STOCKHOLM SCHOOL OF ECONOMICS
Department of Accounting
BE351 Degree Project in Accounting and Financial Management
Spring 2025

The Association Between Abnormal CSR and Financial Performance

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Abstract

This study investigates the relationship between abnormal Corporate Social Responsibility (CSR) performance and financial performance in the European market. Building on the microeconomic optimization framework introduced by Lopatta et al. (2024), we distinguish between "normal" CSR – defined as the firm-specific optimal level of CSR activity – and "abnormal" CSR, which captures underinvestments and overinvestments relative to this optimum. Using ESG data from Refinitiv Eikon for publicly listed European firms, between 2016 to 2023, and firm characteristics from Compustat Global, we first predict the optimal CSR levels by regressing CSR performance on accounting characteristics. Secondly, we regress financial performance on normal and abnormal CSR performance. Our findings indicate some support to the hypotheses that while normal CSR does not negatively affect financial performance, abnormal CSR is associated with reduced profitability, suggesting a concave (inverse U-shaped) relationship. The result might highlight the importance of strategic CSR investment aligned with firm-specific characteristics. Importantly however, is that our robustness tests indicate sensitivity to the model specification, which leaves us to interpret these findings with some prudence. This study contributes to the CSR literature by implementing the framework of an inverse U-shaped relationship between CSR and financial performance to the European context, expanding on prior U.S focused research.

Keywords: Financial Performance, Abnormal CSR, Normal CSR, Neoclassical Firm Theory, Inverse U-shape.

Supervisor: Irina Gazizova, Assistant Professor at the Department of Accounting.

Acknowledgements: We want to recognize our supervisor Irina Gazizova for her immense support and invaluable feedback.

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1 Introduction

1.1 The Relationship Between CSR and Financial Performance

This study aims to further expand on the research of Corporate Social Responsibility (CSR) and its relationship with financial performance. Our main area of interest is to investigate under- and over-investments in CSR. While the assumption of a linear relationship between CSR and financial performance is common, we believe the investment perspective might bring additional value. As CSR improvements require financial resources, it could be believed that there comes a point where additional CSR investments would cost more than the benefits it creates, much like any other investment. If reality captures these characteristics for CSR, it seems reasonable to assume that CSR investments could be captured with an optimal level of investments that yields a maximum return on total financial performance (Lundgren, 2011). Here, underinvestments would imply foregone positive net present value projects, and overinvestments result in the marginal cost outweighing the marginal benefit. In other words, this relationship would be captured as an inverse U-shape with a maximization point.

To give a more tangible example of how this maximization issue and inverse U-shape would look like in practice, with diminishing returns, we can imagine old equipment at a firm. By replacing, for example, old machinery, the CO_2 emissions can be reduced relatively cost-efficiently in the beginning. This would result in relatively "cheap" increase in CSR performance, granting in turn financial gains (eg. differentiation, reduced risk, improving operations). However, going beyond this point proves more costly - with new machinery, it will be more expensive to further reduce CO_2 emissions, as it would require larger and more systemic improvements over the whole production process, or a completely new business model, which might not even reduce emissions significantly. This would imply that the marginal cost of reducing CO_2 emissions becomes increasingly larger - hence you wish to invest in CSR until the marginal cost equals the marginal gains. Another example is product labels - investing resources to get "climate-friendly" (low impact on climate change) as a label might be attractive to multiple stakeholders. However, moving from climate-friendly to "climate neutral" (no impact on climate change) will likely cost more, while the marginal effect of, for example customer acquisition, will decline, as the firm has already invested in CSR-related attributes before. These two cases show that the relative benefits become increasingly costly over time, supporting our assumption of an inverse U-shape relationship.

To capture these dynamics, we follow prior research and use CSR performance as a proxy for CSR investments. Additionally, we will split up the firm's CSR investments into two components, one optimal that yields the maximum financial performance; "normal CSR level", and a suboptimal component which occurs when deviating from the optimal

level; “abnormal CSR level” (Lopatta et al., 2024).

1.2 The Importance of CSR

The area of CSR has become an increasingly important topic in the field of accounting research, where the relationship between CSR and financial performance is one of, if not the most, popular and studied topic within the field of CSR research (Friede et al., 2015). One reason behind this is because of the rapidly changing environment within policies and regulations, and consequently, the substantial increase in the expenditures that companies make on CSR related issues. The consulting firm EPG published a report, which found that among US and UK Fortune Global 500 companies, they spent $15.2 billion on CSR in 2013 (Smith, 2014). In 2022 it had increased to $20 billion (School, 2022). However, although the importance of CSR seems apparent, the link and consequences of CSR expenditure remains an important research area with yet inconclusive relationships. The empirical studies commonly find conflicting results, as some find a negative relationship, no relationship, or mixed results between CSR performance and firm performance. As there still are no results that can unanimously be agreed upon, it is reasonable to assess this matter to be relevant for further research (Garcia-Castro et al., 2010; Margolis & Walsh, 2003).

Although it is not known exactly why these inconsistencies occur, there are several potential reasons. Based on previous studies, these mixed findings could be a result of different definitions and measurements of CSR, causing comparability issues (Diebecker et al., 2019) and different theoretical approaches (Garcia-Castro et al., 2010; McWilliams & Siegel, 2000). It has also been argued that econometric concerns could play a role, such as endogeneity, measurement error, and omitted variable bias (Garcia-Castro et al., 2010). However, recently another factor argued to potentially play an important role is the relationship between CSR performance and financial performance itself. Common practice is to assume a linear relationship, with CSR performance being for the most part measured at an absolute level (Barnea & Rubin, 2010; Fatemi et al., 2015). One of the first to challenge this assumption of linearity is Lopatta et al. (2024), who instead split CSR into two components. This is what allows us to investigate non-linear relationships between normal CSR, abnormal CSR, and financial performance.

1.3 Hypotheses & Methodology Overview

In this research paper we intend to investigate CSR and its relationship to financial performance. More formally, our research question can be stated as: What is the association between abnormal CSR performance and financial performance in the European market? To investigate this topic, we have three hypotheses to investigate through our regression models:

H1: Normal CSR performance is not negatively associated with a firm's profitability.

H2a: Abnormal CSR is negatively related to firm profitability.

H2b: The relationship between abnormal CSR and firm profitability is concave (i.e., larger values of abnormal CSR have a stronger negative relation with firm profitability).

More elaborate explanations behind these specific hypotheses can be found under the literature review. In terms of methodology, we will be using Refinitiv Eikon ESG data as a proxy for CSR investments. The study will be conducted with the focus on the European market, to extend on Lopatta (2024) as they evaluate U.S. listed companies. Additional data for the more typical accounting information, such as firm size, market-to-book ratio, growth etc. will be gathered using Compustat Global.

When conducting the research, we will follow three main steps. In the first regression, we will aim to predict a firm-specific optimal level of CSR output or investment, or in other words, the CSR equilibrium. To do this we will be using accounting characteristics; firm-level variables. For instance, size is one crucial variable as CSR demand may be driven by firm size, as they are more visible to the media (Di Giuli & Kostovetsky, 2014) and financial constraints, as financially constrained firms will face higher costs to finance CSR investments, relative to less constrained companies (Hong et al., 2012). We will be conducting the analysis with additional independent and controlling variables, which will be discussed more in detail under method (section 3).

The second stage of our model will determine whether a firm has under- or overinvested in CSR. We will use the output from the first regression, the predicted optimum level of CSR, and subtract it from the actual CSR value we have retrieved for the specific firm from Refinitiv Eikon. If a company has invested at its optimum, the firm can then be said to be operating at a normal CSR expenditure level that yields maximum financial gains. However, if the predicted value is higher than the actual value, we will get a negative output, indicating an underinvestment (and vice-versa). In the third and last step, we will link the CSR components and their relationship to financial performance through our second regression.

1.4 Our Contribution

The methodology conducted by Lopatta et al.'s (2024) study has contributed to the problem area of CSR investments by challenging the assumption of linearity (King, 2023; Ohlson, 1995). Instead, they propose the idea that each firm has an individual, firm-specific normal level of CSR investments based on non-linear microeconomic theory. A substantial body of research (Masulis & Reza, 2015; Petrovits, 2006; Wang et al., 2008)

uses this microeconomic framework to conclude that there is a negative and significant relationship between abnormal CSR spending and financial performance. However, despite evidence supporting this hypothesis, it has not been established as the common view on the CSR-financial performance relationship. To determine whether there is a negative and significant link between abnormal CSR spending and financial performance, Lopatta et al.'s (2024) study needs replication across different settings, time periods, and CSR valuation criteria. Therefore, we aim to contribute to the CSR research field by using the same methodology as in Lopatta (2024), but applying the model to a European setting in contrast to the U.S. focus of their original study. Additionally, we also conduct our research in a new time period (2016–2023 compared to the original 1991–2013) as well as using a different dataset (Eikon Refinitiv instead of the KLD approach) to evaluate CSR and its relationship with financial performance.

1.5 Indication of Results

In our analysis we find some evidence to support all our three hypotheses. Our results show that the normal CSR component is insignificant, supporting H1, while the squared term for abnormal CSR is consistently negative and significant, supporting H2a and H2b. Hence, the framework introduced by Lopatta et al. (2024) does seem to have empirical usefulness, and the relationship between CSR and financial performance therefore may be illustrated as an inverse U-shape in the European market. However, in our robustness tests we found these conclusions to experience some degree of sensitivity, therefore one should approach these findings with prudence.

1.6 Paper Overview

This paper is structured as follows. In the next section, we will discuss prior research in our literature review. Section 3 will elaborate on our methodology, research design, data sources as well as our sample selection process. In section 4 we will present our findings and analysis of results from our study combined with additional robustness tests. In section 5 we will discuss our findings from a theoretical and practical perspective. Section 6 provides a conclusion of this paper, as well as limitations and proposed ideas for further research. Lastly the reader can find our reference list and appendix in section 7 and 8.

2 Literature Review

2.1 The link between CSR and Financial Performance

The relationship between CSR performance and financial performance is a well-established topic within market-based accounting research, particularly in the context of how accounting information is reflected in stock prices. The theoretical foundation for market-based CSR research is the Residual Income Valuation (RIV) model, introduced by Ohlson in 1995. The specific application of the RIV model often varies between studies based on different assumptions about how information flows within the economy. However, Walker's 1997 variation of Ohlson's RIV model remains the most widely used. In this version, an additional variable, v, captures other value-relevant information that affects the stock price in the current period (t), while influencing book value, earnings, and dividends first in the following period ($t+1$). In CSR-related studies that build on Walker's framework, such as the work by (Hassel et al., 2005), the v variable is set to represent CSR performance.

Apart from the RIV-model-based approach, a second major body of research in the field of market-based CSR research examines how CSR performance is useful in forecasting accounting performance. These studies do not examine how CSR information is reflected in stock prices but instead regress financial performance indicators (e.g., ROE or ROA) on CSR performance while controlling for other variables thought to influence financial performance (Eccles et al., 2014; King, 2023). These studies are not based on valuation theory, but solely examine the strength of the association between CSR and financial performance as a form of scaled correlation.

