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# **CSR and Financial Performance of Renewable Energy Companies**

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**ABSTRACT:**

This thesis analyzes how CSR activities affect financial performance in renewable energy companies within the ten-year period of 2014 to 2023. Based on stakeholder theory and the resource-based view, it examines which CSR dimensions has more influence in this relationship. The positive relationship of environmental performance ROA indicates that sustainability initiatives can enhance operational efficiency and profitability. ROE has a positive but statistically insignificant relation with social performance, indicating that stakeholders might provide benefits to shareholders, but may not be predictable. Overall ESG scores do not have a direct effect, indicating that CSR is affecting financial outcomes via different channels than a uniform bundle. These results support both the resource-based view and stakeholder theory by demonstrating that targeted environmental and social strategies can result in business value. The study recommends managers and policymakers to invest in certain CSR activities particularly in the environmental area to ensure both sustainability outcome and financial performance while promoting broader environmental and social objectives.

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**KEYWORDS:** corporate social responsibility, renewable energy, profitability, finance, Return on Asset(ROA), Return on Equity (ROE), Tobin's Q, Environment, Social, Governance

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## Abbreviations

CSR	Corporate Social Responsibility
ESG	Environmental, Social, and Governance
ROA	Return on Assets
ROE	Return on Equity
Tobin's Q	Tobin's Quotient
EPS	Environmental Pillar Score
SPS	Social Pillar Score
GPS	Governance Pillar Score
VIF	Variance Inflation Factor
OLS	Ordinary Least Squares
R&D	Research and Development
CFP	Corporate Financial Performance

# 1 Introduction

Corporate Social Responsibility (CSR) is defined as a company's voluntary commitment to the environment, society, ethical impact of its operations. Besides profit maximization, CSR focuses more on the condition of stakeholder satisfaction, employees, neighboring communities, the natural environment. Historically CSR has been a part of corporate management mainly due to the interests from the stakeholders (Lu et al., 2014). The relation between Corporate Social Responsibility and Company Financial Performance has been the center of attention for a long time in both the theoretical and empirical literature as well as in business practice.

The renewable energy sector has been an important part in the effort to transition for sustainable development and climate mitigate change. Companies have to deliver financial returns to their stockholders while facing the environmental and social challenges (Pizzi et al., 2020). Corporate Social Responsibility has gained more focus as a strategic framework through which business integrate social, environmental, and ethical concerns into their business operations and stakeholder interactions (Morioka & de Carvalho, 2016).

## 1.1 Research Background

The relation between CSR practices and financial performance has gained significant attention across various industries. The renewable energy sector has a unique context in this relationship. While other industries companies fundamentally report their business models to address sustainability concerns, renewable energy firms generally contribute to environmental sustainability through their core operations (Escrig-Olmedo et al., 2017).

The global investment has grown substantially over the past decade in renewable energy which reached reaching \$0.5 trillion in 2022, despite economic uncertainties and supply

chain challenges. (Global Landscape of Renewable Energy Finance, 2023). This growth indicates increasing interests of renewable energy sector as a way of addressing climate change and achieving sustainable development goals. Along with that stakeholders' expectations regarding corporate responsibility continue to evolve increasingly and demanding more transparency and accountability in environmental, social, and governance (ESG) practices (Broadstock et al., 2021).

The research presented in this paper explores the effect of various scores of CSR factors and the financial performance of renewable energy companies.

## **1.2 Problem Statement**

Despite many environmental benefits of renewable energy generation, companies in this sector face various challenges in managing comprehensive CSR strategies of all aspects of environmental, social, and governance concerns. Previous studies on the relationship between CSR and financial performance show mixed results across different industries (Friede et al., 2015), and these findings from studies in traditional sectors may not necessarily apply to renewable energy companies because of their distinctive characteristics and operating environments.

The existing literature reveals several gaps in the CSR-financial performance relationship in the renewable energy sector. Most of the studies often focused on either environmental performance or total CSR measures, and not many research was done on how different CSR dimensions (environmental, social, and governance) individually and collectively influence financial performance (García-Sánchez & García-Meca, 2017). Second, there is not enough understanding of the factors and conditions that influence this relationship specifically for renewable energy companies (Gonenc & Scholtens, 2017). Third, many studies approached cross-sectional method that fail to capture the potentially dynamic and long-term nature of CSR impacts on financial performance (Endrikat et al., 2014).

These knowledge gaps show the limited understanding in both scholarly and practical guidance for renewable energy companies seeking to optimize their CSR strategies. As this sector has a critical role in addressing global sustainability challenges, advancing knowledge in this area has significant implications for corporate decision-making, policy development, and sustainable economic growth.

### **1.3 Purpose of The Study**

The purpose of this study is to see how CSR efforts (measured by ESG, and 3 pillar scores) affect financial outcomes (ROA, ROE, Tobin's Q) at renewable energy companies given their distinct ability to handle environmental social and governance issues.

As renewable energy companies operate in a highly regulated environment with growing stakeholder expectations for transparency and sustainability, understanding how CSR initiatives impact financial outcomes is crucial for both academic research and practical decision-making. This study tries to answer the following question-

RQ: What is the impact of specific dimensions and overall CSR on the financial performance of renewable energy companies?

### **1.4 Previous Main Studies**

Various academic analyses were found in the similar topic which mostly show how CSR impacts company success over time. The research by Orlitzky et al. (2003) proved CSR practices improves financial outcomes by earning stakeholder trust and decreased risks. Margolis et al (2009) supported earlier findings through their meta-analysis of different industries which showed a positive connection.

Environmental CSR programs analyzed by Hart and Ahuja (1996) demonstrate that renewable energy companies achieve better financial results through operational improvements and cost reduction measures. Scholtens (2008) proves CSR initiates costs during implementation yet delivers superior benefits through reputation gain and business advantage over time.

Vásquez-Ordóñez et al. (2023) found that renewable energy businesses secure better financial results by accessing sustainable funding while developing deeper relationships with stakeholders. Rasoulinezhad and Taghizadeh-Hesary (2022) show how eco-friendly investments improve renewable energy projects through green financing while connecting sustainability to financial success.

Academic research proves sustainable CSR activities help corporations in performance in financial terms. More studies are needed into how CSR practices influence financial results across the fast-growing renewable energy market.

## **1.5 Structure of the thesis**

This thesis contains five chapters, each of which systematically describes the relationship between Corporate Social Responsibility (CSR) and financial performance in the renewable energy companies.

The first chapter is the introduction, which discusses the research topic and background information about CSR and its relevance within the renewable energy sector. In this chapter, the problem statement, research purpose, research questions, and the overview of previous main studies that this thesis mainly follows are described.

The second chapter is the literature review of few available studies, theoretical frameworks, and empirical investigations on the relationship between CSR and financial performance. The chapter discusses the conceptual framework of CSR, theoretical

perspectives as stakeholder theory, resource-based view, and institutional theory, and empirical evidence with specific reference to the renewable energy sector and tries to identify the research gap. Additionally, this literature review assesses the environmental, social, and governance dimensions of CSR.

The third chapter explains the research methodology, research design, data collection process, sample selection, and measurement approach of financial performance and CSR. The independent, dependent, and control variables are described, and the regression models for the analysis are presented.

The fourth chapter presents the results of the data analysis of the relationship between CSR and financial performance. Additional regression analyses are also included in this chapter. It presents the analysis of the impact of different CSR dimensions on Return on Assets (ROA), Return on Equity (ROE), and Tobin's Q to provide useful information about the different effects of environmental, social, and governance factors on financial performance.

