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Corporate Social Responsibility and Stock Prices After the Financial Crisis: The Role of Strategic CSR Activities

Aneta Havlinova[1] · **Jiri Kukacka**[1,2]

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Abstract
We analyze the relationship between corporate social responsibility and the stock market performance in the post-global financial crisis period. A new measure of social responsibility by Thomson Reuters, called the ESG Combined Score, is used. As a novel feature of our analysis, socially responsible engagement is divided into the strategic activities closely related to the examined companies' core business and the remaining secondary activities. The results of the fixed effects regression show a positive and statistically, as well as economically, significant impact of the strategic activities on the corporate stock market performance of companies. This impact is up to 103% higher compared to the secondary activities. The empirical results suggest that if companies aim to increase their share prices via the corporate social responsibility channel, they should strategically select their socially responsible initiatives.

Keywords Corporate social responsibility · Strategic CSR · Business ethics · Corporate financial performance · Fixed effects

JEL Classifications A13 · C23 · G11

Introduction

In recent decades, companies have been, with increasing intensity, encouraged by various groups of their stakeholders to consider the impact their business has on broader society and the environment and to take actions to minimize the negative effects produced by their business operations. In relation to this societal development, a concept called Corporate Social Responsibility (CSR) has emerged in the first half of the 20th century in the U.S. (Clark, 1939; Kreps, 1940; Bowen, 1953). Many CSR proponents simply suggest that companies should not only maximize profit for their shareholders but should also aim to improve the well-being of society and to protect the environment by getting involved in responsible activities that are beyond the scope of the law and their main business purposes. Such a belief builds on the fact that companies actually have the means and influence to do so and on the subjective reasoning that it is thus morally correct for them to incorporate business ethics into their daily business operations.

On the side of theoretical economic reasoning, one needs to start with Freeman (1984) who establishes the 'stakeholder theory' of corporate governance. The stakeholder theory understands the function of a company more broadly than maximizing the well-being of the shareholders and also takes into account the well-being of other groups related to the company. Freeman (1984) identifies the most important stakeholders which the company influences and vice versa, and Carroll (1981) provides one of the first categorizations of stakeholder groups which is generally accepted until nowadays: the primary stakeholders consist of owners, investors, employees, customers, suppliers, and the local authorities and communities, while the secondary stakeholders comprise, e.g., business and trade associations, civic associations and environmental groups, the government, lobbyists,

✉ Jiri Kukacka
jiri.kukacka@fsv.cuni.cz

Aneta Havlinova
aneta.pintekova@gmail.com

[1] Charles University, Faculty of Social Sciences, Institute of Economic Studies, Opletalova 26, 110 00 Prague 1, Czechia

[2] Czech Academy of Sciences, Institute of Information Theory and Automation, Pod Vodarenskou vezi 4, 182 00 Prague 8, Czechia

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competitors, and others. Tirole (2001) also discusses the differences between the traditional approaches focused on shareholder value and a broader concept of 'stakeholder society', which also takes into account the interests of non-investing parties. The suggested theoretical framework builds on the concept of internalization of externalities and discusses possible designs of managerial incentives to implement the stakeholder society. Bénabou and Tirole (2010) then provide an excellent comprehensive economic substantiation of the popularity of the CSR concept, present a combination of economic factors likely accounting for this trend, and stress the roles of potential government failures, the heterogeneity of preferences between lawmakers and other economic agents, and the view of socially responsible behavior as a normal good for which demand increases when income increases. Godfrey (2005), on the other hand, presents CSR as insurance-like protection for relationship-based intangible assets of a company which consequently contributes to the value for shareholders. Finally, an instrumental approach to CSR (Gond et al., 2009; Scherer and Palazzo, 2011; Seele and Lock, 2015) which is often criticized for being merely a marketing or public relation tool can, nonetheless, be associated with economic value added in form of shareholder wealth.

Additionally, many scholars emphasize that socially responsible behavior produces various benefits, such as increased customer loyalty or employee productivity, that lead to improved financial results (Waddock and Graves, 1997a; McGuire et al., 1988; Perrini et al., 2011). However, this claim has not been unambiguously confirmed by empirical research as we document in "Literature Review of Empirical Studies" section. In a recent extensive meta-analysis covering 85 studies from the period between 1972 and 2012, for instance, Revelli and Viviani (2015) conclude that taking CSR aspects into account for portfolio selection is neither a weakness nor a strength in relation to conventional investments and stress the impact of the socially responsible dimensions under study on the heterogeneity of results. One of the issues complicating the previous research examining the link between the CSR and the Corporate Financial Performance (CFP) is the large heterogeneity of measures of financial performance. The researchers use both stock market-based measures, i.e., stock prices, and accounting-based measures of the operating performance, for instance, the earnings per share, price to earnings ratio, Return on Assets (ROA), Return on Equity (ROE), net income, or profit margin. Moreover, with respect to the former, when stock prices are used, dividends are or are not taken into account, and the values are risk-adjusted only in some cases.

The CFP proxy is not the only aspect that differs considerably among empirical studies. It appears even more challenging to find the most appropriate measure for companies' social performance. In early research attempts, measures such as company rankings (Moskowitz, 1972) or content analyses of annual reports (Abbott and Monsen, 1979) are used. However, these rankings can be criticized for multiple limitations, such as being based on subjective or disputable criteria, and the outcomes of the contextual analysis of annual reports can generally be biased and thus misleading, as it is not assured that what a company claims it is doing truly reflects the business reality. In recent literature, more sophisticated methods of CSR measurement have been suggested. Some studies, for instance, use the KLD database (KLD Research & Analytics, Inc., 2019, accessed 2019-03-17), which is generally considered to provide a reliable CSR data as published by an independent third party (Chatterji et al., 2009, 2015). In addition, the KLD data evaluate multiple dimensions of CSR (Waddock and Graves, 1997a). However, even with an improved CSR measure, the results of the existing studies are mixed, suggesting virtually all possible relationships. We refer the reader to "Literature Review of Empirical Studies" section for detailed discussion.

To address the ambiguity of the prior research findings, we reexamine the relationship between CSR and CFP with an innovative measure of CSR, called the Environmental, Social, and Governance Combined Score (ESGC Score). This new proxy for CSR was released by Thomson Reuters in 2017 as an enhancement and replacement to the older ASSET4 Equal Weighted Ratings (Thomson Reuters, 2017). As the key improvements, the ESGC Score considers the impact of significant controversies and provides adjusted category weights to support differentiation across firms. Corporate share prices of the S&P 500 Index constituents are chosen as the standard measure of CFP of U.S. companies. The impact of CSR on stock market performance is analyzed in a 14-year period between 2007 and 2020. This period closely follows the U.S. subprime mortgage crisis, which developed into a global financial crisis after the bankruptcy of Lehman Brothers. One cause of the crisis was the irresponsible behavior of the bank's managers. After the crisis period, companies and markets are expected to have learned a lesson that may have changed the overall perception of the importance of business ethics to avoid such consequences of irresponsible behavior in the future. More responsible companies might be preferred by specific groups of investors due to the lower propensity for financial problems or based on purely ethical considerations, which in turn should be reflected in their share prices.

The first aim of this paper is to contribute to the ongoing debate via an updated analysis reflecting the global changes in financial world experiences in the decade following the global financial crisis. Thus, as a starting point, the impact of the overall CSR on financial results is analyzed. The empirical results of a fixed effects regression suggest that the ESGC Score has a significantly positive impact on the

stock market performance of companies. Holding the other included explanatory variables constant, a one percentile point increase in the ESGC Score is associated with an average increase in share price between 0.8% and 0.9%, depending on the model's specification.

Subsequently, we delve deeper and hypothesize that specific types of socially responsible actions of an engaged company matter. Porter and Kramer (2006) and Kramer and Porter (2011) point out that if analyzed similarly to companies' core business decisions, CSR can be a source of opportunity, innovation, and competitive advantage, and that the largest societal benefits are obtained when so-called 'shared value' is created, meaning that a company uses its unique capabilities to improve the well-being of society, which in turn brings higher financial benefits to the company. Moreover, Bénabou and Tirole (2010) discuss ambiguous 'win-win' welfare consequences of so-called 'strategic' CSR, a term coined by Baron (2001), when a company adopts a socially responsible attitude to strengthen its market position and thus increase profits in the long term, e.g., via weakening regulator supervision or increasing rivals' market entry costs in the future.

Therefore, as a novel feature of our analysis, broadly motivated by these universal ideas, socially responsible activities are divided for each industry into the most relevant for the given type of business, named 'strategic', and those that are not as closely linked to the companies' business core in a given industry, named 'secondary'. For instance, emissions are a crucial issue for a company in the transportation industry, while a telecommunication company does not need to worry primarily about emissions. To avoid potential arbitrariness, this division strictly follows the industry-level Materiality Map by Sustainability Accounting Standards Board (2021, accessed 2021-01-28). We present a matching scheme for the ESGC Score data by Thomson Reuters (2021) in "Regression Results for the Strategic and Secondary CSR Con't" section. A consecutive panel data analysis accounts for a potentially different influence of the two types of CSR activities on financial performance. The regression outcome shows that our strategic CSR score has a statistically, as well as economically, significant positive impact on share prices. This impact is up to 103% higher than for the secondary CSR activities, depending on the model's specification.

