Journal of Asset Management (2023) 24:165–172
https://doi.org/10.1057/s41260-023-00303-6

ORIGINAL ARTICLE

The risk-return tradeoff: are sustainable investors compensated adequately?

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Revised: 21 November 2022 / Accepted: 2 January 2023 / Published online: 27 April 2023

Abstract

We investigate the returns from investing according to corporate social responsibility (CSR) criteria using factor model estimations for a large sample of U.S. firms over the period 2003–2017. To identify the CSR intensity that allows investors to optimize their portfolio returns for a given amount of risk, we relate factor-adjusted portfolio returns to a variety of risk measures. This consideration is important as equity risks have been shown to significantly decrease with CSR. Surprisingly, our results indicate that the lowest CSR-rated portfolios are able to outperform their higher CSR-rated counterparts: Not only do they show higher factor-adjusted returns but they also deliver higher return-to-risk ratios. This indicates that equity returns in our sample decrease even more strongly than the corresponding risks with rising CSR activity.

Keywords Stock returns · Risk-return · CSR · ESG · Factor analysis

JEL Classification G11 · G12 · O16 · Q56

Introduction

The trend of sustainable investing (i.e. investment in accordance with environmental, social and governance (ESG)) has gained a large amount of attention over the last few years. This development manifests in consistently high growth rates of assets under management with a focus on ESG in global capital markets. In the U.S., sustainable investments increased at a rate of 42% from 2018 to 2020 and made up a third of total assets under management in 2020 (USSIF 2021). Despite this global and persistent trend, the question whether such investment strategies are able to outperform conventional strategies and thus generate 'alpha' is, however, still unresolved. While Kempf and Osthoff (2007) and Stotz (2021) indicate positive returns for high ESG-rated portfolios, Halbritter and Dorfleitner (2015) and Naffa and Fain (2021) find no significant differences between returns of high and low ESG-rated portfolios. The findings of Brøgger and Kronies (2021) go even further and display "a negative general ESG premia" in their data. These results are corroborated with regard to investigations of so-called sin stocks, as portfolios of tobacco, alcohol or gambling stocks have been shown to outperform the market (Hong and Kacperczyk 2009; Fabozzi et al. 2008).

In contrast to the inconclusive empirical literature on sustainable investing returns, there is quite strong consensus

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that corporate social responsibility (CSR)[1] engagement of firms is able to mitigate equity risks (see, e.g. Albuquerque et al. 2020; Jagannathan et al. 2017; Luo and Bhattacharya 2009; Sassen et al. 2016; Oikonomou et al. 2012). For the question whether—and, if so, how—sustainability should be considered to optimize portfolio construction, these risk effects therefore need to be taken into account. As return is a natural compensation for investors' risk, return and risk need to be considered conjointly when trying to solve for the optimal sustainability intensity of portfolios.

This is what our analysis sets out to do: We try to point out an "optimal" level of CSR in equity investment by considering the tradeoff between risk and return caused by CSR in these portfolios. To be more precise, we attempt to capture the return that is due to the degree of sustainability in the portfolio, i.e. that is cleansed of the effect of other factors such as size, value, momentum etc., and compare it to the degree of risk that is remaining with this portfolio. By studying these particular return-to-risk tradeoffs for different levels of sustainability intensity, we identify the degree of sustainability that is optimal in the sense of maximizing the CSR-caused return per unit of risk.

Our empirical strategy is based on a portfolio approach for a sample of U.S. firms. We question whether the return per unit of risk increases or decreases with higher CSR activity. In accordance with earlier studies considering individual CSR activities such as environmental issues (Görgen et al. 2020) or social aspects (Fabozzi et al. 2008; Hong and Kacperczyk 2009), we show in a first step that value-weighted equity portfolios of firms with higher CSR indeed yield lower returns calculated with a (Carhart 1997) four factor model. This finding is robust to using equally weighted portfolios or a Fama and French (2015) five factor model approach. Surprisingly, when we combine the CSR-return effect with the risk reducing effect of CSR by building return-to-risk ratios in a second step, we find that the reduced risk for higher CSR portfolios is not able to fully compensate the lower returns. Rather, return-to-risk ratios decrease with increasing CSR. From an investor's perspective, an investment into low ESG-rated portfolios hence yields the highest return per unit of risk. This result is robust with respect to different equity risk measures as well as different return estimations.

