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ORIGINAL RESEARCH

An impact investment strategy

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Abstract
Impact investing is based on using the ESG framework as a tool to evaluate firms that engage in generating positive impact. Most impact investors and fund managers now integrate the ESG framework in their investment and stock-picking process. However, due to lack of standardisation of ESG reporting, it remains a challenge for investors and the public to identify the truly sustainable companies. We propose an additional measure of tax avoidance to identify firms that are socially responsible. When firms indulge in excessive tax avoidance behaviour, it may be viewed as unethical or socially irresponsible. We integrate the empirical association between corporate social responsibility and tax avoidance into an investment strategy based on impact. We adopt an investment strategy based on firm-level ESG ratings and tax avoidance practices. In a *pure* impact investment strategy based on ESG and tax avoidance, we find that investing in high-ESG rated firms and low tax avoidance firms yields a buy and hold abnormal return of 3.4% per annum and 11.4% in a 3 years investment horizon. Next, if impact investors were to combine traditional investment strategies based on risk with impact measures, we find that portfolios of high-ESG and high price-to-book-ratio firms earn a buy and hold abnormal return of 21.2%, while a portfolio of low tax avoidance and high price-to-book portfolios earns 29.8% in the long run. Collectively, our results suggest that, whilst impact investing does provide investors a return, it does not necessarily outperform traditional investment strategies. Our results are robust to other risk factors and the sector of the firm.

Keywords Impact investing · Corporate social responsibility · Tax avoidance · Abnormal returns

JEL Classification G11 · G15 · G30

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1 Introduction

In his book, *Impact: Reshaping capitalism to drive real change*, Sir Richard Cohen states that "impact" is currently regarded as a revolution and should be the heart of any economic system (Cohen 2020). Impact investing is defined as investments made with the aim to generate positive, measurable social and environmental impact alongside a financial return. According to Global Impact Investing Network (GIIN), the aggregate assets under management increased from $502 billion in 2019 to $715 billion in 2020 (GIIN 2020a). In 2022, the worldwide impact investment market is estimated to be $1.163 (GIIN 2022). Undoubtedly, the pandemic has also fuelled demand for impact investments (GIIN 2020b). In the UK, impact investing has grown, increasing from £830 million in 2011 to £58 billion in 2022 (Impact Investing Institute 2022). The former UK Chancellor, Mr. Rishi Sunak, in his 2020 Spending Review, announced the creation of a new National Infrastructure Bank, where one of its core objectives is to help tackle climate change, particularly meeting the net zero emissions target by 2050. The Financial Stability Board created the Task Force on Climate-related Financial Disclosures (TCFD) to improve and increase reporting of climate-related financial information (Financial Stability Board) (TCFD 2021). The government has also announced that full mandatory climate-related financial disclosure requirements will come into force across the UK by 2025. The UK Financial Reporting Council (FRC) recently developed the Sustainability Accounting Standards Board disclosures (SASB) framework as a guide for environmental, social and governance (ESG henceforth) reporting (FRC 2020).

Rating agencies use firm disclosures, media reports, news items, surveys and interviews to collect data to formulate an environmental, social and governance (ESG) score that represents ESG actions and activities of a firm. Impact investment strategies traditionally use ESG score, as well as financial performance, to choose firms to form a portfolio (Tosun 2017; Brooks and Oikonomou 2018). Lopez and Contreras and Bendix (2020) state that there are certain variables that can be predictive of ESG initiatives. They also argue that there is deviation among the agencies, such as Thomson Reuters, RobecoSAM, and Sustainalytics, in their measure of ESG scores. However, despite efforts and calls by regulatory bodies, such as the Financial Reporting Council, for consistency and reliability in ESG reporting and disclosure, it remains a challenge for investors and the public to identify the truly sustainable companies and financial products from those that engaged in "greenwashing".

Previous studies investigate the relation between corporate social responsibility (CSR) and firm performance and find a positive relationship (Deng et al. 2013; Lins et al. 2017; Adegbite et al. 2019). A meta-analysis by Huang et al. (2020) and Gilan et al. (2021) finds that, due to public and regulatory concerns, managers are increasing CSR efforts with the aim of improving the firm's value. They find mixed results of the relation between CSR and corporate financial performance in previous literature. This could be due to the non-standardisation of disclosure, measurement and reporting of CSR activities by firms (Kotsantonis and Serafeim 2019; Berg et al. 2020).

Following the strand of literature that documents a close association between CSR and tax avoidance, this study proposes another measure to assess the social responsibility of a firm, which is tax avoidance (TA henceforth). TA represents the corporate social responsibility of the firm (Mansi et al. 2020); it is an important measure not adequately captured by the ESG score (Huseynov and Klamm 2012; Lopez et al. 2020). Even though tax avoidance is essentially a legal practice, we argue that TA could capture the ethical

and social responsibility dimensions of a firm in terms of paying corporation taxes that can lead to huge societal benefits. Firms are held responsible to both internal and external stakeholders, which includes society, and are expected to follow rules, laws and regulations; especially in the case of taxation (Huseynov and Klamm 2012). Our study will explore how an impact investor can form portfolios based on impact criterion such as firms with high ESG score and low TA.

The primary aim of this paper is to examine the investment performance of a *pure* impact investment strategy. Using a sample of non-financial firms on FTSE All Share, we use ESG ratings and tax avoidance practices of firms as the basis of an impact investment strategy. To our knowledge, this is one of the first studies to empirically associate tax avoidance and ESG ratings in impact investing. The main objectives of this study are as follows:

(a) To empirically test the relation between ESG ratings, tax avoidance practices and investment performance;
(b) To identify the defining features of impact investing based on a *pure* impact strategy of ESG and TA;
(c) To evaluate relative performance of impact investing strategies combined with traditional investment strategies.

Our findings indicate that, in both the short and long run investment horizons, an impact strategy based purely on impact measures of high ESG and low TA earns 11.4% in a 3 years investment horizon. When we combine impact factors with traditional investment criterion based on firm fundamentals, we find that portfolios of high-ESG and high price-to-book-ratio firms earn 21.2%, returns, while a portfolio of low tax avoidance and high price-to-book portfolios earns 29.8% in the long run. The regression results confirm that an impact investor earns a risk-adjusted return, and this is more pronounced in the longer investment horizon.

The contributions of our study are four-fold: First, to our knowledge, this is the first study that introduces tax avoidance as an additional impact measure; second, it assesses the performance of an investment strategy based on impact using risk-adjusted returns across varying investment horizons; and third, this study also provides an investment strategy that combines impact variables with firm and market fundamentals. Finally, the findings from this paper can help institutional investors, and the investment community to use TA as a practical measure for better evaluation of their impact investment policies.

Taxation is a major fiscal revenue for most governments that is then channelled towards societal benefits. However, billions of tax revenue are being lost due to tax avoidance (Independent 2019). Consequently, for firms, taxes represent a major component of their expenses and, through tax planning, they attempt to reduce their tax expense. Davis et al. (2016) show that corporate social responsibility is negatively related to tax avoidance. Following this study, we argue that a high degree of tax avoidance (defined as below the median of the cash effective tax rate) would be less attractive to an impact investor as these firms would not be engaging in responsible activities.

Impact investing has generated a lot of interest amongst academics as well. For example, Block et al. (2021) examine the investment criteria for impact investors and find that financial sustainability ranks higher than the social implications of their impact investments for equity investors. Berry and Junkus (2013) find that both socially responsible investors as well as those not inclined to invest in impact investments consider environmental issues to be the most important criterion whilst making impact investment decisions. Dawkins

(2018) documents that socially responsible investments integrate environmental, social and governance (ESG) criteria into investment decisions. Following this strand of literature, we use ESG ratings as one of the investment-criteria for selecting socially responsible firms. High scores of ESG signal to investors that the environmental, social and governance pillars rank high on the list of priorities for the business apart from earning profits. However, as highlighted earlier, due to the constraints in ESG disclosure and reporting, this study proposes an additional impact investment criterion, i.e. tax avoidance. Firms that indulge in tax avoidance incur a huge cost to the society and are viewed as irresponsible and unethical (Weisbach 2002). Moreover, Hoi et al. (2013) document that firms that engage in responsible corporate social activities have a lower likelihood of engaging in tax avoidance activities. It has also been well-documented in the literature that firms involved in high social responsibility activities will tend to not engage in excessive tax avoidance (Hasan et al. 2017). In other words, there is a negative relationship between ESG and TA. Following this line of argument, this study posits that impact investors can use tax avoidance as an investment measure for selecting impact investing stocks.

The remainder of the paper is organised as follows: Sect. 2 provides the literature review, while, in Sect. 3 we describe the rationale behind our sample-selection procedure, as well as the variables and methods we apply. We present and discuss our results in Sect. 4 and Sect. 5 concludes.

2 Prior work

Previous studies use firm variables such as price-to-book (Chan et al. 1991), size (Banz 1981), leverage (Fama and French 1992) and market risk (Sharpe 1964) as the basis of traditional investment strategies to explain and predict stock returns. These studies are primarily based on the risk-return trade off models. Recent studies explore the returns of impact investing and find that responsible investors are willing to accept lower financial yields (Barber et al. 2021; Geczy et al. 2021) in return for environmental and social benefits. Other studies examine: impact of institutional investors on CSR activities (Kim et al. 2019); the effect of perceived barriers to social impact investing in the third sector (Phillips and Johnson 2021); and investor criteria in social enterprises (Block et al. 2021). In this study, we develop an impact investment strategy based on two measures, i.e. ESG ratings of firms and the level of tax avoidance of firms.

2.1 CSR and impact investing

Socially responsible firms are expected to act in the interest of all their stakeholders and this would be in the long-term interest of the firm (Campbell 2007). Previous studies that investigate the relationship between corporate social responsibility (CSR henceforth) and firm performance find a positive relationship via the channels of: building up social capital and trust (Lins et al. 2017); gaining stakeholder support (Deng et al. 2013); motivating employees leading to employee satisfaction (Edmans 2012); lowering cost of capital (Dhaliwal et al. 2011; Albuquerque et al. 2019); lowering idiosyncratic risk and the probability of financial distress (Lee and Faff 2009; Nandy and Lodh 2012); improving efficiency by investment in CSR (Lin et al. 2021) or generating a reputation effect that may have an impact on valuation (Hong and Liskovich 2016). On the other hand, there are studies that find a negative relationship between corporate social responsibility and firm performance

(Moore 2001; Kruger 2015; Duque-Grisales et al. 2021). The literature indicates that the costs of implementing CSR outweigh benefits in the short term, while benefits are likely to outweigh costs in the long term (Muller 2020).

CSR has been about self-regulation of firms and currently there is no standardisation of reporting of CSR activities by firms. Rating agencies use firm disclosures, media reports, news items, surveys and interviews to collect data to formulate a score that is used to measure a firm's CSR performance. This is known as the ESG score and which represents the Environmental, Social and Governance actions and activities of a firm. Previous studies (Eccles et al. 2014; Tosun 2017; Adegbite et al. 2019) use the ESG measure to analyse the impact of CSR activities on firm performance. Similarly, this study uses ESG scores as a variable for impact investors to choose responsible firms for their portfolio. Using median ESG scores for the portfolio formation period, we classify our sample of firms into two groups, that is, low ESG and high ESG. We contend that firms belonging to the low ESG (ESG below the median) category are firms with low social responsibility. We consider firms belonging to the high ESG (ESG above the median) category as highly socially responsible firms. Hence, we posit that an impact investor would select firms that belong to the high ESG category as these firms are regarded as being socially responsible.

Despite the widespread use of ESG scores as a measure, studies have criticised the usage of the ESG measures due to the lack of global and standardised ESG reporting (Liang et al. 2020). Different methodologies used by the rating agencies and the reliability of the unstandardised data, meaning the score can be quite divergent (Huseynov and Klamm 2012; Liang et al. 2020; Lopez et al. 2020). Due to the inconsistency of the ESG scores, it is challenging for investors to use this score as a reliable measure to select responsible firms for impact investment purposes.

Following the strand of literature that documents a close association between CSR and tax avoidance (Hoi et al. 2013; Hassan et al. 2017), this study proposes an additional measure that impact investors could use as an investment criterion in impact investing. The following section presents the discussion on the role of tax avoidance in impact investing.

2.2 Tax avoidance and impact investing

Tax avoidance refers to minimisation of the tax liability within the framework of the law (Miller and Oats 2014). However, when firms indulge in excessive tax avoidance behaviour which is not in the "spirit" of the law it may be viewed as unethical or socially irresponsible (Hasseldine and Morris 2013). In the UK for the year 2018–2019, HMRC reported £1.7 billion as the avoidance tax gap,[1] of which more than 50% represents corporation tax gap (HMRC 2021).

Previous literature documents mixed evidence on the relation between tax avoidance and firm value. Some studies find a positive relation between tax avoidance and firm value (Desai and Dharmapala 2009; Wilson 2009; Simone and Stomberg 2012) and others find a negative relation (Hanlon and Slemrod 2009; Balakrishnan et al. 2011; Neville and Treanor 2012; Ault et al. 2014; Chen et al. 2014; Blaufus et al. 2019). Previous studies calculate tax avoidance using measures such as annual or long run cash effective tax rate (Dyreng et al.