Actually, a partially similar research practice dates back to Hillman and Keim (2001) who study the relationship between stakeholder management and shareholder value. They argue that better relations with primary stakeholders are also shareholder value-enhancing, but social engagements not related to primary stakeholders are negatively associated with shareholder wealth. While Hillman and Keim (2001) are primarily interested in a general categorization of stakeholders (Carroll, 1981; Waddock and Graves, 1997b) applied for all companies without distinction, the division used in this paper is based on a robust Thomson Reuters Business Classifications of the Standard & Poor (S&P) 500 Index which is more granular and differentiates 18 industry (sub)groups. Khan et al. (2016) study sustainability investments of firms from the materiality point of view for specific industries and suggest that companies with good performance on material sustainability issues significantly financially outperform those with poor performance and that companies with good performance on material issues and poor performance on immaterial issues perform the best. Their research is, in principle, the closest to ours as they also take advantage of the industry-level Materiality Map by Sustainability Accounting Standards Board (SASB). However, the version they use covers only 6 sectors by February 2014, while the current version we use in this paper covers 11 sectors in 2021. Recently, DesJardine et al. (2019) distinguish between 'strategic' and 'tactical' social and environmental practices of companies and study their different impacts on organizational resilience of U.S.-based firms to the global financial crisis. While their research shares to ours the notion of 'strategic' CSR activities, it tackles companies' performance from a different perspective.

This paper is organized as follows. "Literature Review of Empirical Studies" section provides a detailed discussion about the prior research on the CSR–CFP relationship and in "Model Specification" section, the model specification is introduced. "Data and Estimation Methodology" section presents financial data and the ESGC Score, as well as the estimation methodology. "Analysis of the Link Between CSR and CFP" section then summarizes and interprets the core empirical results. Next, in "Strategic and Secondary CSR Activities" section, we analyze the difference in the impact of strategic and secondary CSR activities on companies' stock market performance. Finally, "Conclusion" section concludes the paper and suggests potential directions for future research.

Literature Review of Empirical Studies

Although research on CSR can take various forms from economically theoretical to specific management case studies, we limit the scope of this review to empirical works focused on the relationship between CSR and CFP. For a broader overview of the field, e.g., Bansal and Song (2017) provide an excellent survey of the CSR and corporate sustainability studies framed by historical evolution of both concepts since 1950s.

Mixed Results on the Sign of the Relationship

The first contribution to the ongoing empirical debate can be found in a pioneering article by Moskowitz (1972) who concludes a positive relationship between CSR and CFP. This study presents one of the first CSR rankings of observed firms that is repeatedly used in subsequent research, for instance, by Cochran and Wood (1984), who also find a

positive relationship when comparing socially responsible companies to their industry-specific control groups. A weak-form positive relationship is also obtained by Abbott and Monsen (1979), who use content analysis of companies' annual reports as a CSR measure. Using the KLD database, Waddock and Graves (1997a) find a significant positive relationship in both directions, suggesting that higher financial performance enhances higher social performance, which in turn results in better financial performance. In later research, Hillman and Keim (2001); Van der Laan et al. (2008); Brammer and Millington (2008); Hull and Rothenberg (2008); Inoue and Lee (2011); Servaes and Tamayo (2013); De Klerk et al. (2015); Qiu et al. (2016) report a positive relationship between CSR and CFP but mostly for specific situations. Hillman and Keim (2001), similarly to Van der Laan et al. (2008), reveal a positive relation only for CSR activities concerning primary stakeholders. Further, Brammer and Millington (2008) report a positive relationship only in the long run, Hull and Rothenberg (2008) find an impact of CSR only when there is little innovation and not much differentiation in the industry, and Inoue and Lee (2011) demonstrate a positive relationship specifically in the restaurant and hotel industries. Servaes and Tamayo (2013) show that CSR and firm value are positively related for companies with high customer awareness, which they proxy by advertising expenditures. Moreover, based on an analysis of sustainability reports, De Klerk et al. (2015) find a positive impact on share prices, but when Qiu et al. (2016) pursue a detailed insight, they conclude a positive impact of social disclosure but not of environmental disclosure. The recent research therefore suggests that to reveal the true effects, it might be crucial to distinguish between different types of CSR activities instead of considering only an aggregate measure. On the other hand, studies by Schadewitz and Niskala (2010); Gregory et al. (2014); Eccles et al. (2014) find a positive relationship in every context they examine.

A few early studies, such as Bowman and Haire (1975) using a content analysis and Sturdivant and Ginter (1977) employing Moskowitz 's rating, find an inverted U-shaped relationship. This result supports the intuition that only an optimal level of investment into CSR improves financial results, and companies not investing enough or investing too much into socially responsible activities might be disadvantaged. More recently, however, a regular U-shaped relationship was found, e.g., in Barnett and Salomon (2006), who analyze mutual funds focusing only on socially responsible investment. For this specific type of fund, therefore, consistent with their focus, an extensive social screening applied to portfolio selection improves the financial performance.

A neutral relationship between CSR and CFP is reported by McWilliams and Siegel (2000); Moneva et al. (2007); Van der Laan et al. (2008); Makni et al. (2009); Inoue and Lee (2011); Qiu et al. (2016); Zhao and Murrell (2016); Hawn et al. (2018); Durand et al. (2019), among others. Many occurrences of neutral relationships are complementary to positive ones, e.g., Van der Laan et al. (2008) find no impact only of the CSR concerning secondary stakeholders, such as the local community. On the other hand, McWilliams and Siegel (2000) report a solely neutral relationship after controlling for Research and Development (R&D) investments, Moneva et al. (2007) reveal a positive but statistically insignificant relationship between the quality of sustainability reports and CFP, and Makni et al. (2009) find no impact of CSR among Canadian firms, except for some specific CSR activities related to employees and the environment. Zhao and Murrell (2016) reexamine the results of Waddock and Graves (1997a) using a larger dataset covering also the period after the global financial crisis until 2013 and show that CSR may not have a positive influence on CFP due to complexity of the relationship. Finally, Durand et al. (2019) replicate and expand the results of Hawn et al. (2018) and similarly conclude no impact of the Dow Jones Sustainability World Index events on stock price.

Negative links are found less frequently. One can think of the issue of publication bias in this respect. However, even the small number of studies draws attention to the possibility of unfavorable consequences of investment into socially responsible activities beyond the firm's core competencies. The negative relationship is initially detected by Vance (1975). More recently, a negative link is reported in Hillman and Keim (2001), who find a negative relation between social issue participation, such as charitable giving, and financial performance, and Makni et al. (2009), who detect a negative relationship for investments in employees and environmental issues in the short run for Canadian firms. Servaes and Tamayo (2013) show that for firms with low customer awareness, the relationship is either negative or insignificant.

Causal Direction of the Relationship

While the past research seems generally inconclusive, the most recent findings favor and provide support for a positive CSR–CFP link. More importantly, Flammer (2015) is able to show via a quasi-natural experiment that this positive link is causal in the direction from CSR to CFP. Moreover, assessing the causality channels, she concludes that in general labor productivity and sales growth benefit from CSR proposals. The most recent literature has since thus moved to explain how specifically and in which situations CSR impacts CFP. For instance, Flammer and Luo (2017) find that companies use CSR as an employee governance tool to improve employee engagement and mitigate the adverse behavior such as absenteeism. Additionally, Flammer (2018) provides evidence that firms with higher CSR receive more government procurement contracts because CSR signalizes trustworthiness and serves as a differentiation strategy. Other authors also follow this

advanced CSR research agenda. Luo and Bhattacharya (2006) study casual links between CSR and firm market value and conclude that customer satisfaction is the main mediating channel. Companies with better product quality and higher innovativeness generate market value from CSR initiatives, while for companies with low innovativeness, CSR activities harm customer satisfaction and thus decrease CFP. Cheng et al. (2014) find that companies with higher CSR face significantly lower capital constraints due to better stakeholder engagement and reduced informational asymmetry due to increased transparency. Ioannou and Serafeim (2015) study the CSR–CFP link through the channel of investment analysts' recommendations and document the shift in the perceptions of CSR over time. Via an online randomized field experiments, Burbano (2016) reveals substantial workers' preference for CSR in the workplace, their willingness to give up the higher wage for non-pecuniary benefits, and provides causal empirical evidence for this phenomenon.

Model Specification

For the empirical analysis, we build on the approach of Gregory et al. (2014), which belongs to the most recent works on the CSR–CFP link in the academic literature. The authors identify the source of the firm value by decomposing the effects on forecasted profitability, long-term growth and other components. Similarly to this study, our work is built upon the theoretical basis specified by Ohlson (1995) who presents the idea of the 'other information parameter'. This principle suggests that there are other factors influencing market value than just earnings or book-value. This theoretical framework provides a general basis for models examining the impact of additional information on the stock market performance, such as Barth et al. (1992). In our case, the given additional information is the CSR performance of observed companies. Furthermore, we also base upon the most recent research on the causal links between CSR and CFP which provides strong support for a causal relationship in the direction from CSR to CFP (Flammer, 2015, 2018; Cheng et al., 2014; Burbano, 2016). The general form of the linear regression model is specified as follows:

$$\begin{aligned} Log(P_{it}) =& \beta_0 + \beta_1 NIPS_{it} + \beta_2 BVPS_{it} + \beta_3 LTDTA_{it} + \beta_4 Log(Assets)_{it} \\ &+ \beta_5 RDPS_{it} + \beta_6 ESGC\ Score_{it} + a_i + u_{it}, \end{aligned} \tag{1}$$

where P_{it} is share price of company i, $i = 1, \ldots, N$ at time (year) $t = 1, \ldots, T$. In the literature on the measurement of companies' financial performance, there has always been a debate about whether to use accounting-based measures, e.g., ROA or ROE, or market-based measures, of which the most commonly used is share price. We prefer the latter as accounting-based measures are generally considered backwards-looking and might be subject to managerial manipulation. On the other hand, stock market-based measures reflect the investors' perception of a company's ability to generate future profits and better reflect the impact of CSR on subsequent investment decisions (McGuire et al., 1988; Hillman and Keim, 2001; Van der Laan et al., 2008).

