander et al., 2020; Baumann et al., 2017; Gan & Qiu, 2019; Saka et al., 2019), particularly in developing countries (Johannesen et al., 2020).

However, in recent years, political measures have been implemented in various countries to combat tax avoidance practices. Alexander et al. (2020) studied the impact of anti-avoidance rules implemented in the European Union and concluded that multinationals' profit shifting fell by about 40% from 2007 to 2013 and by as much as 93% when additionally accounting for tax enforcement. Therefore, the empirical literature supports the idea that the loss of tax revenue is a result of inter-jurisdictional differences in tax enforcement and statutory corporate tax rates.

2.5.3.2 Consequences for the Companies

At the firm level taxes are viewed as a cost, and as a result some companies engage in tax avoidance activities as a way to reduce their expenses. However, these activities do not always yield positive outcomes for the companies. Therefore, we have identified several negative consequences of tax avoidance practices (Table 2.9). Additionally, we note the presence of positive outcomes, although these are not as numerous.

The relationship between tax avoidance and firm value has been a topic of interest in the literature, with two competing arguments driving the debate: the tax saving effect *vs.* the agency cost of tax avoidance. Regarding the saving effect, tax avoidance activities are viewed as a way of saving cash that contributes to increasing the companies' wealth to the detriment of the state. From another perspective, tax avoidance is perceived as a risky endeavor, and, according to the agency perspective, tax planning activities create a diversion of resources from shareholders to managers or from minority shareholders to controlling shareholders.

Given these opposing perspectives, the authors sought to investigate the relationship between tax avoidance and firm value. However, the results of prior studies are inconclusive, reflecting the complexity of this issue. In some empirical studies, a negative association is found (Col, 2017; Herron and Nahata, 2020; Li et al., 2019; Minh Ha et al., 2021; Rusina, 2020; Wahab and Holland, 2012), and according to Inger (2014), the nature of tax avoidance methods used by the company may influence this relationship. For instance, tax avoidance resulting from deferral of the residual U.S. tax on unremitted foreign earnings is valued negatively, contrary to tax avoidance from stock option tax deductions.

Other studies have found no significant relationship between tax avoidance and firm value (Akbari *et al.*, 2019; Rudyanto and Pirzada, 2020). However, after incorporating other variables (*e.g.*, the interaction between CSR and tax avoidance has a negative impact) or changing variable construction, the results demonstrated a relationship (Inger and Vansant,

2019; Khuong *et al.*, 2020), suggesting that the relationship may be more complex than initially assumed.

Table 2.9: Tax Avoidance Consequences

	Consequences	Authors
Negative Consequences	Agency conflicts	(Bradshaw et al., 2019; L. Zhang et al., 2022)
	Facilitates the extraction of managerial rent	(Jia & Gao, 2021; Shams et al., 2022)
	CEO forced turnover	(Chyz & Gaertner, 2018)
	A high risk of bankruptcy	(Dhawan et al., 2020)
	A high stock price volatility	(Cao et al., 2021; Chaudhry, 2021; Salehi et al., 2019)
	Negative stock price reactions among companies' peers	(Bauckloh et al., 2021)
	Increases the risk of stock price crash	(Garg et al., 2022; Habib & Hasan, 2016; J.-B. Kim et al., 2011)
	A great tax uncertainty	(Dyreng et al., 2019)
	A great tendency to hold cash	(Khuong et al., 2019)
	A reduction in the maturity of trade credit	(Tosun & Yildiz, 2022)
	Employees require a compensation premium	(Schochet et al., 2022)
	Less efficiency	(Asiri et al., 2020; Khurana et al., 2018)
	Less transparency	(Amar et al., 2019; Inger et al., 2018; H. Liu, 2022; J. H. Nguyen, 2021)
	Companies tend to delay annual earnings announcement	(Crabtree & Kubick, 2014)
	Tendency to manipulate the profitability	(Marwat et al., 2021)
	Attracts less investment and companies invest less	(Alsmady, 2022; Doellman et al., 2020; Varoonchotikul, 2021)
	Negative firms' reputation	(Blaufus et al., 2019; Dhaliwal et al., 2022; J. R. Graham et al., 2014; I. Kim et al., 2020; Y. Lee et al., 2021; Taherinia et al., 2022)
	Increases the cost of equity	(Cook et al., 2017; Lewellen et al., 2021)
	Increases the cost of debt	(Beladi et al., 2018; I. Hasan et al., 2014; Isin, 2018; S. Lee, 2022; Shevlin et al., 2020)
	A lower value of excess cash	(Benkraiem et al., 2022)
Positive Consequences	Companies experience cost savings	(S. Xu & Zheng, 2020)
	An increase in CSR disclosure	(Abdelfattah & Aboud, 2020; Kao & Liao, 2021)
	Decreases the cost of equity, in countries with strong investor protection and in industries with low scrutiny	(Chun et al., 2020; Goh et al., 2016; Heitzman & Ogneva, 2019)
	Decreases the cost of debt	(Y. Lim, 2011)
	Decrease the use of debt	(Ha et al., 2021; Lanis et al., 2021)
	Increase investment efficiency	(Ngelo et al., 2022)
	Increase CRS scores intending to hedge potential negative consequences	(Abid & Dammak, 2022)
	Improve the reputation of a company's directors and executives	(Lanis et al., 2018)

Conversely, some studies report that tax avoidance is positively associated with firm value (Drake et al., 2019; Inger & Vansant, 2019; Robinson & Schmidt, 2013). This positive

relationship is observed in companies with tax loss carryforwards (Mcguire et al., 2016); stock option tax deductions (Inger, 2014), in companies located in developed and common law countries (T. Y. H. Tang, 2019), in environmentally sensitive industries (Rudyanto and Pirzada, 2020), and in China, in companies subject to local-government control and with government ownership exceeding 40 percent (Qu et al., 2020). Drake et al. (2019) found that this positive valuation is moderated by tax risk, which suggests that investor valuation of tax avoidance is higher when the tax avoidance is less risky.

Our study also identified several moderators that could explain the relationship between tax avoidance and firm value, which we categorized into two groups. Moderators with a positive effect, which can mitigate the negative relationship between tax avoidance and firm value, include managerial ability (*i.e.*, competent managers can reduce the negative impacts of tax avoidance) (Akbari et al., 2019), CSR (*i.e.*, CSR engagement can provide insurance-like protection for firm value by reducing the reputation risk of tax avoidance) (Li et al., 2019), and multinationalism (Herron & Nahata, 2020). Moderators with a negative effect, which can increase the negative relationship between tax avoidance and firm value, include financial constraint, high capital expenditures (Herron and Nahata, 2020), and high uncertainty-adjusted tax rates (*i.e.*, the level and uncertainty of future tax avoidance) (Jacob and& Schütt, 2020).

Finally, some authors have argued that tax avoidance activities have no significant consequences for companies, as they believe that investors do not consider the impact of tax avoidance. According to these authors, companies tend to maintain their tax avoidance strategies over time without increasing their risk, which suggests that there may be no negative consequences associated with such activities (Brooks et al., 2016; N. Minh Ha et al., 2022).

2.6 Discussion and suggestions for future research

Following prior reviews our goal was to provide a comprehensive summary and analysis of earlier research on tax avoidance and, accordingly, derive a holistic agenda for future research. In the previous section, we explored the accumulated knowledge on this topic. In this section we outline ways in which researchers can enhance our comprehension of tax avoidance.

2.6.1 Characteristics of Companies

Our systematic review reveals a progression in the treatment of identifying the features of companies linked to tax avoidance. Initially, the focus was on recognizing the characteristics related to financial factors such as size, debt ratio, and profitability. In the subsequent phase the identification of characteristics grew to encompass business aspects (*e.g.*, type of sector, business group, level of business diversification, innovation) and financial and tax instruments options (*e.g.*, hybrid arrangements).

As a result, it seems that future research efforts will focus more on the business features of companies and less on their financial attributes. Some authors argue that changes in company characteristics do not seem to explain differences in tax planning, suggesting that these variations may be more related to business characteristics or options rather than international activity or size (Dyreng et al., 2017; Thomsen & Watrin, 2018). Therefore, in our opinion the future of studying tax avoidance practices may benefit from a more sector-specific approach, considering that not all companies have equal opportunities to engage in such activities.

Building upon this notion, we propose an examination of recent tax havens scandals, such as Panama, Pandora, and Paradise Papers. These incidents reveal specific options exercised by companies, as they expose how certain companies exploit intricate offshore legal structures to avoid or reduce tax payments. Developing a comprehensive understanding of the features of companies that employ such tax planning strategies could aid in the identification of more determinants. On the other hand, the study of these cases could present an opportunity to employ case studies, considering that few studies use this method to investigate tax avoidance practices. This research method is essential for understanding the underlying mechanisms (*e.g.*, transfer pricing, royalty payments, interest expenses) and the companies most likely to employ such schemes (Campbell & Helleloid, 2016; Cen et al., 2017; Kutera, 2017).

Another research opportunity is related to the studies by Drempetic et al. (2020) and Schreck and Raithel (2018). Both of these works suggest that a firm's visibility has a direct impact on the amount of third-party information disclosed. This implies that highly visible companies are more newsworthy and hence more exposed to intense public scrutiny (Aouadi & Marsat, 2018; Servaes & Tamayo, 2014). This phenomenon could elucidate why certain companies exhibit higher levels of tax avoidance and underscore the significance of a company's size as a determinant of tax avoidance.

Finally, companies with limited financial resources or those that rely heavily on capital markets are less likely to engage in unethical behavior due to the potential consequences of their access to finance. Dorfleitner et al. (2022) propose a new approach for measuring a firm's dependency on capital markets using three variables: leverage, cash, and tax avoidance. Unlike what has been done in previous studies, these variables are analyzed together to provide a more comprehensive understanding of the relationship between capital market dependency and tax avoidance. This new approach could prove useful in identifying additional determinants of tax avoidance in the future.

2.6.2 Ownership Structure and Corporate Governance.

The study of ownership structures has aroused great interest in the academic community. Most research focuses on the principal-agent theory, attempting to understand how the separation of ownership and control influences tax avoidance activities. However, empirical consensus on the effects of this relationship remains elusive. This may be due to a range of factors such as the nature of the countries under analysis (see Moshirian et al., (2022), in which it is concluded that civic capital, including ethical values, contributes to the variation of ownership structure across countries), economic issues (emerging countries *vs.* developed countries), regulatory issues (*e.g.*, minority shareholder protection laws, levels of monitoring, market scrutiny), or state-owned enterprises (SOE) and non-SOEs (see Lim (2021) and Bradshaw et al. (2019) about the impact of state-owned enterprises). These factors could explain the contradictory results between ownership and tax avoidance, and we therefore suggest that future studies should consider the economic, cultural, and political contexts. In some cases, results may even contradict the principles of agency theory, namely, concerning type I and II agency costs.

It would also be interesting to explore the impact of corporate restructurings such as initial public offering (IPO), private equity restructuring, management buy-in, management buy-out, and privatization. All these restructurings affect ownership structures and change ownership concentration. Therefore, studying these extreme events may offer some clues about changes in tax avoidance levels as the ownership concentration decreases or increases.

In recent years a growing body of literature has explored the relationship between compensation incentives and tax avoidance activities. Recent studies suggest a non-linear relationship between these variables whereby the relationship is observed only among companies with extreme levels of tax avoidance (Armstrong et al., 2015; Bird & Karolyi, 2017; Huseynov et al., 2017). Building upon this literature we propose the examination of

additional compensation incentives beyond equity-based incentives, such as debt compensations, which have been associated with risk-averse corporate policies in previous research (Kohlbeck & Luo, 2019; Y. Liu et al., 2014), as well as promoted-based incentives (also known as tournament incentives).

Promoted-based incentives are typically measured through the CEO pay gap, which represents the difference between a firm's CEO compensation and the median compensation of the next level of senior managers. According to Kini and Williams (2012), firms with larger CEO pay gaps tend to engage in riskier policy choices. This finding is consistent with the conclusion drawn by Haß et al. (2015), who reported that firms that commit fraud exhibit significantly higher pay gaps than non-fraudulent firms. Such results suggest that tournament incentives may motivate senior managers to increase risk-taking behaviour. As tax avoidance is considered a risky activity, examining these incentives can provide insights into the relationship between incentives and tax planning activities.

2.6.3 Corporate Social Responsibility

Paying taxes is commonly viewed as a responsible behavior by society, and as such, the academic community has been keen to analyze tax avoidance from a CSR perspective. We have identified three prominent theoretical perspectives, namely the risk management theory, slack resource theory, and stakeholder theory, that aim to elucidate the relationship between CSR and tax avoidance activities. However, the current evidence is contradictory, and, in some cases, a lack of relationship is documented.

First, we would like to highlight as a potential explanation for the different results the fact that literature has not yet provided a precise and universally accepted definition of CSR (Shum & Yam, 2011); nor has it settled on a singular metric to identify CSR activities (Hoi et al., 2013). Currently, the most widely used metrics for CSR evaluation are those based on KLD Research & Analytics, Inc. for companies in the United States, and Rankings-RKS for companies in China. However, other metrics rely on questionnaires or surveys (such as the EIRIS database) or publicly available information regarding CSR's economic, social, ethical, and environmental dimensions. As a result, the absence of a common variable or concept for CSR renders cross-study comparisons nearly impossible.

Second, in an international context there appear to be differences in the relationship between tax avoidance and CSR, which may be explained by the legal, institutional environment and individual assessments (Salhi, Riguen, et al., 2020; Zeng, 2018). This suggests that the relationship between tax avoidance and CSR is not linear and likely more

complex than previously assumed. Therefore, introducing moderators such as governance characteristics, ownership structure, and social and ethical characteristics, may help elucidate this complex relationship.

Additionally, at the national level some governments and companies have adopted proactive CSR policies. Governments have established CSR reporting regulations or codes of best tax practices in collaboration with tax authorities, and companies have implemented internal corporate tax policies. Based on recent data analysis of CSR reporting regulations, Haji et al. (2023) concluded that these policies are initially perceived as costly for firms in the short term, but in the long term, they may yield benefits by reducing information asymmetry, albeit not at the operational level.

Understanding the impact of these initiatives can shed light on the connection between corporate tax policies and CSR activities.

2.6.4 Human Resources

Human resources are a vital element of companies, and recent research has been directed toward examining the connection between a company's human resources characteristics and its internal strategies, particularly those linked to tax avoidance practices. Numerous studies have focused on executive experience and its impact on tax avoidance. In this context, we propose exploring the relationship between former politicians in executive positions and their involvement in tax avoidance activities as a future avenue for research.

In several countries there is a perception that when politicians leave office and transition to private companies they engage in *quid pro quo* or influence-peddling behavior, seeking to obtain tax benefits, subsidies, or more favorable tax policies[10]. The media often highlights the "dark side" of such career transitions[11]. Therefore, the question arises as to whether executives with political experience increase tax planning activities, or whether their knowledge and experience lead to greater awareness and, consequently, a lower level of tax planning. Examining this relationship could provide insights into the impact of former

[10] Currently, half of the companies listed on the stock exchange in Portugal have former politicians in their administrations, and in recent years some of these companies (*e.g.*, EDP, BES) have been associated with cases of fraud or aggressive tax planning, which has contributed to the increase in public perception that there is a relationship between former politicians and tax planning activities. (see https://www.dinheirovivo.pt/bolsa/metade-das-empresas-do-psi-20-tem-antigos-governantes-na-administracao-12786026.html).

[11] See "Role call: the former ministers who found private sector jobs" at https://www.theguardian.com/business/2021/apr/16/role-call-the-tory-ministers-who-found-private-sector-jobs; "Here Are The 11 Politicians Who Sit On The Boards Of Public Companies" at https://www.businessinsider.com/politicians-at-public-companies-2012-6.

politicians on tax planning activities within companies.

Finally, the psychological perspective is an area that remains largely unexplored in corporate studies. Although most decisions within a company are based on rationality, emotions and feelings can sometimes influence people's behavior. Salehi, Mirzaee, and Yazdani (2017) investigated the relationship between spiritual and emotional intelligence and tax avoidance, but their results were not statistically significant. To address this gap future studies could examine the impact of executives' emotions in tense or high-risk situations (*e.g.*, mergers and acquisitions, failed negotiations, the sale of corporate bonds, the disclosure of negative news, and situations of pressure in the capital market) using alternative measures and samples. Such studies could provide valuable insights into the role of emotions in decision-making processes related to tax avoidance in corporations.

2.6.5 The role of Auditor, Internal Control, and Information.

Auditing firms have historically played a critical role in company operations, and more recently they have expanded their services to include tax advice. Some scholars argue that the provision of tax services by auditors may compromise their independence and quality, while others suggest that it may lead to cost savings and increased knowledge concentration. The lack of consensus in this debate invites further study. Watrin' et al. (2019) state that the benefits of having an auditor tax provider depend on the quality of tax-related internal controls. This could serve as a guide for future investigations.

Considering recent fraud scandals involving audit firms, such as Enron and Lehman Brothers, the European Union has implemented mandatory audit firm rotation to limit auditor tenure (the length of an auditor–firm relationship), enhance auditor independence and objectivity, and increase audit quality. Applying this reasoning to tax avoidance would suggest that these changes would negatively affect tax avoidance. However, contradictory perspectives have emerged, with Dordzhieva (2022), Jenkins and Velury (2008), and Ghosh et al., (2005) demonstrating that mandatory rotation may compromise auditor independence, result in unintended costs, and delay the disclosure of adverse news. Given these divergent perspectives, further research is needed to explore the impact of mandatory rotation on audit quality and its potential consequences for tax avoidance activities.

2.6.6 Formal Factors

Most of the studies examined suggest that tax enforcement is a crucial preventive measure against tax avoidance activities. However, some of the instruments used have proven to be less effective. For this reason we believe that it is necessary to explore additional measures, including recent ones such as the base erosion and profit shifting (BEPS) project (*e.g.*, CbCR, Multilateral Convention, Controlled Foreign Company (CFC), Mandatory Disclosure Rules, and anti-hybrid rules). Investigating the impact of BEPS, especially in EU countries with a high level of alignment, could help understand how these legal instruments can aid in combating tax avoidance activities.

Nevertheless, the effectiveness of tax enforcement measures hinges on taxpayers' perceptions of their efficacy and the respective consequences of noncompliance. Companies can circumvent or impede disclosure, leading to less transparent and informative information (Gaertner et al., 2016; Hasegawa et al., 2013). Consequently, taxpayers' perceptions and the level of efficacy of tax authorities (*e.g.*, likelihood of detection by local tax authorities, the effectiveness of justice, including legal complexity, length of proceedings, number of convictions for tax offenses, and severity of punishment) could account for the variation in tax avoidance levels across countries.

As a potential avenue for future research, we recommend delving into the stewardship role of accounting information, which remains an underexplored area in tax avoidance research. Majeed and Yan's (2019) study highlights the significance of comparability in decreasing information asymmetry, ultimately leading to a reduction in tax avoidance. However, their findings are limited to China, which has unique characteristics. Conversely, in EU countries, accounting regulation emphasizes the prudence principle, which hampers the neutrality and comparability principles and diminishes the usefulness of financial reporting information for management purposes. As tax and accounting systems differ, an in-depth examination of each could shed light on how countries can optimize their tax and accounting systems to discourage tax avoidance activities.

2.6.7 Informal Factors

Non-tax factors have gained increasing attention in academic research as they may shed light on why companies make specific choices in the face of similar tax contexts. For instance, Dyreng et al. (2015) found that, apart from selecting countries with more tax advantages, companies also consider factors such as corruption (elements of social capital) and investment risk. Future studies could compare countries with similar favorable tax regimes to understand

which non-tax factors have the greatest impact on these choices. Factors such as political clientelism (*e.g.*, the dependency on private funding from parties, which is perceived as a cause of clientelism and corruption (Gherghina & Nemčok, 2021)) or political ideology (*e.g.*, individuals with liberal ideology place slightly greater importance on the values of care and fairness compared to conservatives (J. Graham et al., 2009)) may also play a role in tax avoidance activities.

While valuable brands appear to be positively associated with tax avoidance, research has shown that consumers also consider ethical motivations when making purchasing decisions, such as boycotting or supporting products or brands that reflect their political ideology (Chow et al., 2022; Coelho, 2015). This social movement, known as political consumption, is growing in advanced economies and is more pronounced when companies fail to respect human rights, labor conditions, or environmental protection. However, Matute et al. (2021) suggest that this movement is not as visible when it comes to tax avoidance activities, while Antonetti and Anesa (2017) conclude that right-leaning consumers are less likely than left-leaning consumers to penalize companies that engage in tax avoidance. As a recommendation, future research could investigate this relationship further and explore whether political consumption influences companies' tax avoidance activities.

