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 (CSR) 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 yield a buy and hold abnormal return of 2.6% per annum and 14.3% in a three-year 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 25.5%, while a portfolio of low tax avoidance and high price-to-book portfolios earn 33.1% in the long run. Collectively, our results suggest that whilst impact investing do 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 Codes: 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). 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 £5.1 billion in 2019 (Impact Investing Institute, 2019). The 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, or 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 (Brooks and Oikonomou,2018). Lopez, Contreras and Bendix (2020) state that there are certain variables that can be predictive of ESG scores. 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 (Lins *et al*., 2017; Deng *et al*., 2013). A meta-analysis by Huang *et al.* (2020) finds that due to public and regulatory concerns,

managers are increasing CSR efforts with the aim at 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-standardization of disclosure, measurement and reporting of CSR activities by firms (Davenport, 2000).

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, it is an important measure not captured by the ESG score. Huseynov and Klamm (2012) and Lopez *et al* (2020) show that TA is not one of the predictive variables in the measure of ESG score. Even though tax avoidance is essentially a legal strategy, 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 that includes society and are expected to follow rules, laws and regulation; especially in the case of taxation (Huseynov and Klamm, 2012). However, this study was restricted to firms which used external auditors for tax services and how it has an impact on ETR. Our study will explore how an impact investor could evaluate if a firm behaves responsibly by making certain it has a high ESG score and low TA. Additionally, impact investors could use this measure as an investment criterion in impact investing.

The primary aim of this paper is to examine the investment performance of impact investments. 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. This is one of the first studies, to our knowledge, to empirically relate 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 both in the short and long run investment horizons, the impact strategy based purely on impact measures of ESG and TA earn 14.3% in a three-year investment horizon. When we combine impact factors with traditional investment criterion

based on risk factors, we find that portfolios of high-ESG and high price-to-book-ratio firms earn 25.5%, returns, while a portfolio of low tax avoidance and high price-to-book portfolios earn 33.1% 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 three-fold; First, to our knowledge, this is the first study that introduces tax avoidance as an additional impact measure; second, this is the first study that assesses an investment strategy performance based on impact using risk-adjusted returns across varying investment horizons; and finally, this study also provides an investment strategy that combines impact variables with firm and market fundamentals.

Taxation is a major fiscal revenue for most governments that is then channelled towards societal benefits. 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 attempt to reduce their tax expense. Davis, Guenther, Krull, and Williams (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 signals 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 a second impact investment criteria, 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.,* (2012) document that firms that engage in responsible corporate social activities have a lower likelihood of engaging in tax avoidance activities. This has also been well

documented in the literature that firms involved in high social responsibility activities will tend to lower tax avoidance (Hasan *et al*, 2017). In other words, there is a negative relationship between ESG and TA. Following this train 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: Section 2 provides the literature review, while, in Section 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 Section 4 and Section 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 risk of firms (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 returns (Barber *et al.,* 2021; Geczy *et al.,* 2021). Other studies examine specific impact criteria (such as societal issues), for selecting socially responsible firms (Block *et al*., 2021; Philipps and Johnson, 2021; Kim *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 its 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 (Goss and Roberts, 2011; El Ghoul, *et al.,* 2011; Dhaliwal, *et al.,* 2011; Albuquerque *et al.,* 2019; Chava, 2014; Hoepner *et al.,* 2016); 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). The literature indicates that 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 CSR performance of a firm. This is known as the ESG score that represents Environmental, Social and Governance actions and activities of a firm. Previous studies (Dorfleitner *et al.,* 2015; Eccles *et al*., 2014; Lee, *et al.,*2013) 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 to be 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 unstandardized data, the score can be quite divergent (Liang et al., 2020; Huseynov and Klamm 2012; 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 & 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, 2006, 2009; Wilson, 2009; Simone and Stomberg, 2012) and others find a negative relation (Hanlon and Slemrod, 2009; Chen *et al.,* 2014; Ault *et al.*, 2014; Balakrishnan *et al*., 2011; Neville and Treanor 2012; Blaufus *et al*., 2019). Previous studies calculate tax avoidance using measures such as annual or long run cash effective tax rate (Hanlon and Heitzman, 2010; Dyreng *et al.*, 2008; Gupta and Newberry, 1997; Zimmerman, 1983); GAPP effective tax rate (Rego, 2003; Hanlon *et al.,* 2007; Frank *et al.*, 2009; Lanis and Richardson, 2012, Rudyanto and Pirzada, 2020) or book-tax differences (Desai and Dharmapala, 2009; Wilson, 2009; Yin, 2003).

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 to be 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 to be 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 constitutes a major source of government income that is then used to support social initiatives for the well-being 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

[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.
[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.

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) 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) found 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; Inger and Vansant, 2019; Goerke, 2019; Park *et al.*, 2017 and 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 607 companies listed on the London Stock Exchange (LSE) from 1999 to 2019. For each firm year observation to enter the sample, we require that a fiscal year -end ESG, cash tax paid and stock price series be available for at least 12 months. We exclude financial companies, companies that change 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 987 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 selection (Section 3.2), panel data portfolio selection regressions (Section 3.3.1) and portfolio performance evaluation regressions (3.3.2).

[4] CETR below the median

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 captures investors' experience (Lyon *et al.,* 1999). We calculate one- and three-month BHARs to capture the short-run performance and one- and three- years BHARs to capture medium to long run performance. We calculate BHARs using the following formula:

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

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 captures 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] the pre-tax income.

$$\text{CETR} = \frac{cash\ tax\ paid}{pre{-}tax\ income} \quad (2)$$

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. The first approach is a univariate approach, while the second

[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 (Dyreng *et al*., 2008; Chen *et al.*, 2010, Hanlon, 2003).

is a bivariate. In both cases, we define two categories to classify portfolio performance: high and low. The categories (C) are defined as:

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

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 reflects 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 linear function of the overall random term, level- two error representing firms

[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.