Independent and Control Variables

The independent variable of the main research interest is ESGC Score, a proxy for the CSR of company i at time t. A set of control variables includes Net Income per Share (NIPS) and Book Value per Share (BVPS), reported after-tax. Next, Long-Term Debt to Assets (LTDTA), reflecting the firms' leverage position, is included as a proxy for risk. Inoue and Lee (2011) note that leverage has an impact on the CSR–CFP link as more risk-tolerant firms behave differently than less risk-tolerant firms when deciding whether to invest in CSR. Further, a control for company size is included as larger companies are generally more likely to implement CSR into their strategy. Those companies might be more vulnerable to public pressure or may gain CSR benefits more easily via economies of scale (Siegel and Vitaliano, 2007; Van der Laan et al., 2008). As a proxy for size, the natural logarithm of total assets is used. Further, following, e.g., Waddock and Graves (1997a) and Qiu et al. (2016), Research and Development per Share (RDPS) indicates how much a company spends on R&D of new products and services. Moreover, McWilliams and Siegel (2000) highlight the importance of R&D as a determinant of profitability. Their results on the CSR–CFP link substantially differ before and after controlling for R&D, suggesting an endogeneity issue when R&D is omitted. Finally, a potential unobserved individual effect for company i is denoted a_i and u_{it} is an independent and identically distributed (i.i.d.) error term. On the other hand, we omit the industry dummy originally included by Gregory et al. (2014), as the fixed effects estimator applied to the regression effectively precludes time-invariant explanatory variables. However, the industry impact is taken into account in the subsequent step, where the selection of strategic and secondary CSR activities is essentially industry-specific.

Following Fama and French (1993), the accounting variables and the ESGC Score are lagged by quarter and half a year against share price. That means, typically, data of December of year $t-1$ are matched with share prices in March and June of year t. These shifts follow the importance of processing and incorporating all available financial information in share prices of examined companies. While Fama and French (1993) generally propose a half-year shift, we believe that the information transmission efficiency of financial markets has markedly increased since 1993. Therefore, as a suitable sensitivity and robustness check, we employ two lengths of a period-shift for our analysis. The lagged form of the ESGC Score further follows previous studies,

Table 1 Descriptive statistics of the dataset

Statistic	Median	Mean	St. Dev.	Min.	Max.
Share price P (USD)	47.8	73.3	124.5	1.37	2,800.0
NIPS (USD)	0.58	0.71	6.59	−465.2	125.2
BVPS (USD)	5.35	9.61	33.6	−349.2	715.4
LTDTA (%)	21.7	24.4	23.0	0.00	385.3
Assets (USD)	14.5 bil.	61.7 bil.	215.6 bil.	43.9 mil.	3,386.1 bil.
RDPS (USD)	0.33	0.56	0.98	0.00	19.6
RDPS_zero (USD)	0.00	0.19	0.63	0.00	19.6
RDPS_ind_avg (USD)	0.22	0.60	1.30	0.00	22.3
RDPS_perc_rev (USD)	0.07	0.25	0.66	0.00	19.6
ESGC Score (0-100)	47.2	48.0	17.8	2.28	92.6
Strategic CSR (0-100)	56.1	54.0	21.2	0.13	97.2
Secondary CSR (0-100)	50.8	48.4	25.3	0.00	99.0

Note: unbalanced panel, $N = 6,696$ observations

e.g., Waddock and Graves (1997a), as well as the intuition that benefits coming from socially responsible behavior, and penalties for controversies regarding CSR are expected to be incorporated into the overall company reputation, which carries over into later time periods (Spicer, 1978). Most importantly, the ESGC Score is constructed based on annual and sustainability reports, which are available for investors only at the end of the fiscal year. Related investment decisions can thus be made only in the subsequent period.

Research Hypothesis

To empirically examine the relationship between CSR and CFP, we formulate the following null hypothesis:

H1 There is no statistically significant relationship between the CSR engagement and stock market performance of the U.S. companies.

Based on the findings summarized in "Literature Review of Empirical Studies" section, it is expected that some relationship between CSR and CFP exists, i.e., the hypothesis H1 is expected to be rejected. The most recent research brings statistical evidence that the impact of CSR on financial results is positive due to various benefits such as increased employee satisfaction, customer loyalty and awareness, transparency, better access to finance, and others. Also, when looking at the current trends, one would expect that companies create their socially responsible strategies and investors opt for Socially Responsible Investment funds because they assume that it economically pays-off. Therefore, it seems that the CSR concept has gained its importance as the time passes, especially in the period after the financial crisis due to which people might be more aware of the importance of businesses to act responsibly and appreciate such behavior adequately.

On the other hand, we should not forget that especially in the initial phases of implementation of the CSR initiatives, the costs might be actually created, and some of the recent studies still find a negative impact of CSR on CFP in specific contexts. Therefore, this fact is also considered, and the alternative two-sided hypothesis is that the CSR activities of a company have a significantly positive or negative impact on its stock market performance.

Data and Estimation Methodology

The empirical analysis makes use of the Thomson Reuters Eikon database (Thomson Reuters, 2021, accessed 2021-01-28), from which yearly financial and ESGC Score data and quarterly share prices for S&P 500 Index constituents are obtained for the period 2007–2020. The S&P 500 Index is considered to represent the U.S. economy as a whole since it covers a substantial portion of the overall market capitalization of the U.S. stock market. The performance of its constituents in the period beginning in 2007 allows us to examine the role of CSR after the financial crisis. Due to the unavailability of some data for all S&P 500 companies in all periods and after removing one company as a clear outlier (Berkshire Hathaway Inc., BRKB.N, min. NIPS = − 15,614.2, max. NIPS = 17,937.2, max. BVPS = 191,009.2, cf. Table 1), the resulting sample consists of 486 companies, creating an unbalanced panel of 6,696 observations. Table 1 presents its important descriptive statistics.

Unreported R&D

There is very few or no data available for many companies in our dataset for R&D spending. As it was already discussed in "Independent and Control Variables" section, omitting R&D as an explanatory variable might lead to

the endogeneity issue, however, if only the part of the data with no missing R&D values were used in our analysis, it would have reduced the sample from 486 to 172 companies. To not lose such a massive portion of the data, missing values are imputed using techniques presented in Koh et al. (2018). In the main model, missing data in R&D are approximated as 0.5% of revenues. This variable is denoted as 'RDPS_perc_rev' in Table 1. For robustness check, two more R&D variables with imputed missing values are created. The first one, called 'RDPS_zero' in Table 1, has missing values trivially replaced by zero, while the second one, called 'RDPS_ind_avg' in Table 1, replaces the missing data by industry average in the case when there is R&D data available for more than two companies in the given industry. For industries where this does not hold, missing R&D values are again approximated as 0.5% of revenues. A potential issue with the second robustness check approach is that it ignores relative differences in the size of individual companies in the given industry. Regression results from models containing either of the two additional R&D variables are included in "Regression Results Con't" and "Regression Results for the Strategic and Secondary CSR Con't" section and confirm that imputation strategy choice does not affect the estimated impact of the companies' CSR engagement.

Negative BVPS

Moreover, according to Table 1, there is a subset of companies with negative BVPS. Brown et al. (2008) argues that while the shareholders' value cannot be negative due to the firms' limited liability structure, reporting the firm's book-value as a negative number is an increasing phenomenon. As negative book equity is difficult to interpret economically, a typical solution is excluding given stocks from financial analysis (Griffin and Lemmon, 2002; Vassalou and Xing, 2004, among others). However, there are two important reasons why such a practice should be considered with utmost caution or abandoned. First, excluding negative book-value stocks as representing high default risk companies is likely to lead to a deliberate sample selection bias until also high-growth stocks are excluded. Second, Brown et al. (2008) suggest the proportion of all listed stocks with negative book equity being far from negligible, reaching approximately 5%. Moreover, these stocks are expected to significantly impact asset pricing models as they fall into extreme quantiles of the value/growth categories.

Since the publication of Brown et al. (2008), the situation seems to have even worsened as our dataset consists of almost 9% of companies reporting only negative BVPS. This is confirmed by Jan and Ou (2012) who directly document the increasing frequency of negative book-value incidences over time. Their results also indicate a positive association between R&D accumulated over time and the increasing trend of negative book equity reporting. The exclusion of these firms would reduce the sample to 443 companies. Even more seriously, removing negative BVPS values across all companies would cause a loss of 1,844 observations as there are more than half of the companies with at least one negative BVPS observation in the sample. Similar to the situation with unreported R&D spending discussed above, it would result in a substantial loss of data from our sample. More importantly, this non-random reduction would most like induce a form of sample selection bias to our results. Based on this reasoning, we keep the companies with negative book equity in the dataset. Still, one needs to be fully aware of this fact when interpreting the regression results for the BVPS variable. Especially, a substantial proportion of negative BVPS observations can offset the impact of positive values in the regression, leading to issues with statistical significance of the given variable or even turn the sign of the estimated impact to negative.