The reader may find it unusual that we begin by presenting the two main research methods within market-based CSR research without first explaining why a relationship between CSR and financial performance might be expected. However, as discussed later in the section on past findings, there is no widely accepted view of this association. Instead, researchers have tested a broad range of hypotheses—both positive, negative, and open-ended—using the two methods outlined above. The results have been mixed. In what follows, we present some common interpretations that researchers have proposed to explain these differing outcomes.

Among RIV-model-based CSR studies showing a negative relationship between CSR performance and market value, common explanations are as follows: investors view strong CSR performance as a way to mask weak book values or poor financial results (Guo et al., 2024); CSR activities are seen as reducing profits without lowering risk, leading rational investors to react negatively (Yoon et al., 2024); and the costs of CSR investments are immediate, while the benefits are long term, deterring short-term-focused investors (Yoon & Chung, 2018). Within research showing a negative association between CSR perfor-

mance and accounting performance (e.g., ROE or ROA), the proposed intuition mainly relies on the time horizon of CSR investments. The costs of CSR investments are often immediate and substantial, whereas the benefits are rather long-term, multidimensional, and unobservable, lowering accounting performance in the short term (Lopatta et al., 2024).

Among RIV-model-based CSR studies showing a positive relationship between CSR performance and market value, the following mechanisms have been proposed: CSR investments improve stakeholder management, such as by reducing conflicts with parties like regulators. High-CSR firms tend to have greater institutional ownership, leading to a more stable shareholder base and lower stock volatility. As a result, investors view these firms as less risky. They also tend to place more trust in high-CSR firms and are more likely to interpret positive earnings surprises as signs of a well-managed organization (Brown & Dacin, 1997; T. Chen et al., 2020; Lev et al., 2010; Wang et al., 2008). Note how this view contrasts with the explanations given in RIV-model-based studies that report a negative relationship between CSR performance and market value.

Within research showing a positive association between CSR performance and accounting performance (e.g., ROE or ROA), two main explanations have been suggested: CSR investments may, especially in the long run, create CSR-driven product differentiation, which can result in increased customer awareness and build a firm's competitive advantage (Luo & Bhattacharya, 2006; McWilliams & Siegel, 2001; Servaes & Tamayo, 2013). Firms with higher CSR may attain increased worker productivity, loyalty, and commitment (Brammer et al., 2007; Collier & Esteban, 2007; Kim et al., 2010). As a final remark, note how the views among studies examining CSR as a predictor of accounting performance do not conflict to the same extent as those within RIV-model-based CSR research.

2.2 Results from past studies

In the previous subsection, we presented the explanations researchers have proposed to account for the relationship between CSR and financial performance. We now turn to summarizing the overall findings of the research in this area. In a comprehensive review, Margolis & Walsh (2003) examined 127 studies on the association between CSR and financial performance. Of these, 54 found evidence of a positive relationship, while the remaining 73 reported no relationship, a negative relationship, or mixed results. A similar summary is provided by Friede et al. (2015), who also highlight the mixed and inconclusive nature of the findings in this field. It should also be noted that some studies that initially found a strong positive link have failed replication, as in Eccles et al. (2014). Overall, the most common suggestions by researchers in the field is that CSR performance has either a positive and insignificant, or neutral and insignificant,

relationship with financial performance (Lopatta et al., 2024).

2.3 The need of alternative methods for studying the topic

The conflicting findings and proposed explanations regarding the relationship between CSR and financial performance suggest that the two dominant methodological approaches in the field may be inadequate. As discussed in the introduction, commonly cited limitations of RIV-model-based CSR research and studies treating CSR as a predictor of accounting performance include a lack of comparability, divergent theoretical foundations, and various econometric concerns.

However, a more recent critique focuses on the underlying assumptions these studies make about the nature of the CSR–financial performance relationship itself. Both RIV-based CSR research and studies using CSR as an explanatory variable for accounting performance typically assume a linear relationship, wherein financial performance is the dependent variable and CSR the independent variable of interest.

To illustrate the implications of the linearity assumption, consider the following maximization problem. Without loss of generality, let benefit(CSR) represent the benefits of an arbitrary CSR investment and cost(CSR) represent the associated costs. In an efficient economy, Formula 1 must hold.

Formula 1: CSR optimization problem

$$\max_{\text{CSR}} \left[\text{benefit}(\text{CSR}) - \text{cost}(\text{CSR})\right],$$

where the marginal benefit of CSR equals the marginal cost of CSR:

$$\text{Marginal Benefit}(\text{CSR}^*) = \text{Marginal Cost}(\text{CSR}^*)$$

In equilibrium, the firm will invest the amount CSR^* such that the marginal benefit equals the marginal cost (Varian, 2010). There is no debate among scholars that marginal benefit must equal marginal cost at the point of profit maximization. Rather, the debate concerns the specific shapes of the benefit and cost functions.

As previously discussed, the common convention in the field is to assume a linear relationship between CSR and financial performance. This assumption implies that the marginal effect of a one-unit increase in CSR performance on financial performance remains constant across all levels of CSR engagement. For example, consider the intuition often presented in RIV-based CSR research; that investors may interpret strong CSR performance as a signal intended to mask weak book values. A linear model would imply that any marginal increase in CSR performance is perceived as equally suspicious, regardless of the firm's initial CSR level. Similarly, in studies examining CSR as a predictor of accounting performance, one proposed mechanism is that CSR investments

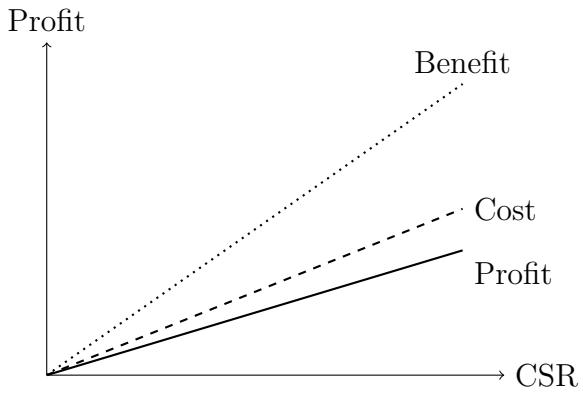


Figure 1: Linear association

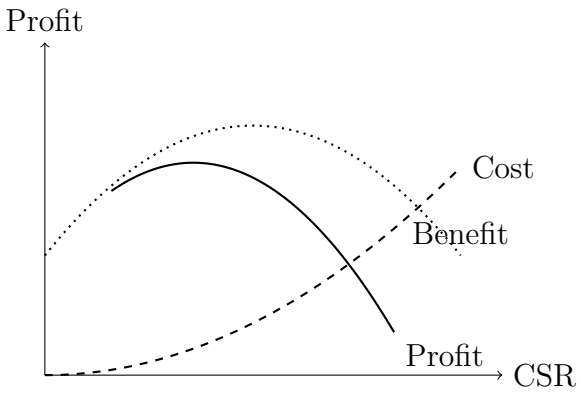


Figure 2: Inverse U-shaped association

may lead to product differentiation. A linear model assumes that a marginal increase in CSR performance results in the same improvement in product differentiation, regardless of the initial level of CSR engagement (Figure 1).

In accordance with Lopatta et al. (2024), we argue that the assumption of linearity might not fully mirror the complexities of the real-world relationship between CSR and financial performance. We propose that CSR investments, like any other type of investment, should follow the relationship outlined by neoclassical firm theory (Hillman & Keim, 2001; McWilliams & Siegel, 2000). Building on Barnea and Rubin (2010), who were among the first to develop a theoretical framework for the supply and demand mechanisms surrounding CSR, we argue that the law of diminishing returns applies to CSR investments.

As such, the CSR cost function must be convex (not linear or concave) due to increasing marginal costs: as the firm invests more, it becomes increasingly expensive to produce additional CSR output. Conversely, the CSR benefit function must be concave (not linear or convex) because of diminishing marginal returns: each additional unit of investment yields a smaller increase in benefit. Subtracting the CSR cost function from the CSR benefit function yields an inverse U-shaped financial performance curve (Figure 2). To provide a tangible example, recall the discussion presented in the introduction on moving from "climate-friendly" to "climate-neutral" branding.

Based on this discussion of scholars' assumptions about the CSR benefit and cost curves, we formulate our argument for the need for further research: Earlier studies have applied the assumption of a linear relationship between CSR and financial performance in their models, which might be simplifying the complexities of reality. Given that the CSR benefit function is concave and the cost function is convex, there is a strong need for research examining the relationship as an inverse U-shaped association.

2.4 CSR as an Investment Optimization Problem

In the previous subsection we defined the optimal level of CSR output. We now elaborate on how Barnea and Rubin (2010) use the inverse U-shape relationship between CSR and financial performance to define the terms normal versus abnormal CSR. First of all Barnea and Rubin (2010) extend the optimization problem to apply equally to CSR investments, i.e. at the optimal level the firm invests an amount – CSR*– such that marginal benefit equals marginal cost. This optimal point they then refer to as normal CSR investment, which is located at the top of the inverse U-shaped curve, making it the most attractive (Lundgren, 2011). Hence each firm will pursue the normal CSR investment level, assuming that they pursue a profit maximization strategy (Yoshikawa, 1980).

The suboptimal, or abnormal component, on the other hand is any investment that deviates from the optimal level. The abnormal CSR component stems from issues based on CSR management and agency complexities. The concave relationship consequently results in CSR being expected to increase financial performance at a decreasing rate up to the equilibrium. Going beyond the equilibrium would then decrease financial performance at an increasing rate. This implies that the further away we go from the optimal level, the greater the negative impact on financial performance. In simple terms, since we assume that there are diminishing returns from investments, the intuition is that any point which is not located at the maximization points yields lower return than the theoretical maximum - regardless if it is an underinvestment or an overinvestment (Lopatta et al., 2024; Lundgren, 2011).

There are many potential causes for these types of suboptimal investments. For example, underinvestments might be a result of firms trying to manage their corporate reputation without creating stakeholder value, effectively engaging in 'greenwashing' (Beder, 1998; Laufer, 2003). CSR investments often result in long-term benefits, which may cause management to avoid these investments to limit cash outflows (Deng et al., 2013; Edmans, 2011). Similarly, overinvestments have many potential reasons as to why they occur. One example is overinvestment in CSR as a means for CEOs of increasing their reputation as a good social citizen, combined with other benefits (Barnea & Rubin, 2010). There are also multiple managerial characteristics which may influence suboptimal investments, for instance; ownership levels, tenure, corporate governance, and how close they are to retirement (Brochet et al., 2021; S. Chen et al., 2018). To exemplify based on ownership, managers are less likely to overinvest if they own a large share in the company, as it would more directly affect their personal financial outcomes. This proposes the idea that managers may overinvest when they bare lower ownership in the company and they could gain reputational benefits, even if it comes at a price of shareholders (Barnea & Rubin, 2010). In this way, although the reasons are various, managerial characteristics

and incentives can cause suboptimal, abnormal, CSR investments.