Finally, the conclusion chapter discusses the main findings, theoretical implications, and practical recommendations for the renewable energy companies that want to optimize their CSR strategies. It also acknowledges the research limitations and makes suggestions for further research directions in this topic.

## **2 Literature Review**

### **2.1 Conceptual Framework of Corporate Social Responsibility**

In the past decades Corporate Social Responsibility (CSR) has been undergoing rapid changes, which has shifted from an optional business activity to a required business strategy. The four elements of one of the earliest frameworks of Social Responsibilities proposed by Carroll (1979) are economic, legal, ethical and discretionary responsibilities. The corporate responsibility, which is still relevant in modern CSR activity, is multi-dimensional and is described in this document.

CSR has been increasingly aligned with sustainable development goals and stakeholder theory. Aguinis & Glavas (2012) have conducted a comprehensive review of literature on CSR and concluded that CSR has gone beyond a responsible business practice to include the needs of the company's diverse stakeholders and contribute to a long-term sustainable development. The analysis showed that CSR can help in minimization of threats and turn risks into a possible competitive advantage and value creation.

The renewable energy sector has a particular context for CSR implementation and assessment. Chang et al. (2017) stated that renewable energy companies operate in a business environment where their core business activities are naturally connected to environmental sustainability objectives. This is interesting because it is allowing CSR to expand beyond environmental practices to social and governance dimensions also. Morioka & de Carvalho (2016) state that renewable energy firms must address the complex issue of generating financial returns while dealing with environmental and social issues, which calls for an integrated approach to business sustainability.

## **2.2 Theoretical Framework on CSR and Financial Performance**

Different theories have been used to explain the relationship between CSR and financial performance. These theories offer different perspectives regarding the effects of CSR initiatives on organizational outcomes.

### **2.2.1 Stakeholder Theory**

Freeman (1984) states in stakeholder theory that companies should be concerned about the interest of all stake holders including employees, customers, communities, and environment other than just shareholders. Firms will be able to build stronger relationship and create sustainable value by meeting their expectations. In recent studies, many have proved that it is still very relevant to the context of renewable energy.

Cantele & Zardini (2018) claim that Stakeholder theory has been successfully applied to sustainability performance, because positive relationships with stakeholders are beneficial to achieve competitive advantages and better financial outcomes. According to Talbot & Boiral (2018), good stakeholder engagement helps companies to achieve better financial performance and stability.

Companies that manage their stakeholders better are able to build trust-based relationships with them which helps in reducing transaction costs, reducing the risks and in turning it into competitive advantage in resource acquisition and allocation. Renewable energy companies that can address stakeholder concerns can achieve superior financial performance through better operational efficiency and lower conflict related costs Jones et al. (2018).

### **2.2.2 Resource-Based View**

Another theoretical perspective of CSR–financial performance relationship is from the resource-based view (RBV). Based on this view, CSR initiatives create valuable, rare, inimitable, and non-substitutable resources that can contribute to achieving competitive advantage (Barney, 1991).

Based on this theory, Branco & Rodrigues (2006) claimed that CSR activities generate both internal resources such as employee skills and organizational capabilities, as well as external resources such as reputation, and legitimacy. According to their research these resources can help to increase financial performance through many ways such as reduction of cost, revenue enhancement, risk management.

McWilliams & Siegel (2011) extended this theory and in context of the RBV to the CSR they argue that strategic investments in CSR can create unique organizational capabilities that can improve firm performance. They claim that CSR activities can generate intangible assets such as reputation, innovation capacity, and employee commitment that create sustainable competitive advantages.

Delmas & Montes-Sancho (2011) claim that environmental capabilities developed result in better operational efficiency and improved innovation in the renewable energy sector. In their study, they recommended that renewable energy companies with good environmental management system can develop unique organizational capabilities which positively affect financial performance.

### **2.2.3 Institutional Theory**

The social, cultural, and regulatory environment in which the organization operates affects the behavior and performance of the organization. According to DiMaggio & Powell (1983), organizations adopt similar practices because of the regulatory pressures,

normative influences, and competitive behaviors. The growing standardization of sustainability practices across industries can be explained more with the help of more recent institutional theory applications to CSR.

Matten & Moon (2020) used the institutional theory to explain the differences in the adoption of CSR across the countries and the regulatory frameworks, industry norms, and cultural expectations have a significant impact on how companies adopt social responsibility. CSR practices and their financial consequences are influenced by institutional pressures in the context of the renewable energy sector. This metric become more standardized and comparable as an increase in institutional pressures for sustainability reporting (Reimsbach et al., 2018). These institutional changes have strengthened the relationship between CSR performance and financial outcomes by increasing information transparency and decreasing information asymmetries.

### **2.3 Meta-Analyses and Review Studies**

A great number of studies have examined the relationship between CSR and financial performance in many different industries, as well as many meta-analyses that have tried to summarize this very complicated field of research. Friede et al. (2015) aggregated over 2,000 empirical studies and conducted one of the most comprehensive meta-analyses to date. Most of the studies reported a non-negative relationship between ESG (Environmental, Social, and Governance) criteria and corporate financial performance, and most of them indicated positive effects.

The meta-analysis conducted by Wang et al. (2016) focused on the mechanisms that link CSR to financial performance and finds that the relationship is mediated by operational efficiency, firm reputation, and customer satisfaction. Based on their research, the CSR-financial performance relationship was more complex than a direct correlation, and it involved several intermediate organizational outcomes.

With a focus on methodological issues, Brooks & Oikonomou (2018) reviewed the existing literature on relationship between CSR and financial performance, and hence emphasize that relationship strength heavily relies on measurement, time horizon, and context. According to them, the financial impact of CSR initiatives should be evaluated in the context of the industry to which the firm belongs.

## **2.4 Different Dimensions and Their Impact**

The research interest has been growing in recent years about the CSR-financial performance relationship in the renewable energy sector. Matytsin et al. (2022) found that effective CSR practices can reduce financial risk and promote long term performance. Although this research focuses on the risk reduction aspect of CSR, which may be especially important to renewable energy firms that operate in a volatile market.

The recent study by Vásquez-Ordóñez et al. (2023) shows that renewable energy businesses perform better in terms of their financial results when they have access to sustainable funding sources and establish deeper relationship with their stakeholders. As Rasoulinezhad and Taghizadeh-Hesary (2022) demonstrate, environmentally responsible investments increase the chances of success of renewable energy projects by means of green financing mechanisms that link sustainability practices to the financial success of energy projects.

### **2.4.1 Environmental Dimension**

CSR is important for renewable energy companies as their core business is directly linked to environmental sustainability and thus has an environmental dimension. According to Lu et al. (2019), superior CSR strategy and implementation by energy companies increase the use of renewable energy resources and decrease the utilization of fossil fuels.

And they achieve improved environmental performance and possible financial gains from operational efficiencies.

According to Le et al. (2024), CSR affects sustainable energy development through the mediating roles of renewable energy resource usage and sustainable energy supply. This implies that environmental CSR initiatives can strengthen the financial performance by decreasing environmental compliance cost and increasing energy efficiency. Environmental CSR has become more and more important after the implementation of renewable energy legislation in many countries and the regulatory changes have strengthened the positive relationship between environmental CSR and financial performance (Matytsin et al., 2022).

#### **2.4.2 Social Dimension**

The social dimension of CSR encompasses relationships with employees, communities, customers, and other stakeholders. According to Escrig-Olmedo et al. (2017), renewable energy companies which effectively handle social responsibility perform better on in reinforcing their brand image and increase trust of the stakeholders. This result corroborates the stakeholder theory's proposition that positive stakeholder relationship is associated with competitive advantage.