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 Section 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:

$$y_{it} = x'_{it}\beta + z'_{it}u_i + \varepsilon_{it} \quad (4)$$

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:

$$x'_{it}\beta = \mu + \beta_1 ESG_{it} + \beta_2 CETR_{it} + \beta_3 (ESG_{it} \times CETR_{it}) + \delta_1 BETA_{it} + \delta_2 SIZE_{it} + \delta_3 PTBV_{it} + \delta_4 LEVERAGE_{it} + \tau_t \quad (5)$$

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 is captured by the grand average refer to year 2002. We estimate this general specification over the full sample to examine the overall effect 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. 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 selection. 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:

$$y_{it}^{j} = x_{it}^{j,\prime}\beta^{j} + z_{it}^{j,\prime}u_{i}^{j} + \varepsilon_{it}^{j} \quad (6)$$

***3.4.1. 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 hypothesis 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 hypothesis that for higher values CETR (Low TA), the effect if 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, positive overall effects under High ESG – Low TA combination[9].

3.3.2 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.

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

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 $\{0,1,2,\dots,G\}$ where '0' refer to the control group and $1,2,\dots,G$ refer to different levels. Each respondent has been assigned one of G+1 possible treatment level g=0, 1, 2,..., G. Furthermore, we observe for each individual the vector

$$\boldsymbol{z}_{it} = (y_{it}, w_{it}, x'_{it})', \quad i = 1,2,\dots,n, \text{ and } t = 1,2,\dots,T \tag{7}$$

where y_{it} and x'_{it} (which is a $k \times 1$ vector) are the same as in section 3.4 above. The observed outcome variable, w_i is the treatment level. The indicator variable, $d_{it}(\mathrm{g}) = 1(w_{it} = \mathrm{g})$, which takes the value 1 if the respondent i in time t is in the group g and the value of zero otherwise. Note that the function $\mathbf{1}(.)$ is the indicator function, the vectors $\boldsymbol{z}_{it}$ are independent and identically distributed draws of the vector $\boldsymbol{z} = (\mathrm{y}, \mathrm{w}, \mathbf{x}')$ and $d(\mathrm{g}) = 1(w = \mathrm{g})$.

The classical potential outcome framework, which 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:

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

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

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

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 $E\left(y_g \middle| x\right) = E(y|w = \mathrm{g}, x)$. This 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.

3.3.3 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 equations (5) and (6) to fit the structure of these Models. Let $y_{it} = (r_{it} - r_{ft})$, where r_{it} is the return on stock i in month t, r_{ft} is the return on the one month-yield in month t. The fixed effect part of model (6) takes the following forms:

Fama-French three factor model:

$$x'_{it}\beta = \alpha + \delta_1(r_{mt} - r_{ft}) + \delta_2 SMB_t + \delta_3 HLM_t + \tau_t \quad (11A)$$

Fama-French three factor plus momentum factor model:

$$x'_{it}\beta = \alpha + \delta_1(r_{mt} - r_{ft}) + \delta_2 SMB_t + \delta_3 HLM_t + \delta_{wlm} WLM_t + \tau_t \quad (11B)$$

Fama-French five factor model:

$$x'_{it}\beta = \alpha + \delta_1(r_{mt} - r_{ft}) + \delta_2 SMB_t + \delta_3 HLM_t + \delta_4 RMW_t + + \delta_5 CMA_t + \tau_t \quad (11C)$$

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 the individual effect as defined above. We follow the same approach as with models (5) and (6), we 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 0.4% and 22%; showing that longer the time horizon the higher is the portfolio returns. The standard deviation and range indicate skewed and dispersed distributions of the BHARS. The mean ESG is 45.12, which is below the average. The sample mean of TA is

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

0.268, closer to zero – 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, CETR, SIZE, PTBV and Leverage, while their statistical association is found to be positive with BETA. The correlation is only significant between returns and ESG, SIZE, and Leverage. There is some evidence that the association between 3-year BHAR and ESG and CETR is statistically significant. Part B reports the pairwise correlation between explanatory variables. The correlation matrix does not report any evidence of the presence of linear dependence between the explanatory variable.

Table 1: Summary Statistics

Panel A: Descriptive Statistics					
Variable	*N*	Mean	Std. Dev.	Min	Max
BHAR 1M	987	.004	.022	-.091	.15
BHAR 3M	987	.012	.063	-.285	.425
BHAR 1Y	987	.056	.236	-.797	1.836
BHAR 3Y	987	.223	.648	-1.05	7.869
ESG	987	45.115	18.023	5.91	91.96
Tax Avoidance	987	.268	.715	0	13.63
Size	987	7.907	1.475	4.589	11.74
PTBV	987	5.047	20.34	.076	530.141
BETA	987	.933	.478	-.61	2.695
Leverage	987	31.746	24.019	0	98.92

Panel B: Correlation Matrix

	Part A				**Part B**					
	BHAR1M	**BHAR3M**	**BHAR1Y**	**BHAR3Y**	**ESG**	**CETR**	**SIZE**	**PTBV**	**LEVERAGE**	**BETA**
ESG	-0.094***	-0.103***	-0.122***	-0.158***	1					
CETR	-0.019	-0.027	-0.044	-0.079**	0.048	1				
SIZE	-0.114***	-0.10***	-0.084***	-0.064**	0.585***	0.046	1			
PTBV	-0.051	-0.045	-0.004	0.036	-0.003	-0.005	-0.007	1		
LEVERAGE	-0.054*	-0.053*	-0.075**	-0.102***	0.264***	0.079**	0.218***	0.137***	1	
BETA	0.035	0.028	0.019	-0.006	0.097***	0.132***	0.127***	-0.070**	0.022	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 one month, three months, one year and three-year 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 five-year 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.