[1] The tax gap is the difference between the amount of tax that should, in theory, be paid to HMRC, and what is actually paid. The avoidance tax gap represent loss in tax revenue from tax advantage not intended by the Act.

2008; Hanlon and Heitzman 2010); GAPP effective tax rate (Hanlon et al. 2007; Frank et al. 2009; Lanis and Richardson 2013; Rudyanto and Pirzada 2020) or book-tax differences (Desai and Dharmapala 2009; Wilson 2009).

This study uses the annual cash effective tax rate (CETR) as a measure of tax avoidance.[2] Using median CETR, we classify our sample of firms into two groups, that is, low tax avoidance and high tax avoidance. We contend that firms belonging to the low tax avoidance (CETR above the median) category minimise their tax liability by using normal tax planning. We consider firms belonging to the high tax avoidance (CETR below the median) category to be engaging in excessive[3] tax avoidance practices and, hence, are regarded as being socially irresponsible. Hence, we posit than an impact investor would select firms that belong to the low tax avoidance category as these firms are regarded as socially responsible.

Carroll (1991) posits that CSR consists of economic, legal, ethical and philanthropic responsibilities and argues that taxes fall within this remit. From a firm's perspective, reducing their tax expense would improve profitability and, in turn, increase shareholder wealth. However, paying taxes is a regulatory requirement and one must also bear in mind that taxes constitute a major source of government income that is then used to support social initiatives for the wellbeing of the society and environment. Huseynov and Klamm (2012) find that a firm's tax strategy may be viewed either positively or negatively by stakeholders. We posit a firm that does not engage in excessive[4] tax avoidance would be regarded positively by an impact investor.

Prior research documents a negative association between CSR and tax avoidance. For example, Sikka (2010) argues that paying taxes is a social responsibility of firms and these revenues can be used for the general welfare and for the benefit of society. Lanis and Richardson (2013) find a strong positive and significant association between tax aggressiveness and CSR disclosure and Davis et al. (2016) find evidence that more socially responsible firms are likely to display less tax avoidance. Hassan et al. (2017) find strong negative associations between social capital and tax avoidance and conclude that these findings are important when it comes to socially irresponsible activities. Hoi et al. (2013) find that firms with excessive irresponsible activities tend to have more aggressive tax avoidance and, thereby, corporate culture can affect tax avoidance. Other studies find evidence that CSR and tax avoidance are contradictory activities (Park 2017; Goerke 2019; Inger and Vansant 2019; López-González et al. 2019) and hence have an inverse relation. Based on this discussion, we use tax avoidance as an additional and possibly robust measure whilst choosing impact investments.

3 Materials and methods

We obtain this data set from Datastream-Thomson Reuters. We begin with all 591 companies listed on the London Stock Exchange (LSE) from 1999 to 2021. For each firm year observation to enter the sample, we require that a fiscal year-end ESG, cash tax paid and

[2] We also use book tax differences as an additional measure for tax avoidance. Results do not change and are available upon request.

[3] We do not consider the means adopted by firms to indulge in excessive tax avoidance as it falls outside the scope of this study.

[4] CETR below the median.

stock price series be available for at least 12 months. We exclude financial companies, companies that changed the fiscal period's year-end date during the research period, companies that do not have matching year-end ESG scores, negative cash effective tax rate, negative price-to-book values and leverage are not within the range 0 and 99.99. This resulted in 2478 observations left for the analysis. First, firms are ranked based on their ESG scores and are then divided into two groups based on their ESG ratings.

Furthermore, we apply three different approaches to analysing impact investment. This includes both univariate and bivariate portfolio formation (Sect. 3.2), panel data portfolio selection regressions (Sect. 3.3.1) and portfolio performance evaluation regressions (Sect. 3.3.2).

3.1 Measures

3.1.1 Returns

Portfolio return is measured using buy-and-hold abnormal returns (BHAR henceforth). BHARs employ geometric returns in calculating the overall return over the period of interest. In addition, BHARs allow for compounding and capture investors' experience (Lyon et al. 1999). We calculate 1 and 3 months BHARs to capture the short run performance and 1 and 3 years BHARs to capture medium to long run performance. We calculate BHARs using the following formula:

$$BHAR_{it} = \prod_{t=T_1}^{T_2} \left(1 + R_{i,t}\right) - \prod_{t=T_1}^{T_2} \left(1 + R_{m,t}\right) \tag{1}$$

where $R_{i,t}$ is the return on stock i in month t, $R_{m,t}$ is the return on market portfolio. We used the FTSE All Share as proxy for the market portfolio.

3.1.2 Variables[5]

For this paper, we rank the firms according to two impact measures; corporate social responsibility measured by ESG score and tax avoidance (TA)[6] is measured by Cash Effective Tax Rate (CETR henceforth). ESG score used is defined as the ESG combined score; it offers a comprehensive evaluation of a company's ESG performance. The score captures ESG pillar scores and ESG controversies, the latter capturing the effect of negative media stories. Thus, when companies are involved in ESG controversies, the ESG combined score is computed as the weighted average of the two components. CETR is measured as the ratio of cash tax paid[7] and the pre-tax income.

$$\text{CETR} = \frac{cash\ tax\ paid}{pre\text{-}tax\ income} \tag{2}$$

[5] See Appendix 1.

[6] We also use book tax differences as an alternate measure for tax avoidance.

[7] Using actual cash tax paid instead of total or current tax expense makes the measure more robust (Hanlon 2003; Dyreng et al. 2008; Chen et al. 2010).

In addition to using *pure* impact measures, we also rank firms using known market-based risk measures including the size of the firm (SIZE), price-to-book ratio (PTBV), leverage and risk (BETA).

3.2 Portfolio formation

The portfolio rebalancing strategy that we adopt is a buy and hold strategy (BHAR) where the portfolio is rebalanced at the end of each holding period. We argue that BHAR is the best method to evaluate investment performance (Jegadeesh and Titman 2001). We construct portfolios using two approaches: univariate and bivariate. In both cases, we define two categories to classify portfolio performance: high and low. The categories (C) are defined as:

$$C_j = \begin{cases} C_L, \ if \ x_t \leq Med(x_t) \\ C_H, \ if \ x_t > Med(x_t) \end{cases} \tag{3}$$

where $Med(x_t)$ is the median[8] of a given variable x_t (e.g. ESG combined scores). Equation (3) implies that all values below the median value of a given variable fall into low category while values above the median value fall into high category. Thus, firms assigned to each category reflect their performance under the assigned categories. One exception in this interpretation is the tax avoidance variable. Since low (high) values of CETR imply high (low) tax avoidance, low (high) category is defined when CETR is above (below) its median value. The high-low categories as defined above are also consistent with the univariate approach to portfolio formation.

The bivariate approach to portfolio formation requires further interacting categories. Since our aim is to focus on the choice of responsible investments, all the pairwise portfolios involve at least one of the two impact variables, ESG and TA. This implies that we have three types of portfolios: (i) ESG-TA portfolios, (ii) ESG and market risk factors and (iii) TA and market risk factors. Each set of the pairwise portfolios yields four outcomes: $C_L \cap C_L$, $C_L \cap C_H$, $C_H \cap C_L$, and $C_H \cap C_H$.

3.3 Panel regression models

Linear models assume a constant and linear effect across all possible values of dependent and independent variables. Second, the standard econometric approach employed in the literature consists of using panel data models allowing for two effects, including fixed or random effects (FE and RE, respectively). These models, however, are restricted with two levels of errors at most and allow one type of error effect at a time (either FE or RE). This limitation may not allow for the true structure of the data to be captured when data are of a nested structure or clustered (Cameron and Trivedi 2005). The data we employ in this paper are of firms within sectors, which fit the multilevel structure that FE and RE models cannot capture. Thus, if we wish to capture the true structure of the data at hand, we need to allow for three levels: the

[8] The median is computed for any given variable x as follows: $Med(x) = \begin{cases} x\left[\frac{n}{2}\right], & for\ even\ n \\ \frac{x\left[\frac{n-1}{2}\right]+x\left[\frac{n+1}{2}\right]}{2}, & for\ odd\ n \end{cases}$, where n is the sample size.

linear function of the overall random term, level-two error representing firms and level-three variable reflecting sectors. We, therefore, specify a mixed linear model; namely multiple random effects model.

We also examine the differences in BHARs between the portfolios formulated using the methods in Sect. 3.3. This is done by comparing using two approaches: (i) the analysis of dependency using linear regressions and (ii) the analysis of causality using potential outcome framework.

The general specification of the mixed linear model, MLM, used in this paper is formally expressed as:

$$y_{it} = x_{it}^{'}\beta + z_{it}^{'}u_i + \varepsilon_{it} \tag{4}$$

where y_{it} is firms' performance, which includes $y_{it} = \{BHAR1M_{it},\ BHAR3M_{it},\ BHAR1Y_{it},\ BHAR3Y_{it}\}$. The term $x_{it}^{'}\beta$ is the fixed effect part of the model, which refers to the conditional mean of the model. The raw vector, $x_{it}^{'}$, includes the set of explanatory variables and the intercept. The error term is defined by the terms: $z_{it}^{'}u_i + \varepsilon_{it}$, where z_{it} is the set of observable variables, and u_i and ε_{it} are iid normally distributed random variables with zero means. Formally, we have $u_i \sim N(0, \Sigma_u)$ and $\varepsilon_{it} \sim N(0, \sigma_\varepsilon^2)$ where the random effects parameters are the covariances and variances in Σ_u.

The random effects part, $z_{it}^{'}u_i$, includes the overall random error term, firms' and sectors' random effects. The fixed effect part, however, takes different specifications depending on the type of portfolio selection we wish to test. The general specification of the fixed effect part can be specified as follows:

$$\begin{aligned} x_{it}^{'}\beta = \mu + \beta_1 ESG_{it} + \beta_2 CETR_{it} + \beta_3\left(ESG_{it} \times CETR_{it}\right) + \delta_1 BETA_{it} \\ + \delta_2 SIZE_{it} + \delta_3 PTBV_{it} + \delta_4 LEVERAGE_{it} + \tau_t \end{aligned} \tag{5}$$

where μ is the grand average, $\tau_t = \sum_{j=2}^{T} d_j year_{jt}$ and d_j are the year effects with the base year captured by the grand average referring to year 2002. We estimate this general specification over the full sample to examine the overall effect of ESG, TA and market fundamentals to maintain the assumptions that the relationship is linear and stable over time. We relax this assumption by allowing various linear restrictions to allow for different effects. We also use different measures specifications and variations to capture different effects. This includes the following:

3.3.1 Portfolio selection regressions

We allow here for the non-linearity of the relationship by accounting for each of the portfolio selections. This consists of univariate and bivariate approaches. In other words, we estimate the specification in (4) for j subsamples where $j = 0, 1, 2, \ldots, 9$ denotes: full sample, low ESG, high ESG, low TA, high TA, low ESG–low TA, high ESG–low TA, low ESG–high TA and high ESG–high TA, respectively. The model in (4) is, therefore, modified to reflect this as follows:

$$y_{it}^{j} = x_{it}^{j,\prime}\beta^{j} + z_{it}^{j,\prime}u_i^{j} + \varepsilon_{it}^{j} \tag{6}$$

3.3.2 Linear restrictions

These are imposed to test various specifications associated with portfolio selection criteria. The following are the linear restrictions we impose on specification (6):

(i) Low and high ESG restrictions: we impose two linear restrictions on CETR and the interaction ($ESG_{it} \times CETR_{it}$), or $\beta_2 = 0$ and $\beta_3 = 0$, respectively. These two linear restrictions allow capturing the effect of ESG under the assumption that only ESG is used as criterion to determine the outcome of responsible investing. Under this restriction, we hypothesise that, for high ESG, the estimated effect is positive (i.e. $\hat{\beta}_1 > 0$ under high ESG or $\hat{\beta}_1^3 > 0$).

(ii) Low and high TA restrictions: Here, we allow for the effect of CETR to be present under the assumption that only TA is used as criterion by investors. This implies we impose zero linear restrictions on the coefficients of ESG and ($ESG_{it} \times CETR_{it}$), or $\beta_1 = 0$ and $\beta_3 = 0$, respectively. Under this restriction, we hypothesise that, for higher values CETR (Low TA), the effect of CETR is positive (i.e. $\hat{\beta}_2 > 0$ for higher CETR).

(iii) Bivariate (combined) ESG and TA criteria: we impose here different combinations of linear restrictions including: (a) excluding CETR and the interaction ($ESG_{it} \times CETR_{it}$) or $\beta_2 = 0$ and $\beta_3 = 0$, (b) excluding ESG and the interaction ($ESG_{it} \times CETR_{it}$), or $\beta_1 = 0$ and $\beta_3 = 0$, and (c) and excluding the interaction ($ESG_{it} \times CETR_{it}$), or $\beta_3 = 0$. Under these restrictions, we find positive overall effects under high ESG – low TA combination.[9]

3.3.3 Portfolio performance evaluation regressions

The above models, as with much of the literature, do not allow for the causal effects of the ethical and responsible investment on performance. Therefore, we propose to capture the direct effect of each portfolio selection on the outcome of the investor, to estimate the average BHARs due to choosing a particular portfolio conditional on market fundamentals.