In a study regarding the relation between CSR activities committed to social stakeholders and sustainable energy development and financial performance of renewable energy companies in Vietnam, it was found that CSR activities oriented towards social stakeholders positively impact sustainable energy development that, in turn, affects financial performance. By finding out which pathways help social CSR to influence financial outcomes, they found that it is related to a better relationship with the community, better employee engagement, and a stronger customer loyalty.

Studies of other kinds of stakeholders have resulted in interesting conclusions. Yuan et al. (2008) separated primary and secondary stakeholders and found that, compared to the responsibility towards the primary stakeholders (employees, customers, investors) the responsibility towards the secondary stakeholders (communities, environment) had a stronger immediate positive effect on financial performance.

### **2.4.3 Governance Dimension**

CSR also has financial performance impact in the renewable energy companies via corporate governance aspects such as transparency, ethical business practices and accountability. To obtain improved financial performance, García-Sánchez and García-Meca (2017) claimed that strong governance in renewable energy companies diminishes agency costs, increases the confidence of investors, and also facilitates better access to capital.

Broadstock et al. (2021) found that governance the robust structures of renewable energy companies enabled the firms to navigate complex regulatory environment, engage with stakeholder well, and make strategic decisions for their long-term financial sustainability.

## **2.5 Other Mediating Factors**

### **2.5.1 Innovation**

Recent research has shown that innovation is a mediating factor in the relationship between CSR and financial performance. The result of the meta-analysis of Wang et al. (2024) on 48 independent empirical studies constitutes 208,997 observations. They found that there is a positive effect of CSR on green innovation, behavior, and outcome. This implies that CSR initiatives result in better financial performance.

In addition, the study found that there is a stronger relationship between CSR and green innovation in the Western cultural background than in the Eastern one and is stronger between SMEs and large corporations. These results highlight the need to factor in contextual factors in the study of how CSR affects the financial consequences through advancing innovation pathways.

### **2.5.2 Regulatory Environment**

Furthermore, the CSR financial performance relationship is also conditioned by market conditions and consumer preferences. Recent meta-analysis of choice experiments also shows that households worldwide are willing to pay an average of €113–€124 per year for renewable energy with onshore wind farms being the most preferred renewable energy source (Cerdá et al., 2024). This ability to pay a premium for renewable energy is an indication that companies with good CSR track records may receive price premiums or even market share in consumer energy markets.

Taskin et al. (2022) found that the relationship between environmental CSR and financial performance is strengthened if consumer preferences for environmentally responsible energy providers are high in the market and if the market is generally high in terms of environmental awareness. This is consistent with findings that CSR strategy should be geared toward consumer values in a specific market context.

### **2.5.3 Challenges and Contradictions in the Literature**

Although there are growing evidence of the positive relationship between CSR and financial performance in the field of renewable energy, the literature still contains several challenges and contradictions. According to Fischer & Newell (2008), financial benefits of CSR initiatives can be cancelled out by the implementation cost in the short term. The

implication of the observation is that it is important to consider the time horizons when doing an evaluation of the financial consequences of CSR.

The findings by Montel Energy (2025) show that challenges of the energy sector includes the balancing of market demands with expectations of investors and tackling of complex regulatory frameworks such as Corporate Sustainability Reporting Directive (CSRD). High market demand for renewable energy can cause price fluctuation and make it difficult to invest in the sustainability while the company is still profitable.

There are also several methodological challenges present in the literature. Brooks and Oikonomou (2018) suggested that the relationship strength is a highly variable phenomenon that is largely determined by measurement approaches and studies with different CSR metrics and other financial performance measures often yield inconsistent results. Moreover, many studies use cross sectional design that do not account for the possible dynamic and long-term influences of CSR impacts on financial performance.

## **2.6 Research Gap**

The study of CSR and financial performance relationships across different industries has left many knowledge gaps regarding renewable energy businesses. There is currently lack of sufficient evidence about both single and combined effects of CSR dimensions on financial outcomes in renewable energy industries. More research is needed to investigate the individual and combined impact of CSR components on financial results along with their respective importance within renewable energy organizations.

Most studies of renewable energy organizations have concentrated on major public companies while neglecting smaller enterprises which are driving decentralized energy networks. Research exploring how organizational size together with maturity levels influence CSR-financial performance connections would yield important knowledge for the broad range of topics in this market.

Investors might not have enough information regarding the time-dependent aspects between corporate social responsibility investments and related financial results. According to Endrikat et al. (2014) a significant number of studies employ cross-sectional analyses which fail to account for the extended duration of CSR impact growth. Extended tracking of CSR initiative effects on financial performance through longitudinal research would help resolve this limitation.

More research is needed on renewable energy companies to understand the specific ways that their corporate social responsibility (CSR) efforts impact their financial outcomes. Future studies should examine more connections with innovation, stakeholder relations, enhanced risk management, and access to sustainable financing.

Research that measures the CSR and financial performance relationship separately for Renewable Energy sectors such as solar, wind and biomass systems would deliver important insights about sector behaviors. The study by Olabi et al. (2023) claimed that solar and wind energy companies maintain control of renewable energy market competition, yet biomass utilities demonstrate varied CSR-financial performance relationships. The study of distinctions between renewable energy technology systems would boost comprehension of CSR responses in this varied industry.

## **2.7 Hypotheses Development**

Based on previous studies, few different findings can be identified explaining the relationship between CSR and CFP. These can be in various directions, as they can be positive, non-negative, negative, or non-significant. By following these results, the following hypotheses were developed:

H<sub>0,1</sub>: There is no relationship between corporate social responsibility (CSR) and financial performance in renewable energy companies.

H<sub>1</sub>: There is a positive relationship between CSR and financial performance in renewable energy companies.

H<sub>0,2</sub>: There is no relationship between specific CSR dimensions (environmental, social, governance) and financial performance in renewable energy companies.

H<sub>2</sub>: There is a positive relationship between specific CSR dimensions (environmental, social, governance) and financial performance in renewable energy companies.

### **3 Methodology and Data Analysis**

The studied literature review shows that there is still a gap of knowledge in the relationship between CSR and financial performance in the renewable energy sector. This part of the thesis discusses how the relationship between CSR and the financial performance of the renewable energy companies was studied.

#### **3.1 Research Design**

This thesis uses a quantitative research methodology with a longitudinal panel data structure to investigate the relationship between CSR and financial performance of renewable energy companies. Panel data methodology was chosen since it allows to capture both the cross-sectional variations across companies and time series dynamics over the study period. Compared to previous literature where it is commonly prevalent with cross sectional design, this approach has methodological advantages such as controlling the unobserved heterogeneity, reducing collinearity among the variables, and capturing the dynamic effects that might be present between CSR and financial performance (Endrikat et al., 2014; Brooks & Oikonomou, 2018).

The analysis applies the Ordinary Least Squares (OLS) regression. The Hausman test was conducted to choose between fixed or random effects. The results favored random effects models ( $p > 0.05$ ), meaning that company specific effects are uncorrelated with explanatory variables (Wooldridge, 2020). In this context, random effects estimation is particularly advantageous since it allows for the inclusion of time invariant variables and for more efficient estimates when the panel structure satisfies the underlying assumptions (Bell et al., 2019). With this analytical framework, different effects of environmental, social, and governance dimensions on the various financial performance metrics are both investigated and controlled for company specific heterogeneity. All statistical analyses were done using EViews econometric software available at the University of Vaasa's virtual computing environment.

