

Article

American Corporate Sustainability and Extra-Financial Performance: Is There an Inverted-U Relationship

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Abstract: In this paper, we explore the nexus between extra-financial performance (sustainable ESG) and firm performance within a sample of American firms from different vital sectors. In particular, we examine whether extra-financial performance has an effect on company performance. To this end, we have used a non-linear model. The study is based on a sample of 93 American companies over the period 2010–2019. We find that the association between extra-financial performance and firms' financial performance is nonlinear, exhibiting an inverted U-shaped pattern. In particular, the results emphasize the importance of caution when pursuing ESG initiatives. Enterprise managers should monitor the effect of ESG activities on extra-financial performance and confirm the ESG threshold of their organization.

Keywords: extra-financial performance; corporate sustainability; ESG; financial performance and American corporate



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1. Introduction

Due to the shortage of assets, the constant development of the total population, and the determined danger of environmental changes, the advanced world appears to have natural and social difficulties. To reduce these problems and cope with global debasement, the society should find an equipped option to guarantee assets and supervise them carefully (Jamali et al. 2009). This is the reason exclusive demands are placed on the ideas of the manageable turn of events and economic enterprise, which consider super monetary standards that can both produce direct monetary benefits and secure assets for the future and people in the future. Some accept that a huge portion of natural and social problems is caused by the business world and its transient impression of profit. For this reason, bearable business activities are essential to the arrangement, and the attainment of support goals will depend to a great extent on the management of the business (Peylo 2012). There have been discussions about the specific meaning of business manageability progressing after some time and what the idea is remembered for. Nevertheless, recently proposed definitions demonstrate that enterprise maintainability incorporates all angles that should be thought about all the time and is, by and large, separated into three main subgroups: climate (E), society (S), and enterprise administration (G). In this way, ESG is an aggregate term for estimating corporate sustainability (Steger 2006). Therefore, for the rest of this paper, when we mention ESG, we are referring to the concept of corporate sustainability. In modern times, the sustainability of an organization is largely determined by its productivity, and the decisions it makes are often based on predictions of potential financial gains. Consequently, to give most organizations the opportunity to participate in ESG exercises by far, there should be monetary compensation for doing so. However, there is currently no examination to demonstrate the monetary effect of sustainable business activities, and there is little exact proof that such speculations produce benefits or increase business value. Previous

examinations of the link between ESG and monetary execution have shown mixed results (Singal 2014). As a result, the economic incentives for ESG exercises are still debatable (Dufwa and Hammarström 2015; Manrique and Martí-Ballester 2017; Cornett et al. 2016; Aboud and Diab 2019; Beretta et al. 2019; Dyck et al. 2019; Cek and Eyupoglu 2020; Gangi et al. 2020; Cerqueti et al. 2021; Ángel et al. 2021; Eratalay and Ángel 2022). The objective of this paper is to examine the connection between ESG factors and financial performance, particularly to broaden the understanding of this relationship among large industrial companies in the United States. The sample of industrial companies incorporates organizations that, as often as not, use normal assets in their creation measures, such as oil, gas, development, materials, and drugs. These organizations are considered to have a general impact on climate and society and are subsequently needed to approach supporting issues (Halme and Huse 1997). This industry is particularly interesting since previous ESG studies often used negative filters when selecting companies to study. This is a screening process, and companies or entire businesses are intentionally omitted from the research due to their engagement in practices deemed fundamentally unsustainable. In fact, the implementation and development of corporate sustainability in companies in the USA are hampered by several global challenges. Fluctuating environmental policies from one administration to the next make long-term planning difficult for companies. In addition, heavy reliance on fossil fuels complicates the transition to more sustainable energy sources, and economic inequality can limit small businesses' access to finance for sustainable initiatives. The culture of over-consumption in the USA encourages the production of single-use goods, which runs counter to the principles of sustainability. Natural disasters linked to climate change, such as forest fires and storms, increase the risks for businesses. In addition, increasing stakeholder pressure and the complexity of sustainability standards add to the complexity of the business landscape. To promote sustainability, it is essential to create a more stable regulatory environment, support the transition to renewable energies, raise awareness of sustainability, and foster innovation in sustainable business practices. According to Lee et al. (2009), firms in the government lenders, health care, and technology sectors tend to be preferred, while companies within the basic materials sector are frequently excluded by default because of the adverse selection process.