ESG Combined Score

Table 1 also contains descriptive statistics for the CSR measure, the ESGC Score. In 2017, Thomson Reuters released a new percentile ranking of CSR scores for more than 6,000 companies worldwide, designed to measure companies' performance in the Environment, Society, and Governance (ESG) area. The ESGC Score, an enhancement and replacement to the older ASSET4 Equal Weighted Ratings, benchmarks companies' performance against either Thomson Reuters Business Classification, in the case of the Environmental and Social metrics, or against Country for Governance metrics. As the key improvements over the replaced equal-weighted ASSET4 ratings, the ESGC Score considers the impact of significant controversies on the overall scoring, facilitates comparable analysis within peer groups via industry and country benchmarks, provides adjusted category weights to support differentiation across firms, and provides percentile rank scoring (Thomson Reuters, 2017; Refinitiv, 2020a, b, accessed 2017-11-20, 2020-01-28). Thus, the ESGC Score serves as an up-to-date, sophisticated measure of CSR performance, as a large amount of publicly available information about companies, such as annual or CSR reports, company websites, and non-government organization websites are analyzed together with all new media materials. We thus believe that a reconsideration of the CSR–CFP link using this enhanced, independent, and professionally provided CSR proxy is an important contribution to the existing academic literature.

Over 450 ESG metrics are created in total, of which the subset of 186 most relevant metrics are selected by Thomson Reuters for each company. The ESG metrics are further

Table 2 ESG categories & weights in scoring. *Source:* Refinitiv (2020a, 2020b)

Pillar	Category	Metrics	Weight
1 Environmental	1.1 Resource Use	20	15%
	1.2 Emissions	28	15%
	1.3 Innovation	20	13%
2 Social	2.1 Workforce	30	13%
	2.2 Human Rights	8	5%
	2.3 Community	14	9%
	2.4 Product Responsibility	10	4%
3 Governance	3.1 Management	35	17%
	3.2 Shareholders	12	5%
	3.3 CSR Strategy	9	3%

divided into the 10 categories introduced in Table 2. To compute the ESGC Score, a weighted sum of the company's percentile rank in the 10 ESG categories, called the ESG score, is computed and further adjusted for ESG controversies, i.e., negative stories published in the media. The category weights, also shown in Table 2, are the ratios of each category's magnitude weight and a sum of magnitudes of all categories used in the ESGC Score framework. The magnitude (materiality) weighting is unique for each industry (sub)group, according to Thomson Reuters Business Classifications as the importance of individual ESG metrics differs across industries. For example, in the 'Workforce' category, the monitored metrics are 'Health and Safety Policy', 'Employee Satisfaction', 'Working Hours', and others (Thomson Reuters, 2017; Refinitiv, 2020a, b, accessed 2017-11-20, 2021-01-28).

"During the year, if a scandal occurs, the company involved is penalized and this affects their overall ESGC Score. ESG controversies score is calculated based on 23 ESG controversy topics, with recent controversies reflected in the latest complete period. Companies with no controversies will get a score of 100. Controversy score calculation addresses the market cap bias from which large-cap companies suffer, as they attract more media attention than smaller cap companies. The ESGC Score is calculated as the average of the ESG score, and ESG controversies score when there are controversies during the fiscal year. When the controversies score is greater than ESG score, then ESG score is equal to ESGC Score." In most cases, ESGC Score data are updated once a year at the end of the fiscal year or based on the companies' own ESG disclosure standards and reporting patterns. In exceptional cases (e.g., a significant change in the reporting standards or corporate structure), the ESGC Score data are refreshed on an ad hoc basis. The data on ESG controversies are potentially updated weekly as when such events occur in global media. However, for most observations, no controversies are reported over the whole period (Refinitiv, 2020a, b, 2021-01-28).

Finally, Table 1 also presents overall descriptive statistics for the strategic and secondary CSR percentile scores derived according to the methodology described and utilized in "Literature Review of Empirical Studies" section.

Multicollinearity Assessment

As part of the dataset's exploratory analysis, a check for potential multicollinearity problem is conducted. As the first step, correlations between variables are calculated, with the result depicted in Figure 1. What may be a cause of potential problems is a relatively high correlation between strategic and secondary CSR scores and a moderate correlation between NIPS and BVPS. Detailed assessment of this issue using the Variance Inflation Factor (VIF) methodology is presented in "Analysis of the Link Between CSR and CFP" and "The Impact of the Strategic and Secondary CSR" sections. Other strong correlations shown in Figure 1 are not of a concern as these variable pairs do not appear simultaneously in our models. It is also important to note relatively large correlations between Log(Assets) and the CSR variables, which puts companies' size and their CSR involvement in a clear positive context. Finally, note the very strong correlation between 'RDPS_perc_rev' used in the main model and 'RDPS_zero'.

Estimation

For the model specified by (1) and the unbalanced panel dataset described above, the Fixed Effects (FE) or the Random Effects (RE) estimator constitute an appropriate estimation methodology. A simple alternative, pooled Ordinary Least Squares (OLS) with cluster-robust standard errors, would ignore the nature of the panel data and would not allow consideration of a possible unobserved individual heterogeneity. In the case of companies, a typical candidate for this issue is the quality of management. This likely omitted variable naturally affects various aspects of company performance. Still, it can hardly be reliably measured or proxied, resulting in a so-called heterogeneity bias of the OLS estimator.

The nature of a potential unobserved effect for company i, denoted a_i, determines the optimal choice between the FE and the RE estimator (Hausman, 1978; Hausman and Taylor, 1981). Considering a general multiple linear regression model framework:

$$y_{it} = \beta_0 + \beta_1 x_{1it} + \cdots + \beta_k x_{kit} + a_i + u_{it}, \tag{2}$$

Table 3 Regression results with missing R&D equal to 0.5% of revenues

	Dependent variable: Log(*P*)	
	A: −1/4y	B: −1/2y
NIPS	0.052***	0.049***
	(0.013)	(0.012)
	[0.026–0.079]	[0.026–0.071]
BVPS	− 0.001	− 0.001
	(0.001)	(0.001)
	[− 0.003–0.001]	[− 0.003–0.001]
LTDTA	0.004**	0.006***
	(0.001)	(0.001)
	[0.002–0.007]	[0.003–0.009]
Log(Assets)	0.576***	0.586***
	(0.033)	(0.033)
	[0.512–0.641]	[0.521–0.651]
RDPS_perc_rev	0.064***	0.071***
	(0.017)	(0.017)
	[0.030–0.098]	[0.037–0.105]
ESGC Score	0.0082***	0.0086***
	(0.0009)	(0.001)
	[0.0063–0.0100]	[0.0067–0.0105]
Observations	4,805	4,806
R^2	0.420	0.446
Adjusted R^2	0.362	0.391
F(6; Obs.−6)	527.2	586.8

Note: $\cdot p < 0.1$; $*p < 0.05$; $**p < 0.01$; $***p < 0.001$. The standard errors are reported in ( ) parentheses. The 95% confidence intervals are reported in [ ] parentheses

where $t = 1, \ldots, T$, $i = 1, \ldots, N$, if a correlation exists between the unobserved effect a_i and some explanatory variables, i.e., $Cov(x_{jit}, a_i) \neq 0\ \exists j \in \{1, \ldots, k\}$, then only the FE estimator is consistent, while the RE estimator is not. Economic intuition for the given dataset of companies, as well as formal results of the Hausman specification test ($H = 919.4$ and $1,246.7 \sim \chi^2_6$ for the models with the quarter and half a year lagged explanatory variables against share price, respectively, presented in Table 3), strongly suggest that the FE estimator is preferred over the RE estimator. In the FE estimation, the differences between individuals, i.e., the unobserved individual heterogeneity, are assumed to be time-constant and captured by the intercept. The model equation is averaged across time for every i:

$$\bar{y}_i = \beta_0 + \beta_1 \bar{x}_{1i} + \cdots + \beta_k \bar{x}_{ki} + a_i + \bar{u}_i, \tag{3}$$

where $\bar{y}_i = 1/T \sum_{t=1}^{T} y_{it}$ and similarly for $\bar{x}_{ji}\ \forall j \in \{1, \ldots, k\}$ and for $\bar{u}_i$. The mean values are subsequently subtracted from the original data to obtain the time-demeaned data:

$$\ddot{y}_{it} = \beta_1 \ddot{x}_{1it} + \cdots + \beta_k \ddot{x}_{kit} + \ddot{u}_{it}, \tag{4}$$

where $\ddot{y}_{it} = y_{it} - \bar{y}_i$ and similarly for $\ddot{x}_{jit}\ \forall j \in \{1, \ldots, k\}$ and for $\ddot{u}_{it}$. After this data transformation, the unobserved effect a_i in (4) disappears, i.e., we have removed the impact of the unobserved individual heterogeneity. The pooled OLS estimator for (4) can now be standardly utilized and interpreted.