### **3.2 Data Collection and Sample**

All data for this thesis was collected from Thomson Reuters Asset4 ESG database, which is a leading source of environmental, social, and governance metrics commonly used in CSR research (Drempetic et al., 2020). The Global Industry Classification Standard and the Thomson Reuters Business Classification system were used to identify the firms that operated primarily in the renewable energy sector (solar, wind, hydroelectric, biomass, and others) from an initial sample of one thousand multinational corporations.

To include different evolutions in CSR practices and regulatory landscapes, the dataset covers a full decade (2014–2023) (Broadstock et al. 2021). To be able to preserve analytical rigor, all observations with missing data above twenty percent of key variables were removed to reduce the imputation bias. In addition to Winsorization at the first and ninety-ninth percentiles to get rid of extreme outliers, firms with significant structural changes, e.g., mergers or acquisitions that may skew the relationship between CSR and financial performance were excluded.

After these filtering steps, the remaining balanced panel is limited to one hundred renewable energy companies. Very few missing data remaining were replaced with 0 expecting that they will not influence the analysis and results too far. With these complete records in all variables, the final data sample contains a total of 549 firm-year observations. This final sample includes a wide range of renewable energy companies, including solar energy, wind, hydroelectric, biomass, and emerging technologies, and represents a wide diversity of firms and geographies. This sample size of 100 companies is comparable to similar studies in this field, including more recent investigations into CSR performance (Beck et al., 2018; Vásquez-Ordóñez et al., 2023).

### 3.3 Measurement of Financial Performance

Financial performance can be measured efficiently by using various financial ratios. These ratios can be found from the company financial statements. These serve as indicators of how well a company is performing in their operations. Though there is no exact definition of financial performance, using a specific ratio depends on the area of topic being studied (Brealey et al., 2011). In this thesis financial performance is measured with three ratios, which are Return on Assets (ROA), Return on Equity (ROE), and Tobin's Q.

Return on Asset (ROA) is one of the most used financial measures in the CFP-CSR studies (Galant & and Cadez, 2017; Kludacz-Alessandri & Cygańska, 2021). Return on assets shows the rate of return generated against the total asset of the company. ROA is calculated as:

$$(1) \quad \text{Return on Assets (ROA)} = \frac{\text{Net Income}}{\text{Total Assets}}$$

Return on Equity is also another commonly used indicator of financial performance (Galant & and Cadez, 2017; Kludacz-Alessandri & Cygańska, 2021). ROE measures a company's profitability of their shareholders' equity. It shows the rate of return a company can generate from the total equity of shareholders' investments. ROE is calculated as:

$$(2) \quad \text{Return on Equity (ROE)} = \frac{\text{Net Sales or Net Income}}{\text{Total Equity}}$$

Tobin's Q is a forward-looking measure because it is based on stock market prices. Tobin's Q can be used for capturing the market's assessment of future cash flows. It can also be used to assess a company's reputational effects (Nekhili et al., 2017). Tobin's Q is calculated as:

$$(3) \quad \text{Tobin's Q} = \frac{\text{Market Capitalization} + \text{Total Debt}}{\text{Total Assets}}$$

### 3.4 Measurement of Corporate Social Responsibility

The Asset4 database has four pillar categories, Corporate Governance, Economic, Environmental, and Social which also have 416 subcategories. The corporate social responsibility can be measured with various methods. In this thesis CSR is measured by using the three pillar scores, Environment Pillar Score, Social Pillar Score, Governance Pillar Score as numeric representation of CSR, following Vázquez-Ordóñez et al. (2023). After analyzing OLS with these pillars, later these pillars were replaced with the overall ESG score.

The Environmental Pillar Score is an indicator of company's performance in managing the natural resources and ecological impacts. It can reflect the emissions management, energy efficiency, waste minimization, water consumption of a company and how motivated they are in reducing resources consumption and reducing emissions. The environmental pillar is divided into three categories, emission reduction, product innovation, resource reduction.

The Social pillar score reflects how well organizations maintain relationships with their employees and their customers as well as suppliers and community stakeholders. Social pillar scores evaluate four main factors which include labor practices, health and safety outcomes, human rights investigation procedures and community outreach activities. (Reuters, n.d.) There are seven categories in the social pillar. These are Product Responsibility, Community, Human Rights, Diversity & Opportunity, Employment Quality, Health & Safety, Training & Development.

The Governance Pillar Score is an indicator of a company's governance practices. The Governance pillar has five categories such as Board Functions, Board Structure, Compensation Policy, Vision & Strategy, and Shareholder Rights. Good governance implies greater transparency, accountability, and strategic affinity with SFG to attract the confidence of investors and access the capital (Pizzi et al., 2020). Research conducted recently determined that environmental initiatives have a better financial outcome for well

governed firms as opposed to poorly governed firms (García-Sánchez & García-Meca, 2017). Strong governance frameworks lead to lower agency costs and operational efficiency as well as market risk reduction for emerging renewable markets (Ari et al., 2024). This is an important variable in the regression models used in various analyses in the similar topic.

In this thesis the ESG Score is used as the measurement (or proxy) for the overall corporate social responsibility performance. It can provide insights into a company's sustainability practices (Shaikh, 2022). It shows a company's overall performance of all dimensions. More researchers are using the Environmental, Social, and Governance (ESG) scores for studying the corporate social responsibility with various variables. While CSR may indicate a company's social awareness and efforts, it can be measured with ESG, for example (Clément et al., 2023; Dorfleitner et al., 2015; Pérez-Cornejo & de Quevedo-Puente, 2023; Kaźmierczak, 2022; Yoon et al., 2024).

### **3.5 Control Variables**

In the CSR-CFP studies, a few mostly used control variables are size, industry, risk, R&D and advertising expenses Lu et al. (2014). In this research the control variables are size and risk. Size is calculated as the natural logarithm of total assets, and risk is the proxy for leverage which is calculated as the ratio of total debt and total assets.

Large companies generally have higher financial resources, operational capabilities, and market power, which enables CSR implementation as well as improves the financial outcomes (Brooks & Oikonomou, 2018). Company size may reflect economies of scale in technology deployment, help sourcing advantages for the procurement, and capability to manage the hefty capital burden of renewable energy projects that smaller companies cannot reasonably undertake (Broadstock et al., 2021). Furthermore, large renewable energy firms tend to be under heightened public scrutiny and are subject to heightened institutional pressures to engage with CSR issues, which in turn might impact upon the

relationship between CSR and financial performance (Matytsin et al., 2022). The asset values typically exhibit positive skewness and the logarithmic transformation of the data addresses that and minimizes the impact of extreme values on estimates of regression coefficients.

(4) Size = Natural log of Total Assets

Risk or Leverage ratio (total debt to total assets) is included to control for the impacts of capital structure on financial performance and CSR engagement, as in financial risk. These factors can increase financial performance through interest expenses, taxes shields and financial constraints, and can potentially confuse the CSR–performance relationship if not controlled (Friede et al., 2015). Under the renewable energy sector, financial risk is quite relevant as the renewable energy projects are so capital intensive and the industry depends on debt financing for its development (Rasoulinezhad & Taghizadeh-Hesary, 2022). Also, the financial risk may limit a firm’s capability to invest in CSR as highly leveraged firm is subject to higher scrutiny from creditors and do not have financial flexibility to bear discretionally outlays on CSR (García-Sánchez & García-Meca, 2017).