2.6.8 Consequences

The consequences of tax avoidance activities have significant impacts at different levels, with the loss of public revenues being the most visible and perhaps most important one. While tax avoidance activities have many negative consequences for companies, they are still attractive to managers and investors, indicating that the benefits of tax avoidance activities outweigh the costs to a certain extent and are even desirable. For instance, Chyz and& Gaertner (2018) found that CEOs who do not avoid enough tax are more likely to be forced out. On the other hand, in certain situations the negative impact of tax avoidance activities is almost offset by other activities, such as CSR activities (W. Li et al., 2019)

It is therefore crucial to understand what factors lead investors to consider that the benefits outweigh the risks of tax avoidance activities. Future research could investigate whether the idea that the probability of detection by tax authorities and the resulting penalties, even for the most aggressive tax positions, are quite low, or the perception that it is not a long-term investment, plays a role. These are some of the unresolved questions in the literature that can be explored to better understand the relationship between tax avoidance and its consequences.

2.7 Conclusions

The present study provides a systematic literature review on the topic of tax avoidance. In recent years there has been a gradual increase in the number of studies in this area, which can be explained by the negative financial impact of tax avoidance activities that allow companies to divert resources from states to private investors, as well as by greater awareness among the public and governments about the importance of combating these activities as a way of promoting a more just and egalitarian society.

In a systematic literature review, selection criteria were defined to outline the main topics and themes covered in the last 20 years regarding tax avoidance. Unlike traditional literature reviews, a systematic review does not allow the researcher to choose which articles to analyze. This allows for more impartial and accurate analysis, with themes being defined after the analysis of all the articles extracted.

Regarding our main research question, "what are the determinants and consequences of tax avoidance activities?", we found that there are determinants that are endogenous and focus on company characteristics, ownership structure, corporate governance, CSR, audit and internal control, and human resource characteristics, as well as exogenous determinants that we subdivide into formal and informal factors. Regarding determinants, we highlight that (1) most studies seek to identify company characteristics associated with a higher level of tax avoidance, with ownership structure, corporate governance, and formal factors being the most analyzed themes; (2) the ownership structure theme presents the most contradictory results, with recent literature admitting that the solution may not be a linear relationship, and future researchers may explore this idea further; (3) the CSR theme is analyzed based on two opposite perspectives, with conclusions depending on the manager's view and society's perception of the impact of tax avoidance activities; (4) management choices such as auditor choice or information quality are little explored but have great potential, especially in light of recent legal framework changes at the EU and USA levels.; (5) regarding formal exogenous determinants, there is a high consensus on the importance of tax enforcement as a deterrent to tax avoidance practices; and finally, (6) we highlight the growing importance of non-tax factors in managers' decision-making, which may influence tax avoidance activities. The study of these factors, although recent, can be a good starting point for future research.

Regarding consequences, we emphasize the most intricate and contentious result, namely the effect of tax avoidance activities on firm value. Recent trends in research have sought to employ moderators as a means of deepening the relationship between tax avoidance activities and firm value.

Finally, we would like to emphasize that our work is not without limitations. We highlight as the main limitations the use of only one keyword, “tax avoidance”, and the exclusive use of articles published in scientific journals up to the 3rd quartile of Scimago. Future studies could replicate our protocol by using other sources or even other keywords associated with tax avoidance.

CHAPTER 3

3 Can the fight against tax avoidance be one click away?

3.1 Abstract

This paper examines the impact of SAF-T (Standard Audit File for Tax Purposes) on tax avoidance activities in Portugal. The sample comprises 299,062 observations from 85,247 non-financial companies from 2012 to 2018, estimated through an ordinary least square panel data regression with firm fixed effects.

The study reveals that the implementation of SAF-T measures had a detrimental effect on companies that previously engaged in high levels of tax avoidance, despite the reduction in statutory tax rates. These findings indicate that intensified tax enforcement played a significant role in combating tax evasion and curbing tax avoidance activities.

This paper delves into Portugal's pioneering adoption of SAF-T, establishing the country as a reference in its implementation. The introduction of SAF-T brought about profound societal changes on several fronts. It fostered technological advancements within companies and increased public awareness regarding the importance of tax compliance. The goal of this article is to make a valuable contribution to the literature by offering a practical example of how SAF-T can effectively reduce tax avoidance through strengthened tax enforcement.

Keywords: tax avoidance, tax planning, tax aggressiveness, tax enforcement, tax

JEL Classifications: M41 – Accounting; M48 – Government Policy and Regulation

3.2 Introduction

The evolution of technology and digitization have not only revolutionized the economy and society but have also become catalysts for innovation and economic growth. As businesses have embraced these advancements, governments too have recognized their potential and followed suit, capitalizing on technological trends to enhance the efficiency and effectiveness of state functions. A notable example is Portugal, which in 2008 became the first country in the European Union (EU) to adopt the Standard Audit File for Tax Purposes (SAF-T).

SAF-T is a software system utilizing XML format that enables companies to record their accounting and invoicing data in predefined and preformatted cells. This includes essential information such as taxpayer identification number, document type, number, value, and date.

The implementation of SAF-T was initially proposed by the Organisation for Economic Co-operation and Development (OECD) with the aim of reducing compliance costs by developing standardized business software that would be accessible to all parties involved. In the case of Portugal its adoption was justified by the need to enable "companies to use a tool that allows them to comply with auditor's data request and assists in its treatment, avoiding the need for auditors specialized in different software, simplifying procedures and propelling the use of new technologies" (Portaria 321-A/2007, de 26/03 - I Série n.º 60, 2007, p.1).

Under the same legal framework implementing the SAF-T, it was mandated that corporate entities liable for corporate income tax (IRC), utilizing computerized accounting methods, be required to produce a file containing information from their invoicing and accounting systems. This file must align with the proposed data structure and must be furnished upon request by inspection services within the scope of their competencies.

In 2013 the communication potential of SAF-T was harnessed by the Portuguese government through the enforcement of mandatory monthly submission of invoicing data via SAF-T invoices. This mandatory electronic transmission of invoicing data to the tax authority triggered the development of a platform called e-invoice .

The establishment of the e-invoice system was groundbreaking at the European level and has evolved into a significant tool in combating tax evasion. This system enabled the comprehensive collection and processing of commercial information from the communicated elements of invoices through SAF-T.

For taxpayers, the most significant impact of implementing SAF-T was experienced through e-invoice, notably in 2015 with the revision of the personal income tax code. This development enabled taxpayers to benefit from tax deductions associated with the invoices

submitted using their individual tax identification number. Additionally, this streamlined the previous tax deduction system[12], simplifying the process for taxpayers.

The introduction of e-invoice marked a significant shift, establishing individual taxpayers as monitoring agents for companies in exchange for tax deductions. This means that any individual can directly report to the tax administration if a company fails to submit an invoice. This shift in responsibility empowers individual taxpayers and enhances control over the compliance of companies (Kleven et al., 2016).

One of the deductions introduced pertains to sectors identified as having a higher risk of tax evasion and fraud. This benefit allows for a 15% deduction of the incurred Value-Added Tax (VAT) up to 250€. The sectors covered by this measure include vehicle repair and maintenance, the hotel and restaurant industry, hairdressing, and beauty parlors.

Prior to this initiative, the Portuguese taxpayer did not typically bother to request an invoice when making purchases or receiving services. However, the implementation of these deductions, accompanied by an awareness campaign emphasizing the importance of requesting invoices[13], resulted in a significant change in behavior among taxpayers.

The presence of an underground economy in the aforementioned sectors was facilitated by certain circumstances, such as a high volume of cash transactions with reduced values. This often led to companies evading VAT payments to the state by not issuing invoices, making it more challenging for tax administrations to enforce control. The lack of invoicing provided an easier avenue for companies to avoid detection.

The implementation of this tax benefit resulted in a substantial increase in invoicing, with a growth rate of 7.5% in the first year and 9.8% in the second year. This in turn led to a rise in tax revenue, surpassing the recorded economic growth, with a 3.5% increase in the first year and 4.26% increase in the second year (Gabinete do Secretário de Estados dos Assuntos Fiscais, 2017).

[12] Electronic invoicing also allowed the automatic filing of most taxpayers' tax statements based on the invoices issued and submitted by companies.

[13] The Portuguese tax administration invested in an educational campaign on the importance of requesting the invoice. Upon entering the electronic invoice portal (https://faturas.portaldasfinancas.gov.pt/), one sees the following sentence: "Why ask for an invoice? When you demand an invoice you guarantee the taxes you pay are handed over to the government. It's a civic duty that increases justice and contributes to the fight against tax evasion. It's unfair to pay more taxes because some taxpayers (individual and corporations) don't comply with their fiscal obligations".

In addition to the tax benefits created, another notable measure was mandatory communication of inventories [14], in 2015, through a SAF-T file. This inventory communication was a pivotal measure to monitor companies' activities, addressing their tendency to under-invoice and artificially inflate inventories to lower their tax liabilities.

In light of the measures taken following the implementation of SAF-T, we seek to understand how companies reacted, particularly in terms of their tax planning activities. Consequently, we delineate two potential scenarios, which we label the "substitution effect" and the "complementary effect".

The substitution effect suggests that the fight against tax evasion may have inadvertently paved the way for lighter tax planning strategies, such as tax avoidance. Due to increased invoicing volume, companies may be keen to find alternative ways to keep their tax payments at the same (low) level.

Conversely, the complementary effect suggests that SAF-T might have played a role in diminishing not only tax evasion but also tax avoidance. The introduction of SAF-T has strengthened tax enforcement, establishing a monitoring environment often associated with lower levels of tax avoidance (Atwood et al., 2012; Baumann et al., 2017; Frank et al., 2018; Kubick et al., 2017).

Using 2015 as a reference year, we examined 299,062 observations spanning two distinct periods: 2012-2014 (pre-SAF-T implementation) and 2016-2018 (post-SAF-T implementation). To measure corporate tax avoidance, three variables were employed: Effective Tax Rate (ETR), ETR differential (ETRdif), and Book-Tax Differences (BTD). As an explanatory variable we used a dichotomous SAF-T variable, coded as 1 for the post-SAF-T mandate years and 0 for the pre-SAF-T mandate years.

Our findings indicate a complementary effect, as companies with the lowest ETR prior to SAF-T implementation witnessed a decrease in tax avoidance levels, despite a reduction in the statutory tax rate in Portugal. We also found that the implementation of mandatory inventory communication weakened the previously negative association between tax avoidance levels and inventories. This finding supports the notion that companies previously under-invoiced and inflated inventories to reduce their tax liabilities. However, extreme cases with higher and lower ETR did not exhibit this pattern, and instead displayed a strong negative relationship, indicating an intensification of tax avoidance behavior.

[14] The inventory communication is mandatory for all business taxpayers, excluding those with a turnover under 100,000€.

Finally, we conducted a study to examine the impact on tax avoidance activities of increased invoicing resulting from the implementation of SAF-T. We found that an increase in invoicing is associated with a lower level of tax avoidance.

In terms of contributions to the literature, our study expands and enriches the research on the role of tax enforcement in addressing tax avoidance (Atwood et al., 2012; Hasegawa et al., 2013; Kubick et al., 2017; Saragih & Ali, 2022; Zeng, 2019; Zhao, 2021). Tax enforcement has often been reported as a potential deterrent to tax planning practices. However, most studies utilize indicators that measure events affecting a restricted set of companies (Hope et al., 2013; Nessa et al., 2020) or indicators that measure the likelihood of a company being subject to a tax audit by tax authorities (Hanlon et al., 2014; Hoopes et al., 2012; Mason & Williams, 2022; Nessa et al., 2020). In contrast, our research takes a unique approach by examining an exogenous event that had a broad impact on the majority of companies in Portugal.

This distinctive event allows us to analyze the impact of tax enforcement in Portugal without being influenced by exclusive measures or internal differences between countries, such as differences in economic or legal factors that affect the likelihood of a tax audit. By exploring this event we gain valuable insights into the effectiveness of tax enforcement measures and their impact on tax planning practices within a business landscape such as the one in Portugal.

In terms of practical implications, our study provides empirical evidence to tax authorities, highlighting that the current implementation of SAF-T can effectively deter tax avoidance practices. As a result, we believe that this study also contributes to the literature on the economic consequences of utilizing modern information technology for big data analysis.

The implementation of SAF-T represents a technological advancement that has affected both companies and tax authorities, made possible through the utilization of technology in the realm of big data. The adoption of this technology has contributed to greater efficiency and effectiveness of tax collection processes.

Furthermore, this study carries strong policy implications for governments worldwide, emphasizing the use of modern information technology as a tool to strengthen tax enforcement. Concerns such as transparency, data protection, and potential excessive use of resources have been central to discussions surrounding the implementation and evolution of SAF-T. Our study contributes to this ongoing discussion by presenting several advantages associated with its implementation.

Our research not only provides valuable insights to tax authorities on the deterrent effect of SAF-T implementation on tax avoidance but also contributes to the broader discourse on the economic consequences of employing modern information technology and big data analysis. Our findings underscore the policy relevance of leveraging technology for tax enforcement purposes, while also addressing concerns and highlighting the benefits associated with the implementation of SAF-T.

The paper proceeds as follows. Section 2 provides the background, literature review, and research hypothesis. Section 3 explains the research design. Section 4 reports the results and Section 5 presents the robustness tests. Sections 6 and 7 discuss and conclude the study.

3.3 Literature analysis and research hypothesis

In their efforts to minimize their tax obligations, taxpayers resort to various tax planning schemes, such as tax evasion and tax avoidance strategies. According to evidence, the tax gap in the European Union in 2015, resulting mostly from domestic tax evasion, could amount to €825 billion annually, with corporate tax avoidance contributing an additional €50 billion to €190 billion (Dover et al., 2015; Murphy, 2019).

The impact of these activities has become a growing concern. Consequently, in recent years the EU and the OECD have prioritized the fight against tax evasion and tax avoidance in their fiscal policy agenda (European Commission, 2015; OECD, 2020).

While sharing the common goal of reducing the amount of taxes paid, tax evasion and tax avoidance differ conceptually. Both activities can be viewed as forms of tax noncompliance, encompassing various activities intended to circumvent a state's tax system, but the means employed may vary in terms of their perceived legality. Tax avoidance involves engaging in transactions that are either legal or, at worst, dubious, often navigating the gray areas of tax legislation. In contrast, tax evasion involves conducting operations that are always considered illegal and subject to sanctions.

While these two practices are often discussed in the literature, differentiation between them is challenging due to the difficulty in clearly delineating the legality/illegality borders of an operation. Quantifying tax evasion activities is also inherently challenging due to their illegal nature, which encourages actors to keep them covert. Therefore, the majority of authors focus their studies on tax avoidance activities because there are measures that can be employed to quantify such activities (Hanlon & Heitzman, 2010).

Empirical studies have shown that corporate tax avoidance is affected by:

(1) characteristics of the company (Agarwal et al., 2022; Amidu et al., 2019; Cheng et al., 2021; Desai et al., 2006; Dyreng et al., 2013; L. Gao, 2016; N. Lee, 2018; Mocanu et al., 2021; Qin et al., 2022; Rego, 2003; Taylor et al., 2015; Vahdani et al., 2019);

(2) Governance and executive compensation (Armstrong et al., 2015; M. A. Desai & Dharmapala, 2006; Kubick et al., 2020; Plečnik & Wang, 2021; Su et al., 2019; Zolotoy et al., 2021);

(3) ownership structure (Bradshaw et al., 2019; Cabello et al., 2019; Farooq & Zaher, 2020; W.-H. Hsu & Liu, 2018; C. H. Lee & Bose, 2021; Mcguire et al., 2014; Mindzak & Zeng, 2020);

(4) Corporate social responsibility (Col & Patel, 2016; Davis et al., 2016; Gulzar et al., 2018; H. H. Huang et al., 2017; N. Khan et al., 2022; C. W. Mao, 2019);

(5) independent auditors (Chyz et al., 2021; Cook et al., 2020; Evertsson, 2016; Garcia-Blandon et al., 2021; D. Huang & Chang, 2016);

(6) socio-cultural factors (Al-Hadi et al., 2022; Boone et al., 2013; S. Chen et al., 2021; Z. Gao et al., 2017; Sun, 2021);

(7) tax enforcement.

Regarding the influence of tax enforcement on tax avoidance activities, some authors assert that an enhancement in tax enforcement increases the state's tax collection capabilities, consequently deterring tax planning activities (E. Chen & Gavious, 2017; Gupta et al., 2014; Hope et al., 2013; Simone et al., 2020). Tax enforcement can be achieved by adopting measures such as mandatory statements, involvement of third-party agents, and the establishment of specialized services that promote stricter scrutiny, transparency, and taxpayer compliance (Hope et al., 2013; Kubick et al., 2016, 2017; Pomeranz, 2015; Slemrod et al., 2001). These efforts focus on detecting and punishing non-compliant taxpayers using all of the information available to tax authorities (Slemrod, 2016).

Nonetheless, the adoption of tax enforcement measures does not always yield positive outcomes. Some authors argue that in certain cases it may even lead to unintended consequences, whereby one form of tax planning is replaced by another (Antón et al., 2021; Gamannossi degl'Innocenti et al., 2022; Malik et al., 2018). Considering that tax evasion provides immediate cash-flow savings related to non-payment of taxes and in extreme cases may even be the salvation of a company's profitability, companies might hesitate to forgo these advantages and could explore alternative and more complex mechanisms to retain their benefits (Gamannossi degl'Innocenti et al., 2022; Gemmel & Hasseldine, 2014).

Our goal is therefore to understand whether the recent tax enforcement measures implemented in Portugal can effectively address not only tax evasion but also tax avoidance. We are aware of the effectiveness of combating tax evasion, as indicated by government data. Note, however, that the impact on tax avoidance activities remains unknown.

Some authors argue that tax enforcement represents the ultimate and most efficient solution in combating tax avoidance (E. Chen & Gavious, 2017). The involvement of multiple parties results in a greater amount of reported information, which serves as a foundation for data control and cross-referencing by tax administrations (Kleven et al., 2016; Naritomi, 2019; Pomeranz, 2015).

The current measures of SAF-T can serve as a complementary mechanism to tackle both tax evasion and tax avoidance. These measures compel companies to disclose higher turnover and lower inventory values, while also deterring tax planning schemes due to heightened scrutiny from tax administrations. If this holds true, a decrease in tax avoidance activities is anticipated following the implementation of SAF-T-related measures.

On the other hand, considering that the reduction in tax evasion represents a loss for companies, they may seek to offset this loss through tax avoidance activities. Consequently, in this situation, the adoption of SAF-T measures could motivate companies to explore alternative avenues for tax savings, leading to an expected substitution effect. In this case, an increase in tax avoidance activities is expected following the implementation of SAF-T measures.

3.4 Data, sample, and research design

For our empirical analysis we used financial statement data obtained from the Bureau van Dijk's Amadeus database. Our study encompassed firm-year observations from the Amadeus database for fiscal years 2011–2018. To refine the dataset we excluded observations associated with operating revenue below €100,000 and observations within regulated industries such as utilities (NACE code 35) and financial services (NACE codes 64-66). These industries are subject to different reporting incentives and heightened regulatory scrutiny compared to other firms. Additionally, we removed companies incorporated in or after 2008 and those with consolidated financial statements, as they could potentially skew the results. We focused solely on public limited liability companies (S.A.) and private limited

liability companies (Lda.) since other business forms are subject to different tax regimes concerning corporate income tax[15].

For the initial sample (480,000 observations) we computed firm-year measures of tax avoidance. To ensure a meaningful interpretation of effective tax rates, we included only observations with positive pre-tax income. Furthermore, we excluded observations lacking sufficient data to compute the variables in our model and removed all observations from the year 2015 (the year of SAF-T implementation). Consequently, our final dataset consisted of 299,062 observations derived from 85,247 companies (Table 3.1).

Table 3.1: Sample Distribution

Year/Industry	Frequency	Percent (%)	Cumulative Percent (%)
2012	43,239	14.5	14.5
2013	46,252	15.5	29.9
2014	48,162	16.1	46.0
2016	54,200	18.1	64.2
2017	54,982	18.4	82.5
2018	52,227	17.5	**100.0**
Total	**299,062**	**100**	
Agriculture, forestry and fishing	11,488	3.8	3.8
Mining and quarrying	1,054	0.4	4.2
Manufacturing industry	55,220	18.5	22.7
Water supply, sewerage, waste management	1,407	0.5	23.1
Construction	30,853	10.3	33.4
Wholesale and retail trade	94,978	31.8	65.2
Transportation and storage	13,075	4.4	69.6
Accommodation and food service activities	19,618	6.6	76.1
Publishing, telecomunications, IT.	5,292	1.8	77.9
Real estate activities	8,905	3.0	80.9
Professional, scientific and technical activities	21,755	7.3	88.2
Administrative and support service activities	8,187	2.7	90.9
Education	3,321	1.1	92.0
Health Care	18,341	6.1	98.1
Arts, entertainment and recreation	2,059	0.7	98.8
Other services	3,509	1.2	**100**
Total	**299,062**	**100**	

3.4.1 Tax avoidance variables

According to Hanlon and Heitzman (2010, p.137), tax avoidance activities can be defined as follows:

[15] We eliminated all the Holding Companies because they only own and manage the capital stock of other companies and all the cooperative companies, which are non-profit companies.