2.5 Hypotheses development

In this study, we aim to answer the following research question: *What is the association between abnormal CSR performance and financial performance in the European market?*

More formally, we develop the following hypotheses based on the theoretical frameworks. Through this microeconomic framework and the idea that each firm has its own optimal level of CSR, companies that invest at the normal level should experience a somewhat positive effect on profitability. However, if theoretically all companies invest in the normal level, we could expect an insignificant effect. Therefore, our first hypothesis concludes that a normal level of CSR investment should result in a positive or insignificant effect on firm profitability:

H1: Normal CSR performance is not negatively associated with a firm's profitability.

For the second hypothesis, as discussed previously, the result of over- or underinvesting in CSR would be expected to be value destroying; either because marginal costs are greater than the marginal benefits (overinvestment), or because of opportunity costs (underinvestment). Hence, our second hypothesis is formulated as follows:

H2a: Abnormal CSR is negatively related to firm profitability.

For the third and last hypothesis, assuming the microeconomic framework, we expect the relationship for normal and abnormal CSR to follow an inverted U-shape. Consequently, we formally express the third hypothesis as:

H2b: The relationship between abnormal CSR and firm profitability is concave (i.e., larger values of abnormal CSR have a stronger negative relation with firm profitability).

3 Empirical Methodology

3.1 Research Design

To empirically address efficient CSR levels, we begin by recalling our definition of normal and abnormal CSR, grounded in neoclassical firm theory. We define normal CSR as the level of CSR output at which marginal benefit equals marginal cost.

3.1.1 Estimating CSR Output

While calculating a firm's theoretical optimal CSR output is conceptually straightforward, two practical challenges arise. The first is defining what constitutes a unit of CSR output. In some cases, this is clear; for example, one daycare spot or one female board appointment can reasonably be counted as one unit. However, for outputs such as community engagement or employee volunteering, unit definition becomes more ambiguous.

We address this issue by drawing on T. Chen et al. (2020), who propose a relationship between CSR output, CSR performance, and CSR investment. Regressing SG&A expenses on KLD CSR performance scores, they find that a one-point increase in the KLD score corresponds to a $40 million rise in SG&A expenses. The magnitude of this marginal change—$40 million—is not the focal point, as it is of course an imprecise measure subject to uncertainty. Rather, the key insight is that the costs of improved CSR performance can be traced to the income statement—SG&A in particular. This indicates that CSR performance, as measured in this case by the KLD score, appears to reasonably reflect both CSR output and CSR investment.

Accordingly, we argue that it is theoretically sound to use CSR performance as a proxy for CSR output in our optimization framework (Formula 1), and to extend the CSR optimization equation to also reflect CSR investment, i.e. at the optimal level, the firm invests an amount , where marginal benefit equals marginal cost. Hence optimal CSR performance can be seen as an estimate of both optimal CSR output and investment. In the Data section, we explain our choice of the Refinitiv CSR performance score.

3.1.2 Estimating the Firm-Specific Optimal Level of CSR Output

While CSR output may be proxied by CSR performance, empirically estimating optimal CSR levels remains difficult, as the underlying benefit and cost functions are unknown. Estimating such functions is already challenging for conventional goods, and even more so for CSR, where spending is less transparent, harder to track, and linked to less tangible outcomes.

One approach in the literature is to estimate CSR benefit and cost functions indirectly through the concept of expected CSR performance. This method builds on findings from studies published in the Journal of Financial Economics, which show that firm

characteristics such as size, growth, financial constraints, R&D, SG&A, and corporate governance are significant predictors of CSR performance (T. Chen et al., 2020; Cronqvist & Yu, 2017; Di Giuli & Kostovetsky, 2014). For example, CSR performance is typically lower in financially constrained firms, as they prioritize short-term, core investments over long-term, non-core, and intangible CSR activities. In contrast, large and growing firms tend to have higher CSR performance, as they attract more media attention and can benefit more from reputational and branding effects.

It is therefore reasonable to view expected CSR performance based on firm characteristics as an indirect estimate of optimal CSR output in Formula 1. If firms generally invest efficiently, differences in average CSR performance based on firm characteristics can be associated with average differences in the shape of the CSR benefit and cost functions. For instance, to continue the example above, financial constraints can be said to bend the CSR benefit and cost functions toward each other, lowering the optimal level of CSR^*. Conversely, size and growth can be said to bend the benefit and cost functions apart, raising the optimal level of CSR^*. Following this logic, we estimate the optimal level of as expected CSR performance based on firm-specific characteristics, adopting the regression model proposed by Lopatta et al. (2024).

Equation 1: CSR equilibrium model

$$\begin{aligned}\text{CSR}_{it} = {} & \beta_0 + \beta_1 \text{SIZE}_{it-1} + \beta_2 \text{ROA}_{it-1} + \beta_3 \text{BTM}_{it-1} \\ & + \beta_4 \text{LEV}_{it-1} + \beta_5 \text{DIV}_{it-1} + \beta_6 \text{R\&D}_{it-1} + \beta_7 \text{CAPEX}_{it-1} \\ & + \beta_8 \text{CASH}_{it-1} + \beta_9 \text{KZ_INDEX}_{it-1} + \beta_{10} \text{CGOV}_{it-1} \\ & + \sum_j \text{SIC2}_j + \varepsilon_{it}\end{aligned}$$

Where i and t index firm and year, respectively. For each year in our study period (2016–2023), we divide the sample into decile groups based on firm size. We then regress CSR_{it} on our control variables within each year and size decile group, resulting in 80 regressions (10 size deciles $\times$ 8 years). This approach recognizes that CSR varies meaningfully across firm size and over time, making it unreasonable to assume constant marginal effects of controls such as growth, size, or financial constraints (Jo & Harjoto, 2012). Instead, we allow the coefficient estimates of our controls to vary across both time and size deciles.

3.1.3 Variables

All control variables are taken from Compustat Global Fundamentals Annual unless stated otherwise. For ease of replication, we refer to the exact item names as listed in Compustat when describing how we measure our controls. Except for advertising

expenses, our control variables align with those used by Lopatta et al. (2024). Since advertising expenses are rarely reported as a separate line item in income statements, we were unable to collect data on this variable. While it is available in Compustat North America, it is not included in Compustat Global. Advertising expenses are occasionally used in CSR research, as firms seeking to differentiate through CSR may also invest heavily in advertising to gain media exposure, strengthen branding, and enhance reputation. However, as these effects are already captured by our controls for size and growth, the omission should not pose a concern. Our definitions of accounting variables follow Lopatta et al. (2024). References to leading studies in the Journal of Financial Economics and the Journal of Business Ethics, where our variables have been used to predict CSR performance, are provided throughout the text.

We include firm size and growth, as larger and growing firms may better absorb CSR costs and attract more public attention, leading to greater CSR engagement (Attig, 2024; Di Giuli & Kostovetsky, 2014; Lopatta et al., 2024). We measure firm size (SIZE) as the natural logarithm of sales/turnover (Jo & Harjoto, 2014; Lopatta et al., 2024). Growth is measured as the year-over-year change in sales/turnover (Attig, 2024; Jo & Harjoto, 2012), while growth opportunities are captured by the book-to-market ratio, calculated as Common/Ordinary Equity scaled by Market Value, with Market Value data obtained from Eikon (T. Chen et al., 2020; Ferrell et al., 2016).

Prior literature shows that CSR spending is positively associated with the relaxation of financial constraints. This is because CSR investments are intangible and non-core to the firm (Hong et al., 2012). Additionally, the benefits of CSR investments are uncertain and unlikely to yield short-term gains (Wickert, 2016). Thus, relaxing financial constraints may encourage firms to pursue CSR investments previously forgone due to capital preservation concerns (Attig, 2024). We capture financial constraints using the following control variables: Return on Assets (ROA): Income Before Extraordinary Items scaled by lagged Total Assets (Cronqvist & Yu, 2017). Leverage (LEV): Debt in Current Liabilities plus Long-Term Debt Total, scaled by Common/Ordinary Equity (T. Chen et al., 2020). Dividend Payout Ratio (DIV): Dividends Common/Ordinary scaled by lagged Common/Ordinary Equity (Lopatta et al., 2024). Cash Holdings Ratio (CASH): Cash and short-term investments scaled by Total Assets (Ferrell et al., 2016). KZ Index: Calculated following Lamont & Polk (2001) (Appendix).

The most problematic controls from an endogeneity perspective are the accounting items under which CSR investments are typically recorded. Two influential studies—Di Giuli & Kostovetsky (2014) and Cronqvist & Yu (2017)—demonstrate a positive association between SG&A, R&D, and CSR performance by regressing these expenses on CSR measures. However, despite this concern, it remains common practice in the field to include CAPEX, SG&A, and R&D as control variables, as seen in Uyar et al. (2023), Jo & Harjoto (2014), Jo & Harjoto (2012), Attig (2024), and Chen et al. (2020). As our study,

like these, examines association rather than causality, we include CAPEX scaled by total assets, SG&A scaled by sales/turnover (SGA), and R&D scaled by sales/turnover (R&D) (Lopatta et al., 2024).

Building on stakeholder theory (Freeman, 1984), previous research suggests that resolving stakeholder conflicts depends on effective corporate governance mechanisms alongside CSR engagements (Jo & Harjoto, 2012), indicating that corporate governance and CSR are positively associated. It is therefore standard practice to include corporate governance as a control variable, as seen in Ferrell et al. (2016), Jo & Harjoto (2012), and Lopatta et al. (2024). We measure corporate governance (CGOV) using the Refinitiv ESG Governance Pillar Score.

Finally, we control for industry characteristics. This has been a standard procedure in KLD-based research, as one would expect the fulfillment of absolute criteria—such as renewable energy adoption or policy violations—to vary due to differences in regulation and public scrutiny across industries. Since the Refinitiv ESG score is a relative measure that already accounts for industry differences, we expect industry characteristics to explain a smaller proportion of the variation in CSR in our Refinitiv-based study compared to earlier KLD-based research. However, in line with previous studies, we still control for industry characteristics (T. Chen et al., 2020; Cronqvist & Yu, 2017; Di Giuli & Kostovetsky, 2014; Ferrell et al., 2016). We estimate industry characteristics (SIC) using Compustat's two-digit SIC code.