Analysis of the Link Between CSR and CFP

We first check for common issues that may occur in panel data analysis. Most importantly, we test for no heteroskedasticity using the Breusch–Pagan test ($LM = 901.7$ and $721.5 \sim \chi^2_6$ for the models with the quarter and half a year lagged explanatory variables, respectively, presented in Table 3). For no serial correlation in the errors, the Wooldridge test for serial correlation in FE panels is used ($F = 686.8$ and $1,371.4 \sim F_{1;\ 4367(8)}$ for the models with the quarter and half a year lagged explanatory variables, respectively, presented in Table 3). The results of the two tests strongly suggest that both heteroskedasticity and serial correlation are present. To correct for these issues, which may lead to inefficiency of the FE estimator and potentially misleading interpretation of the statistical significance of individual estimates, the (industry-)clustered robust standard errors suggested by Arellano (1987) are employed. Table 3 presents the results obtained from the FE regression with missing R&D equal to 0.5% of revenues.

Both models have a reasonably high R^2, suggesting that variation in the independent variables explains 42% and 44.6% of the total variation in the dependent variable. All independent variables except BVPS are statistically significant in both models at least at the 1% significance level.

We primarily focus on the ESGC Score, a proxy for CSR. The model A (with the quarter a year lag) shows that a one percentile point increase in the ESGC Score is associated with a 0.82% increase in share price on average and the model B (with the half a year lag) suggests a similar effect of CSR on CFP, where the impact is a 0.86% increase in share price, holding all other included independent variables constant.

We finally also interpret the regression results on other controls. A one USD increase in NIPS is associated with a 5.3%[1] increase in share price on average for model A and a 5% increase for model B, respectively, holding all other

[1] Please note that due to the logarithmic nature of the dependent variable, the precise interpretation of the estimated coefficient of the non-logaritmized independent variable follows: an increase of the independent variable by 1 (small) unit is associated with a change of the dependent variable by $\left(exp(\hat{\beta}) - 1\right) \times 100$ percent. This is often approximated by $\hat{\beta} \times 100$ percent. However, such simplification holds well only for 'very small' values of $\hat{\beta}$.

included independent variables constant. These results are strongly significant both statistically as well as economically. Statistically insignificant BVPS very close to zero in both models is likely due to a substantial proportion of negative BVPS observations that can offset the impact of positive ones in the regression, a phenomenon already discussed in "Negative BVPS" section. It can be also partially caused by a moderate correlation with NIPS as discussed below. Next, as LTDTA is expressed as a percentage, a one percentage point increase in the debt to assets ratio leads to a 0.4% or even 0.6% increase in share price, holding all other factors constant. This relationship's positive direction can be explained as that a higher level of debt financing is a signal for investors that higher profits in the future might be expected based on current investments. In terms of company size proxied by Log(Assets), the regression results positively impact profitability. A 1% increase in size leads to almost 0.6% increase in share price. Finally, a significant positive relationship between RDPS_perc_rev and share price is observed for both models. A one USD increase in RDPS_perc_rev increases share price by 6.6% or 7.4%, respectively, holding all other factors constant. A natural explanation of the positive impact of R&D expenses might be that investors generally expect the companies to have a positive return on investment into innovations. As a result, investors might be prone to invest in innovating companies in both the short and long term.

Multicollinearity Analysis

A possible econometric concern of this analysis is the moderate correlation between NIPS and BVPS of 45%, see Figure 1, that can potentially be one of the reasons for the BVPS statistical insignificance. As correlation alone is only the first informative signal of potential multicollinearity, we also compute the VIFs for all explanatory variables. The VIF assesses the severity of multicollinearity in terms of how well other explanatory variables explain the multicollinear variables and how much the estimator's variance is inflated due to multicollinearity. As a simple rule of thumb, a VIF greater than 5 indicates a problem caused by the correlation between variables. The most conservative views suggest that VIF values greater than or equal to 2.5 are potentially problematic. However, for none of the explanatory variables in both models does the VIF exceed 1.4, reaching its maximum 1.34 for BVPS. These values signalize no serious multicollinearity issue. One can thus think about omitting BVPS due to its statistical insignificance; however, regressions without given explanatory variable are not advisable because of a large potential for an omitted variable bias as the model's structure is well theoretically justified (Gregory et al., 2014).

Robustness Check

As a robustness check, regression results for models containing either of the two other RDPS variables are included in Table 7. The impact of the ESGC Score variable is largely similar with results based on RDPS_perc_rev across all four new estimated models. This confirms that the R&D imputation strategy choice does not affect the estimated impact of the companies CSR engagement. For models with RDPS_ind_avg also the results for all the control variables are largely comparable with results based on RDPS_perc_rev except for a smaller impact of the RDPS variable itself. Importantly, the VIFs for all explanatory variables in these two models (reported in columns E and F of Table 7) stay below 1.5 suggesting no serious multicollinearity issue. Similarly, for the model with RDPS_zero (reported in columns C and D of Table 7), the VIFs for all explanatory variables stay below 1.2 suggesting almost no multicollinearity issue. On the other hand, for these two models the significance of NIPS and BVPS actually flips which can be attributed to their mutual correlation of 45% already discussed above.

Strategic and Secondary CSR Activities

To extend and innovatively refine the previous analysis that shows an overall positive impact of CSR on share prices, the socially responsible activities are further divided into 'strategic' CSR activities, which are closely connected to the companies' business operations, and 'secondary' CSR activities, which are not directly related the companies' business core. Strategic CSR activities are presupposed to have a more substantial impact on company share prices. In contrast, secondary CSR activities are regarded as less relevant and are therefore likely not to result in comparable financial benefits. The working hypotheses regarding the impact of the strategic/secondary CSR on companies' stock market performance are thus tested considering the extended model:

$$\begin{aligned} Log(P_{it}) =& \beta_0 + \beta_1 NIPS_{it} + \beta_2 BVPS_{it} \\ &+ \beta_3 LTDTA_{it} + \beta_4 Log(Assets)_{it} \\ &+ \beta_5 RDPS_{it} + \beta_6 Strategic\_CSR_{it} \\ &+ \beta_7 Secondary\_CSR_{it} + a_i + v_{it}. \end{aligned} \tag{5}$$

Research Hypotheses

We expect the strategic CSR activities, i.e., those connected to the business core of a company, to impact share prices positively. To empirically support this view, we expect a

positive sign of the β_6 estimate. Moreover, the following null hypothesis would have to be rejected:

H2 Strategic CSR has no statistically significantly positive impact on the U.S. companies' stock market performance.

Next, we expect this impact to be considerably higher than for the secondary CSR activities. Secondary CSR is regarded as less relevant concerning the companies' business core, and therefore likely to bring lower financial benefits. We thus formulate the following null hypothesis which we again expect to be rejected based on a considerably lower estimated coefficient $\widehat{\beta}_7$ compared to $\widehat{\beta}_6$:

H3 Strategic CSR does not have a statistically significantly higher impact than the secondary CSR activities.

Classification of the CSR Activities Using the SASB Materiality Map

We suggest the following application of the 10 Thomson Reuters ESG categories in Table 2 to classify the CSR activities of each company as strategic or secondary for every S&P 500 industry (sub)group. To avoid potential arbitrariness, this division strictly follows the industry-level Materiality Map by Sustainability Accounting Standards Board (2021, accessed 2021-01-28), an independent non-profit organization. Recent research efforts closest to ours by Eccles et al. (2014); Khan et al. (2016) also take advantage of the Materiality Map by SASB. However, the version they use covers only 6 sectors by February 2014, while the current version we use in this paper covers 11 sectors in 2021. For details compare the version in Khan et al. (2016) with the version on the SASB webpage.

The idea of the SASB Materiality Map was first introduced by Lydenberg et al. (2010). It serves as a "tool that identifies and compares disclosure topics across different industries and sectors." It is actually a matrix that vertically consists of 5 broad sustainability dimensions (Environment, Social Capital, Human Capital, Business Model & Innovation, Leadership & Governance) further divided into 26 sustainability-related business issues (see Table 10, first two columns). Its horizontal dimension then includes 11 groups of specific sectoral classification, based on a similar logic as, e.g., the S&P 500 sectors or the Thomson Reuters Business Classifications, further divided into 77 industry subgroups (see Table 9, second column).

The SASB industry-level Materiality Map identifies sustainability-related business issues "that are likely to affect the financial condition or operating performance of companies within an industry". At the industry level, it suggests issues that are likely material for companies in the industry. The assessment is more granular at the aggregate sectoral level, identifying business issues likely to be material for more or fewer than 50% of industries in a given sector together with immaterial issues. An ESG category in Table 2 is denoted as a strategic CSR if it is likely a material issue for companies in the industry. On the other hand, we denote the remaining immaterial ESG categories as a secondary CSR. The Materiality Map neither narrowly follows the Thomson Reuters Business Classifications of industry (sub)groups of the S&P 500 Index nor the 10 ESG categories. Therefore, we present a matching scheme for the ESGC Score data by Thomson Reuters (2021) in "Regression Results for the Strategic and Secondary CSR Con't" section, Tables 9 and 10. The final classification of industry-specific strategic and secondary CSR activities is presented in Table 4.

While optimal for our classification purposes, the sector-based materiality approach, in general, can be criticized for several possible limitations. First, not every company necessarily fits into sectoral or industry specifications. This holds especially for large conglomerates. Second, the presented classification system, however sophisticated in the background, inevitably relies on subjective judgments of involved analysts, at least to some extent. Finally, as suggested by Lydenberg et al. (2010), "measurements of materiality,... may still be overly focused on corporate performance as measured by what is material in the current financial system, rather than a system that is fully aligned with the creation of long-term wealth."