"If tax avoidance represents a continuum of tax planning strategies where something like municipal bond investments are at one end (lower explicit tax, perfectly legal), then terms such as 'noncompliance', 'evasion', 'aggressiveness' and 'sheltering' would be closer to the other end of the continuum. A tax planning activity or a tax strategy could be anywhere along the continuum depending upon how aggressive the activity is in reducing taxes."

To capture a broad spectrum of tax avoidance activities in our study, we employ three tax avoidance measures to enhance the robustness of our findings. Our first measure is the ETR, which calculates the average tax rate per euro of income. This measure enables us to assess the effectiveness of tax planning strategies by capturing non-conforming tax avoidance activities (Rego, 2003). ETR is computed by dividing total tax expense by pre-tax book income. Lower ETR values indicate greater tax avoidance. Consistent with Dyreng et al. (2008) we limit the effective tax rate measures to the interval [0.1] to ensure valid economic interpretation of tax avoidance.

The second tax avoidance measure is BTD, which represents the disparity between pre-tax book income and taxable income, scaled by total lagged assets (Manzon & Plesko, 2002). BTD tax strategies lead to temporary and permanent differences that may be justified by the difference between taxation and accounting rules or may result from management strategies (T. Tang & Firth, 2011). Previous studies have shown that significant differences in this measure are indicative of greater tax avoidance behavior (Lisowsky, 2010; L. F. Mills, 1998; Wilson, 2009).

The third tax avoidance measure is ETRdif, which quantifies the difference between the statutory tax rate and the effective tax rate. This measure allows us to account for variations in tax rates across different years and regions in Portugal, such as mainland Portugal, the Azores, and Madeira. A higher ETRdif implies a greater divergence between the country's statutory rate and the company's effective rate, indicating greater tax avoidance activity (Thomsen & Watrin, 2018).

To minimize the influence of extreme outliers, we winsorize BTD and ETRdif at the 1% and 99% levels. This adjustment helps ensure the robustness of our results by mitigating the impact of highly atypical observations.

3.4.2 Explanatory variables

To evaluate the effects of the implementation of e-invoice and inventory reporting, we constructed a firm-year panel dataset spanning three years before and after their introduction. We used a dummy variable, SAF-T, which takes the value of 1 for the years following the

implementation (2016-2018) and zero otherwise (2012-2014). *SAF-T* is a key explanatory variable, capturing changes in a firm's tax avoidance behavior after 2015.

We included the Inventory intensity variable (Inventory) to examine the influence of the inventory reporting requirement. This variable is calculated as the ratio of stocks to lagged total assets and typically serves as a substitute for the property plant and equipment (PPE) variable. Generally, companies with higher inventory intensity exhibit lower tax avoidance tendencies compared to capital-intensive firms, leading to a positive association between Inventory and tax avoidance measures (Stickney & Mcgee, 1982). However, in Portugal the obligation to report inventories was introduced due to suspicions that companies were manipulating their stock levels to artificially reduce profits and subsequently lower tax payments. Therefore, contrary to previous studies, a negative relationship is expected between these two variables. To further explore this association, we introduce an interaction term between Inventory and SAF-T, aiming to identify the differential impact of inventory reporting after its introduction. If the reporting requirement has effectively reduced artificial inventory manipulation in exchange for increased invoicing, a positive relationship is anticipated. Conversely, a negative relationship suggests that companies have adapted to maintain their tax avoidance strategies despite successful efforts to combat tax evasion.

The Sales variable represents invoice volume and is measured using the logarithm of sales. With the implementation of SAF-T, the e-invoice system was established to incentivize taxpayers to request invoices in exchange for tax savings. To examine the association between SAF-T and the Sales variable, we create an interaction term between these two variables. We expect a positive relationship between tax avoidance and the variable SAF-T*Sales if the introduction of SAF-T has led to an increase in avoidance activities as a countermeasure to reduced tax evasion. Conversely, a negative relationship suggests that SAF-T has effectively countered tax evasion and planning activities through enhanced tax enforcement.

3.4.3 Control variables

To account for potential alternative explanations of tax avoidance variations we incorporated several control variables that capture specific characteristics of companies known to influence or create opportunities for tax planning. These variables include company size (SIZE), number of employees (EMP), profitability (ROA), leverage (LEV), property plant and equipment (PPE), intangible assets (INTAG), liquidity needs (CASH), and sales growth (ΔSALES).

Company size (SIZE) and the number of employees (EMP) are both factors that impact tax avoidance and reflect the size of the company, as the largest companies are those that can achieve economies of scale through tax planning, namely through the use of mechanisms to reduce group taxes (M. A. Desai et al., 2006; Higgins et al., 2015; Hoi et al., 2013; L. Mills et al., 1998). Similarly, highly profitable companies (ROA) have greater incentives for tax planning due to their ample resources and ability to leverage tax deductions and credits (S. Chen et al., 2010; Frank et al., 2009; Manzon & Plesko, 2012; Mcguire et al., 2012; Rego, 2003). Companies with greater leverage (LEV) may exhibit lower levels of aggressive tax planning as they can benefit from deducting financing expenses, although the direction of the LEV coefficient is uncertain, as some companies may engage in tax avoidance to meet debt obligations (Badertscher et al., 2013; J. R. Graham & Tucker, 2006; Richardson & Lanis, 2007).

The presence of property plant and equipment (PPE) can lead to significant differences in tax burden depending on applicable rates and accounting rules. The direction of the coefficient for PPE is indeterminate, as highlighted by Higgins et al. (2015). Intangible assets (INTAG) pose a high risk for tax avoidance due to their intangibility and valuation complexities, making them susceptible to transfer pricing strategies and utilization in tax-advantageous jurisdictions (Dyreng et al., 2008; L. Gao, 2016).

We also consider a company's liquidity needs (CASH), which may justify certain types of tax avoidance, such as deferral strategies (Mcguire et al., 2012). Additionally, we incorporate sales growth (ΔSALES) as a control variable, expecting that companies with greater growth opportunities will exhibit lower levels of tax avoidance (T. Tang et al., 2017).

To ensure valid economic interpretation, continuous variables are winsorized at the 1% and 99% levels. Definitions of all variables can be found in the Appendix. We cluster standard errors by firm to account for potential heterogeneity within firms.

3.4.4 Methodology

To examine the effect of SAF-T implementation on tax avoidance, we employed the fixed-effects Ordinary Least Squares (OLS) estimation method. Our analysis incorporated a panel dataset comprising observations from three years prior to the SAF-T implementation and three years following it while excluding the year of addition (2015).

$$TaxAvoid_{i,t} = \beta_0 + \beta_1 SAFT_{i,t} + \beta_2 Inventory_{i,t} + \beta_3 SAFT * Inventory_{i,t} + \beta_3 Sales_{i,t} + \beta_4 SAFT * Sales_{i,t} + \beta_5 Controls_{i,t} + YearEffects + IndustryEffects + \varepsilon_{i,t} \quad (1)$$

Where tax avoidance is ETR, ETRDif and BTD, and SAF-T * Inventory, SAF-T * Sales the interaction terms between SAF-T and Inventory/Sales.

3.5 Empirical Results

3.5.1 Descriptive statistics

Analyzing the level of tax avoidance before and after the introduction of SAF-T, reveals the following. In Table 3.2 Panel A, we present the difference in ETR, ETRdif, and BTD, along with the control and analysis variables for the full sample in the previous and following periods. The average ETR and ETRdif decreased significantly after the introduction of SAF-T, suggesting a potential increase in tax avoidance activities or a decrease in the statutory tax rate. On the other hand, the decrease in BTD was less remarkable and not statistically significant (refer to Table 3.3 for details).

The decline in ETR can be attributed to the adoption of tax avoidance strategies or the reduction in statutory tax rate that took place after the implementation of SAF-T. Specifically, the ETRdif fell from -13.3% to -10%, indicating a closer alignment between the statutory tax rate and the effective tax rate.

Additionally, the mandatory communication of inventories led to a decrease in the average inventory level from 0.169 to 0.165. This finding supports the suspicion that companies were using inventories to minimize their tax obligations. Moreover, the Sales variable showed an increase from 2.689 to 2.733, which can be attributed to a rise in the number of invoices reported after the introduction of electronic invoicing.

Table 3.2: Summary Statistics

This table shows summary statistics for the variables used in our study. Panel A presents descriptive data for the entire sample. Panel B presents summary statistics for the period before SAF-T implementation, whereas Panel C reports summary statistics for the period after SAF-T implementation.

Panel A: Full Sample								
	N	Mean	SD	Min	Q1	Median	Q3	Max
ETR	299062	0.300	0.216	0.000	0.178	0.247	0.344	1.000
ETRdif	299062	0.115	0.312	-2.216	-0.131	-0.030	0.012	0.187
BTD	299062	-0.006	0.057	-0.187	-0.024	-0.007	0.002	0.278
SAF-T	299062	0.540	0.498	0.000	0.000	1.000	1.000	1.000
Invent	299062	0.167	0.222	0.000	0.000	0.068	0.253	0.948
SAF-TInv	299062	0.089	0.181	0.000	0.000	0.000	0.086	0.948
Sales	299062	2.712	0.610	1.643	2.261	2.588	3.049	4.640
SAF-TSales	299062	1.475	1.433	0.000	0.000	2.036	2.663	4.640
Size	299062	6.281	1.507	0.000	5.234	6.060	7.131	17.602
PPE	299062	0.276	0.260	0.000	0.062	0.196	0.426	1.062
Intang	299062	0.011	0.055	0.000	0.000	0.000	0.000	0.423
ΔSales	299062	0.115	0.404	-0.583	-0.060	0.043	0.179	2.577
LEV	299062	0.205	0.236	0.000	0.020	0.130	0.305	1.205
ROA	299062	0.086	0.117	0.001	0.016	0.044	0.107	0.693
Cash	299062	0.181	0.221	0.000	0.027	0.092	0.248	1.040
Empl	299062	1.952	1.180	0.000	1.099	1.792	2.565	10.720
Panel B: Before SAF-T Implementation								
ETR	137653	0.336	0.230	0,000	0.198	0.273	0.397	1.000
ETRdif	137653	-0.133	0.343	-2.216	-0.162	-0.037	0.004	0.187
BTD	137653	-0.007	0.053	-0.187	-0.021	-0.006	0.000	0.278
SAF-T	137653	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Invent	137653	0.169	0.225	0.000	0.000	0.069	0.257	0.948
SAF-TInv	137653	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Sales	137653	2.689	0.613	1.643	2.239	2.564	3.035	4.640
SAF-TSales	137653	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Size	137653	6.228	1.489	0.001	5.187	6.015	7.075	15.774
PPE	137653	0.267	0.253	0.000	0.059	0.186	0.409	1.061
Intang	137653	0.011	0.054	0.000	0.000	0.000	0.000	0.423
ΔSales	137653	0.099	0.411	-0.583	-0.087	0.023	0.168	2.577
LEV	137653	0.204	0.229	0.000	0.023	0.133	0.306	1.205
ROA	137653	0.075	0.109	0.001	0.013	0.035	0.091	0.693
Cash	137653	0.169	0.215	0.000	0.024	0.082	0.228	1.040
Empl	137653	1.914	1.169	0.000	1.099	1.792	2.565	10.404

Table 3.2: Summary Statistics *(continued)*

Panel C: After SAF-T Implementation								
ETR	161409	0.270	0.200	0,000	0.170	0.222	0.299	1.000
ETRdif	161409	-0.100	0.290	-2.216	-0.109	-0.027	0.018	0.187
BTD	161409	-0.006	0.060	-0.187	-0.026	-0.008	0.003	0.278
SAF-T	161409	1.000	0.000	1.000	1.000	1.000	1.000	1.000
Invent	161409	0.165	0.220	0.000	0.000	0.067	0.249	0.948
SAF-TInv	161409	0.165	0.220	0.000	0.000	0.067	0.249	0.948
Sales	161409	2.733	0.606	1.643	2.280	2.608	3.062	4.640
SAF-TSales	161409	2.733	0.606	1.643	2.280	2.608	3.062	4.640
Size	161409	6.326	1.522	0.000	5.276	6.096	7.177	17.602
PPE	161409	0.284	0.264	0.000	0.064	0.205	0.439	1.061
Intang	161409	0.012	0.056	0.000	0.000	0.000	0.000	0.423
ΔSales	161409	0.129	0.398	-0.583	-0.037	0.057	0.186	2.577
LEV	161409	0.206	0.242	0.000	0.017	0.128	0.304	1.205
ROA	161409	0.095	0.123	0.001	0.020	0.052	0.120	0.693
Cash	161409	0.190	0.225	0.000	0.031	0.102	0.265	1.040
Empl	161409	1.984	1.189	0.000	1.099	1.792	2.639	10.720

Table 3.3 Panels B and C provide further insights into the effect of the introduction of SAF-T, particularly focusing on the difference between companies with the highest and lowest levels of tax avoidance. To analyze this, we divided the companies into two quartiles based on their ETR before SAF-T implementation: the “Low ETR” group consisting of firms in the lowest ETR quartile, and the “High ETR” group comprising firms in the highest ETR quartile.

The results highlight a significant but asymmetric impact of SAF-T. The average ETR experienced a substantial increase for companies in the Low ETR group, while companies in the High ETR group witnessed a significant drop. Specifically, the ETR average for the Low ETR group increased from 19.7% to 23%, whereas the average for the High ETR group fell from 52.2% to 34.8%. These differences are statistically significant and indicate that the introduction of SAF-T led to reduced levels of tax avoidance, especially among companies initially exhibiting higher levels of tax avoidance. In contrast, the reduction in average ETR for companies with lower tax avoidance is likely attributable to the reduction in statutory tax rates[16] after 2015, rather than an increase in tax avoidance within this specific group.

[16] In Portugal the statutory tax rates in 2012 and 2013 were of 25% for mainland Portugal and Madeira and 17.5% for the Azores. In 2014 the taxes decreased to 17% up to 15,000€ for tax base and 23% for the remainder, and for the Azores 13.6% (up to 15,000 €) and 18.4% (over 15,000€). In 2016, 2017, and 2018 the statutory tax rates were 17% (up to 15,000 €) and 21% (over 15,000€) for mainland Portugal and Madeira and 13.6% and 16.8% for the Azores.

Furthermore, the level of inventory fell in the Low ETR group from 18.1% to 16.9%, potentially reflecting a reduction in inventory overstatement resulting from the mandatory reporting requirement. In the High ETR group, the drop in inventory (15.9% to 15.2%) was not statistically significant, aligning with the notion that companies with greater tax avoidance tendencies also tended to overstate their inventories. Additionally, both groups experienced an increase in average sales, with statistically significant changes observed in both cases.

Table 3.3: Summary Statistics

This table shows the changes in our tax avoidance measure ETR, Inventory and Sales. Before (After) shows the average of three years before (after) the SAF-T implementation. Low ETR (High ETR) represents firm-year observations in the lowest (highest) ETR quartile before SAF-T implementation. * denote significance at 1%.

Panel A: Full Sample				
Variable	Before	After	After-before	T-stat
ETR	0.336	0.270	-0.0654*	82.46
ETRdif	-0.133	-0.100	0.0326*	-27.79
BTD	-0.007	-0.006	0.0003	-1.55
Invent	0.169	0.165	-0.0042*	5.09
SAF-TInv	0.000	0.165	0.1651*	-301.37
Sales	2.689	2.733	0.0448*	-20.01
SAF-TSales	0.000	2.733	2.7328*	-1810.32
Size	6.228	6.326	0.0977*	-17.71
PPE	0.267	0.284	0.017*	-18.27
Intang	0.011	0.012	0.0006*	-3.32
ΔSales	0.099	0.129	0.0301*	-20.29
LEV	0.204	0.206	0.0017*	-1.97
ROA	0.075	0.095	0.0201*	-47.47
Cash	0.169	0.190	0.0211*	-26.19
Empl	1.914	1.984	0.0701*	-16.23
N	137653	161409		
Panel B: Low ETR				
ETR	0.197	0.230	0.0331*	-31.28
Invent	0.181	0.169	-0.0118*	8.28
SAF-TInv	0.000	0.169	0.1689*	-169.18
Sales	2.610	2.704	0.0935*	-24.05
SAF-TSales	0.000	2.704	2.7039*	-972.88
Size	6.073	6.262	0.1889*	-19.00
PPE	0.287	0.301	0.0141*	-8.45
Intang	0.012	0.011	-0.0005	1.44
ΔSales	0.141	0.126	-0.0158*	6.07
LEV	0.238	0.221	-0.0169*	10.83
ROA	0.084	0.096	0.0118*	-15.55
Cash	0.161	0.186	0.0245*	-18.09
Empl	1.853	2.005	0.1518*	-20.04
N	52601	49446		

Table 3.3: Summary Statistics *(continued)*

Panel C: High ETR				
ETR	0.522	0.348	-0.1743*	113.56
Invent	0.159	0.152	-0.0071*	5.27
SAF-TInv	0.000	0.152	0.1523*	-160.03
Sales	2.713	2.798	0.0849*	-22.92
SAF-TSales	0.000	2.798	2.7977*	-1026.07
Size	6.268	6.436	0.1682*	-19.15
PPE	0.266	0.283	0.0170*	-10.49
Intang	0,011	0.012	0.0007*	-2.03
ΔSales	0.060	0.106	0.0456*	-20.16
LEV	0.207	0.205	-0.0019	1.44
ROA	0.046	0.076	0.0306*	-52.94
Cash	0.142	0.162	0.0199*	-16.25
Empl	2.000	2.126	0.126*	-17.51
N	53449	46130		

To perform a more detailed analysis we focused on a subset of companies operating in high-risk sectors[17] within the full sample. Panel A of Table 3.4 presents the average values of all variables examined in the analysis. Our findings indicate that companies in this sector exhibited a lower average ETR compared to the entire sample. Furthermore, the average ETR for this group fell significantly from 28.7% to 20.5% following the implementation of SAF-T.

The ETRdif variable increased from -8.4% to -3.2%, indicating a convergence between the ETR and statutory tax rate with the introduction of SAF-T. In contrast, the BTD showed a slight rise of 1.5%, suggesting an increase in the book-tax gap. This increase aligns with the observed rise in ROA of approximately 7.7%.

In Table 3.4 Panels B and C we divided the companies according to the previous categorization. Interestingly, the average ETR variation was similar for both groups, highlighting that companies in the high-risk sector with low ETR experienced an increase in their effective tax rate from 14.5% to 19.6% after the introduction of SAF-T. On the other hand, companies with a high ETR witnessed a substantial decrease in their tax rate from 45.4% to 19.6%. The inventory average variable fell for both groups, while the sales average variable increased significantly, confirming our earlier conclusion.

[17] Sectors of repair and maintenance of vehicles as well as their parts and accessories; hospitality and hairdressing and beauty parlors.

Table 3.4: Summary Statistics for Risk Group

ETR, Inventory and Sales around SAF-T Introduction.
This table shows the changes in our tax avoidance measure ETR, Inventory and Sales. Before (After) shows the average of three years before (after) the SAF-T implementation for the Risk Group. Low ETR (High ETR) represents firm-year observations in the lowest (highest) ETR quartile before SAF-T implementation. * denote significance at 1%.