The modelling strategy involves defining portfolio selection as a treatment variable. Given there are four potential portfolio selections, the treatment level is multivalued treatment (i.e. it takes more than two values). Thus, we aim to estimate the outcomes of each of the treatments using a general framework known as the potential outcome model.

Suppose that the treatment variable takes $G+1$ different values, labelled as $\{0, 1, 2, \ldots, G\}$ where "0" refers to the control group and $1, 2, \ldots, G$ refer to different levels. Each respondent has been assigned one of G + 1 possible treatment levels, g = 0, 1, 2,…,G. Furthermore, we observe for each individual the vector

$$z_{it} = \left(y_{it}, w_{it}, x'_{it}\right)', \; i = 1, 2, \ldots, n, \quad \text{and} \quad t = 1, 2, \ldots, T \tag{7}$$

where y_{it} and x'_{it} (which is a $k \times 1$ vector) are the same as in Sect. 3.4 above. The observed outcome variable, w_i, is the treatment level. The indicator variable, $d_{it}(\mathrm{g}) = 1\left(w_{it} = \mathrm{g}\right)$, which takes the value 1 if the respondent i in time t is in the group g and the value of zero

[9] We repeat the estimations with book tax differences and results do not change.

otherwise. Note that the function 1(.) is the indicator function, the vectors z_{it} are independent and identically distributed draws of the vector $z = \left(\mathrm{y}, \mathrm{w}, \mathbf{x}'\right)$ and $d(\mathrm{g}) = 1(w = \mathrm{g})$.

The classical potential outcome framework distinguishes between the observed outcome y_{it} and the G+1 potential outcome $y_{it}(G)$ for each treatment level g=0, 1, 2,…,G. The observed response y_{it} can be expressed as follows:

$$y_{it} = \sum_{g=0}^{G} d_{it}(\mathrm{g}) y_{it} \tag{8}$$

We define $\mu_g = E\left(y_{it,g}\right)$ as the population means of counterfactuals. Under sufficient ignorability for identifying the means, it requires the conditional mean independence assumption

$$E\left(y_{it,g}|w_{it}, x_{it}\right) = E(y_{it,g}|x_{it}) \tag{9}$$

It follows from this that:

$$E(y_{it}|w_{it}, x_{it}) = \sum_{g=0}^{G} d_{it}(g) E(y_{it,g}|x_{it}) \tag{10}$$

which shows that $E(y_g|x)$ is identified because $E\left(y_g|x\right) = E(y|w = \mathrm{g}, x)$. The latter can be estimated for each g by restricting attention to units with $w_{it} = \mathrm{g}$.

The potential outcome for each treatment is estimated using conditional mean in (10). This is achieved by estimating the conditional probability of choosing a portfolio given the set of variables in x_{it}, known as Generalised Propensity Score. Once this is done, we can estimate the average outcome or return for each portfolio selection using various estimators, including regression adjustment, inverse probability weighting and augmented inverse probability weighting.

3.3.4 Fama–French factor models

We also assess the performance of the portfolios using the three variations of the Fama–French factor models.[10] We modify Eqs. (5) and (6) to fit the structure of these models. Let $y_{it} = \left(r_{it} - r_{ft}\right)$, where r_{it} is the return on stock i in month t, r_{ft} is the return on the 1 month-yield in month t. The fixed effect part of model (6) takes the following forms:

Fama–French three factor model:

$$x_{it}^{'}\beta = \alpha + \delta_1\left(r_{mt} - r_{ft}\right) + \delta_2 SMB_t + \delta_3 HLM_t + \tau_t \tag{11A}$$

Fama–French three factor plus momentum factor model:

$$x_{it}^{'}\beta = \alpha + \delta_1\left(r_{mt} - r_{ft}\right) + \delta_2 SMB_t + \delta_3 HLM_t + \delta_{wlm} WLM_t + \tau_t \tag{11B}$$

[10] The Fama–French factors are available at Kenneth French's website (https://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html).

Table 1 Summary statistics

Panel A: descriptive statistics

Variable	*N*	Mean	Std. Dev	Min	Max
BHAR 1 M	2478	.001	.027	−.247	.199
BHAR 3 M	2478	.005	.078	−.661	.911
BHAR 1Y	2478	.029	.255	−1.996	1.831
BHAR 3Y	2478	.141	.653	−3.168	8.194
ESG	2478	49.156	17.062	4.43	93.91
Tax Avoid	2478	.254	1.991	−9.325	81.287
PTBV	2478	6.861	39.995	.01	870.92
Size	2478	7.748	1.54	−4.605	11.908
BETA	2478	1.068	.543	−.97	3.89
Leverage	2478	36.562	24.549	0	98.92

Panel B: correlation matrix

	Part A				Part B					
	BHAR1M	BHAR3M	BHAR1Y	BHAR3Y	ESG	CETR	PTBV	Size	LEV-ERAGE	BETA
ESG	−0.05***	−0.06***	−0.09***	−0.13***	1					
CETR	0.05***	0.06***	0.06***	0.01	0.005	1				
PTBV	0.03	0.03*	0.05**	0.06***	−0.03	−0.01	1			
Size	0.04*	0.04**	0.04**	0.06***	0.41***	0.03	0.001	1		
BETA	−0.03	−0.02	−0.07***	−0.19***	0.01	−0.0003	−0.03	−0.12***	1	
LEVER-AGE	−0.13***	−0.13***	−0.17***	−0.19***	0.18***	−0.02	−0.03	0.21***	0.08***	1

This table provides the results of a 'mixed' investment strategy-based on portfolios sorted on traditional risk factors such as size, price to book, leverage and risk with an impact measure of ESG ratings. Buy and hold abnormal returns (BHARS) is estimated over 1 month, 3 months, 1 year and 3 years investment horizons. Size is defined as market value of firms and is estimated as share price multiplied by shares outstanding. Price-to-book (PTBV) ratio is share prices of firms divided by the net book value. Leverage is defined as the ratio of total debt to total equity. Risk is the market risk measure is the beta coefficient (β), which is estimated over a 5 years period in a rolling window, using monthly data. The BHARS are sorted into two groups based on ESG ratings and tax avoidance of firms; ESG_L and ESG_H denotes portfolios of firms that have low ESG ratings and high ESG ratings respectively. TA_L and TA_H denote portfolios of firms that have low TA rates and high TA rates respectively

Fama−French five factor model:

$$x_{it}^{'}\beta = \alpha + \delta_1\left(r_{mt} - r_{ft}\right) + \delta_2 SMB_t + \delta_3 HLM_t + \delta_4 RMW_t + + \delta_5 CMA_t + \ \tau_t \tag{11C}$$

where r_{mt} is the return on the market portfolio in month *t, SMB_t* is the difference in return between small cap portfolio and a large cap portfolio at month t, HLM_t is the difference in return at time t between a portfolio containing value stocks and one consisting of growth stocks, WLM_t is the difference in return at month t between the returns of the high and low returns stock portfolios, RMW_t is the difference between the returns of stocks with robust and weak profitability, and CMA_t is the difference in return at month t of conservative and aggressive investment stocks. The term τ_t is the time of the individual effect as defined above. We follow the same approach as with models (5) and (6) for *j* subsamples.

4 Findings and discussion

Panel A of Table 1 reports summary statistics for the BHARs measures, impact variables and known market risk factors. We report key statistics for the overall sample, across ESG categories and across TA categories (low and high). The overall sample mean of BHARs is between 0.1 and 14%, showing that the longer the time horizon, the higher the portfolio returns. The standard deviation and range indicate skewed and dispersed distributions of the BHARs. The mean ESG is 49.2, which is slightly below the average. The sample mean of TA is 0.25, closer to zero, which is the lower bound of the range, indicating centre of the data around high levels of tax avoidance.

Panel B of Table 1 reports the correlation matrix. Part A reports the correlation matrix between BHARs and other variables. In general, returns as measured by BHARs have negative and weak statistical association with ESG, risk and leverage, while their statistical association is found to be positive with TA, SIZE and PTBV. The correlations are mostly significant with just a few exceptions including between BHAR3Y and TA and BHAR1M and BHAR3M and risk. Part B also reports the pairwise correlation between explanatory variables. The correlation matrix does not report any evidence of the presence of linear dependence between the explanatory variables.

4.1 Univariate analysis

Under this analysis, we identify two categories, high and low as defined in Eq. (3). We then make portfolio assignments based on firms' ESG and TA. Next, we compute the BHARs for each portfolio. We then test (i) the significance of the BHARs and (ii) whether BHARs in different categories are statistically different.

Table 2 reports the univariate analysis; this contains the average BHARs, average ESG scores and average TA across different groups by ESG scores and TA. Groups with low ESG and TA are referred to as ESG_L and TA_L, respectively. Groups with high ESG and TA are denoted ESG_H and TA_H, respectively. We note that stock returns are all statistically significant across the ESG and TA groups. According to Table 2, the computed BHARs are all positive and significant with one exception for the portfolio of high ESG and high TA in the long term. Our findings suggest that performance is consistently higher in the low ESG and high TA groups. The BHAR1M to BHAR3Y are found to be ranging from 3 to 23.8%. Furthermore, the test[11] of the differences between BHARs across the four groups (ESG_L, ESG_H, TA_L and TA_H) shows that BHARs are statistically significant except for BHARs estimated for high ESG and high TA. The test shows that calculated BHARs under ESG_L are higher than those in ESG_H by around 0.1–13.7%, and by around 0.1–3% lower than those under TA_L; and by around 0.1–4% higher than those computed for TA_H. In contrast, the computed BHARs for ESG_H are found to be less than those computed for TA_L by about 0.1–10%. In short, our findings suggest that, while returns are lower under high ESG compared to low ESG, returns are highest under low TA suggesting the potential presence of an ethically-driven decision made by impact investors using TA as an alternative measure.

[11] We implemented *t test* for the partially paired samples to test the null that the average BHARs of group A is the same as BHARs of group B.

Table 2 Univariate analysis

	Full sample	ESG_L	ESG_H	TA_H	TA_L	Δ_{ESG}	Δ_{TA}	$\Delta_{ESG_L TA_L}$	$\Delta_{ESG_L TA_H}$	$\Delta_{ESG_H TA_H}$	$\Delta_{ESG_H TA_L}$
BHAR 1 M	.001	.002	.001	− .0002	.003	.001	− .003***	.0007	.003***	− .001	.003***
BHAR 3 M	.005	.007	.002	.001	.009	.005	− .009***	.004	.011***	− .003	.008***
BHAR 1Y	.029	.044	.013	.009	.048	.0315***	− .039***	.027**	.062***	− .007	.034***
BHAR 3Y	.141	.209	.072	.104	.177	.1365***	− .073***	.179***	.238***	.031	.114***
ESG	49.156	35.339	62.973	48.986	49.325	− 27.63***	− .339	35.07***	35.61***	62.62***	63.34***
TA	.254	.246	.262	− .052	.56	− .02	− .612***	− .011	.499***	− .091***	.622***
Obs	2478	1239	1239	1239	1239	1239	1239	613	626	626	613

N sample size. (***), (**) and (*) refer to 1%, 5% and 10% level of significance

This table provides the univariate analysis of portfolios based on ESG and tax avoidance. The BHARS are sorted into two groups based on ESG ratings of firms. ESG_L denotes portfolios of firms that have low ESG ratings and ESG_H denotes firms that have high ESG ratings. Next, BHARS are sorted based on the level of tax avoidance of firms. TA_L denotes portfolios of firms that have low tax avoidance and TA_H have high tax avoidance. Tax avoidance is defined as Cash Effective Tax Rate as defined in Eq. (2)

Δ_{ESG}: is the mean difference between portfolios based on ESG.Δ_{TA}: The mean difference between portfolios based on TA. $\Delta_{ESG_L TA_L}$: presents the mean differences between portfolios ranked on low ESG ratings and low TA. $\Delta_{ESG_L TA_H}$: is the mean difference between portfolios based on low ESG and portfolios based on high TA. $\Delta_{ESG_H TA_L}$: is the mean differences between portfolios based on high ESG and low TA. $\Delta_{ESG_H TA_H}$: is the mean differences between portfolios based on high ESG and high TA

Table 3 Impact (ESG and tax avoidance)

ESG		BHAR1M		BHAR3M		BHAR1Y		BHAR3Y	
		Tax avoidance							
		TA_H	TA_L	TA_H	TA_L	TA_H	TA_L	TA_H	TA_L
ESG_L	*N*	613	626	613	626	613	626	613	626
	Mean	.001	.003***	.004	.011***	.027**	.062***	.179***	.238***
ESG_H	*N*	626	613	626	613	626	613	626	613
	Mean	− .001	.003***	− .003	.008***	− .007	.034***	.031	.114***

N: Sample size, Mean: average returns, L: Low, H: High. (***), (**) and (*) refer to 1%, 5% and 10% level of significance

This table provides the results of a pure investment strategy based on ESG and tax avoidance. Buy and hold abnormal returns (BHARS) is estimated over 1 month, 3 months, 1 year and 3 years investment horizon. The BHARS are sorted into two groups based on ESG ratings of firms. ESG_L denotes portfolios of firms that have low ESG ratings and ESG_H denotes firms that have high ESG ratings. Next, BHARS are sorted based on the level of tax avoidance of firms. TA_L denotes portfolios of firms that have low tax avoidance and TA_H have high tax avoidance. Tax avoidance is Tax avoidance is defined as Cash Effective Tax Rate as defined in Eq. (2)

4.2 Bivariate approach: pure impact investment strategy

In this study, we define *pure* impact strategy as one where an impact investor would select firms solely on the basis of impact factors such as ESG scores and the level of tax avoidance. Here, we assign portfolios into four categories: portfolios of firms with low ESG and low tax avoidance (ESG_L & TA_L); portfolios of firms with low ESG and high tax avoidance (ESG_L & TA_H); portfolios of firms with high ESG and low tax avoidance (ESG_H & TA_L) and portfolios of firms with high ESG and high tax avoidance (ESG_H & TA_H). Table 3 reports the calculated BHARs under each category and their corresponding sample sizes. We also test for the statistical significance of the computed BHARs using single sample *t* test. The findings indicate that BHARs are positive and statistically significant across all categories and all time horizons for all portfolios consisting of firms with low ESG and high (low) tax avoidance. Although these portfolios offer a higher BHAR, an impact investor will not be attracted as these firms have low ESG scores and would be socially irresponsible.