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, CETR, SIZE, PTBV and Leverage, while their statistical association is found to be positive with BETA. The correlation is only significant between returns and ESG, SIZE, and Leverage. There is some evidence that the association between 3-year BHAR and ESG and CETR is statistically significant. Part B reports the pairwise correlation between explanatory variables. The correlation matrix does not report any evidence of the presence of linear dependence between the explanatory variable.

4.1 Univariate Analysis

Under this analysis, we identify two categories, High and Low as defined in Equation (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, it 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 across the portfolio assignments. Our findings suggest that performance is consistently higher in the low ESG group. The BHAR1M – BHAR3Y are found to be ranging from 0.7% to 32.7%. Furthermore, the test[11] of the differences between BHARs across the four groups (ESG_L, ESG_H, TA_L and TA_H) show that BHARs are statistically different across all combinations except one. The test shows that calculated BHARs under ESG_L are higher than those in ESG_H by around 0.5% to 20.8%, and by around 0.3% to 12.1% higher than those under TA_L; and by around 0.2% to 8.7% 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 and TA_H by about 0.3% to 12.1% and 0.2% to 8.7% respectively. Our results also suggest that the BHARs computed for TA_L and TA_H are statistically not different from each other.

[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

	N	ESG_L	ESG_H	TA_L	TA_H	Δ_{ESG}	Δ_{TA}	$\Delta_{ESG_LTA_L}$	$\Delta_{ESG_LTA_H}$	$\Delta_{ESG_HTA_L}$	$\Delta_{ESG_HTA_H}$
BHAR 1M	.004	.007	.002	.004	.005	0.005***	-0.001	0.003***	0.002***	-0.002***	-0.003***
BHAR 3M	.012	.019	.005	.01	.014	0.015***	-0.004	0.009***	0.005***	-0.005***	-0.009***
BHAR 1Y	.056	.085	.026	.049	.062	0.058***	-0.013	0.036***	0.022***	-0.022***	-0.036***
BHAR 3Y	.223	.327	.119	.206	.24	0.208***	-0.034	0.121***	0.087***	-0.087***	-0.121***
ESG	45.115	30.591	59.669	47.075	43.16	-29.08***	3.91***	-16.48***	-12.569***	12.595***	16.51***
TA	.268	.235	.301	.447	.089	-0.067	0.357***	-0.212***	0.145***	-0.145***	0.2120***
Obs	987	494	493	493	494	987	987	759	722	721	759

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 Equation (2).

Δ_{ESG}: is the mean difference between portfolios based on ESG. Δ_{TA}: The mean difference between portfolios based on TA. $\Delta_{ESG_LTA_L}$: presents the mean differences between portfolios ranked on low ESG ratings and low TA. $\Delta_{ESG_LTA_H}$: is the mean difference between portfolios based on low ESG and portfolios based on high TA. $\Delta_{ESG_HTA_L}$: is the mean differences between portfolios based on high ESG and low TA. $\Delta_{ESG_HTA_H}$: is the mean differences between portfolios based on high ESG and high TA.

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 & 2 of Table 3, short term BHARs (1 month and 3-month period) are positive but insignificant for portfolios of firms with high ESG and low TA. On the other hand, impact investors earn BHARs that are positive and statistically significant for portfolios consisting of high ESG and low TA ($ESG_H \& TA_L$) firms in the one

year and three-year time horizon. These findings clearly indicate that a positive and significant BHAR can be earned for a pure impact-based investment strategy.

Table 3: Impact (ESG and Tax Avoidance)

		BHAR1M		BHAR3M		BHAR1Y		BHAR3Y	
		Tax Avoidance							
ESG		TA_L	TA_H	TA_L	TA_H	TA_L	TA_H	TA_L	TA_H
ESG_L	*N*	228	266	228	266	228	266	228	266
	Mean	.006***	.007***	.017***	.021***	.075***	.092***	.279***	.368***
ESG_H	*N*	265	228	265	228	265	228	265	228
	Mean	.002	.002	.004	.006	.026**	.027**	.143***	.09***

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 one month, three months, one year and three-year 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 Equation (2).

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 2.6% per annum and 14.3% in the three-year investment horizon. Conversely, an investment strategy based on portfolio of firms with low ESG and high TA may offer a far higher BHAR of 9.2% per annum and 36.8% for three-year period but these firms do not constitute responsible investments.

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

Earlier, in section 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 4A and 4B report the findings.

4.3.1 ESG and Size

Panel A of Table 4A, 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. According to our findings, portfolio of small firms and firms with low ESG (ESG_L & $Size_S$) earn positive and significant BHARs for the 1-month, 3-month and 1-year periods. In the long run, for the three -year time horizon, portfolios consisting of big firms and firms with low ESG (ESG_L& $Size_B$) earn the highest BHAR (38.4%). However, for an investor who is keen to invest in socially and environmentally responsible firms (ESG_H) 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 14.1%.

4.3.2 ESG and PTBV

Panel B of Table 4A, reports the BHARs for portfolios ranked according to ESG and PTBV. According to our findings, portfolio consisting of low ESG firms with low or high PTBV earn positive and significant BHAR (52.1%). 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 short and long run with the highest BHAR of 25.5% in the three-year 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 4A provides the results for portfolios based on ESG and leverage. For portfolio consisting of low ESG and low or high leverage the BHARs are positive and significant across all time horizons. Portfolio consisting of firms with low ESG and low leverage (ESG_L & $Leverage_L$) earns the highest BHARs of 33.6% over a three-year period. Once again, this combination will not appeal to an impact investor as firms have low ESG ratings.