Panel A: Risk Group				
Variable	Before	After	After-before	T-stat
ETR	0.287	0.205	-0.082	33.88*
ETRdif	-0.084	-0.032	0.052	-14.57*
BTD	0.003	0.018	0.015	-17.88*
Invent	0.154	0.124	-0.030	12.10*
SAF-TInv	0.000	0.124	0.124	-88.83*
Sales	2.481	2.559	0.078	-13.51*
SAF-TSales	0.000	2.559	2.559	-719.11*
Size	5.625	5.612	-0.014	0.75
PPE	0.385	0.399	0.014	-3.65*
Intang	0.017	0.018	0.001	-1.40
ΔSales	0.072	0.131	0.059	-15.21*
LEV	0.253	0.272	0.019	-5.12*
ROA	0.073	0.151	0.077	-44.56*
Cash	0.203	0.261	0.058	-17.56*
Empl	1.942	2.021	0.078	-6.30*
N	10284	16940		
Panel B: Low ETR				
ETR	0.145	0.196	0.051	-14.75*
Invent	0.161	0.124	-0.037	7.79*
SAF-TInv	0.000	0.125	0.125	-41.61*
Sales	2.422	2.549	0.127	-12.03*
SAF-TSales	0.000	2.549	2.549	-348.10*
Size	5.411	5.617	0.206	-5.99*
PPE	0.404	0.409	0.006	0.80
Intang	0.017	0.157	0.140	0.87
ΔSales	0.124	0.120	-0.004	0.52
LEV	0.310	0.274	-0.036	4.79*
ROA	0.091	0.154	0.063	-17.47*
Cash	0.190	0.268	0.078	-12.42*
Empl	1.865	2.023	0.158	-6.95*
N	3404	3856		

Table 3.4: Summary Statistics for Risk Group *(continued)*

Panel C: High ETR				
ETR	0.454	0.263	-0.191	38.40*
Invent	0.147	0.116	-0.031	7.34*
SAF-TInv	0.000	0.116	0.116	-41.42*
Sales	2.552	2.686	0.134	-12.18*
SAF-TSales	0.000	2.687	2.687	-335.15*
Size	5.848	6.032	0.184	-5.76*
PPE	0.404	0.399	-0.0050	-1.552
Intang	0.018	0.017	-0.001	0.1
ΔSales	0.039	0.112	0.073	-12.26*
LEV	0.250	0.239	-0.011	1.91
ROA	0.043	0.115	0.072	-28.66*
Cash	0.166	0.219	0.053	-9.99*
Empl	2.074	2.228	0.154	-6.51*
N	3909	3764		

3.5.2 Correlation results

The Pearson correlation results are reported in Table 3.5. Coefficients that are statistically significant at the 0.05** and 0.01* levels are indicated in bold. We observed a significant negative correlation between ETR and the explanatory variables SAF-T, Invent, SAF-T*Inv, SAF-T*Sales, along with a positive correlation with Sales. ETRdif showed a positive correlation with SAF-T, Invent, SAF-T*Inv, Sales, and SAF-T*Sales, while BTD exhibited a positive correlation with Invent and SAF-T*Inv but a negative correlation with Sales and SAF-T*Sales.

Table 3.5: Pearson Correlation Results

	ETR	ETRdiffer	BTD	SAF-T	Invent	SAF-Tinv	Sales	SAF-Tsales	Size	PPE	Intang	ΔSales	Lev	Roa	Cash
ETRdif	**-0.880***														
	0.000														
BTD	**-0.500***	**0.401***													
	0.000	*0.000*													
SAF-T	**-0.151***	**0.051***	0.003												
	0.000	*0.000*	*0.126*												
Invent	**-0.043***	**0.037***	**0.062***	**-0.009***											
	0.000	*0.000*	*0.000*	*0.000*											
SAF-T*inv	**-0.105***	**0.053***	**0.044***	**0.454***	**0.644***										
	0.000	*0.000*	*0.000*	*0.000*	*0.000*										
Sales	**0.025***	**0.024***	**-0.032***	**0.037***	**0.031***	**0.051***									
	0.000	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*									
SAF-T*sales	**-0.136***	**0.055***	**-0.007***	**0.950***	0.003	**0.446***	**0.262***								
	0.000	*0.000*	*0.000*	*0.000*	*0.092*	*0.000*	*0.000*								
Size	**0.014***	**0.028***	**-0.012***	**0.032***	**0.042***	**0.050***	**0.811***	**0.217***							
	0.000	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*							
PPE	**-0.033***	**0.023***	**0.025***	**0.033***	**-0.259***	**-0.159***	**-0.029***	**0.026***	**0.070***						
	0.000	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*						
Intang	0.000	0.001	**0.012***	**0.006***	**-0.065***	**-0.042***	**0.077***	**0.024***	**0.086***	**-0.060***					
	0.903	*0.443*	*0.000*	*0.001*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*					
ΔSales	**-0.117***	**0.093***	**0.097***	**0.037***	**0.035***	**0.045***	**0.026***	**0.042***	**-0.002**	**0.055***	0.000				
	0.000	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.237*	*0.000*	*0.869*				
Lev	**-0.035***	**0.017***	**0.095***	**0.004****	**0.073***	**0.049***	**-0.108***	**-0.020***	**-0.043***	**0.291***	**0.036***	**0.078***			
	0.000	*0.000*	*0.000*	*0.050*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*			
Roa	**-0.270***	**0.233***	**0.258***	**0.086***	**-0.134***	**-0.039***	**-0.048***	**0.069***	**-0.185***	**-0.005***	**-0.013***	**0.217***	**-0.033***		
	0.000	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.009*	*0.000*	*0.000*	*0.000*		
Cash	**-0.081***	**0.062***	**0.004****	**0.048***	**-0.186***	**-0.097***	**-0.157***	**0.008***	**-0.253***	**-0.157***	**-0.053***	**0.080***	**-0.110***	**0.413***	
	0.000	*0.000*	*0.019*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	
empl	**0.042***	-0.003	**-0.009***	**0.030***	**-0.071***	**-0.033***	**0.770***	**0.207***	**0.650***	**0.071***	**0.071***	**-0.059***	**-0.071***	**-0.087***	**-0.152***
	0.000	*0.122*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*

Notes: This table presents Pearson correlation results among key variables. ** and * indicate significance at the level .05 and .01, respectively.

3.5.3 Multivariate results

The estimation results of Equation (1) are presented in Table 3.6 for two groups: the Full group and the subsample designated as the Risk group. We observe a negative relationship between the SAF-T variable and the dependent ETR variable, with a decrease of approximately 8% for both groups. This finding is in line with the positive coefficient of BTD (Full Group = 0.27% and Risk Group = 2.32%). The results suggest that the introduction of SAF-T has increased tax avoidance activities, as evidenced by the positive coefficient of BTD for both groups and the positive coefficient of ETRdif for the Full group.

Regarding the inventory variable, the results are consistent across all three dependent variables. Contrary to the findings of Stickney and Mcgee (1982), we find that companies with greater inventory intensity, indicative of a larger capital intensity (PPE), exhibit higher levels of tax avoidance. After the implementation of SAF-T, there was a reduction in tax avoidance for the SAF-T*Inv variable (from 3.99% to 2.34%). This result suggests that the enforcement of inventory communication has contributed to a decrease in tax avoidance, supporting the notion that companies in Portugal previously used inventories to lower their tax payments through under-invoicing.

The sales variable demonstrates a positive coefficient for ETR but negative coefficients for the other indicators, indicating that a higher number of invoices is associated with a lower level of tax avoidance. The coefficient between SAF-T and Sales (SAF-T*sales) reveals a statistically significant negative association between SAF-T*Sales and BTD (Full Group: Sales -0.0219, SAF-T*sales = -0.0022; Risk Group: -0.0273, SAF-T*Sales -0.0105). This suggests that the introduction of SAF-T led companies to align their pre-tax income and tax income.

However, this interpretation is not fully supported by the ETRdif variable. The coefficient for the sales variable is negative and significant for both ETRdif groups (Full Group = -0.0554, Risk Group = -0.0821), while the SAF-T*Sales coefficient is positive and significant (Full Group = 0.0054, Risk Group = 0.0189). Therefore, we can conclude that with the introduction of SAF-T, there has been a change in the coefficient's direction from negative to positive. This change may be attributed to the variation in the statutory tax rate. Although the coefficient is positive, it is closer to zero than before, suggesting that companies likely did not increase their levels of tax avoidance, but rather the opposite.

Regarding the control variables, we observe that larger companies (Size and Emp), more profitable companies (ROA), companies with greater growth opportunities (ΔSales), higher debt (LEV), intensive capital (PPE), and more intangible assets (Intang) tend to engage in tax

avoidance. Conversely, companies with higher cash reserves exhibit lower levels of tax avoidance. All control variables, which are statistically significant, exhibit the same trend and coefficient sign for both groups, except for the Employees variable.

Table 3.6: Multivariate analysis of Tax Avoidance measures around SAF-T implementation.

This table shows the regression results for tax avoidance measures (ETR, ETRdif and BTD) for two different groups: Full Group and Risk Group. We control for industry and year fixed effects. The model uses an OLS regression with robust standard errors that are clustered at the firm level. T-statistics are provided in brackets. *denote significance at 1% level.

	Full Group			**Risk Group**		
Variable	ETR	ETRdif	BTD	ETR	ETRdif	BTD
SAF-T	-0.0877*	0.0162*	0.0027*	-0.0875*	-0.0023	0.0232*
	(-23.32)	(2.82)	(2.61)	(-5.86)	(-0,11)	(5.22)
Invent	-0.0399*	0.0502*	0.0113*	-0.0259*	0.0155	0.0139*
	(-11.45)	(10.15)	(15.54)	(-2.14)	(0.83)	(5.31)
SAF-TInv	-0.0234*	0.0219*	0.0042*	-0.0144	0.0189	0.013*
	(-6.46)	(4.16)	(4.99)	(-1.11)	0.97	(3.59)
Sales	0.0563*	-0.0554*	-0.0219*	0.0771*	-0.0821*	-0.0273*
	(26.28)	(-18.62)	(-38.88)	(9.06)	(-6.59)	(-6.45)
SAF-TSales	-0.00165	0.0054*	-0.0022*	-0.0062	0.0189*	-0.0105*
	(1.32)	(2.92)	(-6.84)	(-1.11)	(2.40)	(-6.45)
Size	-0.0222*	0.0316*	0 .0063*	-0.0071*	0.015*	-0.0004
	(-32.04)	(32.19)	(31.46)	(-3.97)	(5.82)	(0.69)
PPE	-0.0156*	0.0222*	-0.0046*	-0.2499	0.0051	0.0002
	(-6.87)	(7.10)	(-6.84)	(-0,57)	(0.71)	(0.1)
Intang	-0.0287*	0.0276*	0.0094*	0.0027	0.0254	0.0055
	(-3.05)	(2.12)	(3.94)	(-0.14)	(1.04)	(0.77)
ΔSales	-0.0252*	0.0278*	0.005*	-0.0323*	0.0365*	0.0088*
	(-25.26)	(18.85)	(13.44)	(-9.88)	(8.67)	(5.87)
LEV	-0.0116*	0.0056	0.0176*	-0.0232*	0.0176*	0.0228*
	(-5.34)	(1.81)	(24.38)	(-5.57)	(3.03)	(11.48)
ROA	-0.536*	0.718*	0.1651*	-0.2718*	0.3704*	0.239*
	(-122.37)	(112.65)	(54.77)	(-32.16)	(30.05)	(34.03)
Cash	0.0149*	-0.0181*	-0.025*	0.018*	-0.0146*	-0.03*
	(6.69)	(-5.73)	(-26.14)	(3.93)	(-2.27)	(-10.46)
Empl	0.003*	-0.0048*	0.0034*	-0.0074*	0.007*	0.008*
	(3.86)	(-4.58)	15.51	(-2.84)	(1.98)	(7.97)
N	299062	299062	299062	27224	27224	27224
R-squared	0.1353	0.0837	0.1368	0.1301	0.057	0.2669

Table 3.7 presents the regression results for both groups under analysis and for the extremes of tax avoidance (Low and High tax avoidance) prior to the introduction of SAF-T[18]. We

[18] We selected all the companies with Highest and Lowest ETR before SAF-T implementation.

observe that the observations for the Full and Risk groups, characterized by high ETR (indicating lower tax avoidance), show a decrease in the ETR variable by 23% and 26.29% respectively. This decrease can be partly attributed to the reduction in the statutory tax rate rather than an increase in tax avoidance.

Table 3.7: Multivariate analysis of Tax Avoidance measures around SAF-T implementation.

This table shows the regression results for the Lowest (Highest) ETR quartile before SAF-T implementation for two different groups: Full Group and Risk Group. We control for industry and year fixed effects. The model uses an OLS regression with robust standard errors that are clustered at the firm level. T-statistics are provided in brackets. *denote significance at 1% level.

	Full Group		**Risk group**	
	High ETR group	Low ETR Group	High ETR group	Low ETR Group
Variable	ETR	ETR	ETR	ETR
SAF-T	-0.23*	0.0132*	-0.2629*	0.0116
	(-30.52)	(2.57)	(-8.98)	(0.53)
Invent	-0.0057	-0.0186*	0.0319	-0.0187
	(-0.94)	(-5.41)	(1.38)	(-1.50)
SAF-TInv	-0.060*	-0.0203*	-0.0406	-0.0066
	(-8.10)	(-4.40)	(-1.48)	(-0.40)
Sales	0.0346*	0.0420*	0.0368*	0.0446*
	(8.44)	(16.44)	(2.20)	(4.22)
SAF-TSales	0.0189*	-0.0014	0.0332*	0.0071
	(7.58)	(-0.83)	(3.18)	(0.90)
Size	-0.0291*	-0.019*	-0.0194*	-0.0055*
	(-21.03)	(-22.82)	(-5.22)	(-2.27)
PPE	-0.0157*	-0.001	-0.0058	-0.004
	(-3.58)	(-0.24)	(-0.52)	(-0.51)
Intang	-0,0356*	0.0118	-0.0466	-0.0164
	(-2,05)	(0.86)	(-1.04)	(-0.56)
ΔSales	-0.027*	-0.0172*	-0.0416*	-0.0236*
	(-11,43)	(-13.89)	(-4.38)	(-5.70)
LEV	-0.0001	-0.0064*	0.0068	-0.0166*
	(0.02)	(-2.48)	(0.59)	(-2.79)
ROA	-0.996*	-0.339*	-0.5738*	-0.1544*
	(-73.69)	(-62.47)	(-20.55)	(-11.46)
Cash	0.0276*	0.0289*	0.0102	0.019*
	(5.39)	(10.12)	(0.80)	(2.54)
Empl	-0.003	0.0023*	-0.0001	-0.0037
	(1.82)	(2.34)	(0.01)	(-1.02)
N	99.579	102.047	7.673	7.260
R-squared	0.2490	0.0854	0.2487	0.0762

For companies with higher tax avoidance levels before the implementation of SAF-T, we observe an increase in the ETR of approximately 1.32% (Full group) and 1.16% (Risk group).

However, the latter value is not statistically significant. Considering the reduction in the statutory tax rate in 2015, we can conclude that it led to an increase in ETR for both groups. Therefore, the introduction of SAF-T contributed to a decrease in tax avoidance within the groups that were more inclined to avoid tax payments.

Regarding the variable SAF-T*Inv, the coefficient is negative and statistically significant for both extremes in the Full Group, indicating that the mandatory communication of inventories increased the levels of tax avoidance in companies with both High and Low ETR. This suggests that the mandatory communication of inventories did not alter the behavior of companies with a higher level of tax avoidance.

The sales variable exhibits a positive coefficient for both groups, except for the SAF-T*Sales variable, which has a negative coefficient for the ETRdif variable. However, this finding is not statistically significant.

3.6 Robustness Tests

In this section we present the findings from several untabulated robustness tests performed on our primary model, which was estimated using the full sample.

3.6.1.1 Alternative tax avoidance measure

To minimize the transitional components used and capture companies' behavior more accurately, we performed a re-estimation of our tax avoidance variable using ETR-3years.

The results indicate that the ETR3years variable for the full group is -0.076 (p-value < 0.001). For the High ETR and Low ETR subsamples, the values of the ETR3years variable are -0.161 (p-value < 0.001) and 0.0361 (p-value < 0.001), respectively. These findings support the notion that the introduction of SAF-T has contributed to a decrease in tax avoidance, especially among companies with higher levels of tax avoidance prior to the implementation of SAF-T.

Furthermore, consistent with previous results, we observe a positive and statistically significant coefficient for the variables Sales and SAF-T*Sales, while the variables Inv and SAF-T*Inv exhibit negative and statistically significant coefficients.

3.6.1.2 Panel regressions with additional controls

In our second robustness test we introduced five new control variables and re-estimated the panel regressions to explore potential associations between tax avoidance and these

variables. The new control variables include an international activities dummy variable (INTER), a variable counting the number of subsidiaries (SUBS), a Board Independence variable (BvD), a variable representing the number of advisors (ADV), and a dummy variable indicating audited accounts (AUD).

The untabulated results demonstrate robustness, with the SAF-T coefficient being -0.0872 (p-value < 0.001) when the dependent variable is ETR for the Full Group, and -0.0757 (p-value < 0.001) when the dependent variable is ETR3. Additionally, the coefficients for ETRdiff and BTD are positive and statistically significant, with values of 0.0158 and 0.0024, respectively.

As for the remaining variables (Sales, SAF-T*Sales, Inv, and SAF-T*Inv) and the subsamples of High ETR and Low ETR, we did not observe any significant changes. The introduction of new control variables did not alter the sign or significance level of any estimated coefficients.

3.7 Discussion

The introduction of SAF-T has led to a decrease in tax avoidance activities (complementary effect) or has it contributed to their increase (substitution effect)? According to several studies, the increase in tax enforcement capacity by states contributes to their ability to collect taxes and thus deter tax planning activities (E. Chen & Gavious, 2017; Gupta et al., 2014; Hope et al., 2013; Simone et al., 2020). The implementation of SAF-T, along with subsequent measures associated with this implementation, were measures of tax enforcement enacted by the Portuguese state aimed at facilitating inspection activities and, simultaneously, combating tax evasion and avoidance.

Our results demonstrate that the use of these tools has not only reduced tax evasion activities but also tax avoidance activities, which, although not the intended outcome, have diminished, particularly among companies that were tax aggressive, i.e., those with low ETRs.

Thus, we did not observe the substitution effect that some authors identify as a risk when taxpayers feel they are losing cash flow and, in some cases, profitability (Antón et al., 2021; Gamannossi degl'Innocenti et al., 2022; Malik et al., 2018). Our findings support the notion that increased tax enforcement contributes to a reduction in tax planning activities.

3.8 Conclusions and limitations

We investigate the impact of the SAF-T introduction on tax avoidance activity in Portugal, specifically examining whether it has a substitution effect (decrease in tax evasion replaced by an increase in tax avoidance) or a complementary effect (decrease in both tax evasion and tax avoidance). We also explore the differential impacts on two activity sectors: the risk sector and non-risk sector. We consider the year 2015 as the focal point of our analysis, as it marked the introduction of key measures resulting from the implementation of SAF-T, such as e-invoice and the obligation to communicate inventories.

Our findings demonstrate that the implementation of SAF-T has a negative impact on companies with high levels of tax avoidance (Low ETR) prior to SAF-T. This indicates that SAF-T effectively reduces tax avoidance activities among companies with a history of high tax avoidance, even after considering the reduction in statutory tax rates. These results highlight the contribution of increased tax enforcement in combating tax evasion and reducing tax avoidance. Similar results were observed in the risk sector (i.e., repair and maintenance of vehicles and respective parts and accessories, hospitality, hairdressers and beauty parlors).

Additionally, we analyzed the impact of the obligation to communicate inventories and the impact of increased invoicing resulting from the efforts to combat fraud and tax evasion. Our findings indicate that inventory communication leads to a decrease in tax avoidance levels. However, this decrease was not observed among companies with extreme levels of tax avoidance (High and Low ETR). Furthermore, we found that an increase in invoicing is associated with a lower level of tax avoidance.

Our conclusions have practical implications for authorities, governments, and the scientific community. Our study not only expands the literature on the effects of tax enforcement but also provides new evidence on how it is possible to restrict tax planning activities through the involvement of third-party agents and tax incentives. We also contribute to the debate on how modern information technology, as a tool to strengthen tax enforcement, can enhance the efficiency and effectiveness of tax authorities. The use of big data presents challenges for governments and raises concerns about data quantity, information gathering, and privacy. Therefore, our study can serve as an example of how big data can be utilized for the benefit of society, addressing these concerns and inspiring future research in this area.

Our findings are subject to limitations. Firstly, the implementation of SAF-T occurred during a period of gradual economic recovery after the 2008 financial crisis. The improved economic conditions may have influenced certain variables, partially explaining some of the results.

Secondly, the statutory corporate tax rates and the Corporate Income Tax Code underwent changes in two distinct periods, in 2014 and 2016. This alteration could have affected certain indicators. However, in our opinion the reduction in statutory tax rates can be viewed as a positive influence. It allows us to demonstrate that companies previously identified with higher levels of tax avoidance (Low ETR) experienced an increase in their ETRs, despite the decrease in statutory tax rates.

Lastly, the amendments to the Corporate Income Tax Code brought significant changes, including the introduction of participation exemption, revisions to the deduction regime for tax losses, and adjustments to the taxation of group companies. These changes, along with the modification of statutory tax rates, contributed to a reduction in the tax burden. However, as mentioned above, in our opinion these changes enabled us to highlight the positive impact of SAF-T implementation on ETRs.

CHAPTER 4

4 Promoting Fiscal Transparency and Compliance: The Crucial Role of SAF-T, e-invoice, and Inventory Reporting in Preventing Tax Evasion and Tax Avoidance

4.1 Abstract

The primary aim of this paper is to evaluate the perceptions of professionals and users regarding the effectiveness of Standard Audit File for Tax (SAF-T), e-invoice, and inventory reporting tools in combating tax evasion and tax avoidance. To achieve this objective, a questionnaire was designed and administered to professionals who use at least one of these tools as part of their professional duties. The questionnaire comprises several questions aimed at (i) assessing the impact of these tools on the work performed by these professionals, (ii) their contribution to improving compliance with tax and accounting obligations, and (iii) their effectiveness in combating tax evasion and avoidance activities. The sample obtained for analysis consisted of a total of 137 observations.