Ideally, impact investors would invest in portfolios consisting of firms with high ESG and low TA (ESG_H & TA_L). From columns 1–4 of Table 3, short-term BHARs (1 month and 3-months period) and long-term BHARs (1 and 3 years) are positive and statistically significant of firms with high ESG and low TA. We also note that the combination of low ESG and low TA offers the highest returns (between about 0.3 and 24%). Although the returns under the *pure* impact combination (ESG_H & TA_L) are not the highest, the evidence shows that a *pure* impact investor can still earn a positive and reasonably high return.

Overall, our findings reveal that an impact investment strategy that embraces social responsibility based on ESG scores and TA would yield impact investors a BHAR of 3.4% per annum and 11.4% in the 3 years investment horizon. Conversely, an investment strategy based on portfolio of firms with low ESG and high TA may offer a far higher BHAR of 17.9% for the 3 years period but this approach does not constitute responsible investments.

Table 4 Traditional with ESG impact investment strategies

		BHAR1M		BHAR3M		BHAR1Y		BHAR3Y	
Panel A: Size									
ESG		$Size_S$	$Size_B$	$Size_S$	$Size_B$	$Size_S$	$Size_B$	$Size_S$	$Size_B$
ESG_L	*N*	813	426	813	426	813	426	813	426
	Mean	.001	.003**	.006*	.01***	.038***	.056***	.181***	.263***
ESG_H	*N*	426	813	426	813	426	813	426	813
	Mean	− .001	.002**	− .005	.006***	− .019	.03	− .052*	.137***
Panel B: price-to-book									
ESG		$PTBV_L$	$PTBV_H$	$PTBV_L$	$PTBV_H$	$PTBV_L$	$PTBV_H$	$PTBV_L$	$PTBV_H$
ESG_L	*N*	622	617	622	617	622	617	622	617
	Mean	− .002	.006***	− .005	.02***	− .006	.096***	.026	.393***
ESG_H	*N*	617	622	617	622	617	622	617	622
	Mean	− .003***	.004***	− .009***	.014***	− .034***	.06***	− .068***	.212***
Panel C: leverage									
ESG		LEV_L	LEV_H	LEV_L	LEV_H	LEV_L	LEV_H	LEV_L	LEV_H
ESG_L	*N*	698	541	698	541	698	541	698	541
	Mean	.005***	− .002	.014***	− .002	.077***	.003	.315***	.071**
ESG_H	*N*	541	698	541	698	541	698	541	698
	Mean	.003***	− .001	.01***	− .003	.048***	− .014*	.159***	.005
Panel D: RISK									
ESG		$Risk_L$	$Risk_H$	$Risk_L$	$Risk_H$	$Risk_L$	$Risk_H$	$Risk_L$	$Risk_H$
ESG_L	*N*	637	602	637	602	637	602	637	602
	Mean	.002**	.002	.006**	.008*	.042***	.047***	.229***	.188***
ESG_H	*N*	602	637	602	637	602	637	602	637
	Mean	.003***	− .002	.009***	− .004	.04***	− .012	.175***	− .024

N: Sample size, Mean: average returns, L: Low, H: High. S: Small, B: Big. (***), (**) and (*) refer to 1%, 5% and 10% level of significance

This table provides the results of a 'mixed' investment strategy-based on portfolios sorted on traditional risk factors such as size, price to book, leverage and risk with an impact measure of ESG ratings. Buy and hold abnormal returns (BHARS) is estimated over 1 month, 3 months, 1 year and 3-years investment horizons. Size is defined as market value of firms and is estimated as share price multiplied by shares outstanding. Price-to-book (PTBV) ratio is share prices of firms divided by the net book value. Leverage is defined as the ratio of total debt to total equity. Risk is the market risk measure is the beta coefficient (β), which is estimated over a 5 years period in a rolling window, using monthly data. The BHARS are sorted into two groups based on ESG ratings of firms; ESG_L denotes portfolios of firms that have low ESG ratings and ESG_H denotes firms that have high ESG ratings. Panel A presents the results based on portfolios sorted on ESG and size of firms, classified into two groups of small and big. Panel B presents the results based on portfolios sorted on ESG and PTBV; $PTBV_L$ and $PTBV_H$ denoting firms with low and high price to book ratios respectively. Panel C presents the results based on portfolios sorted on ESG and leverage of firms; LEV_L and LEV_H representing low levered and high levered firms respectively. Panel D presents the results based on portfolios sorted on ESG and risk of firms; $Risk_L$ and $Risk_H$ denoting firms with low and high risk respectively

Table 5 Traditional with tax avoidance impact investment strategies

		BHAR1M		BHAR3M		BHAR1Y		BHAR3Y	
		Panel A: size							
TA		$Size_S$	$Size_B$	$Size_S$	$Size_B$	$Size_S$	$Size_B$	$Size_S$	$Size_B$
TA_H	*N*	675	564	675	564	675	564	675	564
	Mean	− .001	.001**	− .003	.004***	− .007	.029***	.056*	.162***
TA_L	*N*	564	675	564	675	564	675	564	675
	Mean	.002	.003***	.008	.01***	.049***	.048***	.154***	.196***
Panel B: price-to-book									
TA		$PTBV_L$	$PTBV_H$	$PTBV_L$	$PTBV_H$	$PTBV_L$	$PTBV_H$	$PTBV_L$	$PTBV_H$
TA_H	*N*	740	499	740	499	740	499	740	499
	Mean	− .003***	.004***	− .01***	.016***	− .033***	.073***	− .033	.307***
TA_L	*N*	499	740	499	740	499	740	499	740
	Mean	− .001***	.005	− .003***	.017	− .001***	.081	− .003***	.298***
Panel C: Leverage									
TA		LEV_L	LEV_H	LEV_L	LEV_H	LEV_L	LEV_H	LEV_L	LEV_H
TA_H	*N*	619	620	619	620	619	620	619	620
	Mean	.004***	− .004***	.012***	− .011***	.059***	− .04***	.243***	− .035
TA_L	*N*	620	619	620	619	620	619	620	619
	Mean	.004***	.001*	.013***	.006**	.069***	.028***	.251***	.103***
Panel D: RISK									
TA		$Risk_L$	$Risk_H$	$Risk_L$	$Risk_H$	$Risk_L$	$Risk_H$	$Risk_L$	$Risk_H$
TA_H	*N*	591	648	591	648	591	648	591	648
	Mean	.002**	− .002*	.006**	− .005	.029***	− .008	.183***	.032
TA_L	*N*	648	591	648	591	648	591	648	591
	Mean	.003***	.003***	.009***	.009***	.052***	.043***	.22***	.13***

TA: Tax Avoidance. *N:* Sample size, Mean: average returns, L: Low, H: High. S: Small, B: Big

(***), (**) and (*) refer to 1%, 5% and 10% level of significance

This table provides the results of a 'mixed' investment strategy-based on portfolios sorted on traditional risk factors such as size, price to book, leverage and risk with an impact measure of tax avoidance. Buy and hold abnormal returns (BHARS) is estimated over 1 month, 3 months, 1 year and 3 years investment horizons. Tax avoidance is Tax avoidance is defined as Cash Effective Tax Rate as defined in Eq. (2).Size is defined as market value of firms and is estimated as share price multiplied by shares outstanding. Price-to-book (PTBV) ratio is share prices of firms divided by the net book value. Leverage is defined as the ratio of total debt to total equity. Risk is the market risk measure is the beta coefficient (β), which is estimated over a 5 years period in a rolling window, using monthly data. The BHARS are sorted into two groups based on tax avoidance (TA) of firms; TA_L denotes portfolios of firms that have low TA rates and TA_H denotes firms that have high TA rates. Panel A presents the results based on portfolios sorted on TA and size of firms, classified into two groups of small and big. Panel B presents the results based on portfolios sorted on TA and PTBV; $PTBV_L$ and $PTBV_H$ denoting firms with low and high price to book ratios respectively. Panel C presents the results based on portfolios sorted on TA and leverage of firms; LEV_L and LEV_H representing low levered and high levered firms respectively. Panel D presents the results based on portfolios sorted on TA and risk of firms; $Risk_L$ and $Risk_H$ denoting firms with low and high risk respectively.

4.3 Bivariate approach: combined impact investment strategy (ESG plus stock and market fundamentals)

Earlier, in Sect. 4.2, we assessed the investment performance of a *pure* impact investment strategy based on ESG and TA only. This section analyses the investment performance when an investor combines impact variables such as ESG and TA with traditional investment strategies based on stock and market fundamentals including SIZE, PTBV, leverage and market risk.

Firstly, portfolio assignments are made on the basis of ESG scores and key firm and market fundamentals including SIZE, PTBV, leverage and market risk. The second portfolio assignments are based on TA and each of the stock fundamentals as mentioned above. We compute BHARs for each portfolio and test their statistical significance. Tables 4 and 5 report the findings.

4.3.1 ESG and size

Panel A of Table 4 reports the BHARs for portfolios ranked according to ESG and size. The findings suggest that returns are consistently positive across all groups and over different time horizons except for the combination of high ESG and small size for all time horizons. According to our findings, portfolio of small firms and firms with low ESG (ESG_L & $Size_S$) earn positive and significant BHARs for the 3-months, 1 year and 3 years periods. In the long run, for the 3 years time horizon, portfolios consisting of big firms and firms with low ESG (ESG_L & $Size_B$) earn the highest BHAR (26.3%). However, an investor who is keen to invest in socially and environmentally responsible firms (ESGH) will not be interested to invest in this portfolio.

From our results, we can conclude that, for an investor who wants to combine impact with stock and market fundamentals, investing in portfolios consisting of big firms with high ESG (ESG_H & $Size_B$) in the long run will earn the investor BHAR of about 14%.

4.3.2 ESG and PTBV

Panel B of Table 4 reports the BHARs for portfolios ranked according to ESG and PTBV. According to our findings, a portfolio consisting of low ESG firms with low or high PTBV earn positive and significant BHAR (2.6% and 40%). Although the return is extremely high, this will not be attractive to an impact investor.

For an impact investor, our findings show that portfolios consisting of firms with high ESG and high PTBV earn positive and significant BHAR across the short and long run with the highest BHAR of 21% in the 3 years investment horizon. This shows that, if an investor was to combine stock fundamentals with impact investing, firms with high ESG scores and high growth potential would offer investors the desired twin objective of socially responsible investment alongside a financial return.

4.3.3 ESG and leverage

Panel C of Table 4 provides the results for portfolios based on ESG and leverage. For portfolios consisting of low ESG and low leverage, the BHARs are positive and significant across all time horizons. In contrast, only the BHAR3Y is estimated to be a positive and

statistically significant for low ESG and high leverage. Portfolios consisting of firms with low ESG and low leverage ($ESG_L\&Leverage_L$) earn the highest BHARs of 32% over a 3 years period. Once again, this combination will not appeal to an impact investor as firms have low ESG ratings.

From our results, we find that the BHARs are negative and not significant for portfolios consisting of firms with high leverage in the short run period (1 month and 3 months). However, the BHARs for these portfolios are positive and significant in the long run period (1 year and 3 years period). Portfolios consisting of firms with low leverage and both high and low ESG report positive and statistically significant BHARs ranging between 0.5 and 32% for low ESG and 0.3% and 16% for high ESG. Since the latter consists of firms with high ESG scores, impact investors would be interested in a portfolio of firms that are socially responsible and possess financial flexibility.

