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PAPER

Does Tax Avoidance Diminish Firms' Sustainability?

Chika Saka* • **Tomoki Oshika**** • **Masayuki Jimichi*****

Abstract Firm tax avoidance has gathered substantial public attention in both the real world and academic literature. Stakeholder theory suggests that firms need to maintain good relationships with all firm stakeholders to be sustainable. Although it makes the firm profitable (i.e., higher net income after tax) in the short run, tax avoidance may diminish the sustainability of firms. We thus examine the relationship between tax avoidance and sustainability. First, we find that

on the specific charts we draw, the location parameters of sustainable firms are clearly greater than those of others. Second, we examine the relationship between firm tax avoidance and financial sustainability using the LOGIT model and find that the effective tax rates (ETRs) of the firms are tied with their sustainability. Our results indicate that tax avoidance diminishes sustainability.

Keywords Tax avoidance; Sustainability; Effective tax rates (ETRs); Statutory tax rate

JEL Classification: C55; G15; M14.

1. INTRODUCTION

The Panama Papers and *the Paradise Papers* reveal shocking findings of corruption and tax avoidance. Since tax constitutes the backbone of governmental finance, rampant tax avoidance is so toxic that the related country is virtually at stake. Using tax payment records from tax authorities for more than 20 countries, Piketty approaches the issue from a long-term perspective and presents some economic principles (e.g., rate of return on capital > growth rate) in his book C*apital in the Twenty-First Century* (Piketty, 2014). While Piketty (2014) deals with individual-centric big data, we deal with financial big data from firms and find an economic consequence of tax avoidance.

If tax avoidance is ubiquitous around the world and has existed for many years, what are the economic consequences for firms? If a firm engages in tax avoidance

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actions, it may obtain benefits in the short term; however, it may bring potential harm to the company's reputation as many multinational firms have been recently criticized for their tax avoidance. According to stakeholder theory (Freeman, 2004; Freeman *et al.*, 2004), firms must take care of their stakeholders as they are vital to the organization's survival and success. The government, which collects taxes, is one of the stakeholders, thus, a firm's choice regarding whether to engage in tax avoidance actions may be tied to their economic consequences; that is, the firm's sustainability.

To answer this question, to obtain the evidence of the probability of firms' tax avoidance (Saka *et al*., 2019), the difference of the degrees of tax avoidance between sustainable firms and other firms is examined using two visualization methods. First, we examine the distribution (i.e., histograms) of the effective tax rates (ETRs) of sustainable and non-sustainable firms and find that the ETRs of the sustainable firms tend to distribute more in the higher locations compared to non-sustainable firms. Second, we examine the time trend of ETRs for 20 years and find that the higher ETRs of the sustainable firms have lasted for the long term.

After confirming the difference, we analyze if ETRs are tied with sustainability, using the LOGIT model, as our third analysis. Since tax payment is a civic duty (David and Gallego, 2009), and a firm has a societal obligation to pay its fair share of taxes (Lanis and Richardson, 2015), firms engaging in tax avoidance are criticized. This suggests that firms that avoid taxes tend to have bad reputations, and socially responsible firms are expected to engage in less tax avoidance. However, there is little evidence of how tax avoidance damages a firm's survival or sustainability. Thus, to examine the relationship between firm tax avoidance and financial sustainability, ETRs are analyzed to reveal if they can be used to distinguish sustainable firms from those that are not. Our results indicate that ETRs are higher in the sustainable firms, and higher ETRs are tied with sustainability; thus, the tax avoidance can diminish sustainability.

The findings have some potential implications: first, the results encourage firms to change their mindset about engaging in tax avoidance. Second, we can assume a firm's ETR is a useful indicator to distinguish firm sustainability, which provides a potential key performance indicator for integrated reporting. Overall, the study sheds light on the tax avoidance issue that has grown to the point that it can no longer be ignored by researchers or citizens. Accounting should ultimately serve to enhance social welfare (Lehman, 1992), and should not neglect the social consequences of tax avoidance. We provide evidence that the value-added distribution of paying tax has the potential to distinguish a firm's sustainability.

The remainder of this paper is organized as follows. Section 2 provides the background of the analysis and reviews related research. Section 3 develops the hypothesis and describes the data used. Section 4 describes the results for the hypothesis, and section 5 concludes the paper.

2. BACKGROUND

2.1. Tax avoidance and sustainability

According to agency theory, a firm is simply a nexus of contracts of shareholders. Firm directors have no legal obligation to take actions that will result in their firm paying more tax than required (Hasseldine and Morris, 2013). Agency theory implies that corporate income taxes represent a significant expense to shareholders. From this point of view, increased tax avoidance can result in both higher cash flows and higher after-tax earnings, which leads to widespread interest and concern over the magnitude, determinants, and consequences of firm tax avoidance (Shackelford and Shevlin, 2001; Hanlon and Heitzman, 2010). Many researches explore the role of agency frictions in explaining variations in tax avoidance (e.g., Khan *et al.*, 2017). From the perspective of financial reporting, Frank *et al*. (2009) and Sikka (2017) investigate the association between aggressive financial reporting, corporate profit shifting, and tax avoidance. Previous research related to corporate governance has examined the association between tax avoidance and ownership structure (Chen *et al.*, 2010; Badertscher *et al.,* 2013; Richardson *et al.,* 2016; Khan *et al*., 2017), foreign investors' interests (Salihu *et al.,* 2015), labor unions (Chyz *et al.,* 2013), and business globalization (Rego, 2003; Hope *et al.*, 2013; Finér and Ylönen, 2017). Desai and Dharmapala (2006), Dyreng *et al*. (2010), and Armstrong *et al.* (2015) examine the links between corporate governance, managerial incentives, and tax avoidance.

On the other hand, the costs of tax avoidance are much less clear (Austin and Wilson, 2017). However, many multinational firms have recently been criticized because of their tax avoidance. Margaret Hodge, the chair of the United Kingdom's Parliament Committee on Public Accounts, accused Starbucks, Google, and Amazon of immoral behavior because of their use of the letter of the tax laws, both nationally and internationally, to minimize their tax obligations (Davis *et al.*, 2016). In the case of Starbucks, a Reuter's article in October 2012 compared the amount of Starbucks' U.K. sales to the amount of U.K. income taxes paid by the firm and emphasized that while Starbucks reported no profit for tax purposes in the U.K., the firm was concurrently telling analysts and investors that U.K. operations were profitable. Following this article, Starbucks became the target of protests. During a speech at the World Economic Forum in January 2013, Britain's Prime Minister, David Cameron, publicly reprimanded Starbucks for its lack of tax payments. Following the comments, Starbucks volunteered to forgo enough tax deductions to pay an additional £20 million in taxes in the succeeding two years (Austin and Wilson, 2017).