(5) Risk =  $\frac{\text{Total Debt}}{\text{Total Assets}}$

Other potential control variables were considered but they were excluded from the final specification of the model. Industry classification was not included as only renewable energy companies were included in the sample already. Given the theoretical relevance of R&D intensity, this variable was responsible to have substantial missing data for many sample companies and would thus further reduce the available observations. For the

same reason, the advertising expenditure was excluded. Thus, the final regression models include firm size and financial risk. These control variables are hypothesized by methodological approaches in similar studies (Ari et al., 2024; Vásquez-Ordóñez et al., 2023).

### 3.6 Regression Models

The first analytical approach is the disaggregated model to test how individual ESG pillar scores affect financial performance in renewable energy companies. This methodological choice is based on theoretical foundation that the environmental, social, and governance dimensions have distinct influences on corporate responsibility (Broadstock et al., 2021; Escrig-Olmedo et al., 2019). Based on conclusions of recent meta-analyses by Friede et al. (2015) and Wang et al. (2016), the relationship between CSR and financial performance can be summarized as multifaceted in different in different industries, more related to environmentally sensitive industries, and the importance of different dimensions of CSR for stakeholders and investors can vary. The models are specified in the disaggregated form as follows.

$$(6) \quad ROA_{it} = \alpha + \beta_1 EPS_{it} + \beta_2 SPS_{it} + \beta_3 GPS_{it} + \beta_4 Size_{it} + \beta_5 Risk_{it} + \varepsilon_{it}$$

$$(7) \quad ROE_{it} = \alpha + \beta_1 EPS_{it} + \beta_2 SPS_{it} + \beta_3 GPS_{it} + \beta_4 Size_{it} + \beta_5 Risk_{it} + \varepsilon_{it}$$

$$(8) \quad Tobins\_Q_{it} = \alpha + \beta_1 EPS_{it} + \beta_2 SPS_{it} + \beta_3 GPS_{it} + \beta_4 Size_{it} + \beta_5 Risk_{it} + \varepsilon_{it}$$

In this study, ESG score used is a weighted combination measure based on Thomson Reuters' ASSET4 database methodology to evaluate over 400 company level ESG metrics and normalize them to a 0–100 scale (Shaikh, 2022). This measure has been validated by

previous studies which have considered the relationship between CSR and the financial performance across different industries (Broadstock et al., 2021).

This aggregated approach is based on the integrative perspective of stakeholder theory and institutional theory (Aguinis & Glavas, 2012; Matten & Moon, 2020) that claims that superior CSR performance of firms results in positive synergistic effects across multiple stakeholder domains. Especially in institutional contexts where there are high demands on environmental and social conduct, comprehensive sustainability practices can improve the legitimacy of renewable energy companies (Reimsbach et al., 2018).

The disaggregated model provides granular analyses into which CSR dimensions relate to what in terms of financial outcomes, while the aggregated model provides a complementary perspective on how integrated CSR performance relates to financial metrics. The dual approach taken also address the methodological issues arising around the case when only one CSR measure type is used as per Wang et al. (2016), and Brooks and Oikonomou (2018) that information may be lost.

$$(9) \quad ROA_{it} = \alpha + \beta_1 ESG\_Score_{it} + \beta_2 Size_{it} + \beta_3 Risk_{it} + \varepsilon_{it}$$

$$(10) \quad ROE_{it} = \alpha + \beta_1 ESG\_Score_{it} + \beta_2 Size_{it} + \beta_3 Risk_{it} + \varepsilon_{it}$$

$$(11) \quad Tobins\_Q_{it} = \alpha + \beta_1 ESG\_Score_{it} + \beta_2 Size_{it} + \beta_3 Risk_{it} + \varepsilon_{it}$$

The disaggregated model provides granular analyses into which CSR dimensions relate to what in terms of financial outcomes. And the aggregated model provides a complementary perspective on how integrated CSR performance relates to financial metrics. The dual approach taken also address the methodological issues arising around the case

when only one CSR measure type is used information may be lost (Brooks & Oikonomou, 2018; Wang et al., 2024).

## 4 Findings

This chapter presents the empirical results of the analysis of the relationship between Corporate Social Responsibility (CSR) and financial performance in companies of the renewable energy sector. Descriptive statistics of the dataset is analyzed with correlation analysis before regression results are presented for disaggregated CSR dimensions model and aggregated ESG model.

### 4.1 Descriptive Statistics

The descriptive statistics of the studied data and all the variables used in this study are presented in Table 1.

**Table 1.** Descriptive Statistics

	<b>Mean</b>	<b>Median</b>	<b>Std. Dev.</b>	<b>Min</b>	<b>Max</b>
<b>ROA</b>	4.31	4.56	9.23	-62.47	58.29
<b>ROE</b>	7.84	9.11	18.42	-59.32	64.21
<b>Tobin's Q</b>	1.6325	1.3872	1.0241	0.5124	6.8473
<b>EPS</b>	67.843	71.429	18.652	11.254	96.842
<b>SPS</b>	59.264	61.835	20.478	8.763	92.457
<b>GPS</b>	62.457	65.218	15.943	10.358	94.821
<b>ESG_SCORE</b>	63.188	66.754	16.841	13.218	93.574
<b>SIZE (ln Total Assets)</b>	14.683	14.218	2.264	9.357	19.843
<b>RISK (Leverage)</b>	0.4872	0.4641	0.1783	0.0632	0.9347

The descriptive statistics reveal several notable characteristics of the sample. The mean ROA is 4.31 % with a large variability, from -62.47 % to 58.29 %. ROE has a similar range of -59.32% to 64.21% and a mean of 7.84%. The ranges that are observed for these outcomes are consistent with the highly profitable firms and firms experiencing financial

difficulties across renewable energy companies in the sample, reflecting the heterogeneous nature of the renewable energy sector (Broadstock et al, 2021).

The mean of Tobin's Q is 1.63, which implies that companies in the sample, on average, are valued by the market at a premium to their book values. This is consistent with the finding of Vásquez-Ordóñez et al. (2023) that renewable energy companies have higher market valuations because their growth expectations and sustainability premiums and its rationale.

The highest average score is found in the environmental pillar (67.84), then governance (62.46) and social dimensions (59.26) in terms of CSR performance. Previous research (Escrig-Olmedo et al., 2017) indicates that renewable energy companies usually perform well in environmental dimensions as a natural consequence of their core business. Meaning that composite ESG score of renewable energy companies in the sample above the average sustainability performance compared to the global cross industry benchmarks of Refinitiv (Refinitiv 50).

The leverage ratios of the sample companies average 48.72%, well balanced, typical of capital-intensive industries such as renewable energy. The size based on the natural logarithm of total assets varies greatly, reflecting the varying scale of operations in the sample.

## **4.2 Correlation Analysis**

The Correlation Coefficients between all the variables used in the analysis are presented in Table 2. This preliminary examination first allows identifying possible relationships between CSR dimensions and financial performance indicators.

**Table 2.** Correlation Matrix

	ROA	ROE	Tobin's Q	EPS	SPS	GPS	ESG_SCORE	SIZE	RISK
ROA	1								
ROE	0.742	1							
Tobin's Q	0.389	0.352	1						
EPS	0.186	0.157	0.204	1					
SPS	0.127	0.147	0.183	0.587	1				
GPS	0.094	0.086	0.115	0.423	0.378	1			
ESG_SCORE	0.162	0.156	0.196	0.814	0.825	0.671	1		
SIZE	0.241	0.283	-0.053	0.367	0.394	0.315	0.426	1	
RISK	-0.312	-0.187	0.068	-0.093	-0.074	-0.115	-0.109	0.135	1

There are some interesting patterns to the correlation analysis. Almost all are positively correlated with all financial performance measures, but the top-rated ESG pillar being the environmental shows the strongest associations. They are in line with Rasoulinezhad and Taghizadeh-Hesary (2022), who reported that environmental performance is especially influential for the financial outcomes.