3.1.4 Estimating the Firm-Specific Abnormal Level of CSR

The predicted value from our CSR equilibrium model (Equation 1) represents the firm-specific optimal level of CSR performance. Accordingly, the residual—the difference between the predicted value $\hat{\text{CSR}}_{it}$ and the observed value CSR_{it}—reflects the deviation from this optimal level. Referring to the predicted value as NORM_CSR, we estimate ABN_CSR as follows:

$$\text{ABN_CSR}_{it} = \text{CSR}_{it} - \text{NORM_CSR}_{it}$$

3.1.5 Examining the association between ABN_CSR and ADJ_ROE

Continuing with our main analysis, we assess the association between normal (NORM_CSR) and abnormal CSR performance (ABN_CSR) and financial performance (ADJ_ROE) using the regression model proposed by Lopatta et al. (2024):

Equation 2: Profitability model

$$\begin{aligned}\text{ADJ_ROE}_{it} = &\beta_0 + \beta_1 \text{NORM_CSR}_{it} + \beta_2 \text{ABN_CSR}_{it} + \beta_3 \text{ABN_CSR}_{it}^2 \\ &+ \beta_4 \text{ADJ_ROE}_{it-1} + \text{CONTROLS} + \sum \text{FIRM}_i\end{aligned}$$

where i and t indicate industry and year, respectively. We use industry-adjusted return on equity (ADJ_ROE) as an estimate of financial performance. The CONTROLS vector includes the same variables used to predict the firm-specific optimal level of CSR performance (Equation 1). We do not add further controls to avoid altering the definition of optimal CSR and to reduce the risk of endogeneity and omitted variable bias. As such, the control variables are selected for their relevance in explaining CSR, not necessarily financial performance—though many, such as size, growth, and financial constraints, are commonly used in both contexts.

The predicted CSR value (NORM_CSR) is used to test H1: Normal CSR performance is not negatively associated with firm profitability. The deviation from this predicted value is captured by ABN_CSR. The linear ABN_CSR term is included only for mathematical completeness, to avoid forcing the vertex of the second-degree polynomial to lie on the vertical axis. The squared term of abnormal CSR performance (ABN_CSR^2) is the variable of interest for testing H2a: Abnormal CSR is negatively related to firm profitability, and H2b: The relationship between abnormal CSR and profitability is concave. As previously noted, the rationale for including abnormal CSR performance as a quadratic term is to reflect the inverse U-shaped relationship between CSR and financial performance implied by a concave CSR benefit function and a convex CSR cost function.

Following Lopatta et al. (2024), we include the lagged dependent variable (ADJ_ROE_{it-1}) to address concerns about serial correlation. To address potential reader concerns, we also run the regressions excluding ADJ_ROE_{it-1}, as discussed in the robustness tests section. Finally, to account for omitted variable bias, we estimate the model twice: once with firm-fixed effects and once with two-digit SIC industry-fixed effects.

3.2 Data

In this section we explain our choice of CSR performance data, a key point of debate in the field.

3.2.1 CSR Performance Data

Our data on CSR performance come from Refinitiv's second version, which is the default version when accessed through their internal platforms, such as Eikon. The Refinitiv ESG

Score is widely recognized for its integrity, standardization, and rigor. It is increasingly utilized in academic research to assess corporate social responsibility (CSR) performance (Banerjee et al., 2020; Breuer et al., 2018; Stellner et al., 2015). While other providers, such as Sustainalytics, RepRisk, and MSCI, also offer ESG data, there are notable differences in their methodologies. Sustainalytics' scoring framework is not exclusively based on publicly reported and verifiable data. The RepRisk Rating incorporates reputational risk alongside ESG performance, rather than focusing solely on the latter. Additionally, MSCI's KLD database is no longer updated following the transition to the ESG Ratings Time Series Database.

Refinitiv provides comprehensive data on firm-level relative ESG performance across ten categories based on publicly reported and verifiable data. The ten categories include: Resource Use, Emissions, Environmental Innovation, Workforce, Human Rights, Community, Product Responsibility, Management, Shareholders, and Corporate Social Responsibility (CSR) Strategy. Each of these categories is assigned a weight, reflecting its perceived importance to overall ESG performance based on industry differences. For instance, environmental factors (e.g., Resource Use, Emissions) would be more heavily weighted for firms belonging to industries like energy, mining, or manufacturing, whereas social factors (e.g., Workforce, Human Rights) might have more weight for firms in industries like consumer goods, retail, or technology. In calculating a company's ESG score, Refinitiv aggregates the data across all 10 categories while accounting for their relative importance through the use of these weights. Building on the ESG score, Refinitiv also provides a Combined ESG score (ESGC) that overlays the ESG score by incorporating ESG controversies as reported in the media. In this study, we utilize the Refinitiv Environmental -, Social - and Governmental - Pillar Score, as employed by (Uyar et al., 2023).

3.2.2 Implications of Utilizing Refinitv as Opposed to KLD

In the past two decades, regression-based CSR research has been guided by influential publications in the Journal of Financial Economics, such as *Institutional Shareholders and Corporate Social Responsibility* (Chen et al., 2020), *Socially Responsible Firms* (Ferrell et al., 2016), and *Are Red or Blue Companies More Likely to Go Green?* (Di Giuli & Kostovetsky, 2014). A common practice among these studies is reliance on the MSCI KLD database. Given our use of the Refinitiv ESG Score instead, we outline below the key implications of this choice, highlighting four fundamental differences between the Refinitiv ESG Score and the MSCI KLD ESG Rating Score.

First, the KLD score is divided into strengths and concerns, where a firm is assigned a binary score of 1 (0) if it meets (does not meet) a given strength or concern criterion in a given year. This structure has been widely utilized in academic research. For

example, studies have found that age diversity is negatively correlated with Corporate Social Responsibility (CSR) strengths and concerns (Jo & Harjoto 2014), and that the Accounting Return on Assets (ARL) loads negatively (positively) and significantly on CSR concerns (strengths) (Attig, 2024). The continuous nature of the Refinitiv ESG score, which lacks this binary division, prevents us from making similar inferences about how independent variables are associated with CSR strengths and concerns separately.

Second, the KLD score is absolute, meaning that the requirements for meeting a given criterion, such as renewable energy under environmental strengths or policy violations under environmental concerns, remain consistent across industries. Relative performance is assessed by comparing firms with their peers. In contrast, Refinitiv assigns different weights to different criteria based on industry classification, making it a relative score. As a result, industry differences are more explicitly accounted for in the Refinitiv score. Consequently, we anticipate that our industry classification control variable (SIC) will explain less variation in the dependent variable (CSR) in our Refinitiv-based study compared to previous KLD-based research.

Third, because the KLD score is binary, the overall CSR score is simply the sum of all met (1) and unmet (0) criteria. This allows researchers to exclude specific criteria as deemed appropriate. This flexibility has been extensively used in academic studies, particularly in excluding corporate governance criteria so that the aggregate CSR score only comprises environmental and social criteria. The rationale for this exclusion is twofold. First, corporate governance is often not the primary focus of CSR research. Second, from a theoretical perspective, corporate governance is considered distinct from environmental and social factors in terms of associative mechanisms. Rather than being incorporated within the dependent variable (CSR), corporate governance is typically treated as an independent variable. This approach aligns with stakeholder theory, which suggests that effective corporate governance structures are positively associated with environmental and social performance, primarily through the resolution of stakeholder conflicts.

However, Refinitiv's weighting methodology, as mentioned earlier, prevents the exclusion of specific criteria as deemed appropriate. As such, we measure CSR performance as the equally weighted average of the Refinitiv Environmental and Social Pillar Scores.

Fourth, the KLD score does not account for reputational effects, which aligns with the prevailing research approach that reputational factors should not be part of the dependent variable but instead included as a control variable. The rationale is that firms receiving greater media attention have stronger incentives to improve CSR performance. Regression-based CSR research typically captures reputational effects through firm size, under the assumption that larger firms experience higher media exposure. Alternatively, some studies include media exposure as a separate control variable. By utilizing the Refinitiv Environmental - and Social Pillar Score, we ensure reputational effects are

treated as a control variable rather than being embedded in the dependent variable, in line with standard research practices.

3.2.3 Controls Data

We obtain data for the control variables—size, growth, financial constraints, and the accounting items under which CSR investments are typically recorded—from Compustat Global Fundamentals Annual. The only exception is market value, which we take from Refinitiv Eikon.

3.3 Sample selection

We collect CSR data and market value data for all publicly listed EU firms from the Refinitiv Eikon database for the period 2016–2023. CSR data availability declines significantly before 2016, so we limit the study period to eight years, as extending it would add little value. We exclude firm-year observations with a market value below $10 million (e.g., Dickinson, 2011), as such firms are often near insolvency. Extremely low market values can also distort control variables such as BTM due to unreliable denominators.

Following prior research (C. Kim et al., 2012), we exclude firms in the financial sector—around 1,400 individual firms—due to their adherence to separate accounting norms, particularly in relation to leverage. Control variables are collected from the Compustat Global Fundamentals Annual database for the same period. After merging with Refinitiv CSR data, we obtain an initial sample of 22,089 firm-year observations. This sample includes only firms for which CSR data is available for at least one year.

To predict the optimal level of CSR performance (Equation 1), we require non-missing data for all relevant variables. We drop 9,564 observations due to missing CSR data, resulting in 12,525 firm-year observations with complete CSR information. We then drop an additional 6,512 observations due to missing control variables, yielding an unbalanced final sample of 6,013 firm-year observations. All control variables are winsorized at the 1st and 99th percentiles to reduce the impact of outliers. Table 1 summarizes the sample selection process.

Table 1: Sample Selection Procedure

	Reduction	***N***
Compustat/Refinitv merged sample (2016–2023)		22,089
Missing CSR rating data from Refinitv	9,564	12,525
Data requirements and missing values	6,512	6,013
CSR equilibrium model sample		**6,013**
Profitability model sample		**6,013**

4. Findings and analysis

In this section, we present the results of our empirical analysis. Our findings are summarized in four tables: descriptive statistics, correlation matrix, percentage of significant coefficients from our CSR equilibrium model, and our main results from regressing financial performance on normal and abnormal CSR performance.

4.1 Hypothesis testing

From our main results, we find support for all three of our hypotheses. The normal CSR component is consistently insignificant, confirming H1. The squared term for abnormal CSR performance is consistently negative and significant, supporting H2a and H2b. However, these results exhibit moderate sensitivity, as discussed in the robustness tests.