The findings indicate that introducing these tools has affected compliance in a positive way with tax and accounting obligations and combating tax evasion and avoidance activities in general, despite making the work of professionals more costly in some cases. It was observed that for the most extreme or aggressive levels of tax avoidance or tax evasion, the effectiveness of implementing these tools was more evident in combating tax evasion rather than tax avoidance. Professionals believe that companies with higher levels of tax avoidance have merely adapted their schemes to the existing reality. This underscores the need for combating tax avoidance through a combination of initiatives, potentially including reduction(s) in the complexity of the tax system and raising awareness among tax professionals and entrepreneurs about the importance of paying taxes.

Keywords: tax avoidance, tax evasion, Standard Audit File for Tax (SAF-T), e-invoice.

4.2 Introduction

During a 1998 conference in Ottawa the OECD (Organization for Economic Co-operation and Development) presented a report emphasizing the need for Tax Authorities to utilize technology to enhance tax administration and payment (Committee on Fiscal Affairs, 1998). In May 2005 the Committee on Fiscal Affairs (CFA) published the first version of SAF-T (Standard Audit File for Tax). Among the primary SAF-T objectives were a reduction in compliance costs for businesses, lower administrative costs for revenue bodies, improved outcomes of business audits performed by revenue bodies, and the provision of a platform to facilitate cooperation among revenue bodies, such as joint audits (OECD, 2010).

The proposal for the first version recommended the production of SAF-T from computerized accounting systems. It was to have a readable, non-proprietary (open), and globally common format, with the capability to be produced and exported upon request. SAF-T should be flexible in terms of format, content, and structure to meet the requirements of different tax regimes and jurisdictions (OECD, 2010).

The goal was to create a standardized file containing fiscally relevant information for an entity, allowing the easy export of a predefined set of accounting records to facilitate analysis not only for tax inspection services but also for auditing, accounting, and other organizations. In the Portuguese context SAF-T empowered tax authorities with greater control over taxes, specifically corporate taxes and Value-Added Tax (VAT), enhanced detection capabilities for non-compliance, and increased effectiveness in combating tax evasion activities.

Portugal became the first country to introduce SAF-T, in January 2008, followed by Austria in 2009, Luxembourg in 2011, France in 2014, Poland in 2016, and Lithuania in 2017. With the implementation of SAF-T, the obligation for monthly communication of invoicing documents issued by companies by the 25th of the following month was established in 2013. Additionally, a fiscal incentive was created, corresponding to 15% of the VAT up to 250€ incurred in four sectors: (1) vehicle repair and maintenance, (2) the hotel and restaurant industry, (3) hairdressing, and (4) beauty parlors.

The establishment of this incentive, coupled with the obligation to issue invoices, had a significant impact in 2015, coinciding with the reform of the individual income tax. It was stipulated that taxpayers would be eligible for tax deductions only if they requested an invoice with a taxpayer identification number and if the invoice was electronically communicated. Faced with these two conditions, taxpayers began, on the one hand, to demand invoices with a taxpayer identification number and, on the other hand, to monitor electronically communicated invoices. In the absence of communication, taxpayers could report or input

missing invoices into the system e-invoice[19]. Consequently, taxpayers effectively became "tax auditors" and actively engaged as stakeholders in the process (Naritomi, 2019).

In the early years of SAF-T implementation and the introduction of the e-invoice portal for invoice monitoring many advancements were observed. In the first year there was a 7.5% increase in the number of invoices issued and communicated, followed by a 9.8% increase in the second year. Subsequently, this surge contributed to an uptick in tax revenue, surpassing the recorded economic growth, with a 3.5% increase in the first year and a 4.26% increase in the second year (Gabinete do Secretário de Estados dos Assuntos Fiscais, 2017).

The introduction of SAF-T had additional impacts beyond the increase in invoicing levels, particularly concerning the work conducted by professionals involved in daily accounting and fiscal activities with companies: "With the SAF-T (PT) invoice file, auditors can efficiently verify the content of invoices, transportation and inspection documents, receipts, and other documents, either in a comprehensive or detailed manner" (Carreira, 2017, p.36).

SAF-T and the establishment of the e-invoice system thus marked the initial step toward the digitization of the invoicing system in Portugal. This paved the way for the development of additional tools that enhanced the control and monitoring of taxpayers, contributing to the fight against the shadow economy by increasing the likelihood of detecting tax evasion behaviors. Following the implementation of this tool other initiatives followed, including the electronic transmission of inventory data.

The electronic reporting of inventories was implemented in 2015, with the primary goal of reducing opportunities for manipulating results through inventories. This included addressing issues such as the registration of fictitious inventory, manipulation of inventory counts, non-recording of purchases, and fraudulent inventory capitalization (Gabinete do Secretário de Estados dos Assuntos Fiscais, 2015; Wells, 2001). Following the mandatory implementation of inventory reporting there was a 4.62% drop in year-end inventories in 2015 and a 49.9% increase in gross margins (Gabinete do Secretário de Estados dos Assuntos Fiscais, 2016).

The implementation of these measures has proven to be a powerful mechanism in combating tax evasion activities. However, there are other means by which companies can diminish tax payments, notably through tax avoidance activities. Tax avoidance involves the strategic use of legal provisions in tax laws and regulations to reduce tax liabilities. Unlike tax

[19] Taxpayers can access their invoices through the e-invoice portal, which can be accessed via the website: https://faturas.portaldasfinancas.gov.pt/ .

evasion, which is always considered illegal, tax avoidance schemes operate on the edge of legality and are more sophisticated.

Thus, the question arises as to whether, in the face of the decrease in tax evasion activities, taxpayers viewed tax avoidance activities as substitutes for tax evasion, or conversely, whether digital transformation also helped to reduce tax avoidance activities. Some authors suggest that the presence of increased tax enforcement serves as a deterrent to tax avoidance activities (Alstadsæter et al., 2022), while others argue that it may function as a substitute (Gamannossi degl'Innocenti et al., 2022; Malik et al., 2018; Slemrod & Yitzhaki, 2002).

Therefore, the aim of this paper is twofold. First, we investigate whether the introduction of SAF-T, e-invoice, and the inventory reporting system had an impact on the complexity and costs of the work performed by the respondents and whether it influenced compliance with accounting and tax obligations. Second, our investigation delves into whether the implementation of these tools prompted shifts in taxpayers' conduct concerning adherence to their tax and accounting responsibilities, as well as their engagement in tax avoidance and evasion practices. We present results from a questionnaire designed to understand the various perceptions of professionals. We opted to conduct this questionnaire among professionals holding different positions and roles (e.g., accountants, tax inspectors, auditors, statutory auditors, CFOs, and consultants) who regularly use at least one of the aforementioned tools. Therefore, we surveyed not only professionals working in the private sector but also those in the public sector.

Our findings suggest that utilizing digital transformation for tax enforcement is an effective measure for mitigating both tax evasion and tax avoidance behaviors. However, its efficacy appears to be more pronounced at lower levels of both activities. For companies engaging in higher levels of tax avoidance and evasion, there is a perception that they have sought to adapt their schemes to the existing reality, especially in tax avoidance activities. This indicates that while tax enforcement proves effective, it cannot serve as a stand-alone solution for combatting tax evasion and avoidance activities. Therefore, a comprehensive approach that incorporates other strategies alongside tax enforcement is necessary for addressing these issues effectively.

Our study adds to the extensive body of literature examining the impacts of government policies targeting the reduction of tax evasion, as well as the significance of tax enforcement in combating tax evasion and tax avoidance activities. In recent years research has concentrated mostly on either tax avoidance or tax evasion separately. However, this singular

focus may be misleading. As noted by Cross and Shaw (1981), there is an urgent need for a comprehensive examination of both evasion and avoidance, as taxpayers may perceive them as either substitutes or complements. Consequently, tax authorities must consider both avenues of response to their deterrence efforts.

Lastly, we add to the expanding literature on the impact of digital technologies on tax administration, viewing them as tools to enhance tax enforcement.

The rest of the paper is structured as follows. Section 2 provides a literature review. Section 3 details the design of the questionnaire. Section 4 presents the results. The discussion and conclusion (Sections 5 and 6) summarize our study.

4.3 Literature review

4.3.1 Tax evasion and Tax avoidance

Individuals employ a variety of strategies to diminish their tax obligations. To do so, they engage in activities that can be categorized as follows: (i) those who violate tax laws (tax evasion); (ii) those who exploit tax laws to gain advantages unintended by lawmakers (tax avoidance); and (iii) those who utilize tax allowances for the intended purposes set by lawmakers (tax planning).

Tax evasion activities are defined as illegal actions undertaken by individuals who involve a direct violation of tax laws, aimed at evading or reducing their legal tax obligations (Alm, 2012b; Sandmo, 2005). Individuals and companies engage in income tax evasion through methods such as underreporting income, overstating deductions, or neglecting to file tax returns (Alm, 2012b; Bussy, 2023). Such illicit practices may also occur within the shadow economy, characterized by informal activities that complicate tax authorities' detection and penalization of defaulters due to a lack of reliable information.

Previous studies have identified various factors influencing the likelihood of corporate tax evasion, including public sector corruption (Alm et al., 2016; Friedman et al., 2000; Litina & Palivos, 2016), cultural norms and moral principles (Alm & Torgler, 2011; DeBacker et al., 2015; Fisman & Miguel, 2007; Richardson, 2006), demographic factors like age (Hanno & Violette, 1996), education (Mcgee & Smith, 2007; Richardson, 2006), gender (Gërxhani & Schram, 2006), the tax rates (Fisman & Wei, 2004), degree of penalties (Crocker & Slemrod, 2005), the fairness of tax policy (Richardson, 2006), the complexity of the tax system (Richardson, 2006), competitive threats from the informal economy (Gokalp et al., 2017), and

effectiveness of corporate governance mechanisms (M. A. Desai et al., 2007; M. A. Desai & Dharmapala, 2006).

On the other hand, tax avoidance operates within the legal framework of tax laws, involving the exploitation of loopholes to reduce one's tax liability. This practice includes various strategies by companies and individuals, such as leveraging tax incentives, credits, and exemptions outlined in the tax code. Despite its legal standing, tax avoidance raises ethical and social considerations due to its potential to diminish government revenue and contribute to social inequalities. As with tax evasion, activities of tax avoidance are influenced by both external and internal factors. External factors include the level of tax enforcement (E. Chen & Gavious, 2017; Gupta et al., 2014; Hope et al., 2013; Simone et al., 2020), reputational concerns (Kanagaretnam et al., 2018), and social and cultural characteristics such as religion (Boone et al., 2013), the level of crime (Cho et al., 2020), and social norms (Z. Gao et al., 2017).

Regarding internal factors, company characteristics associated with tax avoidance activities include the level of profitability (Rego, 2003), intangibles assets (Taylor et al., 2015), R&D (Gao, 2016; Lee, 2018), leverage (Rego, 2003), firm size (Mocanu et al., 2021; Rego, 2003), and business diversification (Vahdani et al., 2019). Human resources characteristics also influence tax avoidance activities, including factors such as overconfidence powered by public recognition and media exposure (Chyz et al., 2019; Duan et al., 2018; Hsieh et al., 2018; Kubick & Lockhart, 2017), narcissism (García-Meca et al., 2021; Olsen & Stekelberg, 2016), the background and experience (Alstadsæter & Jacob, 2017; Huang & Zhang, 2020), and gender, whereby being male translates into lower risk aversion (Francis et al., 2014).

While the two activities differ, numerous studies have been conducted in recent years within the scope of each. However, documenting tax evasion activities proves challenging due to the difficulty of obtaining precise data. Even though some of these activities occur in plain sight, acquiring accurate information is elusive. For this reason, studies related to tax evasion activities rely mostly on the use of surveys or questionnaires, experimental studies, or agent-based modeling. In contrast, research on tax avoidance activities has the advantage of utilizing obtainable indicators to measure the level of activity (Hanlon & Heitzman, 2010).

The use of surveys or questionnaires is not free from criticism, especially when questions are targeted directly at individuals who deliberately conceal information (Alm, 2012a; Andreoni et al., 1998). Despite this limitation, Kirchler and Wahl (2010) assert that surveys and/or questionnaires remain among the most utilized and effective methods for analyzing the

level of tax compliance. To comprehend the impact of the tools introduced by the Portuguese government to combat tax evasion, the survey in this study was administered to various experts, some of whom work in the tax authority, aiming to evaluate whether the individuals' professional roles influence perceptions.

4.3.2 Digital transformation and tax enforcement

In recent years, technological innovation has enabled tax administrations not only to revolutionize the way taxes are collected but also to transform the interaction with taxpayers, fostering a more interactive environment, providing greater assistance, and enhancing responsiveness to taxpayers' requests. Technology solutions also play an important role in enhancing transparency, compliance with obligations, and accountability within the tax system.

For this reason, the investment in specific technological solutions by tax administrations is viewed as a strong tool for tax enforcement, as it can inhibit activities related to tax evasion (Alm, 2021; OECD, 2017). Solutions involving the increase in the ability to collect, process, and monitor tax information, particularly through digitization, enable more efficient access to information reported by third parties and taxpayers themselves. With digitization tax authorities can improve their efficiency in tax collection, simultaneously reducing their administrative and compliance costs and achieving a more effective allocation of human resources (Jacobs, 2017; Naritomi, 2019; Pomeranz, 2015).

Furthermore, the use empowers governments to devise programs or initiatives that enhance tax enforcement. Examples of such initiatives include mandatory electronic invoicing, inventory reporting, and the development of SAF-T, which have occurred in Portugal and have become possible due to recent technological advancements. The implementation of these technological measures in Portugal has enabled the Portuguese tax administration to enhance its monitoring capabilities and, consequently, contribute to the strengthening of tax enforcement.

Tax enforcement is highlighted by several authors as an effective means of combating tax evasion practices (Jacobs, 2017). According to Tyler (2006), citizens are more inclined to abide by the law if they perceive legal authorities as legitimate, and the extent of legitimacy may itself be influenced by the level of enforcement. Being effective in combating tax evasion, the question that arises is whether tax enforcement, through digital transformation, can also be effective simultaneously in addressing activities related to tax avoidance.

From a theoretical standpoint, tax evasion and tax avoidance activities may function as substitutes (Gamannossi degl'Innocenti et al., 2022; Malik et al., 2018; Slemrod & Yitzhaki, 2002). Consequently, the reduction in tax evasion activities imposed by increased tax enforcement may lead taxpayers to seek alternative ways to maintain the same tax savings. However, it is also plausible that the activities are not substitutes for each other, and the presence of greater tax enforcement contributes to the reduction of both activities (Alstadsæter et al., 2022). Several studies report that a strong perception of tax enforcement and stronger monitoring mechanisms usually lead to less tax avoidance (Frank et al., 2018; Hope et al., 2013; Kubick et al., 2016, 2017; Nessa et al., 2020; Salihu et al., 2015). In this case, it is anticipated that the digital transformation occurring in Portugal could likewise deter tax avoidance activities.

Considering the diverse perspectives, our goal is to analyze the perception of professionals dealing with recent changes implemented by the Portuguese government and understand if technological innovation as a tool for tax enforcement can be effective in combating both tax evasion and tax avoidance activities.

4.4 Questionnaire design and administration

This study elucidates the perceptions of professionals and users of the SAF-T, e-invoice, and inventory reporting tools regarding their effectiveness in combating tax avoidance and tax evasion. To achieve this, an online questionnaire was distributed among various professionals who use at least one of these tools as part of their daily work. The questionnaire consisted of 42 items and was available from September to October of 2023 through online platforms, mainly from social networks. It is consisted of four parts:

(1) 13 statements divided into 3 subgroups. The initial subgroup assessed general aspects of the SAF-T application, such as the level of complexity, cost, and impact on compliance with accounting and tax obligations. The remaining two subgroups evaluated the perception of the SAF-T impact on tax avoidance and tax evasion activities;

(2) The second part consisted of 16 statements, also divided into 3 subgroups. In this section, the objective was to capture respondents' perceptions regarding the implementation of e-invoice. The first subgroup evaluated general aspects of the e-invoice implementation, including the level of complexity, cost, and its impact on society in terms of awareness of the importance of requesting invoices. The remaining two subgroups addressed respondents's perception of the e-invoice impact on tax avoidance and tax evasion activities;

(3) The third part had 6 statements related to the introduction of the obligation to communicate inventories. In this section the goal was to gather respondents' perceptions regarding the impact of its introduction, particularly concerning tax avoidance and tax evasion activities;

(4) The last section had 7 questions concerning demographic data of the respondents (gender, age, education, and employment experience, number of years of experience in the current profession, type of company, and industry sector)

We opted for closed questions to facilitate swift completion and data processing. Additionally, the questions were of the multiple-choice format, allowing respondents to select from predefined answers based on their level of agreement. Responses were made on a five-point Likert scale: Totally agree = 5, Agree = 4, Neither agree nor disagree = 3, Disagree = 2, and Totally disagree = 1.

We prioritized clarity in the questionnaire. The questions were succinct, unambiguous, and called upon respondents to address only a single issue with their response. We received a total of 137 responses, with not all respondents answering all three sections of the questionnaire (i.e., SAF-T, e-invoice, and inventory reporting). Accordingly, 121 responded to the first section, 128 to the second, and 102 to the third.

4.4.1 Demographic profile of respondents

The sample consists of 137 individuals (54.7% women) who work daily with at least one of the tools. They include accountants, tax inspectors, auditors, statutory auditors, CFOs, and consultants. The sample allocation according to employment is presented in Table 4.1. Note that 26% of the participants in the sample are employed in the public sector.

Table 4.1: Sample allocation according to their employment.

	Frequency	Percent
Auditors	5	3.6
Consultants	22	16.1
CFO	2	1.5
Tax Inspector	36	26.3
Statutory Auditors	5	3.6
Accountants	57	41.6
Other	10	7.3
Total	137	100

In terms of age (see Table 4.2), the highest percentage of respondents (35.8%) fell within the 46–55 age bracket, followed by those aged 36–45 and 26–35, accounting for 24.8% and 19% of the respondents, respectively. The remaining 13.1% were aged over 55, while 7.3% were under 26. These age distributions indicate that the participants were representative of a diverse range of ages able to make informed responses to the questionnaire items.

Regarding educational attainment, the participants exhibited a spectrum of qualifications. Table 4.2 demonstrates that most has higher education, with 61.3% possessing an undergraduate degree, 25.5% holding a master's degree and 1.5% a doctoral degree. The remaining 11.6% of respondents have an educational level below a degree.

Table 4.2: Demographic profile of respondents

Gender	**Frequency**	**Percent**
Male	62	45,3%
Female	75	54,7%
Total	137	100%
Age group	**Frequency**	**Percent**
Below 26	10,0	7,3%
26-35	26,0	19,0%
36-45	34,0	24,8%
46-55	49,0	35,8%
Above 55	18,0	13,1%
Total	137	100
Academic status	**Frequency**	**Percent**
High School	11	8,0
Bachelor's degree	5	3,6
Degree	84	61,3
Masters	35	25,5
PhD	2	1,5
Total	137	100

Regarding the number of years of professional experience in their current profession (Table 4.3), 48.9% of the sample participants have accrued 15 years or fewer, of which 20.4% have been working for less than 6 years.

The remaining respondents, comprising 51.1%, have been engaged in their current business for more than 15 years. Specifically, 20.4% have been in their current business for 21–25 years, and 10.2% for more than 30 years. This age distribution suggests that

participants in this study have relevant experience in using the tools we are investigating, providing valuable insights into their impact on tax avoidance and evasion.

Table 4.3: Sample allocation according to their experience

Experience	Frequency	Percent	Cumulative Percent
Below 6	28	20.4	20,4
6-10	22	16.1	36,5
11-15	17	12.4	48,9
16-20	17	12.4	61,3
21-25	28	20.4	81,8
26-30	11	8.0	89,8
Above 30	14	10.2	100,0
Total	137	100	

Table 4.4 reports that most respondents work exclusively with a single type of enterprise, be it small, midsize, or large, with only 14.6% concurrently engaged with companies of various sizes.

Table 4.4:Business size classification

	Frequency	Percent
Small business	48	35
Mid-market enterprise	20	14.6
Large enterprise	15	10.9
Small business and Large enterprise	1	0.7
Small business and Mid-market enterprise	24	17.5
Mid-market enterprise and Large enterprise	9	6.6
Small business, Mid-market enterprise, Large enterprise	20	14.6
Total	137	100

4.5 Data analysis

In order to examine the perceptions of professionals and users regarding the SAF-T, e-invoicing , and inventory reporting tools in combating tax evasion and avoidance practices, descriptive statistics were employed. Initially, the collective responses of the respondents were analyzed, followed by an investigation into potential differences in responses based on the demographic and professional characteristics of the participants. All statistical analyses were conducted using the SPSS version 28 software package.