In sum, our paper contributes to the literature by not only investigating one aspect of the influence of CSR (either return or risk) but by combining both the CSR-return and CSR-risk literature strands. Our comprehensive return-to-risk ratio analyses indicate that the optimal level of CSR in investment portfolio returns is achieved with a low rather than a high CSR strategy.

[1] We use the terms 'ESG' and 'CSR' in this study interchangeably to describe the sustainability level of firms or stock investment portfolios.

Table 1 Firm sample distribution per industry and descriptive statistics of firm-level CSR

			N	%
Panel A: Industry composition				
Industry	Basic materials		678	7.3%
	Cons. cyclicals		1,661	17.9%
	Cons. Non-cyclicals		647	7.0%
	Energy		681	7.3%
	Financials		1,653	17.8%
	Healthcare		804	8.7%
	Industrials		1,388	15.0%
	Technology		1,133	12.2%
	Tele. Services		103	1.1%
	Utilities		518	5.6%
		Firm-year obs.	Mean	SD
Panel B: Descriptive statistics for CSR variables				
CSR variables	CSR	9,266	52.389	17.559
	Env. pillar score	9,264	50.241	22.42
	Social pillar score	9,264	53.837	19.644
	Governance pillar score	9,266	53.123	21.636

This table shows the industry breakdown according to the TRBC economic sector code in Panel A.

Panel B provides descriptive statistics for the CSR ratings as well as the three pillars *Environmental*, *Social* and *Governance*

Data, methodology and sample

Our sample is based on stocks from all publicly listed U.S. companies that received a CSR score in Refinitiv's ASSET4 database and covers a time span from 2003 to 2017. The CSR rating of Refinitiv comprises three dimensions, the so-called environmental, social and governance pillars. The three pillars are based on more than 400 measures collected annually from companies' and other public disclosures. While the environmental pillar covers issues such as resource use, emissions, and innovation, the social component focuses on the workforce, human rights, community and product responsibility and the governance component is concerned with management issues, shareholder relations and CSR strategy. It should be noted that the pillar scores are percentile ranks, where the environmental and social categories are benchmarked against the TRBC Industry Group, while the governance categories are benchmarked against

the respective Country Group (Refinitiv 2022). The combined CSR scores range from 0 to 100 where higher ratings reflect a higher sustainability assessment of the firm. CSR ratings are typically published annually but may be adjusted in case of significant firm-specific events (Oikonomou et al. 2012; Berg et al. 2022).

Table 1 illustrates the industry breakdown of our sampling firms in Panel A. Panel B provides insights with regard to the CSR ratings of the companies. On average, the consumer cyclicals, financials and industrials are the most prevalent industries in our sample.[2] Regarding the CSR ratings, the firms in our sample receive an average CSR score of 52. The pillars reveal average scores of 50 for the environmental pillar, 54 for the social pillar and 53 for the governance pillar.

The ASSET4 database initially covered the largest stock indices in the world and expanded the coverage consistently over time. As a consequence, also our U.S.-based sample grows from 208 observations in 2003 to 1,055 in 2017. Table 4 in the Appendix provides the coverage of ESG scores in our sample over time.

To study the CSR-return relation in a robust fashion, we resort to a factor estimation model on a portfolio basis. We report results from a Carhart (1997) four factor model, but repeat the analysis also with a Fama and French (2015) five factor model. As the results are very similar, we display the latter in the Appendix in Table 5 and discuss only the Carhart-model results in the main part of the paper. We hence consider market, size, value and momentum as risk factors in our model. In order to test whether CSR constitutes a relevant risk factor in its own right, however, our main focus is on the question whether the intercept of ordered-portfolio regressions varies along with CSR. We therefore run an analysis where we first rank the companies in the sample according to their CSR scores in every year and build value-weighted portfolios.[3] Subsequently, we dissect each sample into quintiles, where Q1 denotes the 20% of firms with the lowest CSR ratings and Q5 the 20% of firms with the highest CSR ratings. We then run the following regression for each quintile portfolio using monthly portfolio returns:

$$R_{i,t} - r_{f,t} = \alpha_i + \beta_{1,i} * \text{RMRF}_t + \beta_{2,i}\text{SMB}_t + \beta_{3,i}\text{HML}_t + \beta_{4,i}\text{MOM}_t + \epsilon_{i,t} \,. \quad (1)$$