4.2 Summary of results

Table 2: Descriptive Statistics

	Obs.	Mean	S.D.	10%	25%	Median	75%	90%
ADJ_ROE_{it}	6013	0.00	0.24	-0.18	-0.07	0.00	0.08	0.20
CSR_{it}	6013	57.99	22.29	25.80	42.04	60.84	76.05	85.71
$NORM_CSR_{it}$	6013	57.99	20.08	31.02	43.69	59.59	74.20	82.89
ABN_CSR_{it}	6013	0.00	9.68	-12.29	-5.05	0.00	5.44	11.86
ADJ_ROE_{it-1}	6013	0.00	0.26	-0.22	-0.08	0.00	0.09	0.22
ROA_{it}	6013	0.04	0.08	-0.03	0.01	0.04	0.07	0.12
$SIZE_{it}$	6013	7.58	1.85	5.17	6.42	7.67	8.78	9.97
$GROWTH_{it}$	6013	0.09	0.25	-0.14	-0.03	0.06	0.16	0.32
SGA_{it}	6013	0.15	0.14	0.01	0.04	0.12	0.22	0.34
$R\&D_{it}$	6013	0.02	0.04	0.00	0.00	0.00	0.02	0.07
LEV_{it}	6013	0.89	1.27	0.05	0.25	0.58	1.10	2.01
BTM_{it}	6013	0.64	0.62	0.13	0.26	0.47	0.82	1.29
DIV_{it}	6013	0.04	0.07	0.00	0.00	0.00	0.06	0.12
$CAPEX_{it}$	6013	0.04	0.03	0.01	0.01	0.03	0.05	0.08
$CASH_{it}$	6013	0.13	0.12	0.03	0.06	0.10	0.17	0.26
$KZ\text{-}Index_{it}$	6013	-3.22	19.57	-11.19	-2.89	0.64	2.29	4.60
$CGOV_{it}$	6013	54.22	22.68	22.20	36.47	56.10	72.73	83.51

Table 2 presents summary statistics for our sample. As noted earlier, all variables are winsorized at the 1st and 99th percentiles to limit the influence of outliers. SIZE, CASH, DIV, and GROWTH align well with findings from previous studies (Lopatta et al., 2024; El Ghoul et al., 2011; Jo & Harjoto, 2012). LEV (mean: 0.89; median: 0.58) is slightly

higher than typically observed for listed firms outside the financial sector (Diebecker et al., 2019; El Ghoul et al., 2011). The KZ-Index median (0.64) closely matches (0.637) reported by Lopatta et al. (2024), though our sample shows much greater variation, as discussed later. Differences in the values of CSR-related terms, including corporate governance (CGOV), are expected due to the use of different data sources (Refinitiv vs. MSCI KLD).

Table 3: Correlation Matrix

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
(1)	ADJ_ROE_{it}	**1.00**																
(2)	CSR_{it}	**0.08**	**1.00**															
(3)	$NORM_CSR_{it}$	**0.09**	**0.90**	**1.00**														
(4)	ABN_CSR_{it}	0.00	**0.43**	0.00	**1.00**													
(5)	ADJ_ROE_{it-1}	**0.46**	0.07	**0.08**	-0.01	**1.00**												
(6)	ROA_{it}	**0.64**	**0.09**	**0.10**	0.00	**0.33**	**1.00**											
(7)	$SIZE_{it}$	**0.14**	**0.67**	**0.74**	0.00	**0.10**	**0.16**	**1.00**										
(8)	$GROWTH_{it}$	**0.13**	**-0.08**	**-0.10**	0.02	**-0.12**	**0.20**	-0.04	**1.00**									
(9)	SGA_{it}	**0.02**	**-0.19**	**-0.21**	0.00	**0.04**	**0.07**	**-0.22**	-0.03	**1.00**								
(10)	$R\&D_{it}$	**-0.09**	**-0.11**	**-0.13**	0.00	**-0.04**	**-0.17**	**-0.30**	0.01	**0.17**	**1.00**							
(11)	LEV_{it}	**-0.11**	**0.09**	**0.10**	0.00	**-0.07**	**-0.15**	**0.15**	0.00	**-0.12**	**-0.16**	**1.00**						
(12)	BTM_{it}	**-0.16**	**-0.10**	**-0.10**	**-0.02**	**-0.15**	**-0.17**	**0.06**	**-0.05**	**-0.19**	**-0.18**	-0.02	**1.00**					
(13)	DIV_{it}	**0.36**	**0.08**	**0.09**	0.01	**0.26**	**0.37**	**0.06**	**0.04**	**0.11**	0.00	0.00	**-0.25**	**1.00**				
(14)	$CAPEX_{it}$	**0.09**	**0.06**	**0.06**	0.01	**0.10**	**0.14**	**0.14**	0.01	**-0.15**	**-0.16**	0.00	**0.11**	**0.04**	**1.00**			
(15)	$CASH_{it}$	-0.03	**-0.18**	**-0.20**	0.00	**-0.04**	**-0.08**	**-0.33**	**0.09**	**0.11**	**0.38**	**-0.12**	**-0.17**	0.02	**-0.18**	**1.00**		
(16)	KZ_Index_{it}	**-0.16**	**0.03**	**0.03**	**0.01**	**-0.13**	**-0.26**	**0.04**	-0.02	**-0.07**	-0.01	**0.09**	**0.06**	**-0.45**	**0.11**	**-0.13**	**1.00**	
(17)	$CGOV_{it}$	**0.03**	**0.48**	**0.52**	**0.03**	**0.04**	0.02	**0.39**	**-0.05**	**-0.12**	0.00	**0.01**	**-0.09**	**0.09**	**0.01**	**-0.10**	**-0.04**	**1.00**

Table 3 displays the pairwise correlation matrix of our variables, with significant correlations shown in bold. The dependent variable, ADJ_ROE, is positively and significantly correlated with both the raw CSR score from Refinitiv (0.08) and our NORM_CSR score (0.09). As expected, ABN_CSR shows no correlation with ADJ_ROE, supporting our view that unusually high and low CSR levels should be equally detrimental. Among the control variables, SIZE (0.14) and DIV (0.36) exhibit the strongest positive correlations with ADJ_ROE, while LEV and BTM are negatively correlated (-0.11 and -0.16, respectively), consistent with prior literature. Unexpectedly, CASH is negatively correlated and LEV positively correlated with NORM_CSR, contrary to the financial constraint mechanism discussed in our literature review. GROWTH is negatively correlated with NORM_CSR, contrary to our expectation that growing firms attract more public attention, leading to greater CSR engagement. However, Lopatta et al. (2024) report similar patterns, suggesting no practical inconsistency. Of the variables typically linked to CSR spending, CAPEX is positively correlated with NORM_CSR, as expected, while R&D and SG&A unexpectedly show negative correlations. Lopatta et al. (2024) also report inconsistencies between theoretical expectations and empirical results for these variables. Contrary to our expectations, NORM_CSR is positively correlated with KZ-Index. As stated earlier, the discrepancy in KZ-Index will be discussed in more detail later.

Table 4: Percentage of Significant Coefficients from CSR_{it} Cross-Sectional Regressions (by Size Deciles and Fiscal Years)

$\mathbf{CSR_{it}}$	**% Pos**	**% Neg**
$SIZE_{it\text{-}1}$	18.75	1.25
$ROA_{it\text{-}1}$	1.25	2.50
$BTM_{it\text{-}1}$	0.00	26.25
$LEV_{it\text{-}1}$	3.75	6.25
$DIV_{it\text{-}1}$	8.75	1.25
$R\&D_{it\text{-}1}$	13.75	0.00
$CAPEX_{it\text{-}1}$	0.00	8.75
$SGA_{it\text{-}1}$	0.00	16.25
$GROWTH_{it\text{-}1}$	1.25	6.25
$CASH_{it\text{-}1}$	3.75	0.00
$KZINDEX_{it\text{-}1}$	5.00	0.00
$CGOV_{it\text{-}1}$	51.25	0.00

Table 4 presents our results from regressing CSR performance on accounting characteristics. The table reports the proportion of decile-year regressions in which each control variable has a significantly positive or negative coefficient at the 5 percent significance level. The most notable result is corporate governance (CGOV), which shows a positive association in 51.25% of the regressions. This likely reflects the tendency of firms to receive similar scores across Refinitiv's three CSR pillars. Consistent with Lopatta et al. (2024), SIZE and R&D exhibit the strongest positive associations, while GROWTH and BTM are frequently negative. Our results for SG&A, the KZ-Index, and CAPEX differ from those reported by Lopatta et al. (2024). LEV also shows some divergence; although we find a similar share of positive associations, Lopatta et al. (2024) report a higher proportion of negative ones.

Table 5: Results from Regressing Financial Performance (ADJ_ROE_{it}) on Normal CSR Performance ($NORM_ES_{it}$) and Abnormal CSR Performance (ABN_ES_{it})

	(2)	(1)	(3)	(4)	(5)	(6)
	ADJ_ROE_{it}	ADJ_ROE_{it}	ADJ_ROE_{it}	ADJ_ROE_{it}	ADJ_ROE_{it}	ADJ_ROE_{it}
CSRit	0.001	-0.020				
	(0.034)	(0.016)				
NORM_CSRit			-0.026	-0.037	-0.026	-0.022
			(0.018)	(0.030)	(0.018)	(0.036)
ABN_CSRit					-0.006	0.015
					(0.011)	(0.017)
ABN_CSRit^2			-0.007**	-0.016*	-0.008***	-0.016*
			(0.002)	(0.008)	(0.002)	(0.008)
ADJ_ROEit-1	0.383***	-0.001	0.383***	-0.002	0.383***	-0.002
	(0.063)	(0.051)	(0.063)	(0.050)	(0.063)	(0.050)
BTMit	-0.068***	0.052	-0.069***	0.053	-0.069***	0.053
	(0.014)	(0.052)	(0.014)	(0.052)	(0.014)	(0.052)
LEVit	-0.124***	-0.231***	-0.124***	-0.231***	-0.124***	-0.231***
	(0.030)	(0.038)	(0.030)	(0.037)	(0.030)	(0.037)
DIVit	0.259***	0.235**	0.259***	0.235**	0.259***	0.234**
	(0.030)	(0.079)	(0.030)	(0.079)	(0.030)	(0.079)
CAPEXit	0.029	0.035	0.029	0.034	0.029	0.033
	(0.017)	(0.033)	(0.017)	(0.032)	(0.017)	(0.033)
SGAit	-0.004	-0.186**	-0.005	-0.187**	-0.005	-0.187**
	(0.012)	(0.066)	(0.013)	(0.066)	(0.012)	(0.065)
CASHit	-0.005	0.091**	-0.005	0.089**	-0.005	0.089**
	(0.023)	(0.035)	(0.023)	(0.035)	(0.023)	(0.035)
KZ_Indexit	0.008	0.005	0.007	0.006	0.008	0.005
	(0.014)	(0.025)	(0.014)	(0.025)	(0.014)	(0.025)
CGOVit	-0.045**	-0.018	-0.044**	-0.015	-0.044**	-0.017
	(0.015)	(0.025)	(0.016)	(0.025)	(0.016)	(0.025)
SIZEit	0.134***	0.632**	0.138***	0.655**	0.138***	0.648**
	(0.028)	(0.186)	(0.027)	(0.192)	(0.027)	(0.191)
GROWTHit	0.162***	0.107**	0.161***	0.105**	0.161***	0.105**
	(0.026)	(0.031)	(0.026)	(0.031)	(0.026)	(0.031)
R&Dit	-0.081	-0.027	-0.081	-0.026	-0.081	-0.025
	(0.054)	(0.079)	(0.054)	(0.079)	(0.054)	(0.079)
N	6013	6013	6013	6013	6013	6013
ADJ. R^2	0.331	0.507	0.331	0.507	0.331	0.507
FIRM FE	NO	YES	NO	YES	NO	YES
IND. FE	YES	NO	YES	NO	YES	NO

* p < 0.1, ** p < 0.05, *** p < 0.01

Table 5 presents our main results, regressing adjusted ROE on observed, normal and abnormal CSR. Columns (1)–(2) include only the observed CSR score. The results are

mixed and insignificant. In columns (3)–(6), we separate CSR into NORM_CSR and ABN_CSR. NORM_CSR remains insignificant, supporting H1. The squared term for abnormal CSR (ABN_CSR^2) is negative and significant across all models, supporting H2a and H2b. The results also highlight the continued relevance of traditional financial determinants: SIZE, GROWTH, DIV, and LEV are significant in all specifications. Some differences from Lopatta et al. (2024) appear: DIV shows a positive sign, while R&D, CAPEX, and the KZ-Index are not significant. Additionally, BTM and lagged ROE are only significant when industry-fixed effects are included, whereas SG&A is only significant with firm-fixed effects. Lastly, including firm-fixed effects improves model fit, increasing the adjusted R^2 from 0.33 to 0.51.