Therefore, this study fills a scholar gap by exploring the connection between firm performance and the strong performance of vital US sectors, and how to assess the health and sustainability of companies more comprehensively. While traditional financial indicators remain essential, it has become imperative to understand how non-financial factors, such as environmental, social, and governance (ESG) practices, influence companies' overall performance. This analysis answers vital questions for investors, regulators, managers, and other stakeholders, including the impact of ESG on companies' profitability, resilience to financial risks, reputation, and competitive advantage. By illuminating these links, it enables more informed investment, business management, and regulatory decisions, thereby promoting sustainability, social responsibility, and long-term value creation for all. This study's significance lies in its contribution to both corporate sustainability and the financial literature, making it relevant to industry practitioners and other stakeholders.

For this reason, one of the main objectives of this study is to explore the linear relationship between a company's financial and extra-financial performance. Our second main objective in this study is to investigate the presence of an inverted-U association between corporate performance and sustainable performance. This notion is based on the idea that there is a delicate balance to be struck between profit maximization and the responsible management of resources and the environment. For example, a company may improve its financial performance by drastically cutting costs, but this could have a negative effect on its sustainable performance by causing adverse environmental or social consequences.

The remainder of this study is structured as follows: Section 1 will offer an overview of the increase in the supportability of businesses by remembering the extra monetary standards for the United States. In Section 2, we construct our hypothetical structure and present a review of prior studies on ESG factors and their monetary ramifications. We

also express our speculations. In Section 3, we describe our approach and information gathering. In Section 4, we will present our findings. Finally, we conclude in Section 5.

2. Literature Review and Development of Hypotheses

2.1. Relationship between Financial and Extra-Financial Performance

More of the literature asserts that there is a link between financial performance and non-financial (Freeman 1984; Preston and Sapienza 1990; Clarkson 1995; Donaldson and Preston 1995; Waddock and Graves 1997b), different from some references that assume there is no relation between financial and non-financial performance (Bauer et al. 2006). We verify that Gond and Crane (2010) adds the unbiased measure to the current typology, determining a lack of relationship, and this invalid link is acquired from the research of McWilliams and Siegel (2000). Some discovered the relationship to be positive, others stated it was negative, and others discovered mixed results. A few clarifications were made to legitimize these tested contrasts. To begin with, ESG and financial performance measures move from one focus to the other. Second, these reviews depend on small examples, cover various time periods with too short a horizon line, and do not control for tilt with respect to danger, size, area of action, and innovative work. In fact, the size of the company (Wirth et al. 2016) and the variety of its board members (Hoang et al. 2016) have a certain influence on the quality of the company's disclosure. For investors, the impact of this communication depends on the inherent value of this information. In addition, using linear approaches to manage the relationship does not account for the complexity of the relationship. These difference factors have been advanced without empirical approval to assess their effect on the findings obtained. This implies that there is a real lack of consensus on this issue, which prompts us to ask this question again from a new perspective.

2.2. Positive Relationship between Financial and Extra-Financial Performance

The existence of a positive association between ESG and financial performance can be analyzed from two theoretical perspectives. The first, inspired by stakeholder theory, shows that after a certain period, ESG will positively impact financial performance. In fact, investment in ESG activities is associated with benefits in the form of brand image and the enhanced reputation of the firm, consumers, and ease of integration into capital markets (El Ghoul et al. 2011). The second argument finds support in the standard resource availability hypothesis, which posits a reverse causality in the relationship: a positive impact of financial performance on ESG performance. This hypothesis' primary assertion is that improved performance stems from having surplus resources that enable a company to address social issues (Nelling and Webb 2009).

Many studies suggest that implementing an ESG strategy can result in cost savings and revenue growth for firms whose backing is critical for the organization's survival (Freeman 1984). Stakeholders are vital to a company's success as it relies on them and cannot survive without their support. Engaging in ESG practices is a means of improving stakeholder conditions and strengthening relationships, leading to a competitive advantage in various markets, ultimately boosting profitability. Some experts suggest that ESG initiatives improve a company's relationship with consumers, creating a competitive edge in the consumer market. Citing Doorman's work from 1990 (Doorman 1990), it can be asserted that enhancing a company's environmental performance could result in heightened productivity, consequently fostering wealth generation for the firm. According to the authors, responding to complaints from key or primary stakeholders improves their reputation and image in a way that has a positive effect on financial performance. External reputation develops initially, and financial performance follows. This social impact hypothesis is consistent with the stakeholder theory developed by Freeman (1984).