4.5.1 Score of the respondents' perceptions about the impact of SAF-T on tax avoidance and tax evasion

The first section of the questionnaire is related to SAF-T and is subdivided into 3 parts (Table 4.5). In the initial segment, general aspects were analyzed concerning the impact of SAF-T implementation on work and compliance with accounting and tax obligations. The majority of respondents agree that SAF-T had a positive impact on tax (85.95%) and accounting obligations (82.64%), contributing to an improvement in tax payments (57.85%).

Regarding the level of complexity and costs, 52.07% believe that the work did not become more complex. However, 45.45% feel that a greater investment was necessary, which would result in increased work costs.

In the second part, aspects related to the impact of the introduction of SAF-T on tax avoidance activities were addressed. Here 42.97% agree or totally agree that the introduction of SAF-T has reduced such activities overall, with 62.81% having no doubts that it is an important tool in combating more agressive tax avoidance activities. However, when questioned about the practical effects of SAF-T, it is observed that 52.9% believe that the most aggressive companies have not changed their habits. Additionally, 61.15% of the respondents noted that some of these companies have adjusted their tax avoidance schemes to the new reality.

Therefore, it is observed that while most respondents acknowledge the positive impact of introducing SAF-T in combating tax avoidance activities, this impact was not perceived by all respondents. In some cases they believe that the more aggressive companies and those opting for such schemes either maintained or adjusted their behavior to the new reality.

Finally, in the third part, the focus was on the relationship between SAF-T and tax evasion activities, specifically regarding the impact of SAF-T on these activities. Here 71.9% of respondents agree that the introduction of SAF-T has led to a reduction in tax evasion activities, and 60.33% believe that this tool has had an impact on companies engaging in such activities. However, 48.76% neither agree nor disagree with the statement that companies have replaced tax evasion activities with tax avoidance activities. Meanwhile, 37.19% agree that entities have shifted from tax evasion schemes to tax avoidance schemes.

It is therefore evident from the opinions that the introduction of SAF-T had a positive impact on compliance obligations and combating tax avoidance and tax evasion activities. However, concerning tax avoidance activities, the impact was not as pronounced, as some companies sought to adapt and adjust their practices, thereby maintaining their tax avoidance activities.

Table 4.5:Score of the respondents' perception about the impact SAF-T on tax avoidance and tax evasion

General Aspects of SAF-T	Totally disagree	Disagree	Neither agree nor disagree	Agree	Totally agree
SAF-T represents a positive change in fulfilling accounting obligations	3	8	10	58	42
	2.48%	6.61%	8.26%	47.93%	34.71%
SAF-T represents a positive change in fulfilling tax obligations	3	7	7	64	40
	2.48%	5.79%	5.79%	52.89%	33.06%
The SAF-T has made the work of professionals (accountants, auditors, inspectors) more complex	15	48	21	28	9
	12.40%	39.67%	17.36%	23.14%	7.44%
The SAF-T has made the work of professionals more costly (e.g., the need for greater investment in training and technological resources).	9	28	29	45	10
	7.44%	23.14%	23.97%	37.19%	8.26%
The implementation of SAF-T has led to a notable improvement in tax payment compliance	5	16	30	58	12
	4.13%	13.22%	24.79%	47.93%	9.92%
The SAF-T has not brought significant changes to tax-compliant companies	6	36	25	35	19
	4.96%	29.75%	20.66%	28.93%	15.70%
SAF-T and Tax Avoidance					
The SAF-T has reduced the development of overall tax avoidance schemes.	9	27	33	47	5
	7.44%	22.31%	27.27%	38.84%	4.13%
The SAF-T is an important measure to combat abusive tax avoidance	4	18	23	63	13
	3.31%	14.88%	19.01%	52.07%	10.74%
Companies that were previously more aggressive in terms of tax avoidance did not change their behavior with the introduction of SAF-T.	1	16	40	57	7
	0.83%	13.22%	33.06%	47.11%	5.79%
With the introduction of SAF-T, companies sought to adapt their tax avoidance schemes to the new reality	1	9	37	64	10
	0.83%	7.44%	30.58%	52.89%	8.26%
SAF-T and Tax Evasion					
SAF-T had a greater impact on companies with higher levels of tax evasion (e.g., non-issuance of invoices).	4	9	21	63	24
	3.31%	7.44%	17.36%	52.07%	19.83%
With the introduction of SAF-T, companies replaced tax evasion schemes with tax avoidance schemes.	1	16	59	40	5
	0.83%	13.22%	48.76%	33.06%	4.13%
The introduction of SAF-T had no impact on companies engaged in tax evasion schemes.	4	69	33	15	0
	3.31%	57.02%	27.27%	12.40%	0.00%

4.5.2 Score of the respondents' perceptions about the impact of e-invoice on tax avoidance and tax evasion

The second section of the questionnaire addressed professionals' perceptions regarding the impact of e-invoice implementation (Table 4.6). As with the previous section, it was divided into 3 parts with a similar structure.

Concerning the general aspects of e-invoice, it was observed that the majority, 78.91% of respondents, agree or totally agree that the introduction of e-invoice made the system fairer. Likewise, 76.57% of respondents believe it contributed to an improvement in tax compliance. In connection with these aspects, 89.07% agree or totally agree that the population has become more aware of the importance of tax compliance, especially regarding the issuance of invoices.

Regarding the professionals' work, most respondents, 53.91%, believe that the work did not become more complex, and 40.67% think that costs did not increase. Finally, 63.29% of respondents acknowledge that despite difficulties associated with the system the benefits outweigh the challenges.

In the second part of the questionnaire, the aim was to understand how e-invoice affected tax avoidance activities. In this regard, it was observed that 62.5% consider e-invoice to be an important complement in combating tax avoidance activities, while only 43.74% believe that there has been an actual reduction in tax avoidance schemes. This perception aligns with the fact that 37.5% believe that the more aggressive companies maintained their schemes, and 66.41% believe companies adapted their schemes to the new reality.

Thus, according to the respondents' perceptions, e-invoice contributed to combating tax avoidance activities. However, this reduction was not evident in all cases, as some respondents believed that companies either maintained or adapted their schemes to the new reality.

In the third part of the questionnaire, which connects e-invoice with tax evasion activities, the majority, 60.94%, believes that e-invoice had an impact on tax evasion activities, and 59.38% think it contributed to changing the behavior of companies engaged in such activities. In this regard, 64.85% recognize that one of the reasons for the decrease in tax evasion practices is related to consumers demanding invoices from these companies. Regarding the replacement of tax evasion activities with tax avoidance activities, 46.88% neither agree nor disagree with this substitution, and 70.32% agree that the introduction of this tool has altered entrepreneurs' perceptions of these issues, making them more cautious.

Table 4.6: Score of the respondents' perception about the impact e-invoice on tax avoidance and tax evasion

General Aspects of e-invoice	Totally disagree	Disagree	Neither agree nor disagree	Agree	Totally agree
The creation of e-invoice was a positive measure as it allowed the establishment of a fairer tax system.	3	8	16	79	22
	2.34%	6.25%	12.50%	61.72%	17.19%
The e-invoice system encourages voluntary compliance with tax obligations. particularly in the issuance of invoices.	3	10	17	76	22
	2.34%	7.81%	13.28%	59.38%	17.19%
e-invoice has contributed to raising awareness among the general public about the importance of requesting invoices.	2	5	7	86	28
	1.56%	3.91%	5.47%	67.19%	21.88%
The benefits created by e-invoice do not outweigh the difficulties generated by this system (e.g.. increased discrepancies).	13	68	23	22	2
	10.16%	53.13%	17.97%	17.19%	1.56%
e-invoice has made the work of professionals (accountants. auditors. inspectors) more complex.	16	53	25	30	4
	12.50%	41.41%	19.53%	23.44%	3.13%
e-invoice has made the work of professionals more costly.	7	45	34	37	5
	5.47%	35.16%	26.56%	28.91%	3.91%
e-invoice and tax avoidance					
e-invoice reduced the overall development of tax avoidance schemes.	2	27	43	51	5
	1.56%	21.09%	33.59%	39.84%	3.91%
e-invoice was a significant addition to combating abusive tax avoidance compared to other previously existing measures (e.g.. SAF-T)	2	13	33	73	7
	1.56%	10.16%	25.78%	57.03%	5.47%
Companies that were previously more tax aggressive (with greater tax avoidance) did not change their behavior with the introduction of e-invoice	0	38	42	42	6
	0.00%	29.69%	32.81%	32.81%	4.69%
e-invoice changed entrepreneurs' perception regarding topics like tax avoidance	2	26	32	66	2
	1.56%	20.31%	25.00%	51.56%	1.56%
With the introduction of .e-invoice. companies sought to adapt their tax avoidance schemes to the new reality.	0	11	32	78	7
	0.00%	8.59%	25.00%	60.94%	5.47%
e-invoice and tax evasion					
The introduction of e-invoice had no impact on companies with tax evasion schemes	10	68	34	16	0
	7.81%	53.13%	26.56%	12.50%	0.00%
Companies that increased the number of issued invoices did so because customers requested them; otherwise. they would continue not to issue invoices.	3	9	33	69	14
	2.34%	7.03%	25.78%	53.91%	10.94%
With the introduction of e-invoice companies replaced tax evasion schemes with tax avoidance schemes.	1	11	60	53	3
	0.78%	8.59%	46.88%	41.41%	2.34%
e-invoice had a greater impact on companies with higher levels of tax evasion. particularly altering the behavior of companies in adopting these schemes.	2	8	42	72	4
	1.56%	6.25%	32.81%	56.25%	3.13%
e-invoice changed entrepreneurs' perception regarding topics such as tax evasion. making them more attentive and cautious.	0	7	31	85	5
	0.00%	5.47%	24.22%	66.41%	3.91%

4.5.3 Score of the respondents' perceptions about the impact of inventory reporting on tax avoidance and tax evasion

In the third section of the questionnaire (Table 4.7), the aim was to understand how inventory reporting contributed to certain practices associated with tax avoidance and tax evasion activities. As such, 66.66% agree or totally agree that inventories are now declared with greater accuracy and 47.06% acknowledge that this reporting helped reduce the risk of inventory overstatement, although 23.53% disagree, and 26.47% neither agree nor disagree. Perhaps for this reason, 64.7% believe that inventory overstatement still exists, but at a lower level, and 40.2% think that companies have found alternative ways to continue their tax planning schemes.

Finally, 52.94% of respondents agree that the implementation of this measure has made the work more complex.

Table 4.7: Score of the respondents' perception about the impact of inventory reporting on tax avoidance and tax evasion

Inventory reporting	Totally disagree	Disagree	Neither agree nor disagree	Agree	Totally agree
Companies easily adapted to this new obligation	3 2.94%	25 24.51%	13 12.75%	57 55.88%	4 3.92%
Inventory reporting has helped reduce the risk of inventory overstatement (artificial increase).	3 2.94%	24 23.53%	27 26.47%	44 43.14%	4 3.92%
Inventory overstatement still exists, although at a lower level.	2 1.96%	10 9.80%	24 23.53%	60 58.82%	6 5.88%
Companies have managed to find alternative means to tax planning, previously accomplished through inventory overstatement.	2 1.96%	10 9.80%	49 48.04%	39 38.24%	2 1.96%
With this measure, companies began to declare their inventories with greater accuracy.	1 0.98%	16 15.69%	17 16.67%	60 58.82%	8 7.84%
This measure has added greater complexity to the work undertaken.	5 4.90%	21 20.59%	22 21.57%	45 44.12%	9 8.82%

4.5.4 The impact of SAF-T, e-invoice, and inventory reporting in different demographics and professional characteristics of respondents

In order to analyze differences in responses considering demographic characteristics (e.g., gender, age, academic status) and professional attributes of respondents (e.g., professional experience, job role), several tests comparing means were conducted. It was found that there were no significant differences in responses based on demographic characteristics. The only statistically significant differences were observed in terms of professional attributes,

particularly regarding employer type (Public vs. Private) and with regard to the use of the e-invoice too **Erro! A origem da referência não foi encontrada.** reports overall mean scores a nd comparisons of the impact of e-invoice on combating tax evasion and avoidance activities, as well as its impact on certain daily aspects, such as compliance with tax and accounting obligations and professionals' daily work.

We found that in most statements, there were no significant differences between means, except for five statements in which differences in the perception of e-invoice impact were observed. The differences centered mostly around the impact of e-invoice on the importance of complying with tax obligations. Respondents from the public sector showed greater agreement with statements related to tax compliance, particularly regarding invoice issuance and increased awareness of the importance of compliance. Therefore, given the earlier results, it is not surprising that they disagreed more with the statement indicating that the benefits of e-invoicing do not outweigh the difficulties generated.

Regarding the impact of e-invoice on tax avoidance activities, public sector workers demonstrated greater agreement with the statement that companies adapted tax avoidance schemes to the new reality. Additionally, concerning tax evasion activities, these workers also agreed that the increase in invoice issuance was due to customers demanding invoices, otherwise they would continue not to issue them.

Table 4.8: Differences in the mean scores of respondents from the public and private sectors in relation to the perception of the impact of e-fatura

General Aspects of e-fatura	Public Sector		Private Sector				
	Mean	Std. Deviation	Mean	Std. Deviation	Mean dif.	Sig.	Significance Diff?
The creation of e-invoice was a positive measure as it allowed the establishment of a fairer tax system.	3.97	0.948	3.81	0.833	0.15	0.390	No
The e-invoice system encourages voluntary compliance with tax obligations. particularly in the issuance of invoices.	4.16	0.583	3.70	0.948	0.46	0.002	Yes
e-invoice has contributed to raising awareness among the general public about the importance of requesting invoices.	4.32	0.475	3.95	0.808	0.37	0.016	Yes
The benefits created by e-invoice do not outweigh the difficulties generated by this system (e.g.. increased discrepancies).	2.19	0.749	2.56	0.989	-0.36	0.034	Yes
e-invoice has made the work of professionals (accountants. auditors. inspectors) more complex.	2.77	0.920	2.59	1.116	0.19	0.401	No
e-invoice has made the work of professionals more costly.	2.84	0.898	2.93	1.043	-0.09	0.670	No
e-invoice and tax avoidance							
e-invoice reduced the overall development of tax avoidance schemes.	3.13	0.92	3.27	0.87	-0.14	0.45	No
e-invoice was a significant addition to combating abusive tax avoidance compared to other previously existing measures (e.g.. SAF-T)	3.61	0.88	3.53	0.79	0.09	0.60	No
Companies that were previously more tax aggressive (with greater tax avoidance) did not change their behavior with the introduction of e-fatura	2.97	0.95	3.18	0.88	-0.21	0.26	No
e-invoice changed entrepreneurs' perception regarding topics like tax avoidance	3.32	0.94	3.31	0.85	0.01	0.94	No
With the introduction of e-fatura. companies sought to adapt their tax avoidance schemes to the new reality.	3.94	0.63	3.54	0.72	0.40	0.00	Yes
e-invoice and tax evasion							
The introduction of e-invoice had no impact on companies with tax evasion schemes	2.29	0.59	2.48	0.87	-0.19	0.16	No
Companies that increased the number of issued invoices did so because customers requested them; otherwise. they would continue not to issue invoices.	3.97	0.71	3.54	0.88	0.43	0.01	Yes
With the introduction of e-fatura. companies replaced tax evasion schemes with tax avoidance schemes.	3.48	0.63	3.32	0.73	0.16	0.26	No
e-invoice had a greater impact on companies with higher levels of tax evasion. particularly altering the behavior of companies in adopting these schemes.	3.61	0.56	3.51	0.78	0.11	0.48	No
e-invoice changed entrepreneurs' perception regarding topics such as tax evasion. making them more attentive and cautious.	3.84	0.45	3.64	0.68	0.20	0.07	No

4.6 Discussion

The results presented in this study shed light on the impact of implementing SAF-T, e-invoice, and inventory reporting in Portugal. The primary objective of implementing these

three tools was to simplify compliance with declarative obligations and combat tax fraud and evasion. Regarding our first objective and primary line of investigation, which focuses on the impact of these tools on work, especially in terms of complexity and inherent costs, we found that the majority of respondents agree or strongly agree that the work did not become more complex. However, they acknowledge that there was a greater need for investment, which would result in increased expenses related to professional activities. An exception to this conclusion is related to inventory reporting, for which an increase in the complexity of work was observed. This finding is consistent with estimates and existing studies regarding the impact of implementing these systems, such as SAF-T and e-invoice, and their benefits. This is especially true in terms of improved control, better quality of information and transparency, and greater effectiveness in risk analysis despite the inherent costs associated with setting up or updating the necessary IT systems, purchasing reporting, and e-invoicing software, and training (Canha, 2018; Carreira, 2017; European Commission, 2022).

Regarding the second line of inquiry concerning the impact of tools on compliance with fiscal and accounting responsibilities, as well as on the practice of tax evasion and avoidance activities, it was found that the presence of stronger tax enforcement, according to respondents' opinions, led to greater compliance with taxpayers' fiscal and accounting obligations. This conclusion aligns with several studies demonstrating that enhanced tax enforcement coupled with technological reinforcement and increased digitalization contributes to better compliance with obligations, as well as an increase in tax revenues (Bellon et al., 2022; Jacobs, 2017; Naritomi, 2019; Savić & Pavlović, 2023; Skare et al., 2023; Slemrod, 2016).

Regarding tax avoidance and evasion activities in general, there is a positive perception of the impact of SAF-T, e-invoice, and inventory reporting tools in combating these activities. However, when questioned about specific and more aggressive cases, doubts persist regarding the effectiveness of these new mechanisms. This conclusion is particularly evident when discussing tax avoidance practices, for which respondents believe that companies have simply adjusted their mechanisms to the existing reality. The explanation for this finding may reside in the fact that the two activities, avoidance and evasion, have fundamentally different modes of operation (illegal vs. legal activities) and consequences (criminal punishment vs. administrative penalties). Additionally, the tools created mostly target evasion and tax fraud activities rather than tax avoidance activities, which is consistent with results observed in other countries (Auksztol & Chomuszko, 2020; Baginska & Kowalik, 2023; European Commission, 2022; Heinemann & Stiller, 2024; Naritomi, 2019).

It is not surprising that when professionals were questioned about the positive impact of e-invoicing on entrepreneurs' perceptions regarding topics such as combating tax evasion and avoidance, the percentage of agreement obtained was higher for tax evasion schemes. On the other hand, the implementation of these tools, namely SAF-T and e-invoicing, sought to encourage an increase in third-party reporting, thereby transforming taxpayers into tax auditors of their own expenses (Naritomi, 2019). This paradigm shift facilitated the combating of collusive tax evasion[20], a situation not observed in tax avoidance activities, as these are predominantly decided and executed internally without the need for collaboration with external agents (Hanlon & Heitzman, 2010).

Nevertheless, it is important to note that both activities can be addressed complementarily, namely through enhanced tax enforcement via digital transformation. Difficulty in combating is encountered at the highest levels, where there is a perception that companies are unwilling to relinquish the tax savings brought about by these activities and adapt their strategies accordingly. This underscores the potential need for a comprehensive approach to tackling tax avoidance, which may necessitate additional measures beyond mere tax enforcement by the Portuguese tax authorities and government. Some authors (Alm & Torgler, 2011; Freedman, 2006) suggest that the complexity of the tax system and a country's cultural attitudes toward these issues are two pivotal factors in addressing this phenomenon. In a study conducted by Borrego (2014) on tax compliance and complexity in Portugal, various accountants were surveyed, leading the author to conclude that the intricacies of the tax system, coupled with their awareness of penalties for noncompliance, incentivize accountants to exploit loopholes in the tax system. Conversely, Borrego (2014) also highlights the need to cultivate a greater sense of morality among accountants to mitigate such activities.

Lastly, it should be noted that while inventory reporting has been recognized as a positive measure in allowing for more accurate inventory declarations, the reality is that tax planning through this avenue persists, albeit to a lesser extent, indicating that the measure's objective has not been fully achieved.

[20] Collusive tax evasion: "Tax evasion is deemed collusive if two or more taxpayers explicitly or implicitly coordinate their tax declarations to evade taxes, to reduce the likelihood of a tax audit, and/or to reduce the penalty; otherwise, it is deemed independent." (Abraham et al., 2017, p.180)

4.7 Conclusion

This study employs a questionnaire to elucidate the perceptions of professionals and users of the SAF-T, e-fatura, and inventory reporting tools regarding their effectiveness in combating tax avoidance and tax evasion. The fight against these activities has been one of the main objectives of the OECD and the EU in recent years. As part of this effort, one of the proposed measures was the adoption of SAF-T, with the aim of creating a standardized file containing fiscally relevant information that would enable states to facilitate inspection and accounting audit processes through the use of technology.