As seen above, tax avoidance is a politically charged topic that can attract unfavorable attention for both firms and their large investors from media, government, and consumer and public interest groups in a phenomenon referred to as "tax-shaming." Many quasi-indexers manage pension and other funds for large portions of the general public, and tax-shaming could result in adverse private consequences for managers of these funds (Khan *et al.*, 2017). Many firms now recognize that tax avoidance, in a broad sense, results in costs for the firm itself. Graham *et al.*'s (2014) survey shows

that out of 509 firms, 77.6 per cent answered that they decided not to implement a tax planning strategy proposed and/or mentioned by an accounting, law, investment, or tax consulting firm because of potential harm to the company reputation, risk of adverse media attention, and so on. Academic research finds confirmatory evidence of the following: a positive and significant association between ETRs and firms' reputations (Austin and Wilson, 2017), a relationship between tax avoidance and unethical behavior, such as accounting fraud (Lennox *et al.*, 2013), and stock price crash risk as a result of tax avoidance (Kim *et al*., 2011).

The reason tax avoidance is potentially harmful to firms can be framed as follows. Tax payment is a civic duty (David and Gallego, 2009) and a firm has a societal obligation to pay its fair share of taxes (Lanis and Richardson, 2015), although comparatively little scholarly attention is paid to the payment of democratically agreed upon taxes (Sikka, 2010). Tax avoidance reduces government revenue, which decreases the level of various national and social services. Recent anecdotal evidence suggests that some stakeholders of public firms regard corporate tax payments as socially responsible. A survey by the *Guardian* newspaper states that nearly 60 per cent of financial directors in the U.K. now regard taxes as an ethical issue (Davis *et al.,* 2016). Therefore, tax avoidance creates a social problem and frequently generates hostility, damages the firm's reputation with its various stakeholders, and at worst, could even result in the cessation of a firm's business operations (Lanis and Richardson, 2015).

A firm exists above and beyond management, shareholders, and any specific stakeholder. Stakeholders are those groups that are vital to the survival and success of the organization (Freeman, 2004). Although each group of stakeholders (i.e., shareholders, consumers, employees, etc.) of a firm is likely to view tax avoidance differently (Austin and Wilson, 2017), both the institution of a business as such and individual companies exist only because they offer valuable services for society (Preuss, 2010). The existing mutual dependence of firms and society implies that business decisions must follow the principle of shared values, which is consistent with Porter's view (Lanis and Richardson, 2015). Regarding sustainable value creation, the economic, environmental, and societal impacts on all stakeholders must be considered. According to stakeholder theory, a firm's success is dependent on the successful management of all its relationships with its stakeholders, and the firm must work for the benefit of its stakeholders to ensure survival (Freeman and Evan, 1990). In a business context, value is created when value is generated for shareholders, as well as all other stakeholders, simultaneously (Badurdeen and Jawahir, 2017). Response to the social needs of relevant stakeholders (Moldavska and Welo, 2017) can be measured by value added distribution including tax payment.

The payment of taxes is both a firm's crucial contribution to society and essential to good stakeholder management; it has been researched from the aspect of tax avoidance and corporate social responsibility (CSR). For example, David and Gallego (2009) discuss the relationship between firm income tax and CSR. Lanis and Richardson (2012a, 2012b) compare the CSR disclosure of tax aggressive firms with those of non-tax-aggressive firms. Lanis and Richardson (2015) indicate that more socially

responsible firms are likely to display less tax avoidance.

A limited number of studies have focused on tax avoidance from the firm's sustainability perspective. This is at least partially due to the many different interpretations of sustainability and the lack of a solid definition of sustainability. The concept of sustainability in a business context is interpreted in several different ways (e.g., Montiel and Delgado-Ceballos, 2014; Lankoski, 2016), and there is no definition of the relationship between the concept of sustainability and accounting (Çalişkan, 2014). The Cambridge Business English Dictionary (Cambridge University Press) has two definitions of "sustainability." The first is "the idea that goods and services should be produced in ways that do not use resources that cannot be replaced and that do not damage the environment," and another is "the ability to continue at a particular level for a period of time." In the field of academic research, the numerous functional definitions of sustainability have been analyzed by many authors. In academic literature after 1970, two categories of the definition of sustainability have been developed: (1) functional definitions related to the concept of "sustainable development," and (2) definitions oriented toward systemic approaches. However, there is lack of clarity in differentiating the concept of "sustainability" from other concepts close in meaning, such as durability, resilience, longevity, and others (Pater and Cristea, 2016).

Interestingly, although these two definitions of sustainability are similar, they have two different meanings. In many corporate social responsibility studies, the word sustainability is used in terms of sustainable development, from the perspective of the environment or natural resources, such as "sustainability has been conceptualized as an emergent characteristic of inter-locking social, environmental, and economic systems" (Bebbington *et al.,* 2017). However, in this study, the use of the word sustainability is consistent with the second meaning. There is no time horizon differentiation for the definition of the concepts of durability and sustainability, and there is no clear distinction between these concepts. Therefore, this study considers the length of a firm's survival, such as for more than 30, 50, or 100 years, as a proxy for the firms' sustainability, following Oshika and Saka (2017). ETRs are analyzed to determine whether a firm's sustainability can be distinguished from that of other firms.

2.2. Measuring tax avoidance

Tax avoidance does not necessarily imply that firms are engaging in anything improper (Dyreng *et al*., 2008). Behaviors that reduce a firm's tax burden include tax saving, tax avoidance, and tax evasion. Tax saving is reducing tax by making legitimate accounting choices. Tax evasion is escaping or reducing tax improperly through unlawful means. Tax avoidance falls into an intermediate category between tax saving and tax evasion, which involves reducing the firm's tax burden by engaging in deviant tax behavior that does not conflict with tax law. It is difficult to distinguish among these three behaviors, as there are many areas in practice where the law is unclear. In addition, as highlighted by Hanlon and Heitzman (2010), it is difficult to separate technically legal avoidance and illegal evasion for two reasons. First, most of the tax planning activities in question involve transactions that are often technically legal. Second, the legality of

a tax avoidance transaction is often determined after the fact in a court of law, and the permissibility of these transactions is almost always ambiguous. There are perennial debates about the meaning and significance of tax avoidance and tax evasion (Sikka, 2010). In this study, consistent with existing research (e.g., Dyreng *et al.*, 2008; Chen *et al.*, 2010; Lanis and Richardson, 2015; Saka *et al.*, 2019), firm tax avoidance is defined broadly as the downward management of taxable income through tax-planning activities, which reduce the firm's taxes relative to its pre-tax accounting income, including both tax reductions that comply with tax law and those that result from grey-area tax planning; our measures do not specifically distinguish between the two.