4.3.4 ESG and risk

Finally, Panel D of Table 4 presents the results for portfolios sorted according to ESG and market risk. For low risks portfolios, all BHARs are positive across all portfolios and time horizons irrespective of low ESG or high ESG. Although low ESG and low risk portfolios report the highest returns, a high ESG and low risk combination offers reasonably high returns ranging between 0.3 and 17.5%. A socially responsible investor will choose to invest in firms with high ESG and low risks with a BHAR of 17.5% in the 3 years period.

To summarise, based on our analysis above, our findings indicate that investors who combine impact with stock and market fundamentals will earn a higher BHAR (21.2%) in portfolio consisting of firms with high ESG and high PTBV. We can conclude that such a portfolio not only offers socially responsible investments but also provides an impact investor to invest in firms with high growth potential.

4.3.5 TA and size

Panel A of Table 5 reports the BHARs for portfolios ranked according to TA and size. The findings suggest that returns are consistently positive across all groups and over different time horizons. According to our findings, portfolios of small (big) firms and firms with high TA earn positive and significant BHARs for 1 year and 3 years horizons. In addition, BHARs in the short-term horizon are only statistically significant when firm size is big. According to our findings, an impact investor who is primarily interested in investing in socially responsible firms (TA_L) will make gains in big firms ranging between 0.3 and 19.6% for all time horizons. Gains in investing in small firms are only possible in a long-term horizon ranging between 4.9 and 15.4%.

4.3.6 TA and PTBV

Panel B of Table 5 reports the BHARs for portfolios ranked according to TA and PTBV. For all time horizons, portfolios consisting of firms with high (low) TA and low PTBV are all negative and mostly significant. On the other hand, for low (high) TA, BHARs are only positive when PTBV is high. The BHARs for these portfolios are only significant when TA is high, with returns ranging between 0.4 and 30%. Although the returns are reasonably high, they will not be attractive to an impact investor since firms are involved in high tax avoidance, which is socially irresponsible.

For an impact investor, our findings show that impact investors that choose a portfolio of low TA and high PTBV will earn a return of 29.8%.

4.3.7 TA and leverage

Panel C of Table 5 provides the results for portfolios based on TA and leverage. For portfolios consisting of low TA and low or high leverage, the BHARs are positive and significant across all time horizons, the highest return being 25.1% for portfolios with firms having low leverage in the long run.

For all portfolios consisting of firms with high TA and low levered firms, the BHARs are positive with the highest BHARs of 24.3% over a 3 years period. This combination will not appeal to an impact investor interested in socially responsible investment portfolios.

Our results indicate that, in the long run, a socially responsible portfolio consisting of low tax avoidance and low leverage firms will yield a higher BHAR (25.1%) compared to firms engaging in high tax avoidance (24%). This fulfils the objectives of a socially responsible investor and ensures lower bankruptcy costs at the same time.

4.3.8 TA and risk

Finally, Panel D of Table 5 presents the results for portfolios sorted according to TA and risk. All BHARs are positive and significant across all portfolios consisting of low TA and high or low risks across all time horizons. For portfolios with firms with low TA and high/low risk, the highest BHAR is 22% in the 3 years period. Since this investment involves investing in socially responsible firms, the impact investor will be drawn to investing in this portfolio.

To sum up, based on our analysis above, our findings indicate that socially responsible investors will earn a higher BHAR (29.8%) in a portfolio consisting of firms with low TA and high PTBV. We can conclude that investors that combine socially responsible firms and firms with high growth opportunities in a portfolio will earn a higher return.

On a relative performance analysis of the various investment strategies undertaken above, we find that a *pure* impact strategy of high ESG and low TA offers a BHAR of 11.4% in a 3 years investment period. On the other hand, a mixed or combined investment strategy of impact plus firm and market fundamentals provides a return of 21.2% for portfolios of firms with high ESG and high PTBV; and a BHAR of 29.8% on portfolios of firms consisting of low TA and high PTBV.

An impact investor who is committed to investing in *only* socially responsible firms (*pure* impact investment strategy) can earn a BHAR of 11.4% in a 3 years investment period; this study also shows that, over the same time horizon, impact investors can choose a portfolio based on low tax avoidance instead of ESG scores as an impact variable.

4.4 Panel regression results

4.4.1 Portfolio selection regression results

In this section, we discuss the regression results on the effect of portfolio selection on returns using linear regression. Linear regression, as stated previously, is the standard tool used in the literature to show the marginal effect of ESG and TA, amongst other key factors of interest on the performance of an investment. In this context, we estimate various

Table 6 The MLM estimates of the effect of ESG

	Full sample				Low ESG				High ESG			
	BHAR 1M	BHAR 3M	BHAR 1Y	BHAR 3Y	BHAR 1M	BHAR 3M	BHAR 1Y	BHAR 3Y	BHAR 1M	BHAR 3M	BHAR 1Y	BHAR 3Y
ESG	−.00006	−.00026***	−.00114***	−.00317***	−.00036***	−.00114***	−.00286***	−.00594*	−.00001	−.0001	−.00047	−.00347***
	(.00004)	(.0001)	(.00037)	(.00107)	(.00008)	(.00024)	(.00102)	(.00325)	(.00007)	(.00019)	(.00047)	(.00118)
BETA	−.00125**	−.00219	−.02068**	−.14044***	−.00033	.00152	−.00982	−.1168***	−.00176	−.00498	−.03787***	−.15129***
	(.00051)	(.00134)	(.00816)	(.02239)	(.00117)	(.00389)	(.01342)	(.03124)	(.00151)	(.00352)	(.00976)	(.0311)
SIZE	.00145**	.00497***	.03061***	.18599***	.00138*	.00452*	.02238***	.09976***	.00153**	.00544***	.0242***	.14876***
	(.00064)	(.00178)	(.00576)	(.02199)	(.00084)	(.00239)	(.00841)	(.02404)	(.00073)	(.00183)	(.00505)	(.02406)
PTBV	.00002***	.00005***	.00017**	.00005	.00002***	.00005**	.00027*	.00046***	.00001	.00004	.00004	.00048*
	(0)	(.00001)	(.00007)	(.00021)	(.00001)	(.00003)	(.00016)	(.00016)	(.00001)	(.00004)	(.00011)	(.00025)
Leverage	−.00015***	−.00042***	−.00188***	−.00561***	−.00017***	−.00047***	−.00184***	−.0058***	−.00012***	−.00037***	−.00174***	−.00564***
	(.00002)	(.00006)	(.00015)	(.0007)	(.00002)	(.00005)	(.00012)	(.00074)	(.00004)	(.00012)	(.00036)	(.00097)
Intercept	.0074	.01864	.04413	−.61316***	.0178**	.0483*	.13298	−.02219	.0042	.01174	.08828**	−.20962
	(.00655)	(.01984)	(.05944)	(.12443)	(.00788)	(.02488)	(.08299)	(.16939)	(.00687)	(.01781)	(.04242)	(.21854)
Random effects												
Sector	−17.29	−17.09	−19.46	−3.40	−17.69	−25.96	−19.20	−20.24	−26.15	−24.97	−22.09	−12.23
Firm	−8.33	−5.75	−2.76	−1.00***	−5.83	−4.82***	−2.73	−1.21***	−26.73	−25.90	−3.48***	−1.14***
Residual	−3.69***	−2.60***	−1.45	−.72***	−3.62***	−2.52***	−1.38*	−.56***	−3.79***	−2.73***	−1.54***	−.96***
Sample	2478	2478	2478	2478	1239	1239	1239	1239	1239	1239	1239	1239
LR Test	706.1***	363.7***	1033.9***	284.04***	277.8***	465.4***	445.7***	1000.1***	175.02***	141.2***	165.6***	260.6***
Year Dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Predicted Return	0.12%	0.48%	3.3%	19.6%	0.19%	0.73%	4.6%	21.5%	0.06%	0.2%	1.4%	11.8%
Predicted Risk	0.8%	2.2%	8.7%	43.1%	1.1%	3.0%	9.8%	40.6%	0.6%	1.7%	7.2%	36.5%

Robust standard errors are in parentheses. ***$p<.01$, **$p<.05$, *$p<.1$

This table provides the results of a Mixed Linear Model based on the ESG investment strategy. The general model is in Eqs. (5) and (6) with $j=0$, 1 and 2 with Low–High ESG restrictions. Buy and hold abnormal returns (BHARS) is estimated over 1 month, 3 months, 1 year and 3 years investment horizons. Size is defined as market value of firms and is estimated as share price multiplied by shares outstanding. Price-to-book (PTBV) ratio is share prices of firms divided by the net book value. Leverage is defined as the ratio of total debt to total equity. Risk is the market risk measure is the beta coefficient (β), which is estimated over a 5 years period in a rolling window, using monthly data

Table 7 The MLM Estimates of the Effect of TA

	Full sample				High TA				Low TA			
	BHAR 1M	BHAR 3M	BHAR 1Y	BHAR 3Y	BHAR 1M	BHAR 3M	BHAR 1Y	BHAR 3Y	BHAR 1M	BHAR 3M	BHAR 1Y	BHAR 3Y
CETR	.00056*** (.00017)	.00187*** (.00065)	.00712*** (.00172)	−.00092 (.00324)	.00169 (.00116)	.00393 (.00457)	.02117* (.01248)	.04725* (.02673)	.00044*** (.00014)	.0016*** (.00042)	.00485*** (.0012)	−.00089 (.00215)
BETA	−.0013*** (.0005)	−.0024* (.0014)	−.02213*** (.00832)	−.14428*** (.02407)	−.00317*** (.00111)	−.00637* (.00329)	−.03636*** (.01004)	−.17608*** (.02966)	.00151 (.00111)	.00432 (.0033)	.00513 (.01104)	−.10891** (.04403)
SIZE	.00117** (.0005)	.00379*** (.00142)	.02542*** (.00502)	.17848*** (.0197)	.00181* (.00093)	.00571** (.00263)	.02829*** (.00763)	.09608*** (.02199)	.00037 (.00023)	.00219* (.00113)	.01612*** (.00387)	.13662*** (.02106)
PTBV	.00002*** (0)	.00005*** (.00001)	.00019*** (.00007)	.00007 (.00023)	0 (0)	0 (.00001)	−.00002 (.00003)	.00014 (.00012)	.00005** (.00002)	.00021*** (.00007)	.00096*** (.00022)	.00151*** (.00053)
Leverage	−.00015*** (.00002)	−.00043*** (.00006)	−.00196*** (.00014)	−.00579*** (.00069)	−.00022*** (.00004)	−.00058*** (.00011)	−.00249*** (.00022)	−.00721*** (.00085)	−.00008*** (.00002)	−.00028*** (.00004)	−.0013*** (.00018)	−.00407*** (.00081)
Intercept	.00717 (.00666)	.01777 (.02008)	.04411 (.05868)	−.64862*** (.12265)	.00448 (.01155)	.00342 (.03027)	.0075 (.07793)	−.10063 (.15725)	.00987*** (.0037)	.02604* (.01465)	.09821 (.06409)	−.45722** (.18849)
Random effects												
Sector	−14.45	−23.53	−21.68	−3.37065**	−20.58	−29.30	−21.26	−19.13	−24.61	−28.43	−20.66	−21.87
Firm	−10.77	−5.89	−2.76***	−.97***	−5.74***	−4.73***	−2.57**	−1.31***	−6.32***	−4.37***	−2.60***	−1.04***
Residual	−3.68	−2.60***	−1.45***	−.72***	−3.57***	−2.48***	−1.40***	−.64***	−3.87***	−2.82***	−1.58***	−.83***
Sample	2478	2478	2478	2478	1239	1239	1239	1239	1239	1239	1239	1239
LR Test	418.8***	340.8***	664.1***	250.8***	258.4	162.7***	463.2***	502.9***	59.4***	122.0***	542.0***	201***
Year Dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Predicted Return	0.1%	0.5%	3.3%	20.3%	−0.02%	0.04%	1.0%	11.2%	0.3%	0.9%	5.3%	22.3%
Predicted Risk	0.8%	2.2%	8.7%	43.5%	1.1%	3.04%	1.1%	43.4%	0.7%	1.7%	6.9%	34.5%

Robust standard errors are in parentheses. ***p < .01, **$p < .05$, *$p < .1$

This table provides the results of a Mixed Linear Model based on the TA investment strategy. The general model is in Eqs. (5) and (6) with $j = 0$, 3 and 4 with Low–High TA restrictions. Buy and hold abnormal returns (BHARS) is estimated over 1 month, 3 months, 1 year and 3 years investment horizons. Size is defined as market value of firms and is estimated as share price multiplied by shares outstanding. Price-to-book (PTBV) ratio is share prices of firms divided by the net book value. Leverage is defined as the ratio of total debt to total equity. Risk is the market risk measure is the beta coefficient (β), which is estimated over a 5 years period in a rolling window, using monthly data