The overall ESG score also has positive and significant correlation with ROA ( $r = 0.162$ ,  $p < 0.01$ ), ROE ( $r = 0.156$ ,  $p < 0.05$ ) and Tobin's Q ( $r = 0.196$ ,  $p < 0.01$ ). These results suggest that companies with stronger overall CSR performance do better financially compared to companies with weaker CSR performance, in line with the meta-analysis of Friede et al. (2015).

Company size (SIZE) has positive correlations with accounting-based performance measures (ROA and ROE) and non-significant negative correlation with the market-based performance (Tobin's Q). On the face of it, this pattern indicates that larger renewable energy companies may have more efficient operations but not more valuable assets in overall markets. According to the financial theory (Brealey et al., 2021), higher debt levels are associated with lower profitability in the sample and leverage (RISK) has significant negative correlation with ROA and ROE.

Moderate to strong correlations between the CSR dimensions (ranging from 0.378 to 0.825) imply that companies tend to exhibit CSR consistency with respect to different sustainability components while differences exist between them and are therefore worthy of separate analyses. All models were checked to ensure multicollinearity has not affected the regression results using the variance inflation factors (VIFs), and all values are less than 5, which indicates that there are no significant multicollinearity issues (Hair et al., 2019).

### **4.3 Disaggregated Regression**

The results of the regression analysis on the relationship of individual CSR dimensions to financial performance are presented in this section. The results of random effects panel regression models with ROA, ROE, and Tobin's Q as dependent variable are provided in table 3.

**Table 3.** Disaggregated Regression

	ROA	ROE	Tobin's Q
<b>EPS</b>	0.0003 (0.0001)**	-0.0003 (0.0011)	0.009 (0.008)
<b>SPS</b>	0.0002 (0.0007)	0.0014 (0.0009)*	0.0047 (0.0054)
<b>GPS</b>	-0.0005 (0.0007)	-0.0015 (0.0010)	-0.0244 (0.0162)
<b>SIZE</b>	0.0346 (0.0194)*	0.1022 (0.0286)***	-0.2349 (0.4240)
<b>RISK</b>	-0.0684 (0.0544)	-0.2943 (0.1219)**	0.3945 (0.5889)
<b>R-squared</b>	0.716	0.755	0.557
<b>Adjusted R-squared</b>	0.619	0.667	0.406

Note: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

Results from the regression show the different effects of CSR dimensions on the financial performance measures. The results for the environmental pillar ( $\beta = 0.0003$ ,  $p < 0.05$ ) indicate that the environmental performance is positively and statistically significant ( $p < 0.05$ ) in terms of profitability in renewable energy firms. This finding is consistent with the resource-based view perspective that environmental capabilities are associated with operational efficiencies and cost reductions. In line with Matytsin et al. (2022), the social and governance pillars are not statistically significantly associated with ROA, as environmental performance is more directly related to operational efficiency in the energy sector.

For ROE, the social pillar demonstrates a positive and marginally significant effect ( $\beta = 0.0014$ ,  $p < 0.1$ ), while the environmental pillar shows no significant impact. This implies that investments in the social dimensions of CSR may positively affect firm returns to shareholders by means of better stakeholder relationships, brand reputation and customer loyalty as suggested by Escrig-Olmedo et al. (2017). The negative but non-significant coefficient for the governance pillar contrasts with some previous findings and warrants further investigation.

None of the individual ESG pillars have statistically significant effects on Tobin's Q but the environmental pillar has the highest positive coefficient ( $\beta = 0.009$ ). The finding of this result indicates that market values of the energy sector based on renewable energy technology may be driven by factors more extensive than CSR performance as indicated by Broadstock et al. (2021).

Among the control variables, company size (SIZE) has a significant positive relation with ROA and ROE, which implies that larger renewable energy companies have economies of scale and resource advantages. ROE has a significant negative relationship with Leverage (RISK), implying that higher debt levels may limit shareholder returns due to higher financial costs and risk in line with García-Sánchez and García-Meca (2017). But no significant relationship was found with Tobin's Q. It is not unsurprising, as Tobin's Q is a forward-looking, market-based valuation metric; it measures investor expectations, it is possible that it may take longer time to reflect beyond the sample time period.

The models have good explanatory power with adjusted R squared values of 0.619 for ROA, 0.667 for ROE and 0.406 for Tobin's Q. This result conforms to previous research showing that different factors affect market-based measures as compared to accounting-based ones (Brooks & Oikonomou, 2018).

#### **4.4 Aggregated Regression**

The results of regression analysis on the effect of the composite ESG score on the financial performance are presented in this section. The results of the random effects panel regression models with ROA, ROE and Tobin's Q as dependent variables are presented in Table 4.

**Table 4.** Aggregated Regression

	ROA	ROE	Tobin's Q
<b>ESG_SCORE</b>	0.000091 (0.0006)	0.0002 (0.0011)	-0.007 (0.0129)
<b>SIZE</b>	0.033 (0.0195)*	0.094 (0.0292)***	-0.257 (0.457)
<b>RISK</b>	-0.071 (0.054)	-0.307 (0.122)**	0.053 (0.762)
<b>R-squared</b>	0.715	0.754	0.551
<b>Adjusted R-squared</b>	0.62	0.666	0.400

Note: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

Results from the disaggregated models are different from the regression analysis using the composite ESG score. The ESG score has positive but not significant relationships with ROA ( $\beta = 0.000091$ ) and ROE ( $\beta = 0.0002$ ) and a negative but not significant relationship with Tobin's Q ( $\beta = -0.007$ ). These findings indicate that the aggregate measure of CSR performance may not account for the various ways in which different CSR dimensions impact on financial outcomes as posited by Wang et al. (2016) that the business and social relationship is refined through specific mechanisms rather than through a uniform effect.

The patterns of the control variables are similar to those of the models with disaggregated CSR dimensions. Size has a strong positive correlation with ROA ( $\beta = 0.033$ ,  $p < 0.1$ ) and ROE ( $\beta = 0.094$ ,  $p < 0.01$ ) and leverage is still negatively correlated with ROE ( $\beta = -0.307$ ,  $p < 0.05$ ).

Adjusted R squared values for the aforementioned models are same as the previous ones, i.e. 0.620 for ROA, 0.666 for ROE and 0.400 for Tobin's Q. The results of the explanatory power between the disaggregated and aggregated models suggest that the overall fit is

robust, though the significance of the individual predictors change between specifications.

#### 4.5 Additional Analysis and Robustness Checks

Both models are similarly subjected to the same additional testing procedures including variance inflation factor analysis for multicollinearity, Breusch-Pagan tests for heteroskedasticity, and Hausman tests for model specification. Moreover, lagged ESG variables ( $t-1$ ) are alternatively used to control for the possible endogeneity of ESG and to investigate the time dimension of the CSR–financial performance relationship, in line with Endrikat et al. (2014) and Meta-Analyses of Friede et al. (2015).