Portugal was among the first countries to adopt SAF-T, and following its implementation it was possible to develop other measures such as e-invoicing and inventory reporting. The implementation of these measures was described by the Portuguese government as a success in combating tax evasion and tax fraud activities. However, this is not the only way to reduce tax payments. Through our questionnaire we were able to understand the impact of these measures beyond combating tax evasion and how companies have adapted to these changes.

Our findings reveal a positive perception of the impact of SAF-T, e-invoice, and inventory reporting tools in combating tax evasion and tax avoidance activities. However, doubts persist regarding the effectiveness of these new mechanisms for more aggressive cases. This conclusion is particularly evident when discussing tax avoidance practices, where respondents believe that companies have simply adjusted their mechanisms to the existing reality. Therefore, our findings suggest that digital transformation is an effective way to improve tax enforcement and compliance by mitigating asymmetric information, and may have the potential to deter moral hazard, injustice, and collusion in tax enforcement and administration. Adopting information technology could be a good policy to strengthen the state's tax capacity but this cannot be the sole solution adopted by governments, as companies may adapt their schemes to the new reality.

Our study is not without limitations, which can serve as suggestions for future research. With this questionnaire we asked direct questions to professionals regarding the impact of these tools on combating tax avoidance and tax evasion. However, we omitted questions that assess the reasons and ethical issues related to these two activities. One reason for this decision was the limitation imposed by our target audience. Since respondents could include individuals from both the public and private sectors with different professions, the questions asked were restricted to certain issues to ensure that they made sense to both parties. Therefore, given our results, it would be interesting to question each group separately.

Lastly, it would be intriguing to understand how entrepreneurs managed to adapt their schemes to this reality and whether the use of technology contributes to this adaptation. Some authors have noted that digital innovation promoted by governments can, in certain cases, contribute to reducing tax risk, thereby increasing tax avoidance and tax evasion activities, as companies gain access to better information and new tax planning schemes (Alm, 2023; L. Chen & He, 2024; Hamilton & Stekelberg, 2017).

CHAPTER 5

5 Conclusions

In recent decades there has been growing interest in tax avoidance activities (Hanlon and Heitzman, 2010; Wang et al., 2020; Wilde and Wilson, 2018). Despite this interest, understanding the relationship between tax avoidance and tax evasion activities presents challenges. Most studies analyze these two activities separately due to difficulties in measuring tax evasion. However, from a theoretical perspective, tax evasion and tax avoidance activities may function as substitutes (Gamannossi degl'Innocenti et al., 2022; Malik et al., 2018; Slemrod and Yitzhaki, 2002), indicating the need to investigate their interaction. Therefore, the long-term aim of this dissertation is to contribute an empirical analysis of whether tax avoidance and tax evasion activities are complementary or substitutive to each other and how the introduction of new tax enforcement tools (i.e., SAF-T, e-invoice, and mandatory inventory reporting) impacts these activities.

For this, the first article (Chapter 2) aimed to identify the determinants and consequences of tax avoidance activities. Our findings revealed a spectrum of determinants, ranging from endogenous factors centered around company attributes, ownership structures, corporate governance, CSR initiatives, auditing, and internal controls, to exogenous factors categorized into formal and informal realms.

Key insights have emerged from our investigation. Concerning determinants, it is notable that the majority of studies aim to identify company characteristics associated with heightened tax avoidance, focusing especially on ownership structure, corporate governance, and formal factors. Notably, research on ownership structures has uncovered varied findings, suggesting potential non-linear relationships.

In analyzing CSR activities, we observe divergent perspectives, with conclusions varying based on managerial viewpoints and societal perceptions regarding the impact of tax avoidance activities. Exploration extends to management choices such as auditor selection and information quality. While this area remains relatively underexplored, its significance is underscored, especially considering the impact of legislative changes mandating audit-firm rotation in certain countries.

Within the realm of formal exogenous determinants, there is widespread agreement on the pivotal role of tax enforcement in deterring tax avoidance practices. Additionally, we emphasize the increasing influence of non-tax factors on managerial decision-making, potentially shaping tax avoidance activities.

Turning to the consequences, a focal point emerged around the intricate and contentious relationship between tax avoidance activities and firm valuation. Recent scholarly endeavors have pivoted toward employing moderators to elucidate the nuanced dynamics underlying this relationship, reflecting a concerted effort to deepen our understanding within this domain.

The second article (Chapter 3) analyzed the impact of the SAF-T introduction on tax avoidance activity in Portugal, specifically examining whether it has a substitution effect (decrease in tax evasion replaced by an increase in tax avoidance) or a complementary effect (decrease in both tax evasion and tax avoidance). The findings indicate that the adoption of SAF-T adversely affects firms with pre-existing high levels of tax avoidance (Low ETR) prior to SAF-T implementation. This implies that SAF-T acts as a potent deterrent against tax avoidance behaviors even in the face of statutory tax rate reductions. Similar outcomes were observed among firms categorized within high-risk sectors (i,e., repair and maintenance of vehicles and respective parts and accessories, hospitality, hairdressers and beauty parlors).

We also examined the effects of inventory disclosure requirements and the consequences of heightened invoicing aimed at combating fraud and tax evasion. Our analysis suggests that mandatory inventory reporting is associated with reduced levels of tax avoidance. However, this reduction was not evident among companies characterized by extreme levels of tax avoidance (High and Low ETR). Moreover, our findings indicate that an increase in invoicing is associated with a lower level of tax avoidance.

The third article (Chapter 4) analyzed the professionals' perceptions of the effectiveness of SAF-T, e-invoice, and mandatory inventory reporting measures in reducing tax evasion and tax avoidance activities and enhancing taxpayer compliance. Our findings highlight the perceived effectiveness of SAF-T, e-invoicing, and inventory reporting tools in combating tax evasion and avoidance. However, concerns persist, especially for more aggressive cases, in which it is believed that companies may simply adjust their tactics, particularly in instances of aggressive tax avoidance.

In conclusion, these results contribute to the growing field of tax avoidance research (Article 1), emphasizing the impact of tax enforcement tools in combating tax avoidance activities (Articles 2 and 3). Overall, the evidence presented here underscores the importance of adopting tools that enable greater monitoring and control of taxpayers (Atwood et al., 2012; Cao et al., 2020; Frank et al., 2018; Hasegawa et al., 2013; Majeed & Yan, 2019; Zeng, 2019). It is imperative to note that these tools cannot be implemented in isolation, as there is a perception that in extreme cases of tax aggressiveness, taxpayers tend to seek alternative means to evade the oversight of tax authorities. Therefore, we can conclude that the efforts to

combat tax evasion in Portugal have allowed for a complementary reduction in tax avoidance activities, and that the substitution effect was not observed in the majority of companies.

5.1 Limitations and contributions

These studies are not without limitations. In the first article we opted to utilize only one keyword, “tax avoidance”, and focused solely on articles published in scientific journals up to the 3rd quartile of Scimago. Changing criteria, such as using more keywords like “tax planning” and “tax aggressiveness”, or selecting other unpublished studies, would have led to the inclusion of articles focusing on specific types of tax avoidance and compromise the quality of the articles selected.

In the second article we addressed two time periods, namely the periods of 2012-2014 and 2016-2018, which were marked by the Corporate Income Tax reform in 2014 and reductions in statutory tax rates, particularly in 2014 and 2016. These changes contributed to a reduction in the tax burden, impacting the measures of tax avoidance used. However, we believe that their impact was marginal and did not significantly influence the conclusions drawn, as even with the aforementioned changes, we observed an increase in effective tax rates.

Finally, in the third article we highlight the choice of target audience as the main limitation. While we sought to include professionals from various fields who deal with at least one of the tools under study, this choice constrained the type of questions asked, as we had to formulate questions that were relevant across different professions.

When it comes to contributions, we believe that our work is a valuable addition to the scholarly study of tax avoidance activities. First, we provide a comprehensive framework of determinants, consequences, and the main measures employed over the last 20 years, benefiting researchers, students, and tax authorities alike. Second, we shed light on how tax enforcement can effectively combat tax evasion and avoidance activities, as well as the interrelationship between these two phenomena. The measures implemented in Portugal are a result of recent technological advancements, particularly in digitization and big data analysis. Consequently, our study also has strong policy implications for governments worldwide, highlighting the importance of leveraging modern information technology to bolster tax enforcement efforts. Additionally, our research underscores the need for continuous adaptation and innovation in tax administration to keep pace with evolving tax avoidance strategies and technological advancements. This emphasizes the importance of robust

collaboration between policymakers, tax authorities, and technology experts to develop effective and adaptive tax enforcement mechanisms.

5.2 Reflections for future studies

This article addresses several important lines of future research in the field of tax avoidance activities and their determinants and consequences. The following areas stand out:

- Company Characteristics: Given the varying opportunities for tax planning across different sectors, future research could benefit from a more nuanced examination of tax avoidance practices tailored to specific industries.
- Ownership Structures and Governance: Exploring the impact of corporate restructurings, such as IPOs and privatizations, on tax avoidance levels could shed light on how changes in ownership concentration influence tax planning activities.
- Additionally, examining the relationship between compensation incentives, including debt compensations and promoted-based incentives, and tax avoidance behaviors offers a promising avenue for future research.
- CSR: Further investigation into the complex relationship between CSR and tax avoidance activities is warranted, particularly in understanding the moderating effects of governance characteristics and social and ethical factors. Analyzing the impact of proactive CSR policies adopted by governments and companies on corporate tax policies could provide valuable insights into the connection between societal responsibility and tax avoidance.
- Human Resources: Exploring the involvement of former politicians in executive positions and their influence on tax planning activities is an intriguing area for research. Investigating the psychological factors influencing decision-making related to tax avoidance, such as emotions in high-risk situations, could offer valuable insights into the behavioral aspects of tax planning within corporations.
- Auditors and Internal Controls: Further exploration of the impact of mandatory audit firm rotation on tax avoidance activities is essential, considering the divergent perspectives on its consequences. Additionally, investigating the stewardship role of accounting information in reducing tax avoidance could provide valuable insights into the effectiveness of accounting systems in deterring tax planning strategies.
- Formal and Informal Factors: Delving into additional measures, such as those introduced by the BEPS project, and understanding taxpayers' perceptions of tax enforcement measures could provide insights into the effectiveness of regulatory interventions in

combating tax avoidance. Exploring non-tax factors, such as political clientelism and consumer behavior, in influencing tax planning decisions offers a promising avenue for understanding the broader context of tax avoidance activities.

- Consequences: Investigating investors' perceptions of the benefits and risks associated with tax avoidance activities could offer insights into the factors influencing decision-making in this realm. Understanding the trade-offs between the potential benefits and consequences of tax avoidance activities is crucial for developing comprehensive strategies to address this issue.
- Finally, regarding the analysis of the relationship between tax avoidance and tax evasion activities, it is suggested to conduct a more in-depth analysis of different professional groups, aiming to understand how more aggressive companies have adapted their schemes to the current reality and how technology can contribute to this adaptation.

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APPENDIXES

Appendix A – Articles selected by areas of study (Article 1)

Endogenous Determinants

1- Characteristics of the company: (Agarwal *et al*., 2022; Akamah *et al*., 2021; Amidu *et al*., 2019; Argilés-Bosch *et al*., 2020; Beuselinck & Pierk, 2022; H. Chen *et al*., 2022; R. Chen *et al*., 2022; T. Chen *et al*., 2021; W. Chen, 2022; Cheng *et al*., 2021; Cobham & Janský, 2019; Dang & Tran, 2021; Desai *et al*., 2006; Donohoe, 2015; Dyreng *et al*., 2013, 2022; Francis *et al*., 2017; Fuadah *et al*., 2022; L. Gao, 2016; Y. Gao *et al*., 2021; Hardeck & Wittenstein, 2018; M. M. Hasan, Habib, *et al*., 2021; M. M. Hasan, Lobo, *et al*., 2021; Hong *et al*., 2022; S. Khan *et al*., 2022; Kohlhase & Pierk, 2020; Kundelis *et al*., 2022; Lee, 2018; Liang *et al*., 2021; Liao *et al*., 2022; Lim, 2012; Masri *et al*., 2019; Mocanu *et al*., 2021; S. Park, 2018; Qin *et al*., 2022; Rego, 2003; Rodríguez *et al*., 2019; Y. Shin & Park, 2022; Stewart, 2018; Taylor *et al*., 2015; Vahdani *et al*., 2019; Wang *et al*., 2022; Yuanita *et al*., 2020)
43 articles

2- Ownership Structure and Corporate Governance

Ownership structure: (Badertscher *et al*., 2013; Bradshaw *et al*., 2019; Cabello *et al*., 2019; Y. Chen, Ge, *et al*., 2019; Cheng *et al*., 2012; Dakhli, 2022; Farooq & Zaher, 2020; B. Francis *et al*., 2022; I. Hasan *et al*., 2022; Hassan *et al*., 2022; W.-H. Hsu & Liu, 2018; Y. Jiang *et al*., 2021; M. Khan *et al*., 2017; Khurana & Moser, 2013; Kovermann & Wendt, 2019; Kuo, 2022; C. H. Lee & Bose, 2021; B. Li *et al*., 2021; O. Z. Li *et al*., 2017; Mcguire *et al*., 2014; Mindzak & Zeng, 2020; Moore *et al*., 2017; Ouyang *et al*., 2020; Richardson, Wang, *et al*., 2016; T. Tang *et al*., 2017, 2022; W. Wang *et al*., 2021; Xiao, 2022)
28 articles

Executive compensation plans: (Armstrong *et al*., 2015; Bird & Karolyi, 2017; M.-C. Chen *et al*., 2020; Desai & Dharmapala, 2006; Huseynov *et al*., 2017; Kubick *et al*., 2020; Seidman & Stomberg, 2017; Taylor & Richardson, 2014; Zolotoy *et al*., 2021)
9 articles

Internal Governance: (Al Lawati & Hussainey, 2021; Alshabibi *et al*., 2022; Arena *et al*., 2021; Armstrong *et al*., 2015; Barros & Sarmento, 2020; Bradshaw *et al*., 2019; Brune *et al*., 2019; Campa *et al*., 2022; T. yuan Chen *et al*., 2022; Choi & Park, 2022; Chughtai *et al*., 2021; Dang & Nguyen, 2022; P. Hsu *et al*., 2018; Jiménez-Angueira, 2018; Kolias & Koumanakos, 2022; N. Li *et al*., 2022; Plečnik & Wang, 2021; Salhi, Riguen, *et al*., 2020; Su *et al*., 2019; Y. Tang *et al*., 2019; Vitols, 2021; Young, 2017)
22 articles

3- Corporate social responsability: (Abdelmoula *et al*., 2022; Adrian *et al*., 2022; Chouaibi *et al*., 2022; Col & Patel, 2016; Davis *et al*., 2016; Ding *et al*., 2022; Emerson *et al*., 2020; Gavious *et al*., 2022; Ginesti *et al*., 2020; González *et al*., 2019; Gulzar *et al*., 2018; Hoi *et al*., 2013; H. H. Huang *et al*., 2017; W. Jiang *et al*., 2022; N. Khan *et al*., 2022; Lanis & Richardson, 2015; H. Liu & Lee, 2019; C. W. Mao, 2019; C. Mao & Wu, 2019; Mayberry & Watson, 2021; Ravenda *et al*., 2015; Timbate, 2021; N. A. Wahab *et al*., 2022; Watson, 2015; Zeng, 2018)
25 articles

4- Human Resources: (Alstadsæter & Jacob, 2017; Baghdadi *et al*., 2022; Boone *et al*., 2013; J. Chen *et al*., 2021; L. H. Chen *et al*., 2017; M.-C. Chen *et al*., 2020; Y. Chen, Huang, *et al*., 2019; Chyz *et al*., 2019; Cortellese, 2022; DeZoort *et al*., 2018; Duan *et al*., 2018; Dyreng *et al*., 2010; Evertsson, 2016; Firmansyah *et al*., 2022; B. B. Francis *et al*., 2014; García-Meca *et al*., 2021; Gul *et al*., 2018; Hjelström *et al*., 2020; Hofmann & Schwaiger, 2020; Hoseini *et al*., 2018; Hsieh *et al*., 2018; H. Huang & Zhang, 2020; Jarboui *et al*., 2020; C. Jiang *et al*., 2018; J. H. Kim & Lee, 2021; Kubick & Lockhart, 2017; Law & Mills, 2017; J. Li, 2022; L. Li & Wu, 2022; Lismont *et al*., 2018; X. Liu *et al*., 2022; Y. Liu *et al*., 2022; Olsen & Stekelberg, 2016; J. Park *et al*., 2016; Rhee *et al*., 2020; Richardson, Taylor, *et al*., 2016; Salehi *et al*., 2017; Seifzadeh, 2022; Shen *et al*., 2019; I. Shin & Park, 2020; Su *et al*., 2019; Sutrisno *et al*., 2022; Taylor *et al*., 2019; Wen *et al*., 2020; Zhang *et al*., 2022)
45 articles

5- Auditors: (Bianchi *et al*., 2019; Boubaker *et al*., 2022; Chang *et al*., 2020; H. Chen *et al*., 2020; Chyz *et al*., 2021; Cook *et al*., 2020; Deng *et al*., 2021; Ding *et al*., 2021; Dong *et al*., 2022; Donkor *et al*., 2022; Evertsson, 2016; Finley & Stekelberg, 2016; Gallemore & Labro, 2015; Garcia-Blandon *et al*., 2021; D. Huang & Chang, 2016; Krishnan & Visvanathan, 2011; Laplante *et al*., 2021; C. Liu *et al*., 2021; Mayberry *et al*., 2015; Mcguire *et al*., 2012; Schmal *et al*., 2021; Watrin *et al*., 2019; Wei & Chen, 2016)
23 articles

Appendix A – Articles selected by areas of study (*continued*)

Exogenous Determinants

6- Formal Factors: (Abernathy *et al*., 2013; Adams *et al*., 2022; Amiram *et al*., 2019; Atwood *et al*., 2012; Borkowski & Gaffney, 2021; Cao *et al*., 2020; E. Chen *et al*., 2013; J. Z. Chen *et al*., 2021; Cho, 2020; Clausing, 2020; Clifford, 2019; Donohoe & McGill, 2011; Finley, 2019; Frank *et al*., 2018; Gaertner *et al*., 2016; Green & Plesko, 2016; Guenther *et al*., 2019; Gupta *et al*., 2014; Hasegawa *et al*., 2013; Henry *et al*., 2016; Hope *et al*., 2013; Joshi, 2020; Kubick *et al*., 2016, 2017; Laplante *et al*., 2019; Y. J. Lee, 2021; Leung *et al*., 2019; Q. Li *et al*., 2020; Y. Li & Ma, 2022; Ma & Thomas, 2020; Majeed & Yan, 2019; Malik *et al*., 2018; McClure *et al*., 2018; Nessa *et al*., 2020; Overesch *et al*., 2020; S. Park, 2018; Pham, 2019; Salhi, Jabr, *et al*., 2020; Salihu *et al*., 2015; Saragih & Ali, 2022; Schenkelberg, 2020; Shevlin *et al*., 2017; Simone *et al*., 2014; Sun *et al*., 2022; Yuanita *et al*., 2020; Zeng, 2019)
46 articles

7- Informal Factors:

Social Capital and Ethics: (Al-Hadi *et al*., 2022; Alharbi *et al*., 2020; Boone *et al*., 2013; J. W. Chang *et al*., 2022; S. Chen *et al*., 2021; Cheng *et al*., 2022; Cho *et al*., 2020; Deng *et al*., 2020; DeZoort *et al*., 2018; Z. Gao *et al*., 2017; Kanagaretnam *et al*., 2018; Lei *et al*., 2022; Na & Yan, 2022; H. Shen *et al*., 2021; Y. Shen *et al*., 2022; Y. Sun, 2021; Yoo & Lee, 2019)
17 articles

Economic Factors: (Arieftiara *et al*., 2020; H. Chen *et al*., 2021; T. Chen *et al*., 2022; De Vito, 2022; Elbannan & Farooq, 2020; Feng *et al*., 2022; Geng *et al*., 2021; Hill *et al*., 2013; D. Jiang *et al*., 2020; Kong *et al*., 2021; X. Li *et al*., 2020; Luo *et al*., 2020; Nguyen & Nguyen, 2020; Ni *et al*., 2022; Richardson *et al*., 2015; Tsai *et al*., 2021; H. Xu & Moser, 2022; Yu *et al*., 2021)
18 articles

Suppliers, Customers, and Products: (Austin & Wilson, 2017; Cao *et al*., 2020; Cen *et al*., 2017; F. Huang & Gao, 2022; H. H. Huang *et al*., 2016; Kanagaretnam *et al*., 2018; Karamshahi *et al*., 2018; Kubick *et al*., 2015; Mansi *et al*., 2020; J. Wang & Mao, 2021)
10 articles