In addition, a company can enhance its rapport with existing employees and boost its appeal to prospective hires through active participation in ESG (Environmental, Social, and Governance) initiatives, consequently gaining a competitive edge in the job market. Research by Sprinkle and Maines in 2010 underscores the growing trend of employees

seeking out organizations with ESG-focused initiatives. This suggests that companies with such programs can not only retain their current workforce, but also draw a larger pool of candidates for their vacant positions over time. Employee retention has a positive impact on profitability as the company trains and educates new staff to the extent that it does (Balakrishnan et al. 2011). In fact, employee retention could likewise have a positive effect on financial performance as it correlates with increased efficiency, as an employee has been employed in the same location for longer. Moreover, a company that is seen as a competitive employer tends to attract a talented workforce, which is probable to have a positive impact on its financial performance (Sprinkle and Maines 2010).

Furthermore, involvement in ESG initiatives can strengthen a company's rapport with financial market stakeholders, thereby establishing a competitive edge within the industry. Certain scholars contend that firms incorporating ESG criteria into their practices demonstrate a heightened consideration for their future viability and sustainability, which leads financial market stakeholders to view them as less risky compared to their counterparts (Deutsche Bank Group 2012). As a result, the capital of these companies is competitive in terms of the cost of debt of equity and the reduced risk premium (Peylo 2012). Furthermore, it has been posited that engaging in ESG criteria can lead to a reduction in internal costs, often referred to as agency costs. This is because companies that incorporate ESG criteria into their practices are more inclined to report on their ESG metrics, as suggested by (Cheng et al. 2014) study. Certain ESG initiatives can also yield cost reductions by enhancing operational efficiency. Companies that adhere to increasingly stringent ESG performance regulations are less prone to legal actions and fines, thus averting legal costs. Additionally, improved energy efficiency has led to reduced energy expenditures, while material recycling has mitigated waste-related expenses and material costs (Cordeiro and Sarkis 1997).

From an exclusive approach, socially responsible investing has evolved into an inclusive approach, integrating companies with ESG "scores" into investment portfolios, allowing for the creation of "best-in-class" funds. As evidence suggests, Waddock and Graves (1997a) found that a company's ESG rating has a notable and statistically significant positive impact on its reputation. Improved consumer relations could have a positive impact on a company's financial performance because it can attract end consumers to a company's products or services. Hence, companies may enjoy price premiums or expand their market share due to this association. Nevertheless, it is worth noting that the financial implications of this correlation are more pronounced for firms operating in business-to-business sectors than for those in business-to-consumer sectors, as highlighted by Sahut and Pasquini-Descomps (2015) and Sprinkle and Maines (2010). Consequently, companies that have a closer proximity to end consumers tend to have greater incentives to engage in ESG activities.

Some other investigations have proven a positive association between company performance and ESG criteria. For instance, numerous researchers have observed a favorable effect on financial performance stemming from the governance component of ESG criteria (Deutsche Bank Group 2012; Ben Abdallah et al. 2020). In fact, Lee et al. (2009) argue that companies with a higher sustainability performance have minor idiosyncratic risks, and Hsu and Chen (2015) demonstrate that firms with a lower sustainability performance are at risk for financial distress. In the realm of finance, Goss and Roberts (2011) discovered that companies with a lower sustainability performance tend to carry 7 to 18 more basis points in bank debt compared to their high-performing counterparts. Moreover, El Ghouli et al. (2011) established that companies voluntarily disclosing their sustainability initiatives generally enjoy a reduced overall cost of capital. A better financial performance leads to a surplus of resources with the financial means of addressing the environmental, social, and governance issues which we are talking about here, resources dependent on financial performance. Other positive performance factors are proposed by different authors. Nonetheless, the scenario described as the "learning effect" by Bauer et al. (2006) suggests that socially responsible investments (SRI) may initially exhibit lower performance compared to tradi-

tional investments in the short run. However, this performance gap is expected to narrow in the medium term before eventually reversing. A “long-term” horizon would therefore be a performance factor for SRI (Barnett and Salomon 2006; Deheuvels 2006). Similarly, the concept of the “information effect” formulated by Kurtz (2005) also indicates that the ESG criteria generate value over time, which means that “the extra-financial rating interpreted as reflecting the control of the risks they face. Consequently, companies that manage their socio-environmental issues as well as possible limit the risks of social or industrial conflicts, which could damage their image, and are thus likely to overtake their competitors over the long term”. On the other hand, companies that are interested in these issues expose themselves to the risk of insolvency and the withdrawal of capital by investors. In addition, Preston and O’Bannon (1997) postulate a positive bidirectional causal relationship between ESG factors and financial performance. Allouche and Laroche (2005) speak of a “virtuous circle”, where there is a high level of social performance and improvement in financial performance to reinvest in socially responsible actions, which can change direction, taking a “vicious circle”, where the degree of social performance is mediocre, thus limiting socially responsible investments.