We hypothesize that evaluation of the financial performance of companies with respect to company-specific strategic CSR areas is likely to refine economic knowledge relative to the overall regression results in "Analysis of the Link Between CSR and CFP" section. Here, we also stress the importance of attempts of companies to reduce their negative impact or to use their business potential to make improvements in given areas of sustainability. An extensive discussion of strategic CSR can be found in Porter and Kramer (2006), who highlight the link between the CSR of a company and its competitive advantage. Kramer and Porter (2011) extend this idea further to a broader concept called 'creating shared value'.

Calculation of the Strategic and Secondary CSR Score

For each company in the dataset, the strategic CSR score is calculated as a weighted sum of the Thomson Reuters ESGC Scores for each ESG category denoted as strategic in the industry in which the company operates. The weights w are based on the values provided by Thomson Reuters reported in Table 2 but are recalculated so that they always add up to 100%. Let us consider an example of the 'Transportation'

Table 4 Industry-specific strategic and secondary CSR activities

No.	Industry (sub)group	Strategic CSR	Secondary CSR
I.	**Basic Materials:** chemicals, mineral resources (metals & mining, constr. materials), containers & packaging	1.1, 1.2, 2.1, 2.4, 3.2	1.3, 2.2-3, 3.1, 3.3
II.	**Consumer Cyclicals**		
a.	**Automobiles & Auto Parts**	1.1-3, 2.1, 2.4, 3.2	2.2-3, 3.1, 3.3
b.	**Cyclical Consumer Products:** home building & construction, furnishing, household goods, leisure, toys, textiles	1.1, 1.3, 2.4, 3.2	1.2, 2.1-3, 3.1, 3.3
c.	**Cyclical Consumer Services:** media, publishing, hotels, entertainment	1.1, 2.1, 2.3-4, 3.2	1.2-3, 2.2, 3.1, 3.3
d.	**Retailers:** apparel, electronics, cars, dept./discount stores, personal care	1.1, 2.3-4, 3.2-3	1.2-3, 2.1-2, 3.1
III.	**Consumer Non-Cyclicals:** food & beverages & drug (retail), personal & household products and services	1.1-3, 2.3-4, 3.2-3	2.1-2, 3.1
IV.	**Energy:** fossil fuels	1.1-3, 2.1-2, 3.1-3	2.3-4
V.	**Financials:** banking & investment services, insurance	2.3-4, 3.1-3	1.1-3, 2.1-2
VI.	**Healthcare:** healthcare services & equipment, pharmaceuticals & medical research	2.2-4, 3.1-3	1.1-3, 2.1
VII.	**Industrials**		
a.	**Industrial & Commercial Services:** business support, compliance, staffing, information services, rating agencies, transactions, environmental services, construction & engineering services	2.1, 2.4, 3.1-2	1.1-3, 2.2-3, 3.3
b.	**Industrial Goods:** machinery, tools, heavy vehicles, trains, ships, aircraft manufacturing, aerospace, defense	1.1-3, 2.1, 2.4, 3.1-2	2.2-3, 3.3
c.	**Transportation:** airlines, logistics	1.2, 2.1, 3.1-2	1.1, 1.3, 2.2-4, 3.3
VIII.	**Real Estate**	1.1-3, 2.4, 3.1-2	2.1-3, 3.3
IX.	**Technology**		
a.	**Fintech & Infrastructure**	2.1, 2.3-4, 3.1-3	1.1-3, 2.2
b.	**Software & IT Services:** software, applications, servers, cloud, social media, search engines, internet security	1.1, 2.1-4, 3.1-2	1.2-3, 3.3
c.	**Technology Equipment:** PCs, phones, semiconductors, electronic equipment & parts, communications & networking	1.1-3, 2.1, 2.4, 3.2	2.2-3, 3.1, 3.3
d.	**Telecommunication Services**	1.1, 2.3-4, 3.1-2	1.2-3, 2.1-2, 3.3
X.	**Utilities:** electric, water, gas	1.1-3, 2.1, 2.3, 3.2-3	2.2, 2.4, 3.1

Source: authors, industry classification by Thomson Reuters (2021), the division of the CSR activities according to Sustainability Accounting Standards Board (2021). *Note:* the numbering of the ESG categories is similar to Table 2, i.e., 1.1 Resource use, 1.2 Emissions, 1.3 Environmental innovation; 2.1 Workforce, 2.2 Human rights, 2.3 Community, 2.4 Product responsibility; 3.1 Management, 3.2 Shareholders, 3.3 CSR strategy

(T) industry, where the strategic ESG categories, according to Table 4, are 'Emissions' (E), 'Workforce' (W), 'Management' (M), and 'Shareholders' (S).

The strategic CSR score of the 'Transportation' (T) industry is computed as follows:

$$Strategic\_CSR_T = \frac{w_E}{\sum w_T} E_{Score} + \frac{w_W}{\sum w_T} W_{Score} + \frac{w_M}{\sum w_T} M_{Score} + \frac{w_S}{\sum w_T} S_{Score}, \quad (6)$$

where $\sum w_T = w_E + w_W + w_M + w_S$. An identical principle applies for all industries and also for the calculations of the secondary CSR score. All 10 ESG categories are always considered exclusively, i.e., none can overlap and none is dropped. The important overall descriptive statistics for the strategic and secondary CSR percentile scores are reported in the bottom part of Table 1.

The Impact of the Strategic and Secondary CSR

Table 5 displays the regression results of the model specified by (5), including the strategic and secondary CSR variables. Again, two models with the quarter and half a year lagged explanatory variables are estimated. Results based on the FE estimator with the robust standard errors are reported, as heteroskedasticity and serial correlation in the errors are also detected in these modified models similarly to models in Table 3; and the Hausman test ($H = 745.6$ and $1,344.4 \sim \chi^2_7$ for the models A and B, respectively, presented in Table 5) again suggests the consistent FE estimator.

Table 5 Regression results for the strategic and secondary CSR

	Dependent variable: Log(*P*)	
	A: −1/4y	B: −1/2y
NIPS	0.053***	0.050***
	(0.013)	(0.011)
	[0.028–0.079]	[0.027–0.072]
BVPS	− 0.001	− 0.001
	(0.001)	(0.001)
	[− 0.004–0.001]	[− 0.003–0.001]
LTDTA	0.004***	0.006***
	(0.001)	(0.001)
	[0.002–0.007]	[0.004–0.009]
Log(Assets)	0.556***	0.563***
	(0.034)	(0.034)
	[0.490–0.622]	[0.498–0.629]
RDPS_perc_rev	0.048**	0.053**
	(0.018)	(0.018)
	[0.012–0.084]	[0.018–0.089]
Strategic_CSR	0.0061***	0.0062***
	(0.0011)	(0.0012)
	[0.0038–0.0083]	[0.0039–0.0085]
Secondary_CSR	0.0030**	0.0035***
	(0.0010)	(0.0010)
	[0.0011–0.0049]	[0.0015–0.0055]
Observations	4,805	4,806
R^2	0.420	0.447
Adjusted R^2	0.361	0.391
F(7; Obs.−7)	451.7	504.2

Note: $\cdot p < 0.1$; $*p < 0.05$; $**p < 0.01$; $***p < 0.001$. The standard errors are reported in ( ) parentheses. The 95% confidence intervals are reported in [ ] parentheses

In the model A (with the quarter a year lag) the strategic CSR is strongly statistically significant, showing that a one percentile point increase is associated with a 0.61% rise in share price on average, holding all other included independent variables constant. The model B (with the half a year lag) suggests almost the same effect of the strategic CSR score. Importantly, this impact is considerably larger than that of the secondary CSR, which is also strongly statistically significant, with the estimated value suggesting the respective increases in share price of only 0.30% or 0.35%. The impact of the strategic CSR is thus by circa 103% or 77% higher compared to the secondary CSR for the model A or B, respectively. The impact of the control variables and the goodness of fit of the model stay largely similar to the models with the overall ESGC Score.

An additional econometric concern of these regression outputs is the relatively high correlation between strategic and secondary CSR of 62%, see Figure 1. We thus again conduct the VIFs analysis. The control variables' results are comparable to the models with the overall ESGC Score. In contrast, the VIF for the strategic CSR variable is equal to 1.84 and for the secondary CSR 1.72 for both models. As all the VIFs values are even below the conservative level, we conclude that the correlation between the strategic and secondary CSR is not an issue in our case. Although regressions with only the strategic CSR score or only the secondary CSR score are not advisable because of the large potential for a biased estimator due to an implicitly imperfect proxy variable for CSR in such a model, the results are qualitatively comparable to those presented in Table 5, with naturally inflated *t*-statistics of the secondary CSR score.

As another important robustness check, regression results for models containing RDPS_zero or RDPS_ind_avg are included in "Regression Results for the Strategic and Secondary CSR Con't" section, Table 8. The impacts of the Strategic_CSR and Secondary_CSR are again largely comparable with results based on RDPS_perc_rev across all four new models with the impact of the strategic CSR score being estimated by 33% to 61% higher compared to the secondary CSR score, depending on the specification of the model.