Table 4A: 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*	363	131	363	131	363	131	363	131
	Mean	.007***	.004**	.021***	.014**	.091***	.068***	.307***	.384***
ESG_H	*N*	131	362	131	362	131	362	131	362
	Mean	.002	.002	.002	.006**	.002	.035***	.056	.141***
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*	251	243	251	243	251	243	251	243
	Mean	.006***	.007***	.017***	.022***	.056***	.114***	.139***	.521***
ESG_H	*N*	243	250	243	250	243	250	243	250
	Mean	-.001	.004***	-.003	.012***	-.011	.063***	-.022	.255***
Panel C: Leverage									
ESG		LEV_L	LEV_H	LEV_L	LEV_H	LEV_L	LEV_H	LEV_L	LEV_H
ESG_L	*N*	285	209	285	209	285	209	285	209
	Mean	.007***	.006***	.02***	.018***	.088***	.08***	.336***	.315***
ESG_H	*N*	209	284	209	284	209	284	209	284
	Mean	.002	.002	.004	.005	.033**	.021*	.163***	.086***
Panel D: RISK									
ESG		$Risk_L$	$Risk_H$	$Risk_L$	$Risk_H$	$Risk_L$	$Risk_H$	$Risk_L$	$Risk_H$
ESG_L	*N*	264	230	264	230	264	230	264	230
	Mean	.003***	.01***	.01***	.03***	.051***	.123***	.252	.413
ESG_H	*N*	230	263	230	263	230	263	230	263
	Mean	.003***	0.0004	.009***	.001	.039***	.015**	.155	.087

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 one month, three months, one year and three-year 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 five-year 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.

From our results, we find that the BHARs are positive and not significant for portfolios consisting of firms with high ESG firms and low (ESG_H & $Leverage_L$) or high leverage (ESG_H & $Leverage_H$) in the short run period (1 month and 3 month). However, the BHARs for these portfolios are positive and significant in the long run period (1 year and 3-year period). Portfolios consisting of firms with high ESG and low leverage will earn a BHAR of 3.3% and 16.3% over the 1-year and 3-year investment period respectively. Since these portfolios consist 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 4A presents the results for portfolios sorted according to ESG and market risk. All BHARs are positive across all portfolios and time horizons. For portfolio with firms with low (high) ESG and low (high) risks, there is positive and significant BHAR for 1-month, 3-month and 1-year period with the highest BHAR at 12.3% for low ESG and high-risk portfolios. The 3-year BHARs are, however, statistically insignificant.

A socially responsible investor will choose to invest in firms with high ESG and low risks with a BHAR of 3.9% in the 1-year 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 (25.5%) 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 4B, 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, portfolio of small (big) firms and firms with high TA earn positive and significant BHARs for all time horizons. For firms with high TA, the highest BHAR (24.1%) is recorded for portfolio consisting of large firm in the three - year time horizon. However, for an impact investor who is primarily interested in investing in socially responsible firms (TA_L), will not be keen to invest in this portfolio (TA_H) due to firms avoiding tax excessively.

4.3.6 TA and PTBV

Panel B of Table 4B, reports the BHARs for portfolios ranked according to TA and PTBV. For all time horizons portfolios consisting of firms with high TA is positive and significant. According to our findings, portfolio consisting of large firms with high and low PTBV earn positive and significant BHAR, the highest being (47.9%) in portfolio consisting of high PTBV in the three-year time horizon. Although the return is extremely high this 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 portfolios consisting of firms with low TA and high PTBV earns a high significant positive BHAR of 33.1% in the three-year

investment period. This shows that if socially responsible investor was to combine stock and market fundamentals with impact investing, firms with low TA and high growth potential would offer these investors a socially responsible investment as well as financial return.

Table 4B: 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_L	*N*	212	281	212	281	212	281	212	281
	Mean	.006***	.002	.016***	.005	.07***	.033***	.242***	.179***
TA_H	*N*	282	212	282	212	282	212	282	212
	Mean	.006***	.003**	.016***	.011***	.065***	.059***	.239***	.241***
Panel B: Price-to-Book									
TA		$PTBV_L$	$PTBV_H$	$PTBV_L$	$PTBV_H$	$PTBV_L$	$PTBV_H$	$PTBV_L$	$PTBV_H$
TA_L	*N*	184	309	184	309	184	309	184	309
	Mean	.001	.005***	.001	.015***	.001	.077***	-.005	.331***
TA_H	*N*	310	184	310	184	310	184	310	184
	Mean	.004***	.006***	.01***	.02***	.036***	.107***	.098***	.479***
Panel C: Leverage									
TA		LEV_L	LEV_H	LEV_L	LEV_H	LEV_L	LEV_H	LEV_L	LEV_H
TA_L	*N*	230	263	230	263	230	263	230	263
	Mean	.005***	.002	.014***	.007*	.069***	.031**	.26***	.158***
TA_H	*N*	264	230	264	230	264	230	264	230
	Mean	.005***	.005***	.013***	.015***	.061***	.063***	.265***	.212***
Panel D: RISK									
TA		$Risk_L$	$Risk_H$	$Risk_L$	$Risk_H$	$Risk_L$	$Risk_H$	$Risk_L$	$Risk_H$
TA_L	*N*	228	265	228	265	228	265	228	265
	Mean	.003**	.004**	.01***	.01**	.052***	.045***	.223***	.191***
TA_H	*N*	266	228	266	228	266	228	266	228
	Mean	.003***	.006***	.009***	.019***	.039***	.089***	.193***	.295***

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 one month, three months, one year and three-year investment horizons. Tax avoidance is Tax avoidance is defined as Cash Effective Tax Rate as defined in Equation (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 five-year 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.