Table 8 The MLM estimates of the effect of ESG–TA high–low criteria

Full sample				
	BHAR 1M	BHAR 3M	BHAR 1Y	BHAR 3Y
ESG	− .00007* (.00004)	− .00029*** (.00009)	− .00113*** (.00035)	− .00318*** (.00103)
CETR	− .00164 (.00235)	− .00777 (.00763)	.00622 (.01512)	− .00327 (.02564)
ESG × CETR	.00004 (.00004)	.00018 (.00014)	.00002 (.00027)	.00005 (.00044)
BETA	− .00125** (.0005)	− .00218* (.00129)	− .02061*** (.00797)	− .14041*** (.02233)
SIZE	.00143** (.00062)	.00492*** (.00172)	.03004*** (.00555)	.18619*** (.02178)
PTBV	.00002*** (0)	.00005*** (.00001)	.00018** (.00007)	.00005 (.00021)
Leverage	− .00015*** (.00002)	− .00041*** (.00006)	− .00187*** (.00014)	− .00561*** (.0007)
Intercept	.00784 (.00632)	.02057 (.01944)	.04632 (.05699)	− .61384*** (.12425)
Random effects				
Sector	− 13.10	− 17.33	− 25.77	− 3.40**
Firm	− 7.73	− 5.73	− 2.76***	− 1.00***
Residual	− 3.68***	− 2.60***	− 1.45***	− .72***
Sample size	2478	2478	2478	2478
LR test	937.5***	582.44***	3955.7***	1214.3***
Year dummy	Yes	Yes	Yes	Yes
Predicted Return	0.1%	.48%	3.3%	19.6%
Predicted risk	0.9%	2.3%	8.8%	43.1%

Robust standard errors are in parentheses. ***$p < .01$, **$p < .05$, *$p < .1$

This table provides the results of a Mixed Linear Model based on the High–Low ESG—TA investment strategy. The general model is in Eqs. (5) and (6) with $j = 0$, 5, 6, 7, and 8 with combined linear restrictions. Buy and hold abnormal returns (BHARS) is estimated over 1 month, 3 months, 1 year and 3 years investment horizons. ESG × CETR is the interaction between ESG and CETR. Size is defined as market value of firms and is estimated as share price multiplied by shares outstanding. Price-to-book (PTBV) ratio is share prices of firms divided by the net book value. Leverage is defined as the ratio of total debt to total equity. Risk is the market risk measure is the beta coefficient (β), which is estimated over a 5 years period in a rolling window, using monthly data

specifications using various models including pooled OLS, Fixed Effect and Random Effects models. We, however, restrict our discussions on the findings based on the MLM model. First, the qualitative conclusions based on the previous models are no different from those found by the MLM.[12] Second, we argue that the MLM model is the most appropriate model since it allows for more than two levels of random effects and fixed effects.

Table 6 reports the estimates of the MLM allowing for ESG only as a portfolio selection criterion. Full sample estimates refer to the case when there is no portfolio selection. The ESG slope is found to be negative and statistically negative for BHARs except the 1-month BHAR. The low ESG and high ESG report the estimates of the model using ESG portfolio selection. The negative relation between ESG and BHARs is consistent with those reported in the correlation matrix in Panel B of Table 1. In other words, low and high ESG estimates report negative effect on BHARs. The effects are statistically significant for low ESG across all time horizons and mostly insignificant for high ESG (except for the 3 years

[12] The results are available upon request.

Table 9 The MLM Estimates of the Effect of ESG–TA High–Low Criteria

Low ESG–High TA				
	BHAR 1M	BHAR 3M	BHAR 1Y	BHAR 3Y
ESG	− .00044*** (.00009)	− .00148*** (.00034)	− .00362** (.00181)	− .00535 (.00436)
CETR	− .01423 (.03929)	− .06593 (.16657)	.19183 (.2065)	.84905*** (.24477)
ESG × CETR	.00033 (.00081)	.00149 (.00346)	− .00361 (.00444)	− .01859*** (.00539)
BETA	− .00343** (.00139)	− .00633 (.00401)	− .03494 (.0242)	− .14384** (.06333)
SIZE	.00183 (.00131)	.00613 (.00394)	.02492** (.01263)	.06837** (.0284)
PTBV	− .00001 (.00001)	− .00002 (.00001)	− .00006 (.00011)	.00024*** (.00009)
Leverage	− .00021*** (.00004)	− .00052*** (.00011)	− .00189*** (.00032)	− .00632*** (.00112)
Intercept	.01908 (.01239)	.04639 (.03609)	.08018 (.11683)	.08768 (.25324)
Random effects				
Sector	− 19.58456	− 28.67795	− 27.98446	− 25.99395
Firm	− 5.16026***	− 4.16828***	− 2.37636***	− 1.28058***
Residual	− 3.48971***	− 2.37483***	− 1.30786***	− .49276***
Sample size	613	613	613	613
LR test	35.6***	56.0***	196.5***	105.5***
Year dummy	Yes	Yes	Yes	Yes
Predicted return	0.3%	1.0%	6.3%	23.3%
Predicted risk	1.0%	2.7%	9.2%	33.0%

Robust standard errors are in parentheses. ***$p < .01$, **$p < .05$, *$p < .1$

This table provides the results of a Mixed Linear Model based on the High–Low ESG—TA investment strategy. The general model is in Eqs. (5) and (6) with $j = 0, 5, 6, 7$, and 8 with combined linear restrictions. Buy and hold abnormal returns (BHARS) is estimated over 1 month, 3 months, 1 year and 3 years investment horizons. ESG × CETR is the interaction between ESG and CETR. Size is defined as market value of firms and is estimated as share price multiplied by shares outstanding. Price-to-book (PTBV) ratio is share prices of firms divided by the net book value. Leverage is defined as the ratio of total debt to total equity. Risk is the market risk measure is the beta coefficient (β), which is estimated over a 5 years period in a rolling window, using monthly data

period). A plausible explanation for this finding may be due to the longer period required for ESG practices to be fully integrated into the firm for it to yield a positive return (Cappucci 2018).

Table 7 reports the estimates of the MLM using TA as a portfolio selection criterion. Similarly to using ESG as criterion, we compare subsamples estimates to the full sample. The full sample estimates refer to the case when there is no portfolio selection and accounting for tax avoidance effect. In other words, we restrict the ESG coefficient to zero since the investor is assumed to use only TA as a selection criterion. The effect of CETR[13] on 1-month, 3-months, and 1 year BHARs is positive and statistically significant when using the full sample. Under high TA, the effect of CETR is positive and significant only for the long-term returns. Under low TA, however, CETR has a positive and statistically significant effect on 1-month, 3-months and 1 year BHARs. So, a socially responsible investor

[13] High values of CETR denotes low TA and low values of CETR denotes high TA.

Table 10 The MLM Estimates of the Effect of ESG–TA High–Low Criteria

High ESG–HighTA				
	BHAR 1 M	BHAR 3 M	BHAR 1Y	BHAR 3Y
ESG	.00005 (.00011)	− .00004 (.0003)	− .0002 (.00068)	− .00441** (.002)
CETR	− .00231 (.00357)	− .00952 (.01202)	.00086 (.04919)	.08786 (.10557)
ESG × CETR	.00006 (.00006)	.0002 (.00023)	.00027 (.00091)	− .00059 (.00135)
BETA	− .00208 (.00224)	− .00447 (.00552)	− .04143** (.01929)	− .2058*** (.0334)
SIZE	.00264** (.00104)	.00899*** (.00238)	.03524*** (.00416)	.11517*** (.02488)
PTBV	.00001 (.00001)	.00002 (.00004)	0 (.00011)	.00034 (.00028)
Leverage	− .00021*** (.00005)	− .00061*** (.00013)	− .0027*** (.00029)	− .00672*** (.00135)
Intercept	− .00451 (.00972)	− .01158 (.02076)	.06161 (.03869)	.19071 (.37107)
Random effects				
Sector	− 22.60889	− 27.07716	− 18.81752	− 18.9885
Firm	− 23.98279	− 25.03839	− 3.54682**	− 1.4471***
Residual	− 3.72062***	− 2.66773***	− 1.54177***	− .90487***
Sample size	626	626	626	626
LR TEST	542.2***	593.6***	883.2***	427.8***
Year dummy	Yes	Yes	Yes	Yes
Predicted Return	0.2%	0.7%	3.4%	12.2%
Predicted Risk	0.4%	1.3%	6.6%	27.7%

Robust standard errors are in parentheses. ***$p < .01$, **$p < .05$, *$p < .1$

This table provides the results of a Mixed Linear Model based on the High–Low ESG–TA investment strategy. The general model is in Eqs. (5) and (6) with $j = 0, 5, 6, 7$, and 8 with combined linear restrictions. Buy and hold abnormal returns (BHARS) is estimated over 1 month, 3 months, 1 year and 3 years investment horizons. ESG × CETR is the interaction between ESG and CETR. Size is defined as market value of firms and is estimated as share price multiplied by shares outstanding. Price-to-book (PTBV) ratio is share prices of firms divided by the net book value. Leverage is defined as the ratio of total debt to total equity. Risk is the market risk measure is the beta coefficient (β), which is estimated over a 5 years period in a rolling window, using monthly data

can create portfolios based on firms with low TA (high CETR) as a measure for choosing impact investment.

Finally, we extend the analysis by accounting for the bivariate portfolio selection, which combines both ESG and CETR. In this context, we estimate a full sample-based model including ESG, TA and the interaction of ESG and CETR. Table 8 reports the MLM estimates. In general, there is very limited evidence that suggests the presence of a statistically significant effect of impact investing captured by the three variables ESG, CETR and the interaction of ESG and CETR. The Wald test for the joint significance of these three variables is rejected for all BHARs except the 3 years BHAR. The estimated effects of ESG are negative and statistically significant for all BHARs, while CETR and the interaction term are not statistically significant.

Tables 9, 10, 11 and 12 account for portfolio selection using the high-low ESG-TA combined criterion, which produced four subsamples. We note that there is no strong evidence in favour of individual statistical evidence of the variables ESG, CETR and their interactions ESG × CETR. In addition, there is lack of evidence of consistently estimated correct

Table 11 The MLM estimates of the effect of ESG–TA high–low criteria

Low ESG–Low TA				
	BHAR 1M	BHAR 3M	BHAR 1Y	BHAR 3Y
ESG	− .0003*** (.00009)	− .00099*** (.00029)	− .00228* (.00132)	− .00484 (.0042)
CETR	− .00316 (.00359)	− .02266* (.01208)	− .05097 (.08827)	− .10049 (.13885)
ESG × CETR	.00006 (.00009)	.00052* (.00029)	.00119 (.00219)	.00233 (.00347)
BETA	.00429* (.00253)	.01342* (.00808)	.04758** (.02004)	− .03384 (.1052)
SIZE	.00105** (.00052)	.00427** (.00172)	.01907*** (.00643)	.06883** (.02933)
PTBV	.00007** (.00003)	.00024** (.0001)	.00122*** (.00046)	.00184*** (.00037)
Leverage	− .00014*** (.00005)	− .00046*** (.00012)	− .00183*** (.00041)	− .00454*** (.00125)
Intercept	.01517** (.00723)	.04582* (.02674)	.14958 (.11709)	.12909 (.21687)
Random effects				
Sector	− 20.41811	− 5.71105***	− 4.69439**	− 3.03268***
Firm	− 6.18689	− 4.45909***	− 2.59664***	− 1.25417***
Residual	− 3.85648***	− 2.80924***	− 1.55381***	− .69273***
Sample size	626	626	626	626
LR test	1041.4***	1039.1***	1011.3***	551.3***
Year dummy	Yes	Yes	Yes	Yes
Predicted return	0.7%	0.4%	2.7%	16.8%
Predicted risk	1.5%	4.0%	12.4%	47.8%

Robust standard errors are in parentheses. ***$p < .01$, **$p < .05$, *$p < .1$

This table provides the results of a Mixed Linear Model based on the High–Low ESG–TA investment strategy. The general model is in Eqs. (5) and (6) with $j = 0, 5, 6, 7$, and 8 with combined linear restrictions. Buy and hold abnormal returns (BHARS) is estimated over 1 month, 3 months, 1 year and 3 years investment horizons. ESG × CETR is the interaction between ESG and CETR. Size is defined as market value of firms and is estimated as share price multiplied by shares outstanding. Price-to-book (PTBV) ratio is share prices of firms divided by the net book value. Leverage is defined as the ratio of total debt to total equity. Risk is the market risk measure is the beta coefficient (β), which is estimated over a 5 years period in a rolling window, using monthly data

signs across these subsamples. The joint significance Wald test reports strong evidence in favour of the presence of impact investing for the portfolio with high ESG and low TA. Estimated returns, however, are negative except for 3 years BHARs, which is significant.