Statistical Significance of the Difference

The working hypothesis H3 requires rigorous testing of the statistical difference between the estimated coefficients of the strategic CSR and secondary CSR. Econometrically, we can translate this hypothesis to $H_0 : \hat{\beta}_6 - \hat{\beta}_7 \leq 0$ vs. $H_A : \hat{\beta}_6 - \hat{\beta}_7 > 0$. One can standardly test this via a one-side *t*-test; however, the standard error of a linear combination of parameter estimates needs to be taken into account. Therefore, the test statistic follows:

$$t = \frac{\hat{\beta}_6 - \hat{\beta}_7}{\sqrt{var(\hat{\beta}_6) + var(\hat{\beta}_6) - 2cov(\hat{\beta}_6, \hat{\beta}_7)}} \sim t_{Obs.-8}. \quad (7)$$

For the model with the quarter a year lagged explanatory variables, the *p*-value of the test is 4.76%. We can thus reject the null hypothesis H_0 at the standard 5% significance level in favor of the alternative H_A and conclude that the strategic CSR has a statistically significantly higher impact than the secondary CSR. For the model with the half a year lagged explanatory variables, the same conclusion about a statistically significant difference of the impact of the strategic and secondary CSR holds at the, also widely accepted, 10% significance level as the *p*-value = 7.23%.

Table 6 Regression results for randomly selected strategic and secondary CSR

	Dependent variable: Log(*P*), −1/4y		
Random case	1	2	3
NIPS	0.053***	0.053***	0.054***
	(0.013)	(0.013)	(0.013)
BVPS	− 0.001	− 0.001	− 0.001
	(0.001)	(0.001)	(0.001)
LTDTA	0.004***	0.005***	0.005***
	(0.001)	(0.001)	(0.001)
Log(Assets)	0.553***	0.560***	0.567***
	(0.034)	(0.033)	(0.034)
RDPS_perc_rev	0.046**	0.046*	0.048**
	(0.017)	(0.018)	(0.018)
Strategic_CSR	0.0046***	0.0043***	0.0042***
	(0.0011)	(0.0010)	(0.0010)
Secondary_CSR	0.0045***	0.0047***	0.0040***
	(0.0010)	(0.0011)	(0.0012)
Observations	4,805	4,805	4,805
R^2	0.422	0.419	0.415
Adjusted R^2	0.364	0.360	0.356
F(7; Obs.−7)	455.8	449.7	442.9

Note: $\cdot p < 0.1$; $*p < 0.05$; $**p < 0.01$; $***p < 0.001$

Sensitivity Check

Finally, a sensitivity check is conducted using random assignments of CSR categories into strategic or secondary for the given industry. This verifies whether the estimated effects of the two CSR scores change substantially when the classification changes. Table 6 shows regression results with three different random CSR classifications. The results show that while the statistical significance of the two new CSR scores is maintained, the estimated coefficients for both randomly-assigned 'Strategic_CSR' and 'Secondary_CSR' variables randomly oscillate around the similar value, circa 0.0044. While in the random case 1 the effects are practically the same, in the random case 2 the impact of the 'Secondary_CSR' slightly exceeds the impacts of the 'Strategic_CSR', and finally in the random case 3 the situation reverses. This is in sharp contrast with the results obtained using the Sustainability Accounting Standards Board (2021)-based classification, for which the estimated coefficient for the Strategic_CSR is consistently higher up to 103% than for the Secondary_CSR across all model specification (see Table 5 and Table 8). Moreover, the effect of the strategic CSR score on share price is always lower for the examined random classifications compared to the SASB industry-specific classification presented in Table 4. We thus verify that a careful selection of company strategic CSR activities leads to a better stock market performance compared to cases when CSR policies are potentially chosen randomly.

Discussion

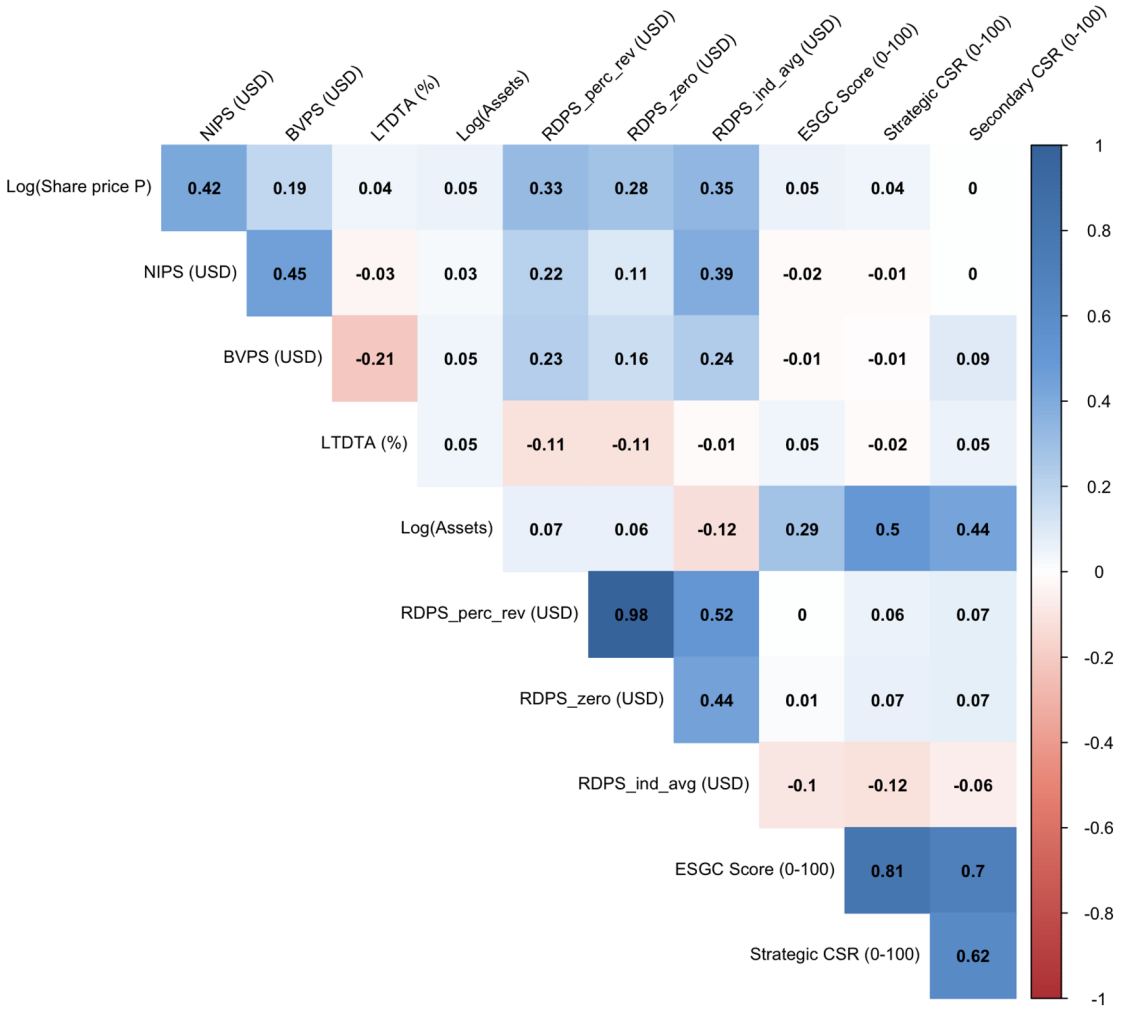
Estimation results in "Estimation" section support our expectation and suggest that the working null hypothesis H1 is rejected in favor of the alternative even at the 0.1% significance level. The results demonstrate a statistically and, more importantly, economically significant positive relationship between CSR and firms' stock market performance in the period after the financial crisis.

"The Impact of the Strategic and Secondary CSR" section provides additional statistical evidence that the working null hypothesis H2 regarding potential statistical insignificance of the strategic CSR variable can also be vigorously rejected. Moreover, in all estimated models, the estimated impact of the strategic CSR score on share prices is positive and up to 103% higher compared to the secondary CSR score, depending on the specification of the model.

Finally, "Statistical Significance of the Difference" section reveals that also the working null hypothesis H3 dealing with potential statistically insignificant difference between impacts of the strategic and secondary CSR activities can be rejected at the standard 5% and 10% significance levels, respectively, for models A and B. We can thus conclude that the strategic CSR activities have a statistically significantly higher impact on the U.S. companies' stock market performance than the secondary CSR. Overall, our results suggest that companies should focus on the strategic CSR activities that are closely related to their business core to achieve better financial performance.

Conclusion

This paper examines the impact of Corporate Social Responsibility (CSR) on companies' stock market performance, measured in terms of share price, in the period after the global financial crisis. We further distinguish between strategic socially responsible activities directly related to a company's business core, and the remaining CSR activities, called secondary. We analyze whether strategic and secondary CSR engagement has a different impact on share prices.



Note: The correlation matrix color gradually changes from dark blue ($\rho = 1$) through white ($\rho = 0$) to dark red ($\rho = -1$) as the Pearson correlation coefficient ρ decreases, see the specific range of colors on the right side of the figure. The presented values are based on an unbalanced panel of $N = 6,696$ observations and rounded to two decimal digits.

Fig. 1 Descriptive statistics of the dataset: Correlations

The link between the CSR and Corporate Financial Performance (CFP) of companies have been examined and discussed in the academic literature since 1972. Still, no general consensus has been reached for the question of whether CSR affects financial results positively, negatively, or not at all. This analysis is conducted with a novel CSR measure released by Thomson Reuters in 2017, called the Environmental, Social, and Governance Combined Score (ESGC Score). The reexamination of the impact of CSR on CFP with this unique proxy for the socially responsible activities of companies provides the latest insight into the field and helps to clarify the relationship between CSR and stock market performance after the global financial crisis. The dataset is an unbalanced panel containing CSR percentile rank scores together with yearly financial and R&D data for a sample of 486 constituents of the S&P 500 Index, which covers a substantial portion of the U.S. stock market capitalization for the period 2007–2020. The link between CSR and stock market performance is estimated via FE regression under (industry-)clustered robust standard errors.