We employ ETR measures as the measure of firm tax avoidance because it has been widely used in empirical tax research (Shackelford and Shevlin, 2001; Hanlon and Heitzman, 2010; Chen *et al.*, 2010; Badertscher *et al.*, 2013). When the firm's ETR is lower, the firm is more aggressive in tax avoidance. Since previous studies show a variety of ETRs, it is important to consider which ETR is appropriate for the purposes of this study. *GAAP* (generally accepted accounting principles) *ETR* is widely used in previous research because it captures a broad range of tax avoidance activities. GAAP ETR is calculated as the ratio of total tax expense reported on the firm's income statement to pre-tax income:

$$GAAP\ ETR = \frac{Total\ Tax\ Expense}{Pre-tax\ Income}$$

This measure reflects non-conforming tax avoidance and is appropriate for publicly listed companies where reported book income is important to investors (Hanlon and Heitzman, 2010). Book income is based upon GAAP; however, taxable income is based on the tax code. The two systems have different goals and are influenced differently (Graham *et al.*, 2012). In addition, countries use two systems for conformity between financial reporting and tax reporting: a uniform reporting system and a dual reporting system. In uniform reporting system countries, such as Japan, Germany, France, Portugal, and Italy, both accounting income and taxable income are primarily based on GAAP, but have several permanent differences, which are not allowed as deductible expenses for tax purposes. In dual reporting system countries, such as the U.K., the U.S., Denmark, Canada, and Australia, the accounting income calculation and tax income calculation are basically independent, but partially overlap (Saka *et al.*, 2019).

Since the numerator in *GAAP ETR* is total tax expense, a tax strategy that defers taxes (e.g., accelerated depreciation for tax purposes) will not alter the *GAAP ETR* (Hanlon and Heitzman, 2010). To detect tax deferral strategies, especially in dual reporting system countries, *Cash ETR*, which is the ratio of cash taxes to pre-tax income, is more appropriate for use. Dyreng *et al.* (2008) use cash ETR for their analysis of U.S. firms. In the U.S., firms make estimated tax prepayments; therefore, cash tax paid (the numerator) corresponds to pre-tax income (the denominator). However, this does not result in a match in countries that do not have estimated tax prepayments. A mismatch between the numerator and denominator of annual cash ETR could exist if the cash paid includes taxes paid on earnings from a different period. In uniform reporting system countries such as Japan, the appropriate ETR for firms might

be *Current ETR*, where the numerator is total tax expense minus deferred income taxes, as tax expense is composed of the sum of current tax expense and deferred tax expense. *Current ETR* reflects temporary differences. Temporary differences are differences in the tax and book bases of assets and liabilities. These differences in bases result in taxable or deductible amounts in future years when the asset is recovered or the liability is settled. Whereas temporary differences arise because there are differences when certain transactions are included on the balance sheet and in the income statement, other differences do not arise from timing issues, but rather are permanent in nature. Consequently, permanent differences do not cause ETRs to differ from statutory tax rates (Graham *et al.*, 2012; Saka *et al*., 2019).

Permanent differences are more important than temporary differences for this research's perspective of investigating whether the firm fulfils its social obligation to pay tax. In this case, *GAAP ETR,* where the numerator is total tax expense, is appropriate. *GAAP ETR* has limitations as a measure of tax avoidance, as discussed above. Tax avoidance activities that generate temporary differences (i.e., those that defer cash taxes paid to later periods) are not reflected in *GAAP ETR* (Hanlon and Heitzman, 2010). Additionally, *GAAP ETR* is also influenced by accounting for tax-related accruals. For example, changes in valuation allowances and changes in tax contingency reserves affect total tax expense (Hanlon and Heitzman, 2010). Thus, *GAAP ETR* is the product of both tax avoidance activities and financial accounting rules. Nonetheless, *GAAP ETR* is a widely used measure of tax avoidance that is easily accessible in the tax footnote of firms' annual reports. Because *GAAP ETR* is easily identifiable by those without financial expertise, it is widely used by the media, which has influence on stakeholders (Saka *et al*., 2019). Therefore, *GAAP ETR*, which reflects aggressive tax planning through permanent book-tax differences, is used in this study.

To confirm the existence of tax avoidance with a trend, we must consider the level of statutory tax rates. Many studies have shown empirical evidence of tax competition among the European and OECD countries (Suzuki, 2014). If the statutory tax rates of these countries have a decreasing trend, a decreasing ETR does not necessarily mean tax avoidance. Therefore, this study analyzes the difference between *GAAP ETR* and the statutory tax rate to confirm the existence of tax avoidance.

$$GAAPETR\text{–}StatutoryTaxRate = \frac{Total\ Tax\ Expense}{Pre-tax\ Income} \text{–} StatutoryTaxRate$$

In addition, *GAAP ETR* changes every year, depending on taxable or deductible amounts in that year. The issue of *GAAP ETR* is that there can be significant year-to-year variation, and undefined ETRs due to negative denominators can obscure inferences about a firm's tax avoidance. To avoid the effects of extreme observations on the one-year measures related to changes in tax accruals or fluctuations in profitability, we also include long-term measures of ETRs. Dyreng *et al.* (2008) used a long-run *ETR* measure, which is estimated as the sum of cash paid for income tax over ten years scaled by the sum of pre-tax income over the same period. This is not the same as simply averaging a series of single year ETRs; averaging would tend to be overly affected by years with unusually large or small ETRs (Dyreng *et al*., 2008). The long-

run computation avoids year to year volatility in annual ETRs (Hanlon and Heitzman, 2010). This study also measures *long-term GAAP ETR* and *the long-term difference of GAAP ETRs and statutory tax rates* over long time periods of 10 and 20 years.

$$Long\ term\ GAAP\ ETR = \frac{\sum Total\ Tax\ Expense}{\sum Pretax\ Income}$$

$$Long\ term\ GAAP\ ETR - Statutory\ Tax\ Rate = \frac{\sum Total\ Tax\ Expense}{\sum Pretax\ Income} - Statutory\ Tax\ Rate\ (Average)$$

3. Hypothesis development and data

3.1 Hypothesis development and definition of variables

Recently, many multinational firms have been accused of tax avoidance, which is a politically charged topic that can attract unfavorable attention from stakeholders in a phenomenon referred to as "tax shaming." Many firms now recognize that, in a broad sense, tax avoidance represents a cost for the firm itself. Previous research has shown evidence of the association between tax avoidance and reputation (Austin and Wilson, 2017) and stock price crash risk (Kim *et al*., 2011).

Tax payment is a civic duty (David and Gallego, 2009) and a firm has a societal obligation to pay its fair share of taxes (Lanis and Richardson, 2015). Therefore, tax avoidance causes a social problem, and frequently generates hostility, damages the firm's reputation with various stakeholders, and at worst, could even result in the cessation of a firm's business operations (Lanis and Richardson, 2015). Stakeholders are those groups who are vital to the survival and success of the organization (Freeman, 2004). According to stakeholder theory, a firm's success is dependent on the successful management of all its relationships with its stakeholders, and the firm must work for the benefit of all stakeholders to ensure survival (Freeman and Evan, 1990).