Here, $R_{i,t}$ denotes the monthly portfolio return of the respective quintile portfolio in USD. $r_{f,t}$ is the monthly risk-free rate. The RMRF factor is often referred to as "market factor". It is estimated as the value-weighted return of all listed firms in the respective investigated market for which equity data is available (Fama and French 1993) in excess of the risk-free rate. SMB (abbreviation for "Small minus big") covers the risk factor in returns with respect to size. It is the average return of the portfolios of smallest firms regarding the market value in excess of the average return of the portfolios of largest firms (Fama and French 1993). The HML factor (abbreviation for "High minus low") is the risk factor in returns with respect to Book-to-market ratios. The factor invests long in the average return of the value portfolio (highest Book-to-market ratios) and short in the growth portfolio (lowest Book-to-market ratios) according to Fama and French (1993). It is also referred to as 'value versus growth' factor. Finally, the "momentum factor" (MOM) is based on a difference portfolio of most and least performing stocks in the 11 months from −12 to −2. According to Carhart (1997), this factor analyzes the persistence of such momentum. The regression intercept α_i is our variable of interest, as it can be interpreted as the abnormal return due to CSR activity in excess of the return from a passive investment into the four risk factors. In addition to estimating alphas for each of these CSR quintile portfolios, we also construct a difference portfolio that amounts to a long position in the highest CSR quintile (Q5) and a short position in the lowest CSR quintile (Q1). We gather daily return data from Refinitiv Datastream for all stocks and additionally download return factor data from the webpage of Kenneth R. French.

The second part of our analyses relies on the comparison of return and risk effects for the investigated equity portfolios. In order to capture the "risk" of said portfolios, we employ several well-established equity risk measures (see, e.g. Jagannathan et al. 2017; Bannier et al. 2022). First, we capture the symmetric risk of the portfolio by calculating the standard deviation of the respective monthly quintile portfolio returns over the sample's time span (2003–2017) in the variable σ, i.e. volatility. Moreover, we focus on the insurance-like properties of CSR covering firms from large losses in adverse events (see, e.g. Godfrey 2005; Godfrey et al. 2009) and investigate downside risks in the negative return distribution. Therefore, we employ 'tail risks' such as the value at risk (VaR) on the 5%-level, i.e. the fifth percentile worst return, as well as the conditional value at risk (CVaR) calculated as the average of all realized returns below the VaR. The investigated downside risks also comprise the second- and third-order lower partial moments LPM(0,2) and LPM(0,3) which reflect the variance and skewness of the distribution of all negative monthly returns in the respective quintile portfolio.

For our final analyses we combine portfolio returns with risk measures in return-to-risk ratios following the construction of the Sharpe (1966) ratio. In our case we build ratios

[2] It should be noted that the industry breakdown in our sample is relatively constant over time.

[3] This procedure follows Gompers et al. (2003) who examine the impact of governance-based risks on stock returns. Moreover, we also study equally weighted portfolios in a robustness check. The results are qualitatively identical and illustrated in Table 6 in the Appendix.

Table 2 Four factor portfolio model This table presents the Carhart (1997) four factor model regressions of value-weighted monthly returns from firm portfolios sorted by their respective CSR score and subdivided into quintiles

	α	RMRF	SMB	HML	MOM	Obs.	Adj. R^2
Difference PF	−0.403***	0.005	−0.456***	0.230***	0.096***	180	0.303
(Q5–Q1)	(−3.184)	(0.141)	(−7.747)	(4.076)	(3.047)		
Q5	0.190***	0.916***	−0.218***	0.100***	−0.012	180	0.961
	(3.522)	(58.897)	(−8.724)	(4.195)	(−0.908)		
Q4	0.329***	1.013***	0.002	−0.064*	−0.014	180	0.930
	(3.948)	(42.143)	(0.061)	(−1.735)	(−0.691)		
Q3	0.435***	1.008***	0.096**	−0.116***	−0.109***	180	0.932
	(5.022)	(40.304)	(2.393)	(−3.002)	(−5.086)		
Q2	0.537***	1.040***	0.132***	−0.079	−0.044	180	0.898
	(4.906)	(32.929)	(2.606)	(−1.629)	(−1.621)		
Q1	0.593***	0.910***	0.238***	−0.129***	−0.108***	180	0.898
	(5.841)	(31.053)	(5.042)	(−2.862)	(−4.284)		