We find that BHARs for portfolios with low TA and small firms are positive and significant and earning a return of 24.2% in the three-year time horizon. From our results, we can conclude that for an impact investor, investing in portfolios consisting of small firms with low TA (TA_L& $Size_S$) in the long run will earn the investor a marginally higher BHAR.

4.3.7 TA and Leverage

Panel C of Table 4B provides the results for portfolios based on TA and leverage. For portfolio consisting of high TA and low or high leverage the BHARs are positive and significant across all time horizons, the highest return being 26.5% for portfolio with firms having low leverage in the long run. Once again, this combination will not appeal to an impact investor as firms indulge in excessive tax avoidance.

For all portfolio consisting of firms with low TA and low and high levered firms, the BHARs are positive with the highest BHARs of 26% for portfolios consisting of firms with low TA and low leverage (TA_L & $Leverage_L$) over a three-year period.

Our results indicate that a socially responsible portfolio consisting of firms engaging in low tax avoidance and low leverage will yield a higher BHAR as it 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 4B presents the results for portfolios sorted according to TA and risk. All BHARs are positive and significant across all portfolios and time horizons. For portfolio with firms with high TA and high risk, the highest BHAR is 29.5% in the three-year period. Since this investment involves investing in socially responsible firms, the impact investor will be drawn to investing in low TA firms, such as the portfolio consisting low risk and low TA which provide a return of 22.3% in the three-year time horizon.

To sum up, based on our analysis above, our findings indicate that socially responsible investors will earn a higher BHAR (33.1%) 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 in a pure impact strategy of (high ESG and low TA) offers a BHAR of 14.3% in a three-year investment period. On the other hand, a mixed or combined investment strategy of impact plus firm and market fundamentals provides a return of 25.5% for portfolios of firms with high ESG and high PTBV; and a BHAR of 33.1% on portfolios of firms consisting of low TA and high PTBV.

An impact investor who is committed to investing in only socially responsible firms can earn a BHAR of 14.3% in a three-year investment period; this study also shows over the

same time horizon investors can choose a socially responsible portfolio using 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, are 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 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 the random effects and fixed effects.

Table 5 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. The effect is, however, statistically significant for the 3-year BHAR. The Low ESG and High ESG report the estimates of the model using ESG portfolio selection. The findings are consistent with one's expectations. In other words, low ESG estimates report negative and – mostly – statistically significant effects on BHARs. The average returns predicted by this criterion range between 0.46% and 15.02%. Furthermore, under High ESG criterion, the effect of ESG is estimated to be positive and statistically significant. The predicted returns are, however, lower than those predicted under Low ESG. The best outcomes under both are obtained in the long run.

[12] The results are available upon request.

Table 5: 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	-.00003	-.0001	-.0006	-.004*	-.0001	-.001**	-.004***	-.0126***	.0002**	.0006**	.0023***	.0047**
	(.0001)	(.0002)	(.0008)	(.0021)	(.0001)	(.0002)	(.0013)	(.0045)	(.0001)	(.0002)	(.0009)	(.0024)
BETA	.0020	.0044	.0045	-.0364	.0084***	.0226***	.0581*	.0847	-.0038**	-.0126**	-.0405*	-.1071**
	(.0015)	(.0044)	(.016)	(.0589)	(.0029)	(.008)	(.0322)	(.0952)	(.0019)	(.0053)	(.0237)	(.0443)
SIZE	-.0015**	-.003*	-.0009	.0710***	-.0024**	-.0047*	-.0034	.0743**	-.0010*	-.0018	.0022	.0741***
	(.0006)	(.0018)	(.007)	(.0218)	(.0011)	(.0028)	(.0075)	(.0292)	(.0005)	(.0015)	(.0087)	(.0252)
PTBV	-.00004**	-.0001**	.0001	.0017	-.00002	-.0001	.0010***	.0062***	-.00004***	-.0001***	.00003	.0010
	(.00002)	(.0001)	(.0001)	(.0014)	(.00004)	(.0001)	(.0002)	(.0015)	(.00001)	(.00003)	(.0001)	(.0012)
Leverage	-.00002	-.0001	-.0006	-.0036***	-.0001	-.0001	-.0008	-.0045***	-.0001	-.0002	-.001***	-.0038***
	(.0001)	(.0002)	(.0005)	(.0013)	(.0001)	(.0002)	(.0007)	(.0015)	(.00004)	(.0001)	(.0003)	(.0012)
Intercept	.013**	.0285	.1136**	.1036	.0093	.0162	.1125	.1324	.01901**	.0489**	.1560*	-.0897
	(.0066)	(.0245)	(.0511)	(.1161)	(.0119)	(.0414)	(.1108)	(.2424)	(.0085)	(.0217)	(.0934)	(.1794)
Sector RE	-6.64***	-5.79***	-20.23	-14.81	-5.51***	-4.56***	-3.93***	-17.22	-6.06***	-5.26***	-4.53	-14.25
Firm RE	-17.36	-18.11	-3.20***	-1.53***	-25.32	-21.81	-3.13***	-1.37	-18.76***	-20.10	-3.03***	-1.378***
Residual RE	-3.83***	-2.79***	-1.49***	-.53***	-3.82***	-2.77***	-1.41***	-.42	-3.90***	-2.89***	-1.69***	-.823***
Sample Size	987	987	987	987	494	494	494	494	493	493	493	493
LR Test	60.28***	52.60***	54.28***	86.11***	65.76***	61.27***	70.15***	74.68***	29.75	28.55	26.24	52.01***
Year Dummy	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Predicted Return	0.44%	1.24%	5.57%	23.48%	0.46%	1.06%	1.96%	15.02%	0.31%	-0.02%	0.37%	6.49%
Predicted Risk	0.54%	1.42%	5.41%	19.50%	0.86%	2.48%	11.83%	34.54%	0.52%	1.44%	5.45%	20.71%