Hypothesis 1: *There is a positive correlation between the ESG level and financial performance.*

2.3. The Negative Association between Financial and Extra-Financial Performance

The presence of an adverse connection between ESG and financial performance can be explained through two distinct arguments. Firstly, the trade-off hypothesis posits that relinquishing certain business strategies or lucrative investment projects primarily results in a decline in the financial performance. Bragdon and Marlin (1972) and Brammer et al. (2006) have this line of argument. On the other hand, the managerial opportunism hypothesis implies a prioritization of the manager’s interests at the expense of shareholders and stakeholders, which also justifies a negative relationship (Preston and O’Bannon 1997). Under this hypothesis, the manager would tend to reduce government-sponsored enterprise expenditures when there is a high financial performance, and would increase them to justify a low financial performance. In fact, this unfavorable link is not limited to the social factor alone, but also to ecological and governance factors.

The arguments proposed by Milton Friedman’s position paper in his book *Capitalism and Freedom* (Friedman 1962a) or the article published by *Times Magazine* (1970) are aimed at strongly criticizing the proponents of corporate social responsibility. According to him, there is no compatibility between socially responsible investment and profitability, social responsibility only prevails when corporate profits. By taking on social and environmental concerns, the company’s policy will generate additional external costs which will be internalized and will irreparably cause a loss of profit and its action. Rudd (1981) also posits that incorporating restrictions into investment portfolios, including social and environmental constraints, might have an adverse impact on their performance. The trade-off hypothesis, which invokes neoclassical theory, argues instead for a negative financial impact of ESG actions (Aupperle et al. 1985). Indeed, ESG engagement is seen as a financial burden that negatively affects shareholder wealth.

On the contrary to the revisionist perspective, neoclassical economists contend that ESG factors add to a firm’s expenses without providing sufficient financial compensation for sustainable investments. According to neoclassical economists, at best, ESG involves a zero-sum trade-off in alignment with corporate financial objectives (Burke and Logsdon 1996). This school of thought suggests that adhering to strict environmental standards, particularly for companies operating in environmentally sensitive industries, will lead to higher costs. This is because the environment and natural resources are factors in production that impose limitations on a company, increasing costs and limiting growth potential (Palmer et al. 1995). Neoclassical economists typically support shareholder theory, which states that corporate social responsibility is equivalent to profit. Hence, allocating

resources to expensive sustainability initiatives would inevitably reduce shareholder value. (Friedman 1962b).

Embracing sustainable practices entails the investment in new, resource-efficient equipment and the establishment of internal processes that promote sustainability, as indicated by Sahut and Pasquini-Descomps (2015). The process of implementing sustainable structures incurs obvious costs (Porter and van der Linde 1991). Walley and Whitehead (1994) show that environmental costs are highest for the materials industry in pollution-intensive industries. Furthermore, when a company's activities are primarily driven by profit maximization within regulatory compliance, there can be a detrimental connection between a financial company's performance and its ESG performance. This is because such activities can expand the firm's operations without adequate economic compensation to offset the associated costs, as highlighted by Buallay et al. (2021).

Many research studies have revealed inverse correlations between financial performance and sustainable business practices. Hart and Ahuja (1996) carried out an empirical work on American companies which studied the effect of ESG factors on several performance ratios of financial companies and discovered that, from an accounting perspective, term sanctions on companies exercise ESG actions. In addition, Cordeiro and Sarkis (1997) studied 532 US companies and demonstrated a negative relationship between the pro-activism environment and one- and five-year security analysts forecasting the earnings performance. Furthermore, adopting a market-driven perspective, Worrell et al. (1995) discovered substantial and consistently negative reactions to announcements of ESG initiatives spanning a five-year timeframe. Sarkis and Cordeiro (2001) carried out a study on 482 American companies which advocate either a proactive position, implementing ESG criteria in their processes, or so-called "end-of-chain" solutions which are based on external recycling and the recovery of waste. They found significantly negative correlations between ESG performance and that of companies, including companies that advocate more proactive solutions for end-of-channel implementations.