Q5 represents the companies with the highest CSR scores (top 20%) while Q1 comprises the companies with the lowest CSR scores (bottom 20%). Portfolios are reallocated annually. The difference portfolio represents a portfolio that is long Q5 companies and short Q1 companies. Coefficients are estimated according to Eq. 1 using standard OLS regressions. Explanatory variables are RMRF, SMB, HML and MOM. The intercept (α) measures the abnormal return of the respective portfolio. T-statistics are reported in parentheses. ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$

of the alphas from the portfolio analyses (Carhart (1997) four factor model) in combination with the aforementioned risk measures of the respective quintile portfolio. It needs to be noted that the alphas, by construction, are adjusted for the effect of well-established risk factors and hence should capture only the compensation for risk coming from CSR. It is also important to consider that even though the Carhart-model does not contain an industry-specific risk factor, the CSR ratings by Refinitiv already control for industry-related aspects. This is due to the benchmarking in the environmental and social pillar scores relative to each firm's industry. As a consequence, the dissection into the quintile portfolios in our analysis already controls for—at least some—industry-specific effects, so that we are quite confident that our results are not overly driven by the industry composition of our sample. In a further robustness check, we also consider the realized excess return (ER) over the risk-free rate of the respective portfolio that is unadjusted for the traditional risk factors and use it in the numerator to calculate the return-to-risk ratios.

Results

We expect investment returns to decrease along with CSR scores as lower risk of CSR firms makes less compensation necessary for bearing this risk as an investor. In the following, we will test this CSR-return relation. Our final objective, however, is to compare the CSR-risk with the CSR-return relation in order to answer the question whether there is an

Table 3 Return-to-risk ratios This table presents ratios of average return to average risk from firm portfolios sorted by their respective CSR score

	$\frac{\alpha}{\sigma}$	$\frac{\alpha}{\text{VaR}}$	$\frac{\alpha}{\text{CVaR}}$	$\frac{\alpha}{\text{LPM(0,2)}}$	$\frac{\alpha}{\text{LPM(0,3)}}$
Panel A: α					
Q5	0.053	0.036	0.024	0.048	0.038
Q4	0.080	0.057	0.038	0.074	0.058
Q3	0.101	0.071	0.047	0.097	0.077
Q2	0.120	0.086	0.057	0.107	0.084
Q1	0.143	0.118	0.073	0.145	0.109
Panel B: ER					
Q5	0.250	0.170	0.113	0.225	0.179
Q4	0.281	0.199	0.131	0.260	0.205
Q3	0.295	0.208	0.137	0.285	0.227
Q2	0.316	0.225	0.150	0.281	0.220
Q1	0.333	0.275	0.169	0.339	0.253

The portfolios are subdivided into quintiles where Q5 represents the companies with the highest CSR scores (top 20%) while Q1 comprises the companies with the lowest CSR scores (bottom 20%). Portfolios are reallocated annually. α in *Panel A* measures the monthly abnormal return of the respective portfolio taken from the Carhart (1997) four factor model. The excess return (ER) in *Panel B* is calculated as the average monthly realized return in excess of the risk-free rate. We use portfolio volatility σ, VaR, CVaR as well as the second- and third-order lower partial moments LPM(0,2) and LPM(0,3) as risk measures

optimal level of CSR that allows to maximize the return-to-risk ratio from an investor's perspective.

Table 2 presents the results from a portfolio return analysis using Eq. 1. In our sample, we find that investing into the most CSR-active companies, i.e. the top 20% (Q5), yields a significant abnormal return of 19 basis points per month. Investing into the quintile of firms with the lowest CSR scores, in contrast, delivers an even higher significantly positive alpha of 59.3 basis points. As a consequence, we find that the difference portfolio that is long in the 20% most CSR-active firms and short in the 20% most CSR-inactive firms yields a highly significant negative alpha of −40.3 basis points per month.

In addition to the decrease in alpha along with CSR activity, we find that also the sensitivity towards the size, the value and the momentum factors varies along with CSR activity. More precisely, the difference portfolio shows a negative loading with respect to the size factor and a positive loading to the value and momentum factor. This may be taken as an indication that the return effects reflected in the CSR-based difference portfolio are not driven by simple size differences of the companies in the quintile portfolios, nor by value differences or momentum effects in the quintile construction, but truly by sustainability-specific effects.[4] As illustrated in Table 5, a Fama and French (2015) five factor portfolio analysis approach delivers qualitatively identical results of increasing alphas in conjunction with decreasing CSR portfolio levels. As the five factor model also allows to capture potential industry effects via the 'profitability factor', this finding lends further credence to the robustness of our results. Moreover, Table 6 in the Appendix shows that equally weighted portfolios deliver qualitatively comparable results especially with regard to the difference portfolio.