*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 Equations (5) and (6) with *j*=0, 1 and 2 with Low-High ESG restrictions. Buy and hold abnormal returns (BHARS) is estimated over one month, three months, one year and three-year 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 five-year period in a rolling window, using monthly data.

Table 6 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 is negative and statistically significant for all the BHARs. It shows that the higher tax avoidance, the lower are returns. The estimated average return is between 0.44% and 23.73%. These predictions are very similar to those obtained when allowing for ESG under full sample (Table 6). The effect of tax avoidance is not found statistically significant under the portfolios formulated by TA. Therefore, based on our findings, there is no positive effect of tax avoidance in explaining the average returns.

Table 6: The MLM Estimates of the Effect of TA

	Full Sample				Low TA				High 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	-.00084*	-.00293*	-.01218*	-.06749***	-.00047	-.00108	-.00566	-.03835	.01314	.03192	.02399	-.10998
	(.00051)	(.00174)	(.00682)	(.01284)	(.00088)	(.00255)	(.00737)	(.02369)	(.01196)	(.03325)	(.11022)	(.47043)
BETA	.00197	.00406	.0025	-.04567	-.00129	-.00732	-.05062**	-.16712**	.00558**	.01846**	.06765**	.11681*
	(.00145)	(.00428)	(.01549)	(.05351)	(.00248)	(.00761)	(.02237)	(.07353)	(.00249)	(.00735)	(.02694)	(.06618)
SIZE	-.0017**	-.00385**	-.00556	.04956***	-.00126	-.00283	-.006	.02202	-.00226***	-.00485**	-.0095	.02088
	(.0007)	(.00194)	(.00646)	(.01805)	(.00083)	(.0025)	(.00858)	(.02709)	(.00075)	(.00202)	(.00712)	(.03331)
PTBV	-.00004**	-.0001**	.00013	.0018	-.00003	-.00007	.00008	.001	-.00008	-.00024	.00065	.00723
	(.00002)	(.00005)	(.00011)	(.0014)	(.00002)	(.00006)	(.00008)	(.00063)	(.00006)	(.00015)	(.00041)	(.00491)
Leverage	-.00002	-.00009	-.00073	-.00414***	-.0001**	-.00031**	-.00155***	-.00401***	.00003	.00007	-.00021	-.00421***
	(.00005)	(.00015)	(.00053)	(.00116)	(.00005)	(.00015)	(.00039)	(.00106)	(.00007)	(.0002)	(.00064)	(.00153)
Intercept	.01348**	.03114	.12931**	.17126*	.01715**	.05025*	.24009***	.50304***	.00749	-.00262	-.00703	.04609
	(.00659)	(.02431)	(.05374)	(.09864)	(.00804)	(.02946)	(.05517)	(.18223)	(.00528)	(.01861)	(.0492)	(.26629)
Sector RE	-6.68***	-5.93***	-24.12	-22.78	-18.53	-18.67	-27.88	-3.33**	-6.21***	-15.76	-24.01***	-21.15
Firm RE	-16.49	-6.38	-3.15***	-1.49***	-6.79	-4.86***	-3.40**	-1.77***	-21.58	-4.87***	-2.97***	-1.56***
Residual RE	-3.83***	-2.79***	-1.49***	-.53***	-3.81***	-2.78***	-1.50***	-.66***	-3.88***	-2.85***	-1.51***	-.46
Sample Size	987	987	987	987	493	493	493	493	494	494	494	494
LR Test	60.75***	52.58***	53.73***	86.64***	28.41	24.64	37.31**	41.83***	61.05***	55.88	48.18***	75.01***
Year Dummy	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Predicted Return	0.44%	1.24%	5.57%	23.73%	0.43%	1.18%	5.45%	21.07%	0.7%	1.93%	6.93%	24.38%
Predicted Risk	0.54%	1.42%	5.40%	19.43%	0.53%	1.14%	6.22%	15.90%	1.24%	3.18%	7.58%	28.50%
*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 Equations (5) and (6) with j=0, 3 and 4 with Low-High TA restrictions. Buy and hold abnormal returns (BHARS) is estimated over one month, three months, one year and three-year 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 five-year period in a rolling window, using monthly data.

Finally, we extend the analysis by accounting for the bivariate portfolio selection, which combined 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 7A reports the MLM estimates. In general, there are very limited evidence that suggest 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 – year BHAR. The estimated effects of ESG and CETR is found negative, while the estimated sign of their interaction is positive. The interaction term is found to be statistically significant for 1 – month, 3 – month and 3 – year BHARs. This implies, the higher is ESG and lower is TA, the higher return.