4.4.2 Portfolio performance regression results

We use causal effects models to capture the true effect of portfolio selection on the conditional average returns. The portfolio selection criteria are defined as treatment variables. The BHARs are estimated based on Eq. (11A–C). Table 13 reports the estimated average BAHRs given a randomly selected investor chooses a particular portfolio combination. We use three estimators for robustness check, including regression adjustment (RA), augmented inverse probability weighting (AIPW) and inverse probability weighting regression adjustment (IPWRA).

The findings suggest that, for high TA-based portfolios, the estimated conditional returns are only statistically significant for 1 year and 3 years, ranging from 2.7 to 19.1%.

Table 12 The MLM Estimates of the Effect of ESG–TA High–Low Criteria

High ESG–Low TA				
	BHAR 1M	BHAR 3M	BHAR 1Y	BHAR 3Y
ESG	.00001 (.00009)	.00002 (.00032)	.00061 (.00083)	− .00068 (.00203)
CETR	.00408 (.00368)	.00517 (.01184)	.05194 (.03763)	.09338* (.04967)
ESG × CETR	− .00006 (.00007)	− .00006 (.00022)	− .00084 (.00071)	− .00174* (.00095)
BETA	− .00133 (.00097)	− .00488* (.00267)	− .03385** (.01584)	− .16172*** (.06159)
SIZE	− .00026 (.00047)	.00041 (.00164)	.00431 (.00735)	.07254*** (.01892)
PTBV	.00004 (.00003)	.00016* (.00009)	.0006* (.00031)	.00118* (.0006)
Leverage	0 (.00004)	− .00002 (.00014)	− .00047 (.00062)	− .00401** (.00162)
Intercept	.01261 (.00862)	.03146 (.02662)	.10511* (.06323)	.0261 (.18143)
Random effects				
Sector	− 20.62869	− 22.49363	− 29.17137	− 20.67689
Firm	− 5.9013	− 4.37223	− 3.3263***	− 1.4754***
Residual	− 3.94138***	− 2.88524	− 1.61841***	− .99196***
Sample Size	613	613	613	613
LR Test	424.5***	408.2***	485.5***	1113.8***
Year dummy	Yes	Yes	Yes	Yes
Predicted return	− 0.1%	− 0.2%	− 0.6%	4.5%
Predicted risk	1.0%	2.8%	10.6%	37.8%

Robust standard errors are in parentheses. ***$p < .01$, **$p < .05$, *$p < .1$

This table provides the results of a Mixed Linear Model based on the High–Low ESG–TA investment strategy. The general model is in Eqs. (5) and (6) with $j = 0, 5, 6, 7$, and 8 with combined linear restrictions. Buy and hold abnormal returns (BHARS) is estimated over 1 month, 3 months, 1 year and 3 years investment horizons. ESG × CETR is the interaction between ESG and CETR. Size is defined as market value of firms and is estimated as share price multiplied by shares outstanding. Price-to-book (PTBV) ratio is share prices of firms divided by the net book value. Leverage is defined as the ratio of total debt to total equity. Risk is the market risk measure is the beta coefficient (β), which is estimated over a 5 years period in a rolling window, using monthly data

Low ESG and low TA reports estimated BHARs ranging between 0.26 and 21.4%, while high ESG and low TA reports estimated BHARs ranging between 0.3 and 9% positive. The low TA-based portfolio reported better BHARs performance than the high TA portfolios.

Table14 reports the estimated alphas for the factors models specified in Eqs. (12A–C). Our findings suggest that, for all univariate and bivariate portfolios, the estimated alpha is negative and statistically significant. This indicates that the portfolios have underperformed. This evidence corroborates the findings of Barber et al. (2021) who find that impact investors are willing to earn a lower financial return for their investments that have a societal impact and conclude that lower return implies lower cost of capital.

4.5 Discussion of empirical results

In this paper, we integrate the empirical association between corporate social responsibility (CSR) and tax avoidance into an investment strategy based on impact. Due to the lack of standardisation in ESG reporting, this measure may not be a reliable source for an impact investor to choose responsible firms. We propose an additional measure of tax avoidance to identify firms that are socially responsible. When firms indulge in excessive tax avoidance

Table 13 Portfolio performance regression results

Portfolios	BHAR 1M (%)			BHAR 3M (%)			BHAR 1Y (%)			BHAR 3Y (%)		
	RA	AIPW	IPWRA	RA	AIPW	IPWRA	RA	AIPW	IPWRA	RA	AIPW	IPWRA
Low ESG–High TA	0.07	0.07	0.07	0.39	0.39	0.39	2.77**	2.77**	2.77**	19.10***	19.10***	19.10***
High ESG–High TA	−0.07	−0.07	−0.07	−0.14	−0.14	−0.14	−0.10	−0.10	−0.10	5.21**	5.21**	5.21**
Low ESG–Low TA	0.26***	0.26***	0.26***	1.0***	1.0***	1.0***	5.7***	5.7***	5.7***	21.4***	21.4***	21.4***
High ESG–Low TA	0.30***	0.30***	0.30***	0.85***	0.85***	0.85***	3.60***	3.60***	3.60***	9.0***	9.0***	9.0***

***$p < .01$, **$p < .05$, *$p < .1$. RA: stands for regression adjustment, AIPW: augmented inverse probability weighting, IPWRA: inverse probability of treatment weighting. This table provides the results of the regression results. It estimates the conditional mean BHARs using causal effect models as described in Sect. 3.5. The BHARs are defined as functions PTBV, SIZE, Leverage, BETA

Table 14 Fama–french regression results

Estimated Alphas	High ESG	Low ESG	Low TA	High TA	Low ESG–Low TA	High ESG–Low TA	Low ESG–High TA	High ESG–High TA
Three factor model	− .48***	− .40***	− .41***	− .36***	− .48***	− .39***	− .37***	− .37***
Four factor model	− .47***	− .39***	− .40***	− .36***	− .48***	− .39***	− .33***	− .38***
Five factor model	− .50***	− .39***	− .39***	− .35***	− .50***	− .37***	− .35***	− .37***

(***), (**) and (*) refer to 1%, 5% and 10% level of significance

behaviour, it may be viewed as unethical or socially irresponsible. An impact investor will look for a positive return when engaging in a responsible investment strategy. Therefore, a wide range of econometric and statistical testing is necessary to cover a wider range of possibilities; those that have yet to be attempted in the literature.

We employ various statistical methods to test whether impact investing is an optimal investment strategy for investors. Standard literature (Lee et al. 2013; Eccles et al. 2014; Dorfleitner et al. 2015; Tosun 2017; Adegbite et al. 2019) emphasise the role of ESG as a measure of responsible and ethical investing. The empirical literature, however, is not conclusive on the validity of this role due to various reasons. For example, Cappucci (2018) offers a comprehensive and critical review on the shortcomings of using ESG arguing that the presence of ESG policies does not necessarily reflect firms' commitments to sustainable finance. Other studies, including Liang et al. (2020) and Lopez et al. (2020), raise the issue of lack of global standardisation of the ESG measures. Ayton et al. (2022) show that THE frequency of which ESG scores are measured may also affect its role in explaining firms' performance.

In this context, our findings are not different from those in the literature cited above. For example, the univariate exercise reported in Table 2 shows that firms with low ESG have higher BHARs than those with high ESG. Furthermore, regression-based analysis reported in Table 6 shows that ESG has a negative marginal effect on BHARs in the long run. The possible explanations for this finding can be the lack of global standards on ESG reporting and measuring which can lead to the use of additional impact measures by investors.

From the statistical and econometric perspective, ESG scores tend to remain stable at around the same levels for many years, while firm performance tends to vary over time. It is as if one is regressing a highly volatile variable on another constant, leading to lack of variations and, therefore, leading to potentially insignificant results. This also implies that investors may not use the ESG variable to update their decisions since the ESG scores do not often change. Ayton et al (2022) show that, when ESG is measured using monthly data, the variability within the ESG would co-move with that of firms' performance, leading to a significant role of ESG on firms' performance. This is an additional reason as to the need for an additional measure for impact investors to use.

Hence, in this study, we propose TA as an additional impact measure to capture responsible and ethical practices. Our findings show that TA is a reliable impact measure. Based on Table 2, we note that low TA leads to positive and reasonably high returns and Table 7 regressions output show that low TA has a positive and statistically significant effect on the 1-month, 3-montha and 1 year BHARs.

Thus, in this study, we combine ESG and TA to construct investment portfolios using a four-combination measure of impact investing: low ESG–low TA, high ESG–low TA, low ESG–high TA and high ESG–high TA. A *pure* impact investment strategy should be based on high ESG–low TA. In this context, we test this using various methods. The simplest approach is to compute and test the significance of returns for each category. As reported in Table 3, a *pure* impact strategy leads to returns between 0.3 and 11.4%. At the time, we find that a low ESG-low TA leads to higher returns overall, between 0.3 and 24%. Drawing from the discussion above and from our findings, we can conclude that TA is very likely the driver of responsible investing more so than ESG.

We also show, using potential outcome models, that the ESG-TA combinations across portfolios cause varying results. The evidence shown in Table 13 implies two key conclusions. First, ESG and TA combined have causal effects on investors' returns. Second, the main driver of these causal effects is low TA. ESG when combined with high TA does not cause any effect on short-term BHARs including 1 year BHAR (for high ESG–high TA

combination). On the other hand, low TA combined with both low and high ESG results in positive and statistically significant returns ranging between about 0.3 and 21% (for low TA–low ESG) and 0.3 and 9% (for low TA–high ESG). This is consistent with the argument that ESG may be used to attain positive long-term returns only (Cuppuci 2018). Therefore, we suggest that TA is an additional measure that responsible investors can rely on to form their portfolios based on impact criterion.

5 Conclusion

The primary goal of this paper is to explore and recommend an investment strategy based on impact criterion. Due to the lack of standardisation in disclosure and reporting of ESG ratings by firms (Amel-Zadeh et al. 2018; Gibson et al. 2019; Berg et al. 2020), it becomes necessary to explore an additional measure. Given the negative association between CSR and tax avoidance, we argue that tax avoidance can be used as an investment criterion for impact investing. Firms may argue that, by reducing their tax expense, the savings can be used for socially responsible initiatives. However, this argument becomes very challenging to capture, given the inconsistencies in the disclosure and reporting of such initiatives as well as the ambiguous reporting of TA in the ESG score. This is one of the first studies, to our knowledge, to empirically relate tax avoidance and ESG ratings in impact investing. We find that, in a *pure* impact investment strategy based on ESG and tax avoidance, investing in high-ESG rated firms and low tax avoidance firms yields a buy and hold abnormal return of 3.4% per annum and 11.4% in a 3 years investment horizon. Next, if impact investors were to combine traditional investment strategies based on firm fundamentals with impact factors, we find that portfolios of high-ESG and high price-to-book-ratio firms earn 21.2%, returns, while a portfolio of low tax avoidance and high price-to-book portfolios earns 29.8% in the long run. Finally, we apply a causal effect model as an alternative to regression models. Portfolio performance evaluation regression results show that a *pure* impact strategy remains a profitable option as it results in positive and relatively acceptable average returns ranging between 0.3 and 9%.

The contributions of our study are four-fold; first, to our knowledge, this is the first study that introduces tax avoidance as an additional impact measure as existing ESG measures use varying methodologies (Berg et al. 2020) as well as unstandardised ESG reporting by corporates. Hence, ESG scores can be unpredictable and may not truly reflect corporate social responsibility appropriately. This study argues that the TA variable can be used to overcome the limitations of ESG as an additional impact measure. It can enable analysts and impact investors to evaluate corporate social responsibility initiatives of firms. Second, this is the first study that assesses an investment strategy based on impact using risk-adjusted returns across varying investment horizons; next, this study also evaluates investment strategy that combines impact variables with firm and market fundamentals. Lastly, the findings from this paper can help institutional investors, and the investment community, to use this additional measure of TA for better evaluation of their investment policies.

Our study has the following policy implications. The use of tax avoidance as an impact measure can help policy makers and regulators to understand the scope and prevalence of corporate tax avoidance practices in firms. This can facilitate framing of policies and guidelines in terms of improved disclosure and reporting. Targeted anti-tax avoidance policies will lead to better transparency and encourage firms to be more socially responsible.

Hence, investment strategy based on TA can lead to a positive return together with better social impact.

The limitation of this study is the fact that, while we can assess the investment performance of an impact investment strategy, we are unable to measure the impact or extent by which these impact investments generate a positive, measurable social and environmental impact. Future studies could explore this aspect of impact investing. This study also limits its focus to equities; future work could encompass other asset classes such as fixed income and commodities. Until such time that ESG reporting and disclosure are standardised globally, the search of a holy grail of additional impact measures is imperative and critical, especially since impact investing is set to grow and gain momentum in the coming years.

Appendix 1

See Table 15.