Sustainable firms distribute a higher proportion of their value-added to stakeholders (including to governments through payment of tax) than non-sustainable firms (Oshika and Saka, 2017). In this sense, firms with a higher degree of tax avoidance cannot achieve sustainability, even though tax avoidance makes the firm more profitable in the short run. Thus, our hypothesis is as follows:

H: Tax avoidance diminishes sustainability.

The hypothesis is examined in three ways. First, we examine the distribution (i.e., histograms) of ETRs of both sustainable and non-sustainable firms. Second, we check the time trend of ETRs for 20 years. Last, we use LOGIT model to determine if ETRs are tied to sustainability.

Three variables are employed for sustainability. The first involves a forward-looking measure of sustainability. The firm is treated as "sustainable" if the listed firm in 1985 is still listed in 2015 (i.e., after 30 years), regardless of the year of foundation[1]. The next two are backward looking measures based on Oshika and Saka (2017). Taking

[1] 1985 is the oldest year included in the database (i.e., Osiris).

the year of foundation for a given firm, the firm is treated as a "sustainable firm" if the firm has achieved 50 or 100 years of sustainability at 2016, the time of the analysis (i.e., founded on or before 1966 and 1916, respectively). These two variables can be thought of as "past survivors." To simplify our explanation hereafter, we classify each group into 30, 50, or 100 years of sustainability. We use the LOGIT model by setting the sustainable dummy as one for sustainable firms, and zero for other firms.

We also consider control variables that prior research has established to be determinants of firm survival rates. These controls include firm-level characteristics, such as firm profitability, leverage, and size. ROE (net income divided by total net assets) is used for profitability. Leverage is calculated as total liabilities divided by total assets, while size is the logarithm of total assets. Thus, the model for the hypothesis is as follows:

$$logit(p) := \log p/(1-p) = \alpha + \beta_1 ETR + \beta_2 ROE + \beta_3 Leverage + \beta_4 Size$$

$$Pr(Sustainability=1) = p,\ Pr(Sustainability=0)=1-p$$

Sustainability is set to one if

(1) a firm has achieved 30 years of sustainability (listed from 1985 to 2015, regardless of the year of foundation)

(2) a firm has achieved 50 years of sustainability (founded on or before 1966)

(3) a firm has achieved 100 years of sustainability (founded on or before 1916)

where

ETR = effective tax rate
ROE = net income divided by total net assets
Leverage = total liabilities divided by total assets
Size = logarithm of total assets

If the coefficient of ETR (i.e.,β_1) is significantly positive, indicating that higher ETRs are tied to sustainability, the hypothesis is supported.

This hypothesis assumes that the degree of tax avoidance differs from one firm to another. Even though tax avoidance is ubiquitous and has lasted for many years, it is not clear if all firms engage in tax avoidance. Therefore, it is worth confirming the phenomena and the cross-sectional variation. In addition, a long run computation should be done to avoid year-to-year volatility in the annual ETR (Hanlon and Heitzman, 2010). Theoretically, even though one year's ETR is lower or higher than the statutory tax rate, in the long run, the firm's ETR should be closer to the statutory tax rate if the firm does not engage in tax avoidance. On the other hand, if many firms stay at lower ETRs for a long period, such as 10 years, then these firms should be considered as engaging in some sort of tax avoidance.

3.2 Data collection

To gain the broadest possible global perspective, the financial data set is obtained from Bureau van Dijk's *Osiris* database for listed firms worldwide from 1985 to 2015. We used the *OECD.Stat* to obtain the statutory tax rate, which we used for

our robustness check. Firms without all the necessary financial data for analysis are excluded. As a result, the sample consists of 61,549 firms. ETRs are defined as the ratio of total tax expense divided by pre-tax accounting income. The ETR is set as missing if either the denominator (i.e., pre-tax accounting income) or the numerator (i.e., total tax expense) is zero or negative.

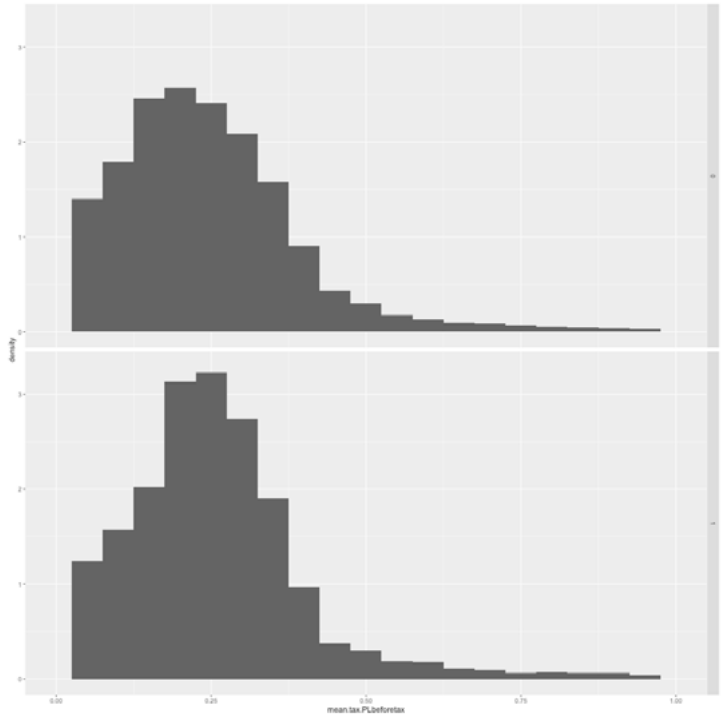
4. Results of analysis

In this section, we present three types of evidences of the relationship between firms' tax avoidance and the firms' sustainability, under the assumption of the probability of firms' tax avoidance (Saka *et al*., 2019). The first two evidences are the visualized results using histograms and box plots of ETRs to distinguish sustainable firms from those that are not, as described in section 4.1. The third evidence is the empirical result showing that firms' sustainability is explained by ETRs, as described in section 4.2. Note that the ETR is treated as missing if either the denominator (i.e., pre-tax accounting profit) or numerator (i.e., total tax expense) is zero or negative, as ETR is defined as the ratio of total tax expense divided by pre-tax accounting profit.