According to these portfolio-level results, firms with lower CSR activity hence offer higher abnormal returns after controlling for the four risk factors market, size, value and momentum than firms with stronger CSR activity. Interpreted as a compensation for risk, these higher returns suggest that market participants associate lower corporate social responsibility with higher risk, thus asking for a higher return. While this observation at first sight appears to simply complement prior findings on the CSR-risk effects, it also gives rise to the question whether one of the two effects dominates.

In order to test this issue, we hence need to combine the abnormal returns, i.e. alphas, due to CSR in each quintile portfolio with a proxy for the average risk per quintile portfolio.[5] In essence, we are interested in the question what CSR-induced return a portfolio can realize, based on a given amount of risk. Table 3 reports the corresponding results, where Panel A displays the findings from abnormal return-to-risk ratios (α) and Panel B from excess return-to-risk ratios (ER).

As can be seen from Panel A, all return-to-risk ratios increase throughout with decreasing CSR level. Investing into firms with the lowest CSR activity hence delivers the highest abnormal return per unit of risk, if risk is approximated with either volatility (σ), VaR, CVaR or lower partial moments. The excess return-to-risk ratios in Panel B confirm these results. Again, we find that the risk-return tradeoff is optimized for firms in the lowest CSR quintile.

These results lead us to conclude that investing in firms with weak CSR activity allows to reap an abnormal return, over and above the return to be expected from these firms' sensitivity towards the traditional risk factors. Such an investment also yields a maximum excess return in total, i.e. including the return contribution of these traditional risk factors. Though firms that do not engage strongly in corporate social responsibility are indeed perceived to be exposed to higher risks than CSR-active firms, the higher return seems to more than overcompensate the higher risk. Overall, therefore, the investment return per unit of risk is more favourable for CSR-inactive firms than for those with strong CSR activities.[6]

Conclusion

In this study we investigate the return effects of CSR in conjunction with its risk-reducing aspects for a large sample of U.S. firms. As prior studies have established the risk-reducing capabilities of firms' sustainable behavior, the higher risk for 'unsustainable' firms should be compensated by higher returns. In this line, our results show that low CSR is, indeed,

[4] Further analyses, which are not reported for the sake of brevity of this study but available upon request from the authors investigate impacts of the financial crisis as it lies in the midst of the investigated sample period. Therefore, we repeat the analyses and differentiate between crisis and non-crisis periods by employing the NBER business cycle definition to identify crisis periods following Brøgger and Kronies (2021). We find that the significantly negative return effect from CSR in the difference portfolio (Q5-Q1) is driven by the non-crisis months in our sampling period, as the sample shows an insignificantly positive alpha in crisis months. Second, we study whether one of the individual CSR pillars (Environmental, Social, Governance) drives the negative return effect and run the portfolio analysis after sorting firms according to the environmental, social and governance score individually. The negative CSR-return effect is confirmed for all CSR pillars, but is particularly strong with regard to the social pillar.

[5] The return variable(s) serving as nominator in the ratios reflect the quintile portfolio alphas from the Carhart (1997) four factor regressions as well as the excess return ER over the risk-free rate (as described in "Data, methodology and sample" Section). The applied risk measures are also described in detail in Section Data, methodology and sample Section.

[6] In an unreported robustness check we replicated all analyses with a European sample which yielded the same results: Low ESG-rated stocks outperform the high ESG-rated portfolios. Moreover, the return-to-risk ratios are maximized for the lowest CSR scores (Q1).

associated with higher portfolio returns. Interestingly, these higher returns even overcompensate the investor for the amount of risk she has to bear. As reflected by the consideration of return-to-risk ratios the highest returns per unit of risk are achieved in the lowest rated CSR portfolio. Hence, from an investor's perspective, the 'optimal' return-to-risk ratio is achieved for a portfolio that invests in the lowest CSR-rated firms.

At a first glance, neither investors nor companies profit from stocks of firms that commit to CSR engagement experiencing less positive returns. However, investors who already focus on sustainability issues in the investment decisions not necessarily seek to achieve the highest possible outperformance but invest with the intention to contribute to a sustainable transformation of firms and economies. As of now, these investors tend to accept lower financial returns in order to invest in accordance with their sustainability preferences (Riedl and Smeets 2017).