4.3 Robustness & Sensitivity Tests

While NORM_CSR remains insignificant and ABN_CSR^2 consistently negative and significant across columns (1)–(4), the results are somewhat sensitive to model specification. This raises concerns about the significance—though not the direction—of our findings (untabulated results are available upon request).

To assess sensitivity to functional form and potential endogeneity, we first conduct propensity score matching using all control variables from the main regression. Following Lopatta et al. (2024), we define treatment as firms with abnormal CSR above or below one standard deviation from the mean. The estimated average treatment effect (ATE) is negative but statistically insignificant ($p = 0.200$), suggesting that the significance, rather than the sign, is sensitive to specification. Since propensity score matching does not account for the quadratic relationship between ABN_CSR and ADJ_ROE, the reduced significance is not unexpected.

We also test whether our results depend on the inclusion of specific control variables. The coefficient for ABN_CSR^2 remains negative and significant in all cases, except in the firm fixed effects model, where it becomes marginally insignificant when either BTM or LEV is excluded. Overall, this supports the robustness of our main findings (H2a and H2b) to the inclusion or exclusion of individual controls.

In contrast, support for H1 is less robust. When LEV, CGOV, SIZE, GROWTH, or R&D are excluded, the firm fixed effects model remains stable, whereas in the industry fixed effects model, NORM_CSR becomes negative and significant. This is consistent with a confounding effect, as LEV and CGOV are positively correlated with NORM_CSR (0.10 and 0.52, respectively) but negatively associated with ADJ_ROE. For GROWTH, which is negatively correlated with NORM_CSR (-0.10) but positively associated with ADJ_ROE, the confounding effect operates in the opposite direction.

For SIZE and R&D—which are positively (0.74) and negatively (-0.13) correlated with NORM_CSR, and positively and negatively associated with ADJ_ROE, respectively—

the emergence of a negative and significant NORM_CSR coefficient may reflect suppression effects. The effect of omitting R&D is particularly concerning, as, in contrast to Lopatta et al. (2024), a large proportion of firms in our sample—up to the median—report no R&D activity. This suggests that R&D may function more as a binary indicator (R&D-active vs. inactive), making it a crucial control. To address concerns regarding the inclusion of ADJ_ROE_lag on the right-hand side, we confirm that omitting it does not affect our main results.

Following Lopatta et al. (2024), we calculate variance inflation factors (VIFs) for the regression covariates. All VIFs are below 1.5, except for NORM_CSR (2.81) and SIZE (2.67). Given that the conventional threshold for multicollinearity concerns is 5–10, we conclude that multicollinearity is unlikely to bias our results.

We note that the size-year groups used to estimate optimal CSR performance (Equation 1) are sometimes very small. To address potential overspecification, we redefine abnormal CSR relative to the industry median, as in Lopatta et al. (2024). Using both industry and firm fixed effects (Regressions (5) and (6) in the main analysis), we again find NORM_CSR to be insignificant and ABN_CSR^2 to be negative but also insignificant. This confirms the robustness of the sign, but not of the significance. However, since the industry median is not grounded in neoclassical firm theory—unlike CSR expectations based on firm characteristics—the lack of significance is theoretically expected (Barnea & Rubin, 2010).

To test the sensitivity of our results to alternative CSR measures still grounded in neoclassical theory, we re-express the cross-sectional regression by estimating it per size quartiles rather than deciles. This allows the marginal effects of controls on optimal CSR to vary by size-quartile and fiscal year. As before, NORM_CSR remains insignificant and ABN_CSR^2 remains negative but insignificant, with p-values of 0.832 and 0.179 for Regressions (5) and (6), respectively. While difficult to explain theoretically, we suggest that shifting from deciles to quartiles reduces granularity in how firm size interacts with CSR predictors, leading to less precise estimates. Nonetheless, the sharp decline in significance highlights a major robustness concern tied to how the optimal level of CSR is measured.

Regarding the measurement of short-term accounting performance, our results are not sensitive to using ADJ_ROE as the dependent variable. When we instead regress adjusted return on assets (ADJ_ROA) on the main controls—now also including lagged ADJ_ROA—we continue to find no consistent negative relationship between NORM_CSR and ADJ_ROA, consistent with H1. Similarly, ABN_CSR^2 remains negative and significant in both our industry and firm fixed effects models, supporting H2a and H2b. These results also hold when excluding ADJ_ROA_lag from the control variables.

4.4 Additional Analysis - Decomposition of Environment & Social Dimensions

We present an additional analysis in which we decompose CSR into its environmental and social dimensions. This extension is particularly relevant in the European context, where institutional and regulatory factors may emphasize environmental performance more. For example, policies such as the European Green Deal, the EU Emissions Trading System (EU ETS), and the EU Taxonomy directly affect firms' risk exposure, compliance costs, and investor access (About the EU ETS - European Commission, 2025; EU Taxonomy for Sustainable Activities - European Commission, 2025; The European Green Deal - European Commission, 2021). These measures suggest that environmental standards are more stringent and harmonized than social ones. In contrast, social performance may be less differentiating in Europe due to strong labor laws, broad employee protections, and well-developed welfare systems (Labour Law - European Commission, 2024). Additionally, there are indications that environmental products and attributes gain more attention. For instance, an European survey showed that 83% of respondents believe a product's impact on the environment plays an important role in their purchasing decision (Europeans' Attitudes towards the Issue of Sustainable Consumption and Production - Juli 2009 - - Eurobarometer Survey, 2009). A similar notion can be shared in another study that emphasizes environmental attributes of products that have experienced higher sales growth compared to those without such claims (Do Consumers Care about Sustainability & ESG Claims? | McKinsey, 2023). Hence, there are reasons to believe that the environmental and social dimensions may interact differently with financial performance.

Although CSR is typically examined as a single construct, several studies have explored its components separately. Yoon et al. (2024), for instance, decompose CSR into environmental, social, and governance dimensions to study their individual effects on financial performance. Similarly, Hassel et al. (2005) focus on the link between environmental performance and market value. In line with this approach, we split both the normal and abnormal CSR components into environmental and social dimensions, yielding four variables: normal environmental performance, normal social performance, abnormal environmental performance, and abnormal social performance. As before, the abnormal terms are included in both linear and squared forms.

Table 6: Percentage of Significant Coefficients from ENV_{it} and SOC_{it} Cross-Sectional Regressions (by Size Deciles and Fiscal Years)

	(1)		**(2)**	
	ENV_{it}		SOC_{it}	
	% Pos	% Neg	% Pos	% Neg
$SIZE_{it-1}$	17.50	0.00	13.75	3.75
ROA_{it-1}	1.25	2.50	3.75	2.50
BTM_{it-1}	1.25	11.25	0.00	32.50
LEV_{it-1}	3.75	7.50	3.75	3.75
DIV_{it-1}	6.25	1.25	6.25	1.25
$R\&D_{it-1}$	11.25	0.00	6.25	0.00
$CAPEX_{it-1}$	1.25	7.50	0.00	8.75
SGA_{it-1}	0.00	11.25	1.25	10.00
$GROWTH_{it-1}$	2.50	3.75	1.25	12.50
$CASH_{it-1}$	5.00	1.25	1.25	2.50
$KZINDEX_{it-1}$	10.00	1.25	10.00	0.00
$CGOV_{it-1}$	40.00	0.00	51.25	0.00

Table 6 indicates that, while the overall direction of control variables remains consistent with our CSR regressions, there are notable differences in the frequency of significant coefficients between environmental and social performance. BTM is less frequently negative for ENV (11.25% vs. 32.50%), R&D is more often positive (11.25% vs. 6.25%), and GROWTH is less frequently negative (3.75% vs. 12.50%). The only change in direction concerns CASH: for SOC, it is more often negative (2.5% negative, 1.25% positive), whereas it is more frequently positively associated in ENV and CSR (5.0% and 3.75% positive, 1.25% and 0% negative, respectively). Compared to our CSR regressions, SG&A appears less frequently negative in the decomposed regressions (11.25% and 8.75% vs. 16.25%), while the KZ-index is more often positive (10% and 10% vs. 5%).

Table 7: Results from Regressing Financial Performance (ADJ_ROE_{it}) on Normal and Abnormal Environmental and Social Performance