Table 7A: The MLM Estimates of the Effect of ESG – TA High – Low Criteria

	Full Sample			
	BHAR 1M	BHAR 3M	BHAR 1Y	BHAR 3Y
ESG	-.0001	-.0002	-.001	-.0045**
	(.0001)	(.002)	(.001)	(.0021)
CETR	-.0051***	-.017**	-.048	-.213**
	(.0019)	(.007)	(.033)	(.091)
ESG×CETR	.0001**	.0003**	.001	.003*
	(.00003)	(.0001)	(.001)	(.001)
BETA	.0022	.0048	.0054	-.033
	(.0015)	(.0044)	(.0160)	(.057)
SIZE	-.0015**	-.003*	-.0008	.0733***
	(.0006)	(.0018)	(.0070)	(.022)
PTBV	-.00004**	-.0001**	.0001	.002
	(.00002)	(.0001)	(.0001)	(.001)
Leverage	-.00002	-.0001	-.001	-.004***
	(.0001)	(.0002)	(.001)	(.001)
Intercept	.014**	.031	.120**	.119
	(.007)	(.025)	(.054)	(.119)
Sector RE	-6.62***	-5.76***	-20.82**	-11.48
Firm RE	-16.95	-15.87	-3.19***	-1.51***
Residual RE	-3.83***	-2.80***	-1.49***	-.53***
Wald Test	2.17	3.72	3.97	13.17***
Sample Size	987	987	987	987
LR Test	62.39***	55.58***	56.54***	93.96
Year Dummy	YES	YES	YES	YES
Predicted Return	0.45%	1.26%	5.56%	23.38%
Predicted Risk	0.55%	1.45%	5.51%	20.10%

*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 Equations (5) and (6) with *j*=0, 5, 6, 7, and 8 with combined linear restrictions. Buy and hold abnormal returns (BHARS) is estimated over one month, three months, one year and three-year 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 five-year period in a rolling window, using monthly data

Table 7B: The MLM Estimates of the Effect of ESG – TA High – Low Criteria

	Low ESG – Low TA				High ESG – Low TA				Low ESG – High TA				High ESG – High 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	BHAR 1M	BHAR 3M	BHAR 1Y	BHAR 3Y
ESG	.0004	.001	.0038	-.0030	.0003**	.001***	.003**	.008***	-.0004***	-.002***	-.01***	-.014***	.00011	.00014	.0003	-.0043*
	(.00043)	(.00122)	(.0043)	(.0112)	(.0001)	(.0003)	(.0014)	(.0031)	(.0001)	(.0003)	(.0031)	(.0044)	(.0003)	(.0009)	(.0023)	(.0025)
CETR	.0145	.0433	.4224*	.621	.0043	.0140	-.0323	-.1689*	-.0412	-.1941*	-1.316**	-.0541	.0873	.1622	-.1642	-2.483*
	(.014)	(.048)	(.218)	(.4797)	(.0043)	(.0117)	(.0249)	(.0916)	(.035)	(.1019)	(.6275)	(1.337)	(.0890)	(.2761)	(.9753)	(1.3138)
ESG×CETR	-.0006	-.0016	-.0122**	-.0181	-.00004	-.0001	.0006*	.0023*	.0015*	.007***	.049***	.0134	-.001	-.0015	.002	.029
	(.0004)	(.0014)	(.0059)	(.0134)	(.0001)	(.0002)	(.0003)	(.0013)	(.0009)	(.002)	(.0189)	(.0363)	(.0016)	(.0046)	(.0155)	(.0213)
BETA	.011***	.027***	.0136	-.031	-.010**	-.033**	-.0802	-.198**	.008***	.027***	.117***	.269*	.0072*	.0217*	.0463	.0216
	(.0026)	(.007)	(.026)	(.078)	(.004)	(.014)	(.057)	(.091)	(.003)	(.009)	(.039)	(.139)	(.0037)	(.012)	(.040)	(.097)
SIZE	-.004**	-.009*	-.013	.042	-.002	-.001	.001	.008	-.002	-.003	-.003	.081	-.0004	.001	.018	.057**
	(.002)	(.005)	(.010)	(.035)	(.001)	(.004)	(.013)	(.020)	(.001)	(.003)	(.011)	(.073)	(.002)	(.004)	(.016)	(.025)
PTBV	-.0001***	-.0003***	.001**	.005***	-.00001	0	.0001	.0004	.0001***	.0002***	.002***	.006***	-.0004***	-.001***	-.001	.010
	(.00003)	(.00006)	(.00027)	(.00122)	(.00001)	(.00003)	(.0001)	(.00049)	(.00002)	(.00007)	(.00031)	(.0021)	(.0001)	(.0003)	(.0024)	(.011)
Leverage	-.0002**	-.001**	-.003***	-.006***	-.0001	-.0003	-.001	-.003**	.0001	.0003	.001	-.0014	0	-.0001	-.001*	-.005**
	(.0001)	(.0003)	(.001)	(.002)	(.0001)	(.0002)	(.001)	(.002)	(.0001)	(.0003)	(.001)	(.002)	(.0001)	(.0002)	(.001)	(.002)
Intercept	.010	.026	.060	.184	.0131*	.032*	.168*	.286**	.002	-.007	.058	-.407	.014	.038	.133	.306
	(.021)	(.073)	(.175)	(.377)	(.008)	(.017)	(.093)	(.145)	(.007)	(.019)	(.179)	(.682)	(.022)	(.063)	(.212)	(.263)
Sector RE	-5.06***	-4.17***	-26.96	-23.71	-5.54***	-4.54***	-3.98	-2.79	-25.28	-28.31***	-28.51***	-16.42442	-6.15***	-21.01	-15.83	-18.96
Firm RE	-21.03	-20.07***	-24.52	-1.60***	-20.92	-4.31***	-2.60***	-1.71***	-26.30	-28.64	-3.40**	-1.78***	-5.73***	-4.53	-3.00***	-1.66***
Residual RE	-3.88***	-2.80***	-1.42***	-.61***	-3.88***	-2.93***	-1.76***	-.845***	-3.84***	-2.82***	-1.47***	-.32	-4.05***	-3.01***	-1.74***	-.855***
Sample Size	228	228	228	228	265	265	265	265	266	266	266	266	228	228	228	228
LR Test	61.62***	48.06***	43.34***	35.78*	29.69	36.05*	34.67*	44.97***	55.33***	65.18***	81.47***	67.66***	45.13***	37.88**	26.82	51.92***
Year Dummy	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Wald Test	6.67*	5.66	4.07	4.50	8.08**	9.61**	6.94*	12.86***	2.99	6.18*	15.99***	5.09	2.63	1.79	0.21	2.46
Predicted Return	0.9%	2.25%	5.09%	11.20%	-0.14%	-0.62%	-0.81%	3.52%	0.83%	3.31%	20.48%	35.34%	0.82%	2.00%	1.04%	-5.96%
Predicted Risk	1.68%	4.66%	23.39%	42.89%	0.76%	2.31%	7.44%	20.73%	3.36%	15.73%	112.59%	67.21%	2.97%	6.72%	9.49%	77.54