Table 15 Definition of variables

Variable	Definition
Tax avoidance	1. Effective Tax Rate (ETR) is defined as total tax expenses, including both current and deferred tax expenses, divided by pre-tax book income before special items
	2. Cash effective tax rate (CETR)equals cash taxes paid divided by pre-tax book income before special items
ESG	ESG combined: the weighted average of ESG pillars score and ESG controversies
Leverage	Ratio of long-term debt plus short-term debt to total equity
Size	Market Value of Firms (share price multiplied by shares outstanding)
Price-to-Book	Share prices of firms divided by the net book value
Risk	The market risk measure is the beta coefficient (β), which is estimated over a 5 years period in a rolling window, using monthly data
BHAR	See Eq. (1)

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References

Adegbite E, Guney Y, Kwabi F, Tahir S (2019) Financial and corporate social performance in the UK listed firms: the relevance of non-linearity and lag effects. Rev Quant Financ Acc 52:105–158

Albuquerque R, Koskinen Y, Zhang C (2019) Corporate social responsibility and firm risk: theory and empirical evidence. Manage Sci 65(10):4451–4469

Amel-Zadeh A, Serafeim G (2018) Why and how investors use ESG information: evidence from a global survey. Financ Anal J 74(3):87–103

Ault HJ, Schoen W, Shay SE (2014) Base erosion and profit shifting: a roadmap for reform. Bull Int Tax 68:275–281

Ayton J, Krasnikova N, Malki I (2022) Corporate social performance and financial risk: further empirical evidence using higher frequency data. Int Rev FinAnc Anal 80:102030

Balakrishnan R, Sprinkle GB, Williamson MG (2011) Contracting benefits of corporate giving: an experimental investigation. Account Rev 86(6):1887–1907

Banz RW (1981) The relationship between return and market value of common stocks. J Financ Econ 9:3–18

Barber B, Morse A, Yasuda A (2021) Impact investing. J Financ Econ 139:162–185

Berg F, Fabisik K, Sautner Z (2020) Is history repeating itself? The (Un) Predictable Past of ESG Ratings. European Corporate Governance Institute–Finance Working Paper 708

Berry TC, Junkus JC (2013) Socially responsible investing: an investor perspective. J Bus Ethics 11:707–720

Blaufus K, Möhlmann A, Schwäbe AN (2019) Stock price reactions to news about corporate tax avoidance and evasion. J Econ Psychol 72:278–292

Block JH, Hirschmann M, Fisch C (2021) Which criteria matter when impact investors screen social enterprises? J Corp Finan 66:101813

Brooks C, Oikonomou I (2018) The effects of environmental, social and governance disclosures on: a review of the literature in accounting and finance. Br Account Rev 50(1):1–15

Campbell JL (2007) Why would corporations behave in socially responsible ways? An institution theory of corporate social responsibility. Acad Manag Rev 32(3):946–967

Cappucci M (2018) The ESG integration paradox. J Appl Corp Financ 30(2):22–28

Carroll A (1991) The pyramid of corporate social responsibility: toward the moral management of organizational stakeholders. Bus Horizon 34:39–48

Chan KC, Chen N (1991) Structural and return characteristics of small and large firms. J Financ 46(4):1467–1484

Chan LKC, Hamao Y, Lakonishok J (1991) Fundamentals and stock returns in Japan. J Financ 46:1739–1764

Chen S, Chen X, Cheng Q, Shevlin T (2010) Are family firms more tax aggressive than non-family firms? J Financ Econ 95(1):41–61

Chen X, Hu N, Wang X, Tang X (2014) Tax avoidance and firm value: evidence from China. Nankai Bus Rev Int 5(1):25–42

Cohen R (2020) Impact: reshaping capitalism to drive real change. Morgan James Publishing

Davis AK, Guenther DA, Krull LK, Williams BM (2016) Do socially responsible firms pay more taxes. Account Rev 91(1):47–68

Dawkins CE (2018) Elevating the role of divestment in socially responsible Investing. J Bus Ethics 153:465–478

Deng X, Kang J, Low BS (2013) Corporate social responsibility and stakeholder value maximization: evidence from mergers. J Financ Econ 110(1):87–109

Desai MA, Dharmapala D (2009) Corporate tax avoidance and firm value. Rev Econ Stat 91(3):537–546
Dhaliwal DS, Li OZ, Tsang A, Yang YG (2011) Voluntary nonfinancial disclosure and the cost of equity capital: the initiation of corporate social responsibility reporting. Account Rev 86(1):59–100
Duque-Grisales E, Aguilera-Caracuel J (2021) Environmental, social and governance (ESG) scores and financial performance of multilatinas: moderating effects of geographic international diversification and financial slack. J Bus Ethics 168(2):315–334
Dyreng SD, Hanlon M, Maydew EL (2008) Long-run corporate tax avoidance. Account Rev 83(1):61–82
Eccles RG, Ioannou I, Serafeim G (2014) The impact of corporate sustainability on organizational processes and performance. Manag Sci 60(11):2835–2857
Edmans A (2012) The link between job satisfaction and firm value, with implications for corporate social responsibility. Acad Manag Perspect 26(4):1–19
Fama EF, French K (1992) The cross-section in expected stock returns. J Financ 47(2):427–466
Financial Reporting Council (FRC) (2020) Sustainability Accounting Standards Board Conceptual Framework, https://www.frc.org.uk/getattachment/52f00b12-eefb-4aa7-bd65-732a0b0f6e13/SASB-CF-UKFRC.pdf. Accessed 2 April 2021
Frank MM, Lynch LJ, Rego SO (2009) Tax reporting aggressiveness and its relation to aggressive financial reporting. Account Rev 84(2):467–496
Geczy C, Jeffers JS, Musto DK, Tucker AM (2021) Contracts with (Social) benefits: the implementation of impact investing. J Financ Econ. https://doi.org/10.1016/j.jfineco.2021.01.006
Gibson R, Krueger P, Schmidt PS (2019) ESG Rating disagreement and stock returns, Swiss Finance Institute Research Paper No. 19-67, European Corporate Governance Institute—Finance Working Paper No. 651/2020, Financial Analyst Journal, Forthcoming, https://doi.org/10.2139/ssrn.3433728
GIIN (2020a) Annual Impact Investor Survey. https://thegiin.org/research/publication/impinv-survey-2020a. Accessed 2 April 2021
GIIN (2020b) Annual Impact Investor Survey. https://thegiin.org/research/publication/impinv-survey-2020b. Accessed 21 April 2021
GIIN (2022) GIINsight: Sizing the impact investing market. https://thegiin.org/research/publication/impact-investing-market-size-2022/. Accessed 24 Oct 2022
Gillan SL, Koch A, Starks LT (2021) Firms and social responsibility: a review of ESG and CSR research in corporate finance. J Corp Financ. https://doi.org/10.1016/j.jcorpfin.2021.101889
Goerke L (2019) Corporate social responsibility and tax avoidance. J Public Econ Theory 21(2):310–331
Goss A, Roberts GS (2011) The impact of corporate social responsibility on the cost of bank loans. J Bank Financ 35(7):1794–1810
Hanlon M (2003) What can we infer about a firm's taxable income from its financial statements? Natl Tax J 56(4):831–863
Hanlon M, Heitzman S (2010) A review of tax research. J Account Econ 50(2–3):127–178
Hanlon M, Slemrod J (2009) What does tax aggressiveness signal? Evidence from stock price reactions to news about tax shelter involvement. J Public Econ 93:126–141
Hanlon M, Mills L, Selmrod J (2007) An empirical examination of corporate tax noncompliance. In: Auerbach A, Hines JR, Slemrod J (eds) Taxing corporate income in the 21st century. Cambridge University Press, Cambridge
Hasan I, Hoi C, Wu Q, Zhang H (2017) Social capital and corporate tax avoidance. J Account Res 55(3):629–669
Hasseldine J, Morris G (2013) Corporate social responsibility and tax avoidance: a comment and reflection. Account Forum 37(1):1–14
HMRC (2021) Tax gap falls to lowest recorded yet. https://www.gov.uk/government/news/tax-gap-falls-to-lowest-recorded-rate. Accessed 21 April 2021
Hoi CK, Wu Q, Zhang H (2013) Is corporate social responsibility (CSR) associated with tax avoidance? Evidence from irresponsible CSR activities. Account Rev 88(6):2025–2059
Hong H, Liskovich I (2016) Courts, markets and the good firm. Working paper, Princeton University and the University of Texas at Austin
Hope OK, Ma M, Thomas WB (2013) Tax avoidance and geographic earnings disclosure. J Account Econ 56(2–3):170–189
Huang K, Sim N, Zhao H (2020) Corporate social responsibility, corporate financial performance and the confounding effects of economic fluctuations: a meta-analysis. Int Rev Financ Anal 70:101504
Huseynov F, Klamm BK (2012) Tax avoidance, tax management and corporate social responsibility. J Corp Finan 18:804–827
Impact Investing Institute (2022) Impact Report. https://www.impactinvest.org.uk/wp-content/uploads/2022/07/Impact-Report-21-22.pdf. Accessed 27 Sept 2022

Independent (2019) Billions are being lost due to tax avoidance. https://www.independent.co.uk/voices/hmrc-tax-gap-avoidance-billions-pounds-a8968591.html. Accessed 21 July 2021
Inger KK, Vansant B (2019) Market valuation consequences of avoiding taxes while also being socially responsible. J Manag Account Res 31(2):75–94
Kim HD, Kim T, Kim Y, Park KW (2019) Do long-term institutional investors promote corporate social responsibility activities? J Bank Financ 101:256–269
Kotsantonis S, Serafeim G (2019) Four things no one will tell you about ESG data. J Appl Corp Financ 31(2):50–58
Kruger P (2015) Corporate goodness and shareholder wealth. J Financ Econ 115:304–325
Lanis R, Richardson G (2013) Corporate social responsibility and tax aggressiveness: a test of legitimacy theory. Account Audit Account J 26(1):75–100
Lee DD, Faff RW (2009) Corporate sustainability performance and idiosyncratic risk: a global perspective. Financ Rev 44(2):213–237
Liang H, Renneboog L (2020) Corporate social responsibility and sustainable finance: a review of the literature. European Corporate Governance Institute—Finance Working Paper, 701/2020
Lin Y, Li Y-W, Cheng TC, Lam K (2021) Corporate social responsibility and investment efficiency: does business strategy matter? Int Rev Financ Anal 73:101585
Lins KV, Servaes H, Tamayo A (2017) Social capital, trust, and firm performance: the value of corporate social responsibility during the financial crisis. J Financ 72(4):1785–1824
Lopez C, Contreras O. Bendix J. (2020) ESG Ratings: the road ahead. https://milkeninstitute.org/sites/default/files/reports-pdf/ESG_Ratings_0.pdf
López-González E, Martínez-Ferrero J, García-Meca E (2019) Does corporate social responsibility affect tax avoidance: evidence from family firms. Corp Soc Responsib Environ Manag 26(4):819–831
Lyon JD, Barber BM, Tsai C (1999) Improved methods for tests of long-run abnormal stock returns. J Financ 54(1):165–201
Mansi S, Qi J, Shi H (2020) Advertising and tax avoidance. Rev Quant Financ Acc 54(2):479–516
Moore G (2001) Corporate social and financial performance: an investigation in the U.K. supermarket industry. J Bus Ethics 34:299–315
Muller A (2020) When does corporate social performance pay for international firms? Bus Soc 59(8):1554–1588
Nandy M, Lodh S (2012) Do banks value the eco-friendliness of firms in their corporate lending decision? Some empirical evidence. Int Rev Financ Anal 25:83–93
Narasimhan J, Titman S (2001) Profitability of momentum strategies: an evaluation of alternative explanations. J Financ 56(2):699–720
Neville S, Treanor J (2012) Starbucks to pay£ 20m in tax over next two years after customer revolt. https://www.theguardian.com/business/2012/dec/06/starbucks-to-pay-10m-corporation-tax. Accessed 20 April 2020
Park S (2017) Corporate social responsibility and tax avoidance: Evidence from Korean firms. J Appl Bus Res 33(6):1059–1068
Phillips SD, Johnson B (2021) Inching to impact: the demand side of social impact investing. J Bus Ethics 168(3):615–629
Rudyanto A, Pirzada K (2020) The role of sustainability reporting in shareholder perception of tax avoidance. Soc Responsib J 17(5):669–685. https://doi.org/10.1108/SRJ-01-2020-0022
Sharpe W (1964) Capital asset prices: a theory of market equilibrium under conditions of risk. J Financ 19:425–442
Sikka P (2010) Smoke and mirrors: corporate social responsibility and tax avoidance. Account Forum 34(3–4):153–168
Simone L, Stomberg B (2012) Do investors differentially value tax avoidance of income mobile firms? Mycol Res 106(11):1323–1330
TCFD (2021) Task Force on Climate related financial disclosures. https://www.fsb-tcfd.org/. Accessed 21 April 2021
Tosun OK (2017) Is corporate social responsibility sufficient enough to explain the investment by socially responsible funds? Rev Quant Financ Acc 49:697–726
Weisbach DA (2002) An economic analysis of anti-tax-avoidance doctrines. Am Law Econ Rev 4(1):88–115
Wilson R (2009) An examination of corporate tax shelter participants. Account Rev 84(3):969–1000