	(2)	(1)	(3)	(4)	(5)	(6)
	ADJ_ROE_{it}	ADJ_ROE_{it}	ADJ_ROE_{it}	ADJ_ROE_{it}	ADJ_ROE_{it}	ADJ_ROE_{it}
ENVit	0.002	-0.029				
	(0.024)	(0.036)				
SOCit	-0.024	0.030				
	(0.015)	(0.032)				
NORM_ENVit			0.018	-0.037	0.018	-0.040
			(0.030)	(0.035)	(0.032)	(0.039)
ABN_ENVit					-0.008	-0.006
					(0.012)	(0.018)
ABN_ENVit^2			-0.007*	-0.021**	-0.007	-0.021*
			(0.003)	(0.009)	(0.005)	(0.009)
NORM_SOCit			-0.044*	0.001	-0.044	0.020
			(0.021)	(0.032)	(0.024)	(0.035)
ABN_SOCit					0.002	0.023
					(0.010)	(0.018)
ABN_SOCit^2			0.003	0.004	0.003	0.005
			(0.008)	(0.008)	(0.009)	(0.009)
ADJ_ROEit-1	0.383***	-0.001	0.383***	-0.002	0.383***	-0.003
	(0.063)	(0.051)	(0.063)	(0.050)	(0.063)	(0.050)
BTMit	-0.069***	0.053	-0.071***	0.052	-0.071***	0.053
	(0.017)	(0.052)	(0.014)	(0.053)	(0.017)	(0.053)
LEVit	-0.124***	-0.231***	-0.124***	-0.230***	-0.124***	-0.230***
	(0.032)	(0.038)	(0.030)	(0.038)	(0.032)	(0.038)
DIVit	0.259***	0.235**	0.258***	0.235**	0.258***	0.235**
	(0.031)	(0.079)	(0.031)	(0.079)	(0.031)	(0.079)
CAPEXit	0.029	0.034	0.029	0.033	0.029	0.033
	(0.019)	(0.033)	(0.017)	(0.033)	(0.019)	(0.033)
SGAit	-0.004	-0.186**	-0.005	-0.188**	-0.005	-0.188**
	(0.015)	(0.066)	(0.013)	(0.066)	(0.016)	(0.066)
CASHit	-0.004	0.091**	-0.004	0.090**	-0.004	0.090**
	(0.024)	(0.035)	(0.022)	(0.035)	(0.023)	(0.035)
KZ_Indexit	0.008	0.006	0.008	0.006	0.008	0.006
	(0.016)	(0.025)	(0.014)	(0.025)	(0.016)	(0.025)
CGOVit	-0.044**	-0.018	-0.042**	-0.014	-0.042**	-0.016
	(0.016)	(0.025)	(0.015)	(0.026)	(0.016)	(0.026)
SIZEit	0.133***	0.633**	0.138***	0.654**	0.138***	0.646**
	(0.028)	(0.187)	(0.027)	(0.190)	(0.027)	(0.188)
GROWTHit	0.162***	0.107**	0.161***	0.105**	0.161***	0.104**
	(0.028)	(0.032)	(0.026)	(0.031)	(0.027)	(0.031)
R&Dit	-0.081	-0.027	-0.081	-0.026	-0.081	-0.026
	(0.054)	(0.079)	(0.053)	(0.079)	(0.053)	(0.079)
N	6013	6013	6013	6013	6013	6013
ADJ. R^2	0.331	0.507	0.331	0.507	0.331	0.507
FIRM FE	NO	YES	NO	YES	NO	YES
IND. FE	YES	NO	YES	NO	YES	NO

* p < 0.1, ** p < 0.05, *** p < 0.01

Table 7 confirms the importance of traditional financial determinants, largely consistent with the results in Table 5. Evaluating the effects of the normal and abnormal CSR components separately by dimension, we observe notable differences between environmental and social performance. In columns (3)–(6), neither NORM_ENV nor NORM_SOC

is consistently significant, with only NORM_SOC showing weak negative significance in column (3). In most specifications, the squared term for abnormal environmental performance (ABN_ENV^2) is negative and significant, while the squared term for abnormal social performance (ABN_SOC^2) is consistently insignificant. The adjusted R^2 values remain identical to those in the main analysis.

5. Discussion

5.1 Interpretation of Results

Referring to columns (1) and (2) in Table 5, we find both negative and positive but statistically insignificant coefficients for the raw CSR scores from Refinitiv. This suggests that the initially significant positive correlation between CSR and ADJ_ROE disappears once we control for key variables such as SIZE, GROWTH, and LEV. This suggests that changes in CSR do not have a constant marginal effect on performance. We interpret this as consistent with the prevailing view in the literature—that CSR performance typically has either a weakly positive or neutral, but statistically insignificant, relationship with financial performance.

In columns (3) to (6), we decompose CSR into NORM_CSR and ABN_CSR. In our results, NORM_CSR remains insignificant, while ABN_CSR^2 is negative and significant. This pattern points to a non-linear, inverse U-shaped relationship between CSR and financial performance. Our findings align with neoclassical firm theory, which assumes concave CSR benefit and convex CSR cost functions. Under this framework, financial performance is maximized when the marginal cost equals the marginal benefit of CSR, supported by our non-significant NORM_CSR term. Our negative coefficient on ABN_CSR^2 supports the idea that any deviation from this optimal level—either too much or too little CSR—reduces financial performance at an increasing rate.

Our additional analysis suggests that the inverse U-shaped relationship may be more pronounced for environmental performance than for social performance. As outlined previously, it could possibly be due to institutional aspects: As the EU strives for a relatively high minimum standard in workplaces, it could imply that firms have less differentiating power in this regard. Additionally, there are indicators that show that customers may find the environmental dimension more important in their purchasing decisions, possibly due to a higher discrepancy between their product choices in Europe, compared to social factors. These dynamics might affect how the decomposed CSR dimensions materialize into benefits in terms of financial performance, and could explain why ABN_ENV^2 is significant while ABN_SOC^2 is not.

5.2 Comparison with Prior Literature

Our main findings, while not as robust, align with those of Lopatta et al. (2024). We find no significant negative association between normal CSR and financial performance, and a negative and significant association between squared abnormal CSR and financial performance. Overall, our control variables correspond well with previous literature, with deviations discussed in more detail below.

Although Table 5 presents the results from our profitability model and is central to

evaluating our three hypotheses, our control variables are primarily chosen to explain firm-specific variations in expected CSR levels based on accounting characteristics. Therefore, our discussion of control variables will mainly focus on Table 4, which reports results from the CSR equilibrium model. Associations with financial performance will be briefly noted later.

SIZE is positively and significantly associated with CSR in 18.75% of our regressions, consistent with Lopatta et al. (2024). Several studies, including Ferrell et al. (2016) and Di Giuli & Kostovetsky (2014), have similarly found that SIZE is positively associated with CSR using time-fixed effects. This supports the common argument that larger firms are more capable of absorbing CSR costs and attracting public attention, which encourages CSR engagement.

Regarding our growth variable, BTM is negatively and significantly associated with CSR in 26.25% of our regressions, consistent with Lopatta et al. (2024). Since a high BTM ratio reflects low growth potential, this negative coefficient supports the idea that high-growth firms draw more public scrutiny and therefore engage more in CSR. However, our findings contrast with Ferrell et al. (2016) and Di Giuli & Kostovetsky (2014), who use time-fixed effects and find that MTB is negatively associated with CSR—implying that high-growth firms engage less in CSR. We suggest that allowing coefficients to vary by size deciles and firm years may better capture firm-level differences in how growth and public attention interact, which time-fixed effects may overlook, explaining why our and Lopatta et al. (2024) results align with researchers' consensus whereas Ferrell et al.'s (2016) and Di Giuli & Kostovetsky's (2014) do not.

In line with Lopatta et al. (2024), we find a weak negative and significant association between GROWTH and CSR (6.25% of regressions). This contradicts the prevailing view that high-growth firms are more prone to seek reputational benefits through CSR. While it is difficult for us to explain why Lopatta et al.'s (2024) results differ from that of prior literature, we propose that our results may be influenced by multicollinearity. Although our VIFs are generally low, SIZE shows a VIF of 2.67—the second highest. While not severe, this may still cause conceptual overlap. Since SIZE is positively associated with CSR and smaller firms tend to grow faster, the model may struggle to separate the effects of SIZE and GROWTH, resulting in unstable or counterintuitive GROWTH coefficients.

Turning to financial constraint variables, we find the following. ROA is mostly insignificant, LEV is negatively and significantly associated with CSR in 6.25% of regressions, DIV is positively significant in 8.25%, and CASH is positively significant in 3.75%. These results broadly support the idea that CSR spending increases as financial constraints ease. Yet, inconsistencies remain. For example, while Lopatta et al. (2024) and Ferrell et al. (2016), similar to us, find no clear pattern for ROA, other studies such as Di Giuli & Kostovetsky (2014) find a strong positive association. These differences may arise from smaller group sizes in our model or differences in control variables—e.g., Di Giuli &

Kostovetsky (2014) do not adjust for line items where CSR costs are typically recorded. Furthermore, allowing coefficients to vary by size deciles and years as done by Lopatta et al. (2024) and in our study may reveal different ROA–CSR relationships across firm types, unlike a time-fixed effect model applied by Di Giuli & Kostovetsky (2014).

One notable result is the positive and significant CASH coefficient in 3.75% of regressions, despite its strong negative correlation with NORM_CSR (–0.20). This could indicate that once other financial constraint controls are included, CASH may reflect a true easing of financial pressure that supports CSR, consistent with Lopatta et al. (2024). However, given its low frequency, random variation is a more likely explanation—instead aligning with Di Giuli & Kostovetsky (2014), who find no significant effect for CASH.

Among financial constraint variables, our main contradiction with prior research concerns the KZ-index. We find a positive and significant KZ coefficient in 5% of regressions, whereas Lopatta et al. (2024) report more mixed results. Both conflict with the dominant view that higher financial constraints (higher KZ) should reduce CSR, as supported by Di Giuli & Kostovetsky (2014). This discrepancy could stem from how the KZ-index is defined. A notable portion of firms in our sample report property, plant, and equipment (PPE) near zero, producing extreme KZ values in both directions. In contrast, Lopatta et al. (2024) report little variation, possibly because they use a version of the Lamont & Polk (2001) index deflated by total assets instead of PPE. If our KZ-index uses a different deflator, this may explain the divergence.

Looking at variables typically associated with CSR expenditure, we find a positive and significant R&D coefficient in 13.75% of regressions, consistent with Lopatta et al. (2024) and the view that CSR is partly recorded under R&D (Attig, 2024). However, R&D spending is low in our sample. A large proportion—up to the median—report no R&D activity, resulting in a left-skewed distribution that likely biases the coefficient, making our result appear more consistent than it truly is.

We find a negative and significant CAPEX coefficient in 8.75% of regressions, which contrasts with Lopatta et al. (2024), whose results are more mixed. While Attig (2024) and Harjoto (2012) also report negative or mixed results, these findings conflict with theory, which predicts a positive association. If a substantial portion of CSR investments are recorded under CAPEX, CAPEX should be positively associated with CSR. One explanation of the discrepancy between theory and empirics in the field may be multicollinearity: SG&A, which most strongly captures CSR engagement, may absorb much of the variation, distorting the CAPEX coefficient. Although we, as discussed next, propose that R&D as opposed to SG&A is the absorbing variable in our sample, the mechanism behind our negative CAPEX coefficient could resemble this overarching issue in the field.

This brings us to one of our more unexpected findings: SG&A is negatively and significantly associated with CSR in 16.25% of regressions, contradicting prior studies

such as T. Chen et al. (2020), who find a strong positive link between CSR scores and SG&A spending. We suggest that this may stem from how line items interact within our sample: If the R&D variable, despite being unstable, captures much of the CSR-related variation, this could distort the estimated effects of CAPEX and SG&A. Another explanation could be model specification. While our negative SG&A coefficient estimate conflicts with broader literature, Lopatta et al. (2024), although not as extreme, observe a similar result. This suggests that our and Lopatta et al.'s (2024) CSR equilibrium model—where coefficients vary by size and fiscal year—may yield results that are not directly comparable with the time-fixed effects models commonly used in the *Journal of Financial Economics* and *Journal of Business Ethics*.