Appendix

Table 4 Firm sample distribution per year

Year	N	%
2003	208	2.24
2004	282	3.04
2005	300	3.24
2006	371	4.00
2007	398	4.30
2008	519	5.60
2009	583	6.29
2010	649	7.00
2011	683	7.37
2012	696	7.51
2013	702	7.58
2014	732	7.90
2015	1,029	11.11
2016	1,059	11.43
2017	1,055	11.39
Total	9,266	100

Table 5 Five factor model This table presents the Fama and French (2015) five factor model regressions of value-weighted monthly returns from firm portfolios sorted by their respective CSR score and subdivided into quintiles

	α	RMRF	SMB	HML	RMW	CMA	Obs.	Adj. R^2
Difference PF	−0.433***	0.005	−0.446***	0.101*	0.091	0.272***	180	0.293
(Q5-Q1)	(−3.283)	(0.127)	(−7.175)	(1.665)	(1.054)	(2.649)		
Q5	0.156***	0.936***	−0.214***	0.077***	0.063*	0.112***	180	0.963
	(2.857)	(58.163)	(−8.318)	(3.063)	(1.755)	(2.646)		
Q4	0.257***	1.046***	0.047	−0.039	0.192***	−0.063	180	0.935
	(3.099)	(42.693)	(1.194)	(−1.028)	(3.509)	(−0.975)		
Q3	0.382***	1.053***	0.105**	−0.042	0.080	−0.041	180	0.922
	(3.999)	(37.349)	(2.341)	(−0.962)	(1.268)	(−0.549)		
Q2	0.533***	1.042***	0.160***	0.034	0.038	−0.326***	180	0.905
	(4.875)	(32.307)	(3.099)	(0.682)	(0.529)	(−3.825)		
Q1	0.589***	0.931***	0.232***	−0.024	−0.029	−0.160*	180	0.889
	(5.378)	(28.818)	(4.502)	(−0.480)	(−0.396)	(−1.874)		

Q5 represents the companies with the highest CSR scores (top 20%) while Q1 comprises the companies with the lowest CSR scores (bottom 20%). Portfolios are reallocated annually. The difference portfolio represents a portfolio that buys Q5 companies and sells short Q1 companies. Coefficients are estimated using the following OLS estimation: $R_{i,t} - r_{f,t} = \alpha_i + \beta_{1,i} * \text{RMRF}_t + \beta_{2,i}\text{SMB}_t + \beta_{3,i}\text{HML}_t + \beta_{4,i}\text{RMW}_t + \beta_{5,i}\text{CMA}_t + \epsilon_{i,t}$. Explanatory variables are RMRF, SMB, HML, RMW and CMA where RMW reflects the "profitability" factor and CMA the conservative vs. aggressive investment factor. The intercept (α) measures the abnormal return of the respective portfolio. T-statistics are reported in parentheses. ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$

Table 6 Four factor model-Equally weighted portfolios This table presents the Carhart (1997) four factor model regressions of equally weighted monthly returns from firm portfolios sorted by their respective CSR score and subdivided into quintiles

	α	RMRF	SMB	HML	MOM	Obs.	Adj. R^2
Difference PF	−0.247**	−0.011	−0.448***	0.079*	0.047*	180	0.389
(Q5-Q1)	(−2.427)	(−0.390)	(−9.470)	(1.732)	(1.879)		
Q5	0.004	1.021***	0.051**	0.068***	−0.091***	180	0.973
	(0.069)	(65.037)	(2.032)	(2.815)	(−6.769)		
Q4	0.123	1.077***	0.325***	0.059	−0.195***	180	0.936
	(1.227)	(37.138)	(6.977)	(1.317)	(−7.816)		
Q3	0.161*	1.061***	0.395***	0.015	−0.170***	180	0.949
	(1.825)	(41.595)	(9.650)	(0.389)	(−7.752)		
Q2	0.158*	1.085***	0.459***	0.046	−0.135***	180	0.957
	(1.909)	(45.369)	(11.954)	(1.262)	(−6.582)		
Q1	0.251**	1.033***	0.499***	−0.010	−0.139***	180	0.938
	(2.596)	(36.991)	(11.122)	(−0.243)	(−5.787)		

Q5 represents the companies with the highest CSR scores (top 20%) while Q1 comprises the companies with the lowest CSR scores (bottom 20%). Portfolios are reallocated annually. The difference portfolio represents a portfolio that is long Q5 companies and short Q1 companies. Coefficients are estimated according to Eq. 1 using standard OLS regressions. Explanatory variables are RMRF, SMB, HML and MOM. The intercept (α) measures the abnormal return of the respective portfolio. T-statistics are reported in parentheses. ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$

Funding Open Access funding enabled and organized by Projekt DEAL.

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