In fact, taking up social responsibility activities generates additional costs which place socially efficient companies at a competitive disadvantage compared to others (Friedman 1962c) and limit their strategic alternatives (Vance 1975). Moreover, all initiatives considered to be socially responsible will move leaders away from their supposed priority objective of maximizing profit. This theory has also been validated empirically by Vance (1975), but on a financial basis in relation to the shares of the company. The authors find that companies with strong experience and social competence see their market share decrease. The theory of the "cost" of ESG engagement has advanced the underperformance of investments relative to socially responsible investing. Rudd (1981) states that each transaction generates costs represented either by a brokerage commission or by the expenses incurred to pursue or exclude specific blocks of shares within the portfolio selection, which Luther et al. (1992) describe as surveillance costs. All costs would ultimately reduce yield (Barnett and Salomon 2006). In addition, the assumption of the opportunism of managers is the principle that a high level of performance leads to a high level of low ESG performance; this hypothesis is also renamed as "collection" hypothesis. In fact, when managers generate financial returns to their profits and reduce social spending, it is to capture their own personal income. The interest of the manager then takes precedence over that of the stakeholders.

The objective of this paper is to situate the ESG and financial performance of American companies in six different sectors. To experiment with this empirically, we set up a hypothesis that tests the relating ESG performance and financial performance. In fact, the natural resources are factors of production in our sample, which impose limits, increasing costs and limiting the organization's capacity for growth (Palmer et al. 1995). Our hypothesis posits a negative correlation, as the companies we have chosen might encounter challenges in realizing the financial advantages associated with the ESG criteria while simultaneously grappling with regulatory constraints.

Hypothesis 2: *A negative correlation exists between the degree of ESG and financial performance.*

2.4. The Nonlinear Association between Financial and Non-Financial Performance

Recent research endeavors aim to overcome the constraints of prior studies by recognizing the intricate, non-linear connection between the ESG criteria and financial performance. However, several studies have found that the relationship is curvilinear, rather than linear, with both positive and negative impacts on financial performance depending on the firm's position on the curve. For example, [Barnett and Salomon \(2012\)](#) propose a U-shaped relationship, while [Wagner and Schaltegger \(2004\)](#) suggest an inverse U-shaped relationship. The positive financial impact of ESG activities depends on the company's ability to improve its relationship with stakeholders through ongoing and consistent efforts, as credibility is key. However, if ESG activities are seen as self-serving or mere "greenwashing", their credibility with stakeholders could diminish. According to [Wagner and Schaltegger \(2004\)](#), there is a curvilinear, inverted U-shaped relationship between environmental performance and financial performance, suggesting a win-win situation where improving their environmental performance could lead to a better financial performance. In this scenario, a company should employ a profit-maximizing strategy when deciding which environmental initiatives to pursue. Nevertheless, the realization of this mutually beneficial relationship depends on meeting the minimum threshold of the environmental performance required by regulations. Additionally, the recognition of a nonlinear relationship between environmental and economic practices was brought to light by [Barnett and Salomon \(2012\)](#). They contended that as a company enhances its environmental performance, its initial financial performance may decline, but eventually improves as environmental performance advances, leveraging more essential resources and enhanced management discretion over the long term. Likewise, scholars such as [Hart \(1995\)](#), [Russo and Fouts \(1997\)](#), and [Jin and Xu \(2020\)](#) have also identified a U-shaped relationship between environmental initiatives and a company's economic performance. This pattern arises due to ongoing enhancements in pollution prevention strategies, organizational culture, and stakeholder management, offering the potential for long-term improvements in financial performance. More recently, drawing on Indian companies, [Ghosh et al. \(2023\)](#) has attempted to examine the link between financial and extra-financial performance using the generalized method of moments (GMM) estimator. The study's findings validate a positive U-shaped relationship between environmental performance and financial performance.

The third hypothesis explores the presence of a non-linear correlation between ESG performance and financial performance. We hypothesize that it is non-linear for various reasons. First, because the ESG criteria entail both financial drawbacks and financial advantages, a non-linear relationship is delineated. Moreover, numerous preceding studies employing a linear framework have yielded mixed or inconclusive findings, suggesting that this relationship is more intricate than a linear one.