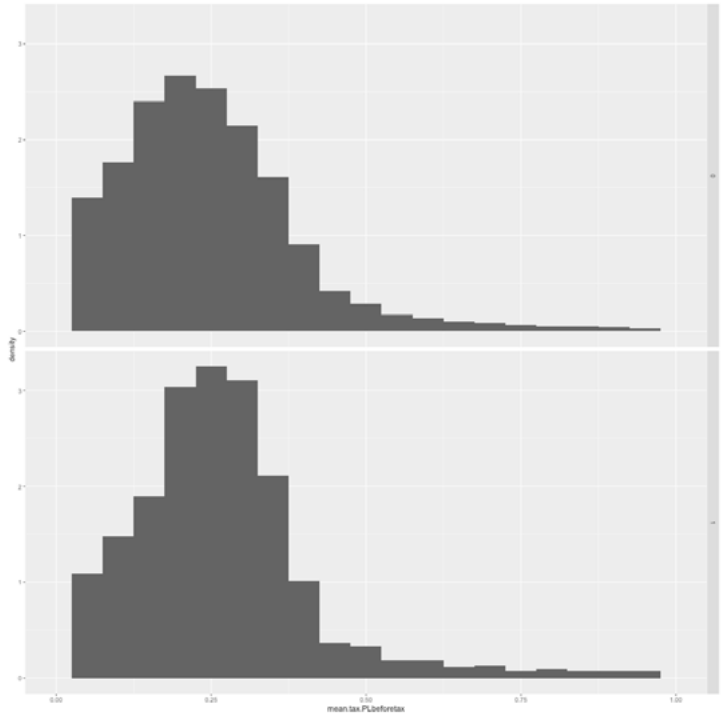
4.1. Tax avoidance and sustainability: visualization

Here, we show two types of visualized evidences (i.e., histograms and box plots of ETRs) to distinguish sustainable firms from those that are not using ETRs. First, as ETRs exhibit substantial cross-sectional variation (e.g., Dyreng *et al.,* 2008), we confirm, in Figure 1, if there is a difference in the cross-sectional variation of the ETRs between sustainable firms and other firms around the world. Figure 1 shows the average ETRs of each of the listed firms in histograms for a 10-year period (2006-2015), divided into sustainable firms (below) and others (above), for three types of sustainable firms: (a) 30 years, (b) 50 years, and (c) 100 years. The vertical (y) axis indicates the density of average GAAP ETRs for 10 years of each of the listed firms, and the horizontal (x) axis indicates the level of ETRs. Figure 1 shows that the location parameters of sustainable firms are clearly greater than those of others. Similar results satisfy in all cases of the sustainable firms.

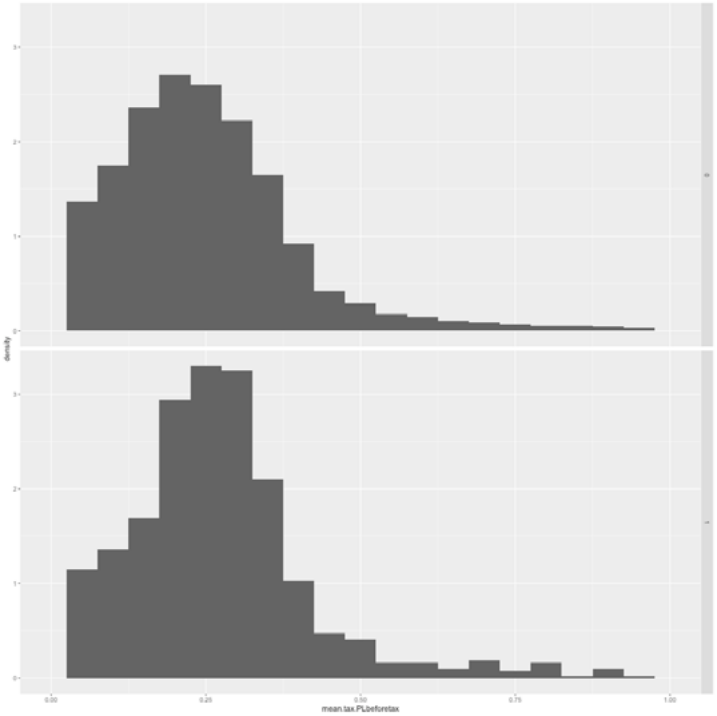
Figure 1 Mean ETRs for 10 years (2006-2015) of sustainable firms and others
(a) Firms with 30 years of sustainability (below) and others (above)



(b) Firms with 50 years of sustainability (below) and others (above)



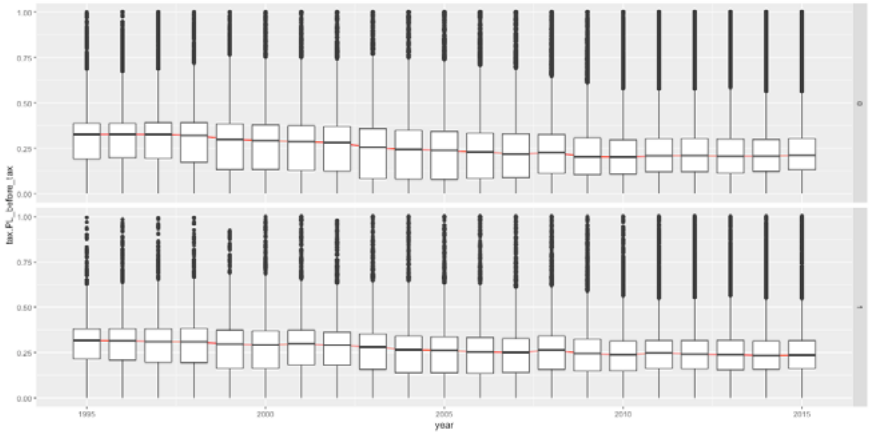
(c) Firms with 100 years of sustainability (below) and others (above)



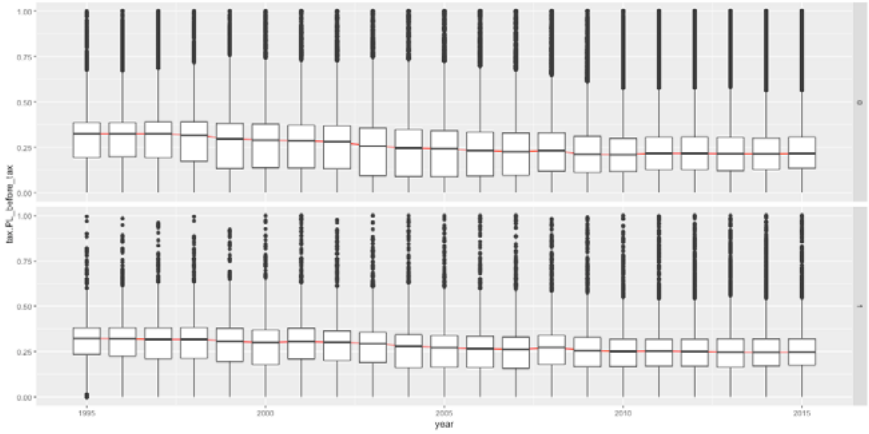
Second, we show, in Figure 2, the time-series trend (box plots) of ETRs for firms with 20 years (1995-2015) of sustainability (below) and other firms (above) around the world, for three types of sustainable firms: (a) 30 years, (b) 50 years, and (c) 100 years. In Figure 2, the vertical (y) axis indicates the GAAP ETRs, and the horizontal (x) axis indicates the timeline (years 1995-2015), which illustrates the dynamic trend from 1995 to 2015. Figure 2 shows that ETRs have a downward trend because of tax rate competition among tax authorities; however, the more important evidence that the location parameters of sustainable firms are greater than those of other firms. The similar results satisfy in all cases of the sustainable firms: (a) 30 years, (b) 50 years, and (c) 100 years.