Several other analyses were conducted to ensure the robustness of the findings. To alleviate earlier criticisms on the potential endogeneity of foreign aid (Endrikat et al., 2014), further models with lags of E, S, and G Pillar Scores, and ESG Score which took  $t-1$  value were tested. The results of these lagged models for ROA as the dependent variable are presented in Table 5.

$$(12) \quad ROA_{it} = \alpha + \beta_1 EPS_{i,t-1} + \beta_2 SPS_{i,t-1} + \beta_3 GPS_{i,t-1} + \beta_4 Size_{i,t} + \beta_5 Risk_{i,t} + \varepsilon_{it}$$

$$(13) \quad ROA_{it} = \alpha + \beta_1 ESG\_Score_{i,t-1} + \beta_2 Size_{it} + \beta_3 Risk_{it} + \varepsilon_{it}$$

**Table 5.** Regression with Lagged Values

Variable	ROA	ROA
<b>EPS(t-1)</b>	0.0004 (0.0002)**	-
<b>SPS(t-1)</b>	0.0002 (0.0008)	-
<b>GPS(t-1)</b>	-0.0004 (0.0007)	-
<b>ESG_SCORE(t-1)</b>	-	0.0001 (0.0007)
<b>SIZE</b>	0.0351 (0.0196)*	0.0339 (0.0197)*
<b>RISK</b>	-0.0675 (0.0547)	-0.0702 (0.0546)
<b>R-squared</b>	0.713	0.711
<b>Adjusted R-squared</b>	0.665	0.619

Note: \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

The results of the lagged models indicate a strong and positive effect of environmental performance on ROA, and thus they appear robust to the presence of potential endogeneity concerns. This supports with Matytsin et al. (2022) arguments that environmental initiatives might require time to be materialized in financial terms as they realize long term operational efficiencies and reduce risk.

To investigate further potential nonlinear relationships between CSR and financial performance, lagged value for ESG scores were included in the models. The results with no significant nonlinear patterns were found suggested that CSR–financial performance relationship is best described in linear way within the observable range of CSR performance in the renewable energy sector.

Also, financial performance was used as independent variables in some models and future CSR scores as dependent variables to determine whether there is a reverse causality effect, or whether financial performance impacts subsequent CSR investment. In this sample of renewable energy companies, no consistent significant relationships were

found, implying that a more dominant direction of the influence flows from CSR to financial performance, than vice versa.

Following the theory perspective of institutional theory (Matten and Moon, 2020), these findings indicate that contextual factors have impact on the CSR financial performance relationship.

#### **4.6 Findings Summary**

The analysis revealed several findings regarding how corporate social responsibility (CSR) made a difference to the financial success of renewable energy companies.

Different aspects of CSR have different effects on company finances. When the environmental performance is good, return on assets (ROA) improves significantly while the return on equity (ROE) increases slightly with the social performance. This has confirmed the prediction that different CSR dimensions would affect different financial outcomes in different ways.

When only the overall ESG score was used, there was no clear connection to financial performance. This suggests that individual CSR components effect might be masked when CSR is measured in aggregated form.

These relationships are considered to be time dependent. When the effects of CSR activities on finances in later periods were analyzed, a connection was found between good environmental performance and better ROA in the future. Overall, it can be concluded that environmental initiatives can result in eventually positive financial implications.

Other factors also impacted the financial performance. Larger companies tended to show better accounting based financial results and lower ROE was associated with

companies with more debt. When the relationship between CSR and finances is studied, these factors must be accounted for. These relationships varied depending on company size and location. This therefore highlights the importance of context in the study of sustainability.

These findings partly support the hypothesis (H1) that financial outcomes in renewable energy companies are positively related to CSR performance. But this is not a simple positive connection. Different CSR dimensions affect different aspects of financial performance through different mechanisms. The most obvious finding is that environmental performance positively affects operational profitability (ROA), which is logical for renewable energy companies whose main business is related to environmental sustainability, and also allows to accept the hypothesis (H2) that a dimension has effect of financial performance. While accepting these hypotheses H0 is rejected.

## 5 Conclusion

### 5.1 Summary of Research and Findings

The relationship between Corporate Social Responsibility (CSR) and financial performance in renewable energy companies was investigated in this thesis. Two questions were answered.

A significant positive impact on Return on Assets (ROA) was demonstrated by environmental performance, suggesting that operational efficiency and profitability in renewable energy companies are directly contributed to by environmental initiatives. Meanwhile, a marginally significant positive effect on Return on Equity (ROE) was shown by social performance, indicating that improved stakeholder relationships may provide potential benefits to shareholders.

No significant effect with financial performance measures were found by the overall ESG score. It is highlighted by this that specific mechanisms rather than a uniform effect are how the relationship between CSR and financial outcomes operates. The findings support that more meaningful insights than composite measures alone are provided by disaggregated analysis.

The significant positive impact of environmental performance on future ROA was confirmed by the analysis using lagged CSR variables. It is suggested by this that financial benefits that manifest over time. And it may be generated by environmental initiatives, supporting the long-term strategic view of CSR proposed by the shared value concept of Porter & Kramer (2006).

These results give a clearer picture of which CSR aspects are most likely to influence financial returns in renewable energy companies. This research contributes to the development of theoretical framework and practical approaches to corporate sustainability in the renewable energy industry.

## 5.2 Theoretical Implications

This study offers several important theoretical contributions to the understanding of the CSR financial performance relationship in the renewable energy sector.

The findings support a first contingency perspective on the CSR–financial performance relationship. This suggests that the different CSR dimensions affect financial outcomes through different mechanisms. The resource-based view (Barney, 1991) is consistent with the fact that environmental capabilities have a significant positive effect on ROA, which means that environmental capabilities generate competitive advantages and valuable operational efficiencies (Delmas & Montes-Sancho, 2011). However, the study indicates that the benefits of having such performance are more pronounced in renewable energy companies. Their environmental initiatives are more consistent with the core business of the companies than in other industries.

The marginal positive effect of the social performance on ROE supports stakeholder theory (Freeman et al., 2020). This suggests that investments in social dimensions are beneficial to the shareholder by creating better stakeholder relationships. This finding contributes to the ongoing theoretical debate about whether shareholder value is created by stakeholder management (García-Sánchez & García-Meca, 2017) and provides evidence that it does, at least in the renewable energy context.

The multidimensional conceptualization of CSR suggested by Aguinis and Glavas (2012) and advanced in recent work by Brooks and Oikonomou (2018) is also supported by the differential effects of CSR dimensions across performance metrics. The usefulness of aggregate CSR measures is challenged by the results, and it is suggested that the specific relationships between individual CSR dimensions and various aspects of financial performance should be accounted for by theoretical models.

Furthermore, a contribution to the dynamic capability's perspective is made by the findings on temporal effects. It is suggested by this that time is required by environmental initiatives to develop into capabilities that enhance financial performance. This aligns with the recent theoretical work by Clément et al. (2023) proposing that the CSR-financial performance relationship should be conceptualized as a dynamic process rather than a static association.

Finally, institutional theory perspectives (Matten & Moon, 2020) are supported by the variations observed across different contexts. It highlights how the relationship between CSR and financial outcomes is shaped by institutional environments. It is suggested that the contextual embeddedness of CSR practices must be accounted for by theoretical frameworks, particularly in globally diverse sectors like renewable energy.

### **5.3 Practical Implications**

Several practical implications for managers, investors, and policymakers in the renewable energy sector are offered by the findings of this study.

For managers of renewable energy companies, it is suggested by the results that financial benefits may be optimized by strategic allocation of resources across different CSR dimensions. The significant positive impact of environmental performance on ROA indicates that operational efficiency and profitability can be enhanced by investments in environmental initiatives beyond regulatory requirements. Environmental initiatives that create synergies with core business operations, such as reducing resource consumption, optimizing energy efficiency, and minimizing waste should be prioritized by managers.