The results show a statistically and economically significant positive impact of CSR on companies' stock market performance. A one percentile point increase in the ESGC Score is associated with an increase in share price between 0.8% and 0.9%, depending on the model's specification. The

Table 7 Regression results with missing R&D equal to 0 or industry average

	Dependent variable: Log(P)			
	C: −1/4y	D: −1/2y	E: −1/4y	F: −1/2y
NIPS	0.006·	0.005·	0.052***	0.047***
	(0.003)	(0.003)	(0.014)	(0.012)
BVPS	0.003***	0.003***	− 0.0008	− 0.0005
	(0.0007)	(0.0005)	(0.001)	(0.001)
LTDTA	0.006***	0.007***	0.004***	0.006***
	(0.001)	(0.001)	(0.001)	(0.001)
Log(Assets)	0.626***	0.633***	0.593***	0.603***
	(0.032)	(0.032)	(0.032)	(0.032)
RDPS_zero	0.048**	0.055**		
	(0.017)	(0.017)		
RDPS_ind_avg			0.036*	0.045**
			(0.016)	(0.016)
ESGC Score	0.0085***	0.0090***	0.0083***	0.0087***
	(0.0009)	(0.0009)	(0.0009)	(0.0009)
Observations	5,402	5,403	4,864	4,865
R^2	0.392	0.425	0.421	0.448
Adjusted R^2	0.332	0.369	0.363	0.392
F(6; Obs.−6)	528.8	606.7	536.0	596.8

Note: $\cdot p < 0.1$; $*p < 0.05$; $**p < 0.01$; $***p < 0.001$

Table 8 Regression results for the strategic and secondary CSR con't

	Dependent variable: Log(P)			
	C: −1/4y	D: −1/2y	E: −1/4y	F: −1/2y
NIPS	0.006·	0.005·	0.053***	0.048***
	(0.003)	(0.003)	(0.013)	(0.012)
BVPS	0.003***	0.002***	− 0.001	− 0.0008
	(0.0007)	(0.0006)	(0.001)	(0.0009)
LTDTA	0.006***	0.007***	0.005***	0.006***
	(0.001)	(0.001)	(0.001)	(0.001)
Log(Assets)	0.608***	0.611***	0.567***	0.575***
	(0.033)	(0.033)	(0.033)	(0.033)
RDPS_zero	0.031·	0.037*		
	(0.018)	(0.018)		
RDPS_ind_avg			0.027*	0.035*
			(0.014)	(0.014)
Strategic_CSR	0.0052***	0.0057***	0.0058***	0.0059***
	(0.0011)	(0.0011)	(0.0011)	(0.0012)
Secondary_CSR	0.0039***	0.0043***	0.0036***	0.0041***
	(0.0009)	(0.0010)	(0.0010)	(0.0010)
Observations	5,402	5,403	4,864	4,865
R^2	0.390	0.425	0.422	0.449
Adjusted R^2	0.330	0.368	0.364	0.394
F(7; Obs.−7)	449.5	518.7	461.3	515.2

Note: $\cdot p < 0.1$; $*p < 0.05$; $**p < 0.01$; $***p < 0.001$

results thus support the broad hypothesis of CSR proponents that socially responsible activities of companies result in outcomes such as customer loyalty, employee satisfaction, and lower litigation charges, which is in turn reflected in the financial results of the company.

We further innovatively examine the importance of different types of socially responsible activities that companies pursue; that is, we assess whether various CSR initiatives contribute equally to better financial results. The CSR activities originally grouped into 10 ESG categories by Thomson Reuters are denoted either as strategic or secondary for each industry following the Materiality Map by Sustainability Accounting Standards Board (2021). Consequently, for every company, the strategic CSR score and the secondary CSR score are calculated depending on the industry in which the company belongs. To the best of our knowledge, such a distinction between CSR activities has not been made in the academic literature.

The results indicate that strategic CSR activities have a statistically and economically significant positive impact on a company's stock market performance. A one percentile point increase in the strategic CSR score is associated with an increase in share price of about 0.6%, depending on the model's specification. Importantly, this impact is statically significantly larger than that of the secondary CSR with the estimated values suggesting the respective increases in share price of only about 0.35%. These results empirically support the views of some famous theoretical economists (Bénabou and Tirole, 2010) and business strategists (Kramer and Porter, 2011), who claim that economic and social value creation are closely connected.

Table 9 Matching between the Thomson Reuters and SASB Materiality Map industry groups

TR industry (sub)group	SASB sector: industry subgroup(s)
I. Basic Materials	Extractives & Minerals Processing: Construction Materials; Metals & Mining
	Resource Transformation: Chemicals, Containers & Packaging
II: Consumer Cyclicals	
a. Automobiles & Auto Parts	Transportation: Auto Parts; Automobiles
b. Cyclical Consumer Products	Consumer Goods: Apparel, Accessories & Footwear; Building Products & Furnishings; Toys & Sporting Goods
c. Cyclical Consumer Services	Services: Casinos & Gaming; Hotels & Lodging; Leisure Fac.; Media & Entertainment
	Technology & Communications: Internet Media & Services
d. Retailers	Consumer Goods: Multiline and Specialty Retailers & Distributors
	Food & Beverage: Food Retailers & Distributors
III: Consumer Non-Cyclicals	Food & Beverage
	Consumer Goods: Household & Personal Products
IV: Energy	Extractives & Minerals Processing: Coal Operations; Oil & Gas (complete)
V: Financials	Financials: Consumer Finance; Investment Banking & Brokerage
VI: Healthcare	Health Care
VII: Industrials	
a. Industrial & Commercial Services	Infrastructure: Engineering & Construction Services
	Services: Advertising & Marketing; Professional & Commercial Services
b. Industrial Goods	Resource Transformation: Aerospace & Defense; Industrial Machinery & Goods
c. Transportation	Transportation w/o Auto Parts and Automobiles
VIII. Real Estate	Infrastructure: Real Estate; Real Estate Services
IX: Technology	
a. Fintech & Infrastructure	Technology & Communications: Software & IT Services
	Financials: Consumer Finance
b. Software & IT Services	Technology & Communications: Software & IT Services
c. Technology Equipment	Technology & Communications: EMS & ODM; Hardware; Semiconductors
	Resource Transformation: Electrical & Electronic Equipment
d. Telecommunication Services	Technology & Communications: Telecommunication Services
X: Utilities	Infrastructure: Electric Utilities & Power Generators; Gas Utilities & Distributors; Water Utilities & Services

Source: authors, Sustainability Accounting Standards Board (2021), and Thomson Reuters (2021)

Table 10 Matching between the SASB Materiality Map and ESG categories

SASB Dimension	SASB Business Issues Category	ESG Category (Pillar)
Environment	GHG Emissions	Emissions (1)
	Air Quality	Emissions (1)
	Energy Management	Resource Use (1)
	Water & Wastewater Management	Resource Use (1)
	Waste & Hazardous Materials Management	Emissions (1)
	Ecological Impacts	Resource Use (1)
Social Capital	Human Rights & Community Relations	Human Rights/Community (2)
	Customer Privacy	Human Rights (2)
	Data Security	Product Responsibility (2)
	Access & Affordability	Community (2)
	Product Quality & Safety	Product Responsibility (2)
	Customer Welfare	Community (2)
	Selling Practices & Product Labeling	CSR Strategy (3)
Human Capital	Labor Practices	Workforce (2)
	Employee Health & Safety	Workforce (2)
	Employee Engagement, Diversity & Inclusion	Workforce (2)
Business Model & Innovation	Product Design & Lifecycle Management	Product Responsibility (2)
	Business Model Resilience	Innovation (1)
	Supply Chain Management	Innovation (1)
	Materials Sourcing & Efficiency	Innovation (1)
	Physical Impacts of Climate Change	Innovation (1)
Leadership & Governance	Business Ethics	Management (3)
	Competitive Behavior	Management (3)
	Management of the Legal & Regulatory Environment	CSR Strategy (3)
	Critical Incident Risk Management	Management/CSR Strategy (3)
	Systemic Risk Management	Management (3)

Source: authors, Sustainability Accounting Standards Board (2021), and Thomson Reuters (2021)

From a practical perspective, the results suggest that companies should strategically select what type of CSR initiatives they engage in because socially responsible activities that are strategically related to the core of their business would produce considerably larger financial benefits. Our findings hence provide useful advice for corporations when considering investments into CSR and suggest the importance of a sound consideration of the suitability of specific CSR actions for different industries.

In future research, the relationship between CSR and CFP can be examined with different datasets covering other geographical areas as the ESGC Score is also available for companies outside the S&P 500 Index. Moreover, further refinement of the distinction between strategic and secondary CSR activities could be based on additional consultation with professionals from each industry.

Appendix A: Multicollinearity Assessment: Correlations

Appendix B: Regression Results Con't

Appendix C: Regression Results for the Strategic and Secondary CSR Con't

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Data Availability The data that support the findings of this study are available from the Refinitiv Eikon database (Thomson Reuters, 2021, accessed 2021-01-28). Restrictions apply to the availability of these data, which were used under license for this study. Data are available at https://eikon.thomsonreuters.com with the permission of Thomson Reuters.

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