Hypothesis 3: *There is a significant non-linear correlation between the ESG level and financial performance.*

3. Data and Methodology

The initial sample was chosen by extracting data for 93 U.S. companies spanning from 2010 to 2019 from the Thomas Reuters and World Scope Global Databases. In 2010, this database encompassed around 37,000 active firms, constituting approximately 95% of the global market capitalization. When we collected firm's information, our starting point was the ESG scores. The scores were individually acquired for each company from Thomson Reuters' Asset 4 database. The E, S, and G scores were assigned on a scale ranging from 0 to 100, with 0 representing the lowest performance and 100 indicating the highest performance on the scale. We started with downloading scores of all firms that belong to six vital American sectors who can be considered the most important sectors in USA, and they are Oil and gas producers, Health care equipment and services, Pharmaceuticals and biotechnology, Construction and materials, Industrial engineering, and Equity investment instruments, which are 528 firms in total.

3.1. Dependent Variable

Our study analyzes the impact of corporate social performance on financial performance, using the return on assets (ROA) as the dependent variable for each firm per year, as suggested by Waddock and Graves (1997b). We have relied on ROA ratio as a measure of financial performance, and to measure this ratio, which is limited to a short period, we used an accounting method. It should be noted that companies exhibiting a higher Return on Assets (ROA) presented the potential for superior returns on their investments and are generally expected to have an enhanced capacity to secure capital in financial markets when compared to companies with a lower ROA. Specifically, ROA is defined as the ratio of earnings before interest to total assets:

$$ROA = \frac{\text{Net income} + ((\text{Interest Expense on Debt} - \text{Interest expense capitalized}) \times (1 - \text{Tax Rate}))}{\text{Average of Last Year's and Current Year's Total Asset}} * 100$$

3.2. Control Variables

To account for possible external factors that may impact financial performance, we included control variables in our regression analysis. We also used fixed effects to control for unobservable factors that may vary across industries, firms, and years. Through this approach, our objective was to separate and analyze the standalone connection between corporate social performance and financial performance. Based on previous research, we have chosen to include company size as a control variable (Weber 2014; Wirth et al. 2016; Abeyrathna and Priyadarshaa 2019; Pekovic and Vogt 2021). Previous studies exploring the relationship between internal company characteristics have identified company size as a crucial control variable to consider. As company size increases, the impact of economies of scale becomes more pronounced, making the company potentially more receptive to improving its financial performance through mechanisms such as corporate governance, among others. Consequently, the great differences in size between companies can lead to significant variations in their willingness to manage both their ESG performance and their economic results. With this in mind, we incorporated firm size as one of the control variables (see Appendix A, Table A1 for data sources).

4. Empirical Methodology

The study has two primary objectives: first, to explore the relationship between corporate performance and sustainable performance, and second, to investigate the presence of an inverted U. To achieve these goals, the paper employs a dynamic panel data methodology to estimate a regression model for the ROA across a range of countries. Specifically, the study estimates the following linear equation:

$$ROA_{it} = \alpha_0 + \alpha_1 ROA_{it-1} + \alpha_2 ESG_{it} + \alpha_3 Size_{it} + \alpha_4 Age_{it} + \alpha_5 Debt_{it} + \epsilon_{it} \quad (1)$$

where ROA represents the financial performance for the sector *i* in period *t*; ESG is the lagged ESG score; Size is the logarithm of market capitalization; Age is the logarithm of Years since incorporation; Debt is the total debt asset; and ϵ_{it} is the error term. In Model (1), ESG was quantified as an evenly balanced representation of the individual scores.

In our analysis, we observed a correlation exceeding 0.8 between the E and S scores, as detailed in Appendix B (see Table A2). To address the issue of multicollinearity in our model, we combined the E and S scores into a single aggregated score, termed the E/S score, with equal weighting. Despite this consolidation, the correlation between the E/S score and the G score remains at 0.3. However, acknowledging previous research suggesting that ESG should be assessed as separate scores, we also utilized these scores individually in Models (2), (3), and (4).

$$ROA_{it} = \alpha_0 + \alpha_1 ROA_{it-1} + \alpha_2 ES_{it} + \alpha_3 Size_{it} + \alpha_4 Age_{it} + \alpha_5 Debt_{it} + \epsilon_{it