It is suggested by the marginal positive effect of social performance on ROE that shareholder value may be enhanced by social initiatives focused on stakeholder relationships. Strategic approaches to community engagement, particularly in project development phases, should be developed by renewable energy managers. With that project viability

can be enhanced, operational risks can be mitigated, and delays can be reduced by community acceptance (Vásquez-Ordóñez et al., 2023). The lack of significant association between governance performance and financial outcomes does not mean that governance is unimportant, but it is suggested that its benefits may operate through risk reduction rather than direct financial enhancement (García-Sánchez & García-Meca, 2017).

For investors and financial analysts, the importance of disaggregated CSR assessment when evaluating renewable energy companies is highlighted by the findings. Rather than relying solely on composite ESG scores, how companies perform across specific environmental, social, and governance dimensions should be examined by investors, with particular attention to environmental metrics given their demonstrated link to operational profitability. It is suggested by the temporal effects observed that longer-term perspectives should be adopted by investors when evaluating the financial implications of CSR initiatives, particularly environmental programs that may require time to generate returns (Friede et al., 2015).

For policymakers, it is suggested by the results that alignment between sustainability goals and financial outcomes may be created by regulatory frameworks encouraging strong environmental performance in renewable energy companies. Sustainability objectives could be advanced and sector profitability could be enhanced simultaneously by policies that incentivize beyond-compliance environmental initiatives (Matytsin et al., 2022). Opportunities for win-win policy approaches that promote both sustainability and economic development are suggested by the potential synergies between environmental performance and financial outcomes in the renewable energy sector.

#### **5.4 Limitations and Future Research Directions**

While valuable insights are contributed by this thesis, several limitations must be acknowledged.

Despite careful methodological design, endogeneity concerns cannot be eliminated. Although potential reverse causality was addressed by lagged models being employed, both CSR and financial performance might still be influenced by unobserved variables. More sophisticated econometric techniques such as instrumental variables, system GMM estimators, or quasi-experimental designs could be employed by future research to better address endogeneity (Wang et al., 2016).

Statistical power and generalizability are limited by the sample size of 100 companies, while comparable to similar studies. The sample could be expanded by future research to include more renewable energy companies across diverse geographic regions, particularly emerging markets where institutional contexts differ substantially from developed economies (Matten & Moon, 2020).

A period of significant growth and transition in the renewable energy sector is captured by the study's time frame (2014-2023). How the CSR-financial performance relationship evolves as the sector matures, technologies advance, and policy landscapes shift could be examined by future longitudinal studies (Rasoulinezhad & Taghizadeh-Hesary, 2022).

Selection bias may potentially influence this study focusing on publicly traded companies with available ESG data, by which companies with few data or privately held renewable energy firms are excluded. Methods to assess CSR performance in smaller and including private renewable energy companies could be developed by future research, and whether the observed relationships hold across different company sizes and ownership structures could be examined (Escrig-Olmedo et al., 2019).

While financial performance was examined through accounting and market-based measures by this study, broader performance outcomes, including innovation capacity, market share growth, and long-term resilience could be explored by future research. Additionally, deeper insights into the mechanisms through which specific CSR initiatives

translate into financial benefits in the renewable energy context could be provided by qualitative research (Aguinis & Glavas, 2012; Brooks & Oikonomou, 2018).

Additionally, other interactions and their effects between different CSR dimensions could be investigated by future studies, and how specific combinations of environmental, social, and governance initiatives might create synergistic effects on financial performance could be explored (Clément et al., 2023). The relationship between CSR and financial performance is moderated by factors such as technological innovation, market competition, and policy support. These specific moderators in the renewable energy sector could also be examined by research (Broadstock et al., 2021).

## **5.5 Concluding Remarks**

This thesis provides evidence that the relationship between CSR and financial performance for renewable energy companies is complex. Different CSR dimensions affect different aspects of financial performance via various extents. The findings also contribute to the understanding of corporate sustainability advances in the renewable energy sector through both theoretical understanding and practical approaches.

The most robust finding suggests that environmental performance leads to a positive impact on operational profitability in renewable energy companies. This alignment creates opportunities for companies to create opportunities to improve financial performance and, at the same time, advance sustainability objectives for the potential acceleration of the transition of an energy system to a more sustainable system.

With the growth and evolution of the renewable energy sector, it is vital to understand CSR initiatives about their financial returns, as managers, investors, and policymakers are interested. This study plays a foundational role in providing a foundation for more nuanced approaches to sustainability management in the sector based on both the

business case for strategic CSR and the need for differentiated approaches along the environmental, social, and governance dimensions.

Thus, in conclusion, this study argues that there might be synergies between financial objectives and CSR strategies that lead to environmental performance in the renewable energy sector while pacifying the notion that there are trade-offs. These synergies offer promising pathways to enhance a company's sustainability impact and financial success, while helping the broader goals of social, environmental sustainability, and economic prosperity.

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## Appendix: List of Companies

ABENGOA S.A.	ENPHASE ENERGY
ABENGOA SA - ADR	ESS TECH INC
ABO ENERGY	EVERFUEL A/S
AFC ENERGY PLC	FIRST SOLAR, INC.
AMERESCO, INC	FLUENCE ENERGY INC
AMERICAN	FTC SOLA
ARRAY TECH	FUELCELL ENERGY INC
AZELIO AB	FULLSHARE HOLDINGS
BALLARD POWER	GCL SYSTEM INTEGRAT
BBGI PCL	GCL TECHNOLOGY
BIOKRAFT	GEVO
BLACK	GOLDWIND SCIENCE
BM GREENTECH	GREEN PLAINS INC
CAMECO CO	HAINAN DRINDA
CANADIAN SO	HANERGY THIN
CARBON ENERGY LTD	HANWHA SOLUTIONS
CENTROTHERM INTERN	HOLLYSYS AUTOMATION
CERES POWER HLDGS	HYDROGENPRO AS
CHARGEPOINT	ITM POWER PLC
CHINA HIGH SPEED	JA SOLAR
CHINA Southern Power Grid	JINKO SOLAR
CLIMEON AB (PUBL)	JINKOSOLAR HOLDING
CROPENERGIES AG	LONGI GREEN ENERGY T
CW ENERJI MUHENDISLI	MAXEON SOLAR
DAJIN HEAVY INDUSTRY	MERIAURA GROUP OYJ
DEEP YELLOW LTD	METACON AB (PUBL)
DONGFANG ELECTRIC	MEYER BURGER TECH
ENERGY V	MIDSUMMER AB

MIDSUMMER AB	SOLAREEDGE TECH
MINGYANG SMART	SOLARVEST HOLD
MONTAUK REN	SOLARWORLD AG
MOTECH IND INC	SOLID POWER
NEL ASA	STEM INC
NHOA SA	SUNGROW POWER
NORDEX SE	SUNNOVA E
PINNACLE RENEWABLE	SWEDISH STIRLING AB
PLUG POWER INC.	TCL ZHONGHUAN REN
POD POINT GROUP HOLD	THYSSENKRUPP NUCERA
RAIZEN SA	TITAN WIND ENER
RENEWABLE ENERGY	TONGWEI CO LTD
RENU ENERGY LTD	TPI COMPOSITES INC
RISEN ENERGY CO	TRINA SOLAR CO LTD
SAMAIDEN GROUP	VERBIO SE
SANY RENEWABLE	VESTAS WIND SYSTEMS
SFC ENERGY AG	XINYI SOLAR HOL
SHANGHAI AEROSPACE A	
SHANGHAI AIKO	
SHENZHEN S.C NEW	
SHOALS TECHNO	
SHUANGLIANG ECO	
SICHUAN NEW	
SIEMENS	
SIEMENS GAMESA RE	
SIF HOLDING NV	
SMA SOLAR TECH	
SMART GUNES	