*Robust standard errors are in parentheses. *** p<.01, ** p<.05, * p<.1.* Wald Test: reports the test statistic of the joint significance of ESG, CETR and ESG×CETR.

This table provides the results of a Mixed Linear Model based on the High – Low ESG – TA investment strategy. The general model is in Equations (5) and (6) with *j*=0, 5, 6, 7, and 8 with combined linear restrictions. Buy and hold abnormal returns (BHARS) is estimated over one month, three months, one year and three-year 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 five-year period in a rolling window, using monthly data

Table 7B accounts 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 a consistently estimated correct signs across these subsamples. The joint significance Wald test reports strong evidence in favour of the presence of impact investing for the portfolio High ESG and Low TA. Estimated returns, however, are negative except for 3 – year BHAR. In summary, using regression analysis, there is no strong evidence in favour investing.

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 equation (11). Table 9 reports the estimated average BAHRs given a randomly selected investor choose 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 any selected portfolio, the conditional return is estimated to be positive. The High ESG – Low TA is estimated to produce positive and statistically significant BAHRs ranging from 0.34% to 18.29%. This portfolio gives the third highest BHARs, while High ESG – High TA produces the lowest level of BHARs. The estimated BHARs for this latter portfolio are mostly statistically insignificant.

Table 9 reports the estimated alphas for the factors models specified in equations (12A) to (12C). Our findings suggest that for all univariate and bivariate portfolio, 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 return in return for their investments effecting a societal impact and conclude that lower return implies lower cost of capital.

Table 8: 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 – Low TA	0.43***	0.43***	0.43***	1.31***	1.31***	1.31***	5.91***	5.91***	5.91***	24.78***	24.78***	24.78***
High ESG – Low TA	0.34**	0.34**	0.34**	0.85*	0.85*	0.85*	4.03**	4.03**	4.03**	18.29***	18.29***	18.29***
Low ESG – High TA	0.59***	0.59***	0.59***	1.92***	1.92***	1.92***	9.71***	9.71***	9.71***	45.71***	45.71***	45.71***
High ESG – High TA	0.15	0.15	0.15	0.43	0.43	0.43	2.24	2.24	2.24	10.65***	10.65***	10.65***

****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 Section 3.5. The BHARs are defined as functions PTBV, SIZE, Leverage, BETA.

Table 9: 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	-.23054***	-.20713***	-.25451***	-.21786***	-.24252***	-.20249***	-.22233***	-.21354***
Four Factor Model	-.22859***	-.20456***	-.25104***	-.21696***	-.24036***	-.19804***	-.22099***	-.21258***
Five Factor Model	-.22757***	-.20564***	-.24969***	-.21676***	-.23782***	-.20008***	-.2209***	-.21379***

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

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, 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 charitable purposes by them. However, this argument becomes very challenging to capture given the inconsistencies in the disclosure and reporting of charitable 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 yield a buy and hold abnormal return of 2.6% per annum and 14.3% in a three-year investment horizon. Next, if impact investors were to combine traditional investment strategies based on risk with impact factors, we find that portfolios of high-ESG and high price-to-book-ratio firms earn 25.5%, returns, while a portfolio of low tax avoidance and high price-to-book portfolios earn 33.1% in the long run.

Although regressions results – using Mixed Linear Models – have not been conclusive, there is limited evidence on the role of ESG as an investment decision driver. Our findings suggest that when using ESG as a portfolio selection criterion, the role of ESG is statistically significant and generally offer positive average returns (a long horizon return ranging from 6% to 15%). Furthermore, the evidence suggests the presence of a long horizon pure impact – using High ESG and Low TA – with average return of 3.52%, while other combined criteria are not statistically significant. Finally, we apply causal effect model as alternative to regression models. Portfolio performance evaluation regression results show that a pure impact strategy remains a profitable option as it results positive and relatively acceptable average returns ranging between 0.3% and 14%.

The contributions of our study are three-fold; First, to our knowledge, this is the first study that introduces tax avoidance as an additional impact measure; Second, this is the first study that assesses an investment strategy performance based on impact using risk-adjusted returns across varying investment horizons assesses an investment strategy performance based on impact using risk-adjusted returns across varying investment horizons; second, this study introduces tax avoidance as an additional impact measure; and finally, this study also provides an investment strategy that combines of impact variables with firm and market fundamentals.

The limitation of this study is the fact whilst 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, commodities. Till such time that ESG reporting and disclosure is standardized 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.

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Appendix 1 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), which 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 five-year period in a rolling window, using monthly data
BHAR	See Equation (1)