Figure 2 ETRs trend for 20 years (1995-2015) of sustainable firms and others

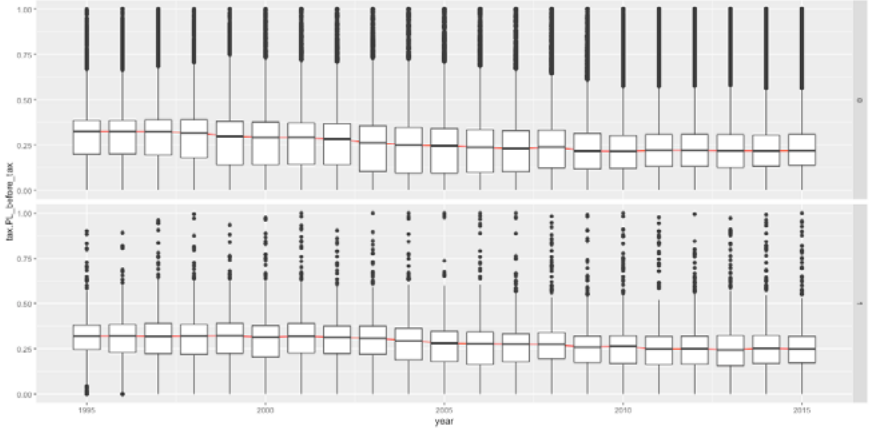
(a) Firms with 30 years of sustainability (below) and others (above)



(b) Firms with 50 years of sustainability (below) and others (above)



(c) Firms with 100 years of sustainability (below) and others (above)



4.2. Tax avoidance and sustainability: LOGIT model results

Figures 1 and 2 show that the sustainable firms show higher ETRs than other firms, and that phenomena lasted for long. This is consistent with the conjecture that sustainable firms engage in less tax avoidance. However, this univariate result may be an artefact of profitable firms' tendency for sustainability and payment of more taxes. Thus, we use the logit regression with control variables as our third analysis.

Table 1 shows the results of the logit regression for three types of sustainable firms: (a) 30 years, (b) 50 years, and (c) 100 years. Their purpose is to determine if ETRs can distinguish sustainable firms from others. We calculate the ETR for 1985 (paid tax expense divided by pre-tax accounting income). In our empirical analysis, we examine whether the ETR in 1985 is related to the three sustainability measures, while controlling for profitability (ROE), leverage, and size. The result in Table 1 shows that the coefficients on the *ETR* are all positive, and two of them (30 years and 50 years) are statistically significant. These are consistent with the hypothesis.

However, the level of the ETRs themselves may not indicate the level of tax avoidance. In terms of tax avoidance, it is more important to highlight ETRs compared to the statutory tax rates. Therefore, not only the distribution of firms' ETRs themselves but also the relations between ETRs and statutory tax rates should be investigated. Additionally, we use the difference between ETRs and statutory tax rates (ETRs minus statutory tax rates) instead of using ETRs themselves as our robustness check. Our new LOGIT model thus becomes:

$$logit(p) := \log p/(1-p) = \alpha + \beta_1 TRD + \beta_2 ROE + \beta_3 Leverage + \beta_4 Size$$

where

TRD = difference between ETRs and statutory tax rates (ETRs minus statutory tax rates).

All other variables stay the same.

Table 1. Firms' ETRs (Effective Tax Rates) and sustainability

	30 years	**50 years**	**100 years**
Intercept	0.378	-3.938	-8.010
	(0.90)	(48.66)***	(45.19)***
ETR	0.337	0.522	0.488
	(6.83)***	(7.60)***	(1.65)
ROE	0.341	0.160	0.307
	(18.93)***	(2.36)	(2.15)
Leverage	-0.406	-0.833	-0.996
	(11.51)***	(28.41)***	(10.81)***

	30 years	50 years	100 years
Size	-0.026	0.201	0.413
	(0.94)	(29.48)***	(29.42)***
Total observations	2039	2039	2039
Sustainable	689	297	70
Others	1350	1742	1969
Proportion of Sustainable	33.8%	14.6%	3.4%

The results from using LOGIT regression. The dependent variables are the dummy variables of the three types of sustainability. *ETR* is the effective tax rate, *ROE* is the net income divided by total net assets, *leverage* is the total liabilities divided by total assets, and *size* is the logarithm of total assets. The numbers in the parentheses show the Wald chi square statistics. ***, **, and * indicate that the coefficient is significant at 1%, 5%, and 10% level, respectively.

The results in Table 2 show that the coefficients on *TRD* are all positive and significant. In conclusion, the empirical results of the LOGIT models are largely consistent with the hypothesis that high ETR firms exhibit sustainability.

Table 2. Firms' TRD (effective tax rates minus statutory tax rates) and sustainability

	30 years	50 years	100 years
Intercept	-2.729	-4.177	-7.580
	(25.26)	(34.83)***	(28.90)***
TRD	0.427	0.522	0.623
	(7.33)***	(3.71)***	(1.98)*
ROE	0.498	0.234	0.203
	(24.88)***	(3.55)	(0.77)
Leverage	-0.813	-0.928	-0.962
	(29.88)***	(26.30)***	(7.92)***
Size	-0.247	0.233	0.413
	(45.96)	(25.83)***	(21.06)***
Total observations	1607	1607	1607
Sustainable	502	249	63

	30 years	50 years	100 years
Others	1105	1358	1544
Proportion of Sustainable	31.2%	15.5%	3.9%

The results from using LOGIT regression. The dependent variables are the dummy variables of the three types of sustainability. *TRD* is the difference between ETRs and statutory tax rates (ETRs minus statutory tax rates), *ROE* is the net income divided by total net assets, *leverage* is the total liabilities divided by total assets, and *size* is the logarithm of total assets. The numbers in the parentheses show the Wald chi square statistics. ***, **, and * indicate that the coefficient is significant at 1%, 5%, and 10% level, respectively.

5. Conclusions and discussion

The issue of firm tax avoidance has recently had substantial attention in academic literature, as well as in the real world. However, little evidence exists on the long-term worldwide situation and on the economic consequences; in other words, how tax avoidance affects the firm itself in the long run. Since tax payment is a civic duty (David and Gallego, 2009), a firm has a societal obligation to pay its fair share of taxes (Lanis and Richardson, 2015). According to stakeholder theory, a firm's success is dependent on the successful management of all its relationships with its stakeholders; therefore, the firm's survival and success can be represented by how the firm pays tax. To ensure survival, a firm must work for the benefit of its stakeholders (Freeman and Evan, 1990). This study examines the relationship between tax avoidance and firm sustainability.