Tax avoidance measures:
(Austin, 2019; Blaylock *et al*., 2012; Desai & Dharmapala, 2006; Drake *et al*., 2020; Dyreng *et al*., 2008, 2017; Guenther *et al*., 2017, 2021; Hamzah *et al*., 2021; Henry & Sansing, 2018; Jackson, 2015; J.-B. Kim *et al*., 2011; Lampenius *et al*., 2021; Rego, 2003; Schimanski, 2017; Schwab *et al*., 2022; Simone *et al*., 2019; Thomsen & Watrin, 2018)
17 articles

8- Consequences:

(Abdelfattah & Aboud, 2020; Abid & Dammak, 2022; Akbari *et al*., 2019; Alexander *et al*., 2020; Alsmady, 2022; Amar *et al*., 2019; Asiri *et al*., 2020; Bauckloh *et al*., 2021; Baumann *et al*., 2017; Beladi *et al*., 2018; Benkraiem *et al*., 2022; Blaufus *et al*., 2019; Bradshaw *et al*., 2019; Brooks *et al*., 2016; Cao *et al*., 2021; Chaudhry, 2021; Chun *et al*., 2020; Chyz & Gaertner, 2018; Clausing, 2016; Col, 2017; Cook *et al*., 2017; Crabtree & Kubick, 2014; Dhaliwal *et al*., 2022; Dhawan *et al*., 2020; Doellman *et al*., 2020; Drake *et al*., 2019; Dyreng *et al*., 2019; Gan & Qiu, 2019; Garg *et al*., 2022; Goh *et al*., 2016; Graham *et al*., 2014; Ha *et al*., 2021; Habib & Hasan, 2016; I. Hasan *et al*., 2014; Heitzman & Ogneva, 2019; Herron & Nahata, 2020; Inger, 2014; Inger *et al*., 2018; Inger & Vansant, 2019; Isin, 2018; Jacob & Schütt, 2020; Janský & Palanský, 2019; Jia & Gao, 2021; Johannesen *et al*., 2020; Kao & Liao, 2021; Khuong *et al*., 2019, 2020; Khurana *et al*., 2018; I. Kim *et al*., 2020; J.-B. Kim *et al*., 2011; Lanis *et al*., 2018, 2021; S. Lee, 2022; Y. Lee *et al*., 2021; Lewellen *et al*., 2021; W. Li *et al*., 2019; Lim, 2011; H. Liu, 2022; Marwat *et al*., 2021; Mcguire *et al*., 2016; N. Minh Ha *et al*., 2022; N. M. Minh Ha *et al*., 2021; Ngelo *et al*., 2022; J. H. Nguyen, 2021; Qu *et al*., 2020; Robinson & Schmidt, 2013; Rudyanto & Pirzada, 2020; Rusina, 2020; Saka *et al*., 2019; Salehi *et al*., 2019; Schochet *et al*., 2022; Shams *et al*., 2022; Shevlin *et al*., 2020; Taherinia *et al*., 2022; T. Y. H. Tang, 2019; Tosun & Yildiz, 2022; Varoonchotikul, 2021; N. S. A. Wahab & Holland, 2012; S. Xu & Zheng, 2020; L. Zhang *et al*., 2022)
80 articles

Appendix B – Journals and publications per year used in the Systematic Literature Review (Article 1)

Journals	2003	2006	2008	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Total
Abacus												1			1	1	3
Accounting & Finance									1		1		2	2	3		9
Accounting and Business Research										1				2		1	4
Accounting Forum															1	1	2
Accounting Horizons												1		1			2
Accounting Research Journal										1				1			2
Accounting Review			1	1		4	1	2	1	3	4	1	4	2	3	3	30
Accounting, Economics and Law: A Convivium															1		1
Administrative Sciences																1	1
Advances in Accounting												1				1	2
Applied Economics											4			1	1	1	7
Applied Economics Letters																1	1
Asian Economic Journal																1	1
Asian Review of Accounting													1				1
Asia-Pacific Journal of Accounting & Economics										2			1	1		2	6
Australasian Accounting, Business and Finance Journal																1	1
British Accounting Review						1											1
BRQ Business Research Quarterly															1		1
Business Perspectives & Research														1			1
Central European Business Review																1	1
China Journal of Accounting Research											1						1
Chinese Management Studies													1				1
Cogent Business & Management														1	2	1	4
Cogent Economics & Finance																3	3
Comparative Economic Research														1			1
Competitiveness Review																1	1
Contemporary Accounting Research	1														3	3	7
Corporate Governance: An International Review											1					1	2
Corporate Social Responsibility & Environmental Management													1				1
Critical Perspectives on International Business												1					1
Decision Support Systems												1					1
Development Policy Review													1				1
Economic Analysis and Policy																1	1
Economic Modelling									1				1		1	1	4
Economic Research-Ekonomska Istrazivanja													1		2		3
Economic Systems														1			1
Economics & Sociology													1			1	2
Economies																2	2
Emerging Markets Finance & Trade														1		1	2
Energy Economics															1		1
Eurasian Business Review												1					1
European Accounting Review													1	2	1		4
European Management Review														1			1
Family Business Review													1				1
Financial Innovation															1		1
Frontiers in Energy Research																1	1
Frontiers in Psychology															1	3	4
Gadjah Mada International Journal of Business														1			1
Global Finance Journal														1			1
Heliyon																1	1
Humanities and Social Sciences Reviews													1				1
International Journal of Accounting & Information Management													1				1
International Journal of Accounting (World Scientific)													1				1
International Journal of Emerging Markets																1	1
International Journal of Ethics and Systems																1	1
International Journal of Law andManagement											1						1
International Journal of Managerial Finance													1			1	2

Appendix B – Journals and publications per year used in the Systematic Literature Review *(continued)*

Journals	2003	2006	2008	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Total
International Journal of Organizational Analysis													1				1
International Journal of Social Economics												1					1
International Journal of Trade and Global Markets													1				1
International Review of Economics & Finance														2		1	3
International Review of Financial Analysis												1				2	3
International Tax and Public Finance												1	1	1			3
Journal of Accounting & Economics							2		3		1		1	2	1		10
Journal of Accounting & Public Policy												1	1		2	3	7
Journal of Accounting Research														1			1
Journal of Accounting, Auditing & Finance							1						2	1	2	1	7
Journal of Asian Finance, Economics and Business													1				1
Journal of Asia-Pacific Business																1	1
Journal of Banking & Finance					1		1			1						1	4
Journal of Business Economics														1			1
Journal of Business Ethics									2	1	1	1		1		3	9
Journal of Business Finance & Accounting											3	1			1	1	6
Journal of Business Research											1	1			2		4
Journal of Contemporary Accounting & Economics								1	1	1			2	1	2	1	9
Journal of Corporate Accounting and Finance															1		1
Journal of Corporate Finance										1	1	2		1	2	3	10
Journal of Economic Psychology													1				1
Journal of Economics & Finance														1			1
Journal of Empirical Finance																1	1
Journal of Environmental Management															1		1
Journal of Financial Crime										1			1	1		1	4
Journal of Financial Economics		1			1		1	1			2						6
Journal of Financial Reporting and Accounting																3	3
Journal of International Accounting Research														2	1		3
Journal of International Accounting, Auditing & Taxation												1		2	1	2	6
Journal of International Business Studies													1	1			2
Journal of Management Accounting Research													1		1		2
Journal of Management and Governance																1	1
Journal of Management Studies															1		1
Journal of Public Economics		1											1				2
Journal of Risk and Financial Management															1	1	2
Journal of the American Taxation Association					2		4	3	3	3	3	2	2	3	4	1	30
Kasetsart Journal of Social Sciences															1		1
Kyklos															1		1
Management Science												1				1	2
Meditari Accountancy Research													1	1			2
Montenegrin Journal of Economics															1		1
National Tax Journal							1			4		1	1	3			10
North American Journal of Economics & Finance														1	1		2
NTU Management Review										1		1					2
Pacific Accounting Review																1	1
Pacific-Basin Finance Journal												1		1	3	1	6
Polish Journal of Management Studies															1	1	2
Problems and Perspectives in Management														1			1
Quality and Quantity													1				1
Quarterly Journal of Finance														1			1
Review of Accounting Studies								1			2	2	4			3	12
Review of Pacific Basin Financial Markets & Policies														1			1
Review of Quantitative Finance & Accounting						1		1		1				2	1	2	8
Revista Espanola de Financiacion y Contabilidad															1		1
Social Responsibility Journal													1	2			3
South Asian Journal of Business Studies															1		1
Spanish Journal of Finance and Accounting														1			1
Sustainability												3	5	1	2	4	15
Sustainability Accounting, Management and Policy Journal																1	1
Technological Forecasting & Social Change																1	1
World Bank Economic Review														1			1
Total Geral	**1**	**2**	**1**	**1**	**4**	**6**	**11**	**9**	**12**	**21**	**26**	**28**	**50**	**57**	**59**	**80**	**368**

Appendix C – Questionnaire (Article 3)

This questionnaire aims to study the impact that the introduction of the SAF-T (Standard Audit File for Tax) had on Portuguese companies, as well as the impact of measures resulting from the introduction of this system, namely the creation of e-invoicing and the inventory communication system.

This study is part of a doctoral thesis being developed at ISCTE-IUL in the field of tax planning. We kindly ask you to pay attention to the instructions for each question that will appear throughout the questionnaire.

Please note that there are no right or wrong answers. All responses are important.

Filling out this questionnaire is voluntary and anonymous, ensuring confidentiality. All questions will be treated in an aggregated manner and used only for statistical purposes.

We appreciate your collaboration, which is crucial for this project.

Before we start the questionnaire, it's essential that you read the concepts of tax evasion and tax avoidance. The distinction between them is crucial for the following questions.

Tax Avoidance and Tax Evasion: Both activities aim primarily at reducing the amount of tax to be paid. In the case of tax avoidance, the method of reducing tax payment involves carrying out operations that are either legal or of dubious legality, as they fall within the gray area of tax legislation. In contrast, tax evasion activities involve deliberate operations that are always considered illegal because they go beyond what the law permits, and their practice is always punishable (e.g., failure to issue an invoice).

A- In this section, we will present a series of statements regarding the SAF-T, introduced since 2008, in Portugal.

A1- Have you had any contact with SAF-T? Yes___/ No____ (if you answered "no," proceed to Section B)

A2- Please indicate the extent to which you agree with each of the following statements. For each statement, select (by placing a cross) whether 1- Strongly Disagree, 2- Disagree, 3- Neither Disagree nor Agree, 4- Agree, 5- Strongly Agree.

General Aspects of SAF-T	**Totally disagree**	**Disagree**	**Neither agree nor disagree**	**Agree**	**Totally agree**
SAF-T represents a positive change in fulfilling accounting obligations					
SAF-T represents a positive change in fulfilling tax obligations					
The SAF-T has made the work of professionals (accountants, auditors, inspectors) more complex					
The SAF-T has made the work of professionals more costly (e.g., the need for greater investment in training and technological resources).					
The implementation of SAF-T has led to a notable improvement in tax payment compliance					
The SAF-T has not brought significant changes to tax-compliant companies					
SAF-T and Tax Avoidance					
The SAF-T has reduced the development of overall tax avoidance schemes.					
The SAF-T is an important measure to combat abusive tax avoidance					
Companies that were previously more aggressive in terms of tax avoidance did not change their behavior with the introduction of SAF-T.					
With the introduction of SAF-T, companies sought to adapt their tax avoidance schemes to the new reality					
SAF-T and Tax Evasion					
SAF-T had a greater impact on companies with higher levels of tax evasion (e.g., non-issuance of invoices).					
With the introduction of SAF-T, companies replaced tax evasion schemes with tax avoidance schemes.					
The introduction of SAF-T had no impact on companies engaged in tax evasion schemes.					

B- In this section, we will present a series of statements regarding the e-invoice, introduced since 2015, in Portugal.

B1- Have you had any type of professional contact with the e-invoice? Yes___/ No____ (if you answered "no," proceed to Section C)
B2- Please indicate the extent to which you agree with the following statements. For each statement, select (by placing a cross) whether 1- Strongly Disagree, 2- Disagree, 3- Neither Disagree nor Agree, 4- Agree, 5- Strongly Agree.

General Aspects of e-invoice	**Totally disagree**	**Disagree**	**Neither agree nor disagree**	**Agree**	**Totally agree**
The creation of e-invoice was a positive measure as it allowed the establishment of a fairer tax system.					
The e-invoice system encourages voluntary compliance with tax obligations. particularly in the issuance of invoices.					
e-invoice has contributed to raising awareness among the general public about the importance of requesting invoices.					
The benefits created by e-invoice do not outweigh the difficulties generated by this system (e.g.. increased discrepancies).					
e-invoice has made the work of professionals (accountants. auditors. inspectors) more complex.					
e-invoice has made the work of professionals more costly.					
e-invoice and tax avoidance					
e-invoice reduced the overall development of tax avoidance schemes.					
e-invoice was a significant addition to combating abusive tax avoidance compared to other previously existing measures (e.g.. SAF-T)					
Companies that were previously more tax aggressive (with greater tax avoidance) did not change their behavior with the introduction of e-invoice					
e-invoice changed entrepreneurs' perception regarding topics like tax avoidance					
With the introduction of .e-invoice. companies sought to adapt their tax avoidance schemes to the new reality.					
e-invoice and tax evasion					
The introduction of e-invoice had no impact on companies with tax evasion schemes					
Companies that increased the number of issued invoices did so because customers requested them; otherwise. they would continue not to issue invoices.					
With the introduction of e-invoice companies replaced tax evasion schemes with tax avoidance schemes.					
e-invoice had a greater impact on companies with higher levels of tax evasion. particularly altering the behavior of companies in adopting these schemes.					
e-invoice changed entrepreneurs' perception regarding topics such as tax evasion. making them more attentive and cautious.					

C- In this section, we will present a series of statements regarding inventory reporting, introduced since 2015, in Portugal. Respond to this section only if you work with inventory reporting or with companies that report inventories.

C1- Do you usually report inventories or work with companies that report inventories? Yes___/ No____ (if you answered "no," proceed to Section D)
C2- Please indicate the extent to which you agree with the following statements. For each statement, select (by placing a cross) whether 1- Strongly Disagree, 2- Disagree, 3- Neither Disagree nor Agree, 4- Agree, 5- Strongly Agree.

	Totally disagree	**Disagree**	**Neither agree nor disagree**	**Agree**	**Totally agree**
Inventory reporting					
Companies easily adapted to this new obligation					
Inventory reporting has helped reduce the risk of inventory overstatement (artificial increase).					
Inventory overstatement still exists, although at a lower level.					
Companies have managed to find alternative means to tax planning, previously accomplished through inventory overstatement.					
With this measure, companies began to declare their inventories with greater accuracy.					
This measure has added greater complexity to the work undertaken.					

D- You have reached the final section. In this part, we aim to collect some sociodemographic data.

D1- Gender: Female____/ Male____/ Other_____
D2- Age____
D3- Educational attainment:

High School	
Bachelor's degree	
Degree	
Masters	
PhD	

D4 – Professional Activity:

Auditors	
Consultants	
CFO	
Tax Inspector	
Statutory Auditors	
Accountants	
Other	

D5- Years of experience in the current profession:

Below 6	
6-10	
11-15	
16-20	
21-25	
26-30	
Above 30	

D6- Types of companies you work with on a daily basis (you can select more than one option):

Small business	
Mid-market enterprise	
Large enterprise	

D7- Sectors of activity of the companies you have contact with (you can select more than one option)

Agriculture, Forestry, Fishing	
Mining Industry	
Manufacturing Industry	
Water supply, sewage, waste management	
Construction	
Wholesale and retail trade	
Transportation and storage	
Accommodation and food service activities	
Publishing, telecommunications, IT	
Real estate activities	
Professional, scientific, and technical activities	
Administrative and support service activities	
Education	
Healthcare	
Arts, entertainment, and recreation	
Other services	

Appendix D - Conference proceedings where the systematic review was presented

Eurasia Business and Economics Society
www.ebesweb.org - ebes@ebesweb.org

32nd EBES Conference - Istanbul
August 5-7, 2020
Istanbul, Turkey
Hosted by
Kadir Has University

July 14, 2020

Andreia Magalhães
ISCTE-IUL
Portugal

Dear Andreia Magalhães,

Based on the recommendation of the conference chair and a session chair, your paper entitled **"All we need are taxes: A systematic review on tax avoidance"** has been accepted for oral presentation at the ***32nd EBES Conference - Istanbul.*** This is also to confirm that your abstract will be published in the conference program and the abstract book (with an ISBN number in an USB drive in PDF form). All papers and proposals are evaluated using a double blind reviewing process.

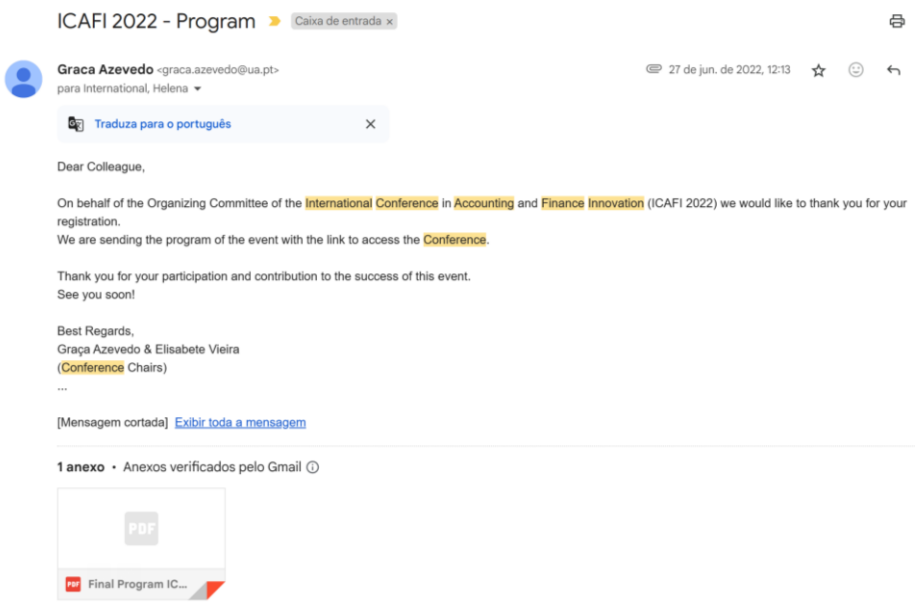
The ***32nd EBES Conference – Istanbul*** will be held on August 5th, 6th, and 7th, 2020 at the Kadir Has University in Istanbul, Turkey. Congratulations on your successful research efforts, and thank you for presenting your research paper at the ***32nd EBES Conference – Istanbul.***

Respectfully,

Eurasia Business Economics Society EBES 2008

Ender Demir, Ph.D
EBES
Conference Coordinator

Appendix E - Conference proceedings where the empirical essay was presented



ICAFI 2022 - Program Caixa de entrada ×

Graca Azevedo <graca.azevedo@ua.pt>
para International, Helena

27 de jun. de 2022, 12:13

Traduza para o português

Dear Colleague,

On behalf of the Organizing Committee of the International Conference in Accounting and Finance Innovation (ICAFI 2022) we would like to thank you for your registration.
We are sending the program of the event with the link to access the Conference.

Thank you for your participation and contribution to the success of this event.
See you soon!

Best Regards,
Graça Azevedo & Elisabete Vieira
(Conference Chairs)
...

[Mensagem cortada] Exibir toda a mensagem

1 anexo • Anexos verificados pelo Gmail

PDF

Final Program IC...

ICAFI 2022

14:00 – 16:00 Parallel Session 1

Room 1 | Moderator Rui Robalo	Room 2 | Moderator Cecília Carmo
Contabilidade pública em Cabo Verde: Situação atual e perceções futuras *Amélia Pires & Carla Brito* **Determinantes das irregularidades na Gestão Pública Municipal** *Abinair Silva & Augusta Ferreira* **Fatores associados à irregularidade na Educação Pública Municipal** *Abinair Silva & Augusta Ferreira* **A Design for Public Expense in Investment Property Through Tokenization** *Romildo Silva, Helena Inácio & Rui Marques* **As principais lacunas e inconformidades identificadas na prestação de contas em SNC-AP** *Daniela Teixeira & Patrícia Gomes*	**A utilização e conhecimento do *Activity-Based Costing* em Portugal** *Patrícia Quesado & Mariana Rolo* ***Business Intelligence* no Controlo de Gestão: utilização do *Power BI* - Estudo de caso na Renault CACIA – Portugal** *Marina Azevedo & Jorge Martins* **A taxa efetiva de imposto das sociedades: Revisão de literatura** *Gisela Oliveira, Sérgio Cruz & Vera Silva* **Pode a luta contra a elisão fiscal estar à distância de um clique?** *Andreia Magalhães, Rogério Serrasqueiro & Paulo Dias* **Governo das sociedades e gestão fiscal empresarial: um estudo bibliométrico** *José Madureira & Carla Carvalho*