Although not the main focus in interpreting our control variable results, we briefly comment on their association with financial performance. These results are presented in Table 5, which reports the outcomes from the profitability model. We consistently find a positive and significant coefficient for DIV, aligning with prior literature identifying it as a key predictor of financial performance (Jo & Harjoto, 2012). Among the variables under which CSR-related expenses are often recorded, CAPEX is insignificant, consistent with findings by Jo & Harjoto (2012). SG&A, by contrast, is negative and significant, but only when controlling for firm-fixed effects. This is somewhat unusual, as variables typically become more significant under industry-fixed effects. We suggest that SG&A may be linked to unobserved firm-level characteristics—such as managerial quality, corporate culture, or long-term strategic focus—that remain stable over time and are better captured by firm-level fixed effects. R&D is less significant than expected, commonly showing strong effects in prior studies (e.g., Lopatta et al., 2024). This may relate to the lower R&D intensity in our sample; our median R&D is 0, and the 75th percentile is 0.02, compared to 0.05 and 0.044 in Lopatta et al.'s (2024) sample, causing biased and unstable coefficient estimates. ADJ_ROE_lag, BTM, and CGOV become significant only when using industry-fixed effects. This is likely because firm-fixed effects absorb much of the time-invariant variation in profitability, valuation, and governance. The insignificance of the KZ-index may be due to its composite structure, as already discussed above. Our model's explanatory power increases substantially when controlling for firm-fixed effects, with an R^2 of 0.507 compared to 0.331 under industry-fixed effects. This suggests that many time-invariant firm characteristics are associated with financial performance in our sample. Lopatta et al. (2024) report a higher adjusted R^2 of around 70%, which may stem from differences in sample size (15,000 vs. 6,000), geographic scope (U.S. vs. Europe), and time period (1991–2013 vs. 2016–2023). Given the many factors influencing financial performance, differences in R^2 across studies are expected. For reference, Jo & Harjoto (2012) report adjusted R^2 values ranging from 18% to 34%, aligning well with typical CSR studies. Thus, our results fall within a reasonable explanatory range, while Lopatta et al.'s (2024) model appears unusually high in this regard.

5.3 Theoretical and Practical Implications

From a theoretical perspective, our findings support a non-linear relationship between CSR and financial performance. This aligns with prior research suggesting that the commonly applied linearity assumption may oversimplify the relationship, highlighting the need for alternative modeling approaches. However, the sensitivity of our results to model specifications—particularly the inclusion of control variables and the choice of decile groups when estimating optimal CSR performance—suggests that our findings are less robust than those of Lopatta et al. (2024). This reflects persistent challenges in CSR research, including issues of endogeneity and limited comparability, raising the possibility that our results may partly reflect random variation. We also note that the financial penalty for CSR misalignment appears modest. For instance, the negative association of leverage is approximately 15 times larger than that of the squared abnormal CSR term across specifications. Similarly, SIZE, GROWTH, and DIV exhibit significantly stronger positive effects, underscoring the dominant role of traditional financial factors. These results suggest that while CSR may influence performance, its relative impact remains limited.

From a practical standpoint, this study offers useful insights for managers and investors. Managers should approach CSR as a strategic investment—engaging at optimal levels may help sustain or improve profitability, whereas under- or overinvestment could be detrimental. Integrating CSR in a way that generates tangible benefits, rather than as a compliance or reputational exercise, is essential. For investors, assessing the alignment between CSR activity and a firm's financial profile may help identify agency issues or strategic inefficiencies. As CSR continues to grow in importance, a firm's ability to manage these challenges and invest effectively may increasingly influence investment decisions.

6. Conclusion

In this study we have aimed to examine whether deviations from firm-specific optima levels of CSR investments – abnormal CSR – affect firm profitability in the European market. Although prior research evaluating the relationship between CSR and financial performance is extensive, the effect and significance still remains inconclusive across the research field. While the study by Lopatta et al. (2024) has demonstrated a concave, non-linear relationship in U.S. firms, our findings provide some support for this framework in an European context. We have found that normal CSR performance does not have a significant linear relationship with adjusted ROE. This might indicate that firms that are investing close to their predicted optimal CSR level do not experience strong performance effects, neither positive nor negative, in line with Lopatta et al. (2024).

Further, our squared term for abnormal CSR is significant and consistently negative, which indicates support for our hypothesized inverse U-shaped relationship between CSR and financial performance, which is also aligned with Lopatta et al. (2024). Thus, we gain support that CSR should not be pursued without careful consideration – both underinvestments and overinvestments can be destructive for financial performance. From a theoretical perspective, our findings are aligned with the notion of the microeconomic framework (Lundgren 2011), where it is crucial to consider the cost-benefit approach to stakeholder satisfaction in order to maximize firm value.

Crucially, however, is that our results experience sensitivity in our robustness tests. By removing certain control variables or changing from decile to quartile regressions when predicting the optimal level of CSR performance, our results become insignificant. Because of this, the support for our three hypotheses and findings in our additional analysis should be pursued with prudence in relation to both model specification and variable measurement.

Our contribution to the research field is that we have implemented the framework of an inverse U-shape relationship between CSR and financial performance in the European market. Although we find some support, the results have evidently not been as robust as when they have been evaluated in the U.S. market by Lopatta et al. (2024). Additionally, although decomposing the CSR dimensions has been conducted before, we have now tested the implications of the separate components using squared terms in our additional analysis. Our findings show that the concave relationship is significant for abnormal environmental performance, while no significant relationship is found for the social dimension.

While our research provides new insights, there are some limitations that should be noted. Firstly, our analysis is restricted to European publicly listed firms, which may limit generalizability to other regions or private firms. Secondly, although the Refinitiv ESG data is comprehensive and widely used, it differs from binary scoring

systems like MSCI KLD and may embed different weighting assumptions. Thirdly, while we mitigate some endogeneity concerns using lagged variables and fixed effects, causal interpretations remain limited. Lastly, our model does not directly account for time-varying macroeconomic shocks, such as the COVID-19 pandemic or geopolitical instability, which could influence CSR behavior and performance over our sample period.

Future research could explore several extensions. Most centrally, since our models experience sensitivity, it is difficult to assume that this framework holds unconditionally. Therefore it could be interesting to use this model in different markets to see where the results are more robust. For instance, applying it to emerging markets, or non-European advanced economies beyond the U.S., could reveal whether the concave relationship holds across different institutional contexts. Second, researchers could test interaction effects between CSR and governance, investor pressure, or CEO characteristics to further explain abnormal CSR behavior. Third, a more extensive analysis of sub-pillars (for instance emissions, labor relations, product safety) could identify which CSR components affect financial performance the most. Finally, case studies or event studies could complement these findings by examining how firms adjust CSR behavior in response to shocks and whether that adjustment aligns with profitability outcomes.

7. References

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8. Appendix

8.1 Description of Variables

Table 8: Variable definitions (Part 1).

Variable		Definition
(1)	ADJ_ROE_{it}	Two-digit SIC industry mean-adjusted ROE, where ROE is measured as Income Before Extraordinary Items / Common/Ordinary Equity - Total (lagged)
(2)	CSR_{it}	(Refinitiv Environmental Pillar Score + Refinitiv Social Pillar Score) / 2
(3)	$NORM_CSR_{it}$	The predicted value of CSR ($\hat{CSR}$) obtained from the CSR equilibrium model (Equation 1)
(4)	ABN_CSR_{it}	$CSR_{it} - NORM_CSR_{it}$. Residuals from the cross-sectional regressions (per size deciles and fiscal years) on CSR performance
(5)	$ADJ_ROE_{it\text{-}1}$	Lagged industry-adjusted ROE
(6)	ROA_{it}	Income Before Extraordinary Items / Assets - Total (lagged)
(7)	$SIZE_{it}$	ln(Sales/Turnover (Net))
(8)	$GROWTH_{it}$	$(SIZE_{it} - SIZE_{it-1})$ / $SIZE_{it-1}$
(9)	SGA_{it}	Selling, General and Administrative Expense / Assets - Total
(10)	$R\&D_{it}$	Research and Development Expense / Assets - Total
(11)	LEV_{it}	(Debt in Current Liabilities - Total + Long-Term Debt - Total) / Common/Ordinary Equity - Total
(12)	BTM_{it}	Common/Ordinary Equity - Total / Market Value
(13)	DIV_{it}	Dividends Common/Ordinary / Common/Ordinary Equity - Total (lagged)
(14)	$CAPEX_{it}$	Capital Expenditure / Assets - Total
(15)	$CASH_{it}$	Cash and Short-Term Investments / Assets - Total
(16)	KZ_Index_{it}	Calculated using the procedure presented in Lamont et al. (2001)
(17)	$CGOV$	Refinitiv Corporate Governance Pillar Score
Robustness Tests		
	ADJ_ROA_{it}	Two-digit SIC industry mean-adjusted ROA, where ROA is measured as Income Before Extraordinary Items / Assets - Total (lagged)
	$ADJ_ROA_{it\text{-}1}$	Lagged industry-adjusted ROA

Table 9: Variable definitions (Part 2: Additional Analysis).

Variable	Definition
Additional Analysis	
ENV_{it}	Refinitiv Environmental Pillar Score
$NORM_ENV_{it}$	The predicted value of ENV ($\hat{ENV}$) obtained from the ENV equilibrium model (Equation 1) with ENV as the dependent variable
ABN_ENV_{it}	$ENV_{it} - NORM_ENV_{it}$. Residuals from the cross-sectional regressions (per size deciles and fiscal years) on ENV performance
SOC_{it}	Refinitiv Social Pillar Score
$NORM_SOC_{it}$	The predicted value of SOC ($\hat{SOC}$) obtained from the SOC equilibrium model (Equation 1) with SOC as the dependent variable
ABN_SOC_{it}	$SOC_{it} - NORM_SOC_{it}$. Residuals from the cross-sectional regressions (per size deciles and fiscal years) on SOC performance

KZ Index Calculation:

$$\begin{aligned}\text{KZ Index} = &-1.001909 \cdot \frac{\texttt{Income Before Extraordinary Items + Depreciation and Amortization}}{\texttt{Property, Plant and Equipment - Total (Net) (Lagged)}} \\ &+0.2826389 \cdot \frac{\texttt{Liabilities and Stockholders Equity - Total + Market Value} - \texttt{Common/Ordinary Equity - Total} - \texttt{Income Taxes - Deferred}}{\texttt{Liabilities and Stockholders Equity - Total}} \\ &+3.139193 \cdot \frac{\texttt{Long-Term Debt - Total + Debt in Current Liabilities - Total}}{\texttt{Long-Term Debt - Total + Debt in Current Liabilities - Total + Stockholders Equity - Total}} \\ &-39.3678 \cdot \frac{\texttt{Dividends Common/Ordinary + Dividends - Preferred/Preference}}{\texttt{Property, Plant and Equipment - Total (Net) (Lagged)}} \\ &-1.314759 \cdot \frac{\texttt{Cash and Short-Term Investments}}{\texttt{Property, Plant and Equipment - Total (Net) (Lagged)}}\end{aligned}$$

8.2 Declaration of AI Usage

- **Zotero:** Used for reference management.
- **ChatGPT:** Used to improve language and quality of the text, focusing on clarity and consistency, not used for content generation. Has also been used for coding syntax.