Using the three types of definitions for the sustainable firms, this paper first investigated visually. The histograms showed that the location parameters of sustainable firms are clearly greater than those of non-sustainable firms. The time-series trend (box plots) of ETRs for 20 years (1995-2015) showed that these relationships lasted long. Thereafter, we analyzed if ETRs are tied with sustainability, using the LOGIT model. The coefficients on ETRs are all positive, though insignificant in one model, and show that higher ETRs are tied with sustainability. This result stayed similar when we used the TRD (the differences between ETRs and the statutory tax rates) to take the difference of the statutory tax rates across countries and time. Our results overall indicate that ETRs are higher in the sustainable firms and higher ETRs are tied with sustainability, thus tax avoidance diminishes sustainability.

As a conclusion, the study obtained empirical results that are essentially consistent with the hypothesis that high ETR firms demonstrate sustainability. This study contributes to the literature in three key ways. (1) It extends the findings of Dyreng *et al.* (2017) by calculating the differences between ETRs and statutory tax rates, which is more clearly representative of tax avoidance than the ETR alone. (2) The empirical analyses involve firms all over the world and over 20 years, which make the results generalizable. (3) This is the first study to show the economic consequences (i.e., effect on sustainability) of tax avoidance in the long run. Much research has examined ETRs, but none has decomposed them as done in this study, or examined shifting

across a worldwide sample of firms over the long term. Our study reaches beyond Markle and Shackelford (2012), Lee and Swenson (2016), and Dyreng *et al.* (2017) by explicitly considering statutory tax rates and ETRs over the long term. We extend existing research by using a worldwide database, and show the relationship between tax avoidance and firm sustainability.

Our findings have several potential implications. First, firms should change their mindset about engaging in tax avoidance. Existing research shows evidence of both the cost and benefit aspects of firm tax avoidance. We provide additional evidence that tax avoidance is related to the firm's sustainability. Second, since ETRs are a useful indicator for distinguishing whether firms are sustainable firm, our study provides a potential key performance indicator for integrated reporting. Integrated reporting, a new trend in corporate reporting, requires information on the value created by an organization that leads to financial stability and sustainability, and the ETR has the potential of meeting this requirement.

Finally, our study is subject to some limitations. First, the empirical sample is somewhat limited, and the threshold of sustainable firms was established *ad hoc* due to data availability. Thus, additional tests are needed to certify the robustness. Second, our ETR measures are drawn from financial statements prepared for investors and not for tax authorities. To analyze ETRs among countries, considering the conformity between financial reporting and tax reporting and the individual countries' tax systems might be useful. Hence, our results should be interpreted with some caution.

Nonetheless, we believe that this is the best endeavor to date to comprehensively analyze the tax behavior of firms worldwide. It would be useful for future research to examine the reality of the situation of firm tax avoidance in the long term. Overall, this study sheds light on the tax avoidance issue that has grown to the point it can no longer be ignored by researchers or citizens. Accounting should ultimately serve to enhance social welfare (Lehman, 1992); accounting should not neglect the social consequences of tax avoidance. This study is an initial step toward the investigation of firm tax avoidance worldwide.

References

Armstrong, C. S., Blouin, J. L., and Jagplinzer, A. D. (2015), "Corporate governance incentives and tax avoidance", *Journal of Accounting and Economics*, Vol. 60, pp. 1-17.

Austin, C. R., and Wilson, R. J. (2017), "An examination of reputational costs and tax avoidance: Evidence from firms with valuable consumer brands", *The Journal of the American Taxation Association*, Vol. 39 No. 1, pp. 67-93.

Badertscher, B. A., Katz, S. P., and Rego, S. O. (2013), "The separation of ownership and control and corporate tax avoidance", *Journal of Accounting and Economics*, Vol. 56, pp. 228-250.

Badurdeen, F., and Jawahir, I. S. (2017), "Strategies for value creation through sustainable manufacturing", *Procedia Manufacturing*, Vol. 8, pp. 20-27.

Bebbington, J., Russell, S., and Thomson, I. (2017), "Accounting and sustainable development: Reflections and propositions", *Critical Perspectives on Accounting*, Vol. 48, pp. 21-34.

Çalişkan, A.Ö. (2014), "How accounting and accountants may contribute in sustainability", *Social Responsibility Journal*, Vol. 10 No. 2, pp. 246-267.

Chen, S., Chen, X., Cheng, Q., and Shevlin, T. (2010), "Are family firms more tax aggressive than non-family firms?", *Journal of Financial Economics*, Vol. 95, pp. 41-61.

Chyz, J. A., Leung, W. S. C., Li, O. Z., and Rui, O. M. (2013), "Labor unions and tax aggressiveness", *Journal of Financial Economics*, Vol. 108, pp. 675-698.

David, F., and Gallego, I. (2009), "The interrelationship between corporate income tax and corporate social responsibility", *Journal of Applied Accounting Research,* Vol. 10 No. 3, pp. 208-223.

Davis, A. K., Guenther, S. A., Krull, L. K., and Williams, B. M. (2016), "Do socially responsible firms pay more taxes", *The Accounting Review*, Vol. 91 No. 1, pp. 47-68.

Desai, M. A., and Dharmapala, D. (2006), "Corporate tax avoidance and high-powered incentives", *Journal of Financial Economics*, Vol. 79, pp. 145-179.

Dyreng, S. D., Hanlon, M., and Maydew, E. L. (2008), "Long-run corporate tax avoidance", *The Accounting Review*, Vol. 83 No. 1, pp. 61-82.

Dyreng, S. D., Hanlon, M., and Maydew, E. L. (2010), "The effects of executives on corporate tax avoidance", *The Accounting Review*, Vol. 85 No. 4, pp. 1163-1189.

Dyreng, S. D., Hanlon, M., Maydew, E. L., and Thornock, J. R. (2017), "Changes in corporate effective tax rates over the past 25 years", *Journal of Financial Economics*, Vol. 124 No. 3, pp. 441-463.

Finér, L., and Ylönen, M. (2017), "Tax-driven wealth chains: A multiple case study of tax avoidance in the Finnish mining sector", *Critical Perspectives on Accounting*, Vol. 48, pp. 53-81.

Frank, M. M., Lynch, L. J., and Rego, S. O. (2009), "Tax reporting aggressiveness and its relation to aggressive financial reporting", *The Accounting Review*, Vol. 84 No. 2, pp. 467-496.

Freeman, R. E. (2004), "A stakeholder theory of modern corporations", in *Ethical Theory and Business*, Beauchamp, T. Bowie, N. and Arnold, D. (Eds.), Prentice Hall, Upper Saddle River, N.J. pp. 38-48.

Freeman, R. E., and Evan, W. M. (1990), "Corporate governance: a stakeholder interpretation", *Journal of Behaviour Economics,* Vol. 19 No. 4, pp. 337-359.

Freeman, R. E., Wicks, A. C., and Parmar, B. (2004), "Stakeholder theory and the corporate objective revisited", *Organization Science*, Vol. 15 No. 3, pp. 364-369.

Goh, B. W., Lee, J., Lim, C. Y., and Shevlin, T. (2016), "The effect of corporate tax avoidance on the cost of equity", *The Accounting Review*, Vol. 91 No. 6, pp. 1647-1670.

Gordon, E. A., Greiner, A., Kohlbeck, M. J., Lin, S., and Skaife, H. (2013), "Challenges and opportunities in cross-country accounting research", *Accounting Horizons*, Vol. 27 No. 1, pp. 141-154.

Graham, J. R., Raedy, J. S., and Shackelford, D. A. (2012), "Research in accounting for income taxes", *Journal of Accounting and Economics*, Vol. 53 No. 1, pp. 412-434.

Graham, J. R., Hanlon, M., Shevlin, T., and Shroff, N. (2014), "Incentives for tax planning and avoidance: Evidence from the field", *The Accounting Review*, Vol. 89 No. 3, pp. 991-1023.

Gray, S. J. (1988), "Towards a theory of cultural influence on the development of accounting

systems internationally", *Abacus*, Vol. 24 No. 1, pp. 1-15.

Hanlon, M., and Heitzman, S. (2010), "A review of tax research", *Journal of Accounting and Economics*, Vol. 50 No. 2, pp. 127-178.

Hasseldine, J., and Morris, G. (2013), "Corporate social responsibility and tax avoidance: A comment and reflection", *Accounting Forum*, Vol. 37, pp. 1-14.

Hope, O.-K., Ma, M., and Thomas, W.-B. (2013), "Tax avoidance and geographic earnings disclosure", *Journal of Accounting and Economics*, Vol. 56 No. 2, pp. 170-189.

Khan, M., Srinivasan, S., and Tan, L. (2017), "Institutional ownership and corporate tax avoidance: New evidence", *The Accounting Review*, Vol. 92 No. 2, pp. 101-122.

Kim, H.-B., Lee, Y., and Zhang, L. (2011), "Corporate tax avoidance and stock price crash risk: Firm-level analysis", *Journal of Financial Economics*, Vol. 100, pp. 639-662.

Lanis, R., and Richardson, G. (2012a), "Corporate social responsibility and tax aggressiveness: An empirical analysis", *Journal of Accounting and Public Policy*, Vol. 31, pp. 86-108.

Lanis, R., and Richardson, G. (2012b), "Corporate social responsibility and tax aggressiveness: A test of legitimacy theory", *Accounting, Auditing and Accountability Journal,* Vol. 26. No. 1, pp. 75-100.

Lanis, R., and Richardson, G. (2015), "Is corporate social responsibility performance associated with tax avoidance?", *Journal of Business Ethics*, Vol. 127, pp. 439-457.

Lankoski, L. (2016), "Alternative conceptions of sustainability in a business context", *Journal of Cleaner Production*, Vol. 139, pp. 847-857.

Lee, N., and Swenson, C. (2016), "Effects of overseas subsidiaries on worldwide corporate taxes", *Journal of International Accounting, Auditing and Taxation*, Vol. 26, pp. 47-59.

Lehman, C. R. (1992), *Accounting's Changing Role in Social Conflict.* Markus Wiener Publishing, New York, NY.

Lennox, C., Lisowsky, P., and Pittman, J. (2013), "Tax aggressiveness and accounting fraud", *Journal of Accounting Research*, Vol. 51 No. 4, pp. 739-778.

Markle, K., and Shackelford, D. (2012), "Cross-country comparisons of corporation income tax rates", *National Tax Journal*, Vol. 65 No. 3, pp. 493-527.

Moldavska, A., and Welo, T. (2017), "The concept of sustainable manufacturing and its definitions: A content-analysis based literature review", *Journal of Cleaner Production*, Vol. 166, pp, 744-755.

Montiel, I., and Delgado-Ceballos, J. (2014), "Defining and measuring corporate sustainability: are we there yet?", *Organization and Environment*, Vol. 27 No. 2, pp. 113-139.

Oshika, T., and Saka, C. (2017), "Sustainability KPIs for integrated reporting", S*ocial Responsibility Journal*, Vol. 13, No. 3. pp. 625-642.

Pater, L. R., and Cristea, S. L. (2016), "Systemic definitions of sustainability, durability and longevity", *Procedia – Social and Behavioral Sciences*, Vol. 221, pp. 362-371.

Piketty, T. (2014), *Capital in the Twenty-First Century*, Harvard University Press, Cambridge, MA.

Preuss, L. (2010), "Tax avoidance and corporate social responsibility: you can't do both, or can you?", Corporate Governance, Vol. 10 Iss. 4, pp. 365-374.

Rego, S. O. (2003), "Tax-avoidance activities of U.S. multinational corporations",

Contemporary Accounting Research, Vol. 20 No. 4, pp. 803-833.

Richardson, G., Wang, B., and Zhang, X. (2016), "Ownership structure and corporate tax avoidance: Evidence from publicly listed private firms in China", Journal of Contemporary Accounting & Economics, Vol. 12, pp. 141-158.

Saka, C., Oshika, T. and Jimichi, M. (2019) "Visualization of tax avoidance and tax rate convergence: exploratory analysis of world-scale accounting data", Meditari Accountancy Research, Vol. 27 No. 5, pp. 695-724.

Salihu, I. A., Annuar, H. A., and Obid, S. N. S. (2015), "Foreign investors' interests and corporate tax avoidance: Evidence from an emerging economy", Journal of Contemporary Accounting & Economics, Vol. 11, pp. 138-147.

Shackelford, D., and Shevlin, T. (2001), "Empirical tax research in accounting", Journal of Accounting and Economics, Vol. 31, pp. 321-387.

Sikka, P. (2010), "Smoke and mirrors: corporate social responsibility and tax avoidance", Accounting Forum, Vol. 34 No. 3, pp. 153-168.

Sikka, P. (2017), "Accounting and taxation: Conjoined twins or separate siblings?", Accounting Forum, Vol. 41 No. 4, pp. 390-405.

Suzuki, M. (2014), "Corporate effective tax rates in Asian countries", Japan and the World Economy, Vol. 29, pp. 1-17.

Tajaddini, R., and Gholipour, H. F. (2017), "National culture and default on mortgages", International Review of Finance, Vol. 17 No. 1, pp. 107-133.

Tax Justice Network (2017), Financial Secrecy Index Ranking 2009, 2011, 2013, 2015 http://www.financialsecrecyindex.com/

Tools

Cran.R. n.d.a. "Introduction to dplyr", available at:

https://cran.r-project.org/web/packages/dplyr/vignettes/dplyr.html (accessed 1 January 2020).

Cran.R. n.d.b. "The R Project for Statistical Computing", available at:

http://www.r-project.org/ (accessed 1 January 2020).

ggplot2. n.d., available at:

https://ggplot2.tidyverse.org/ (accessed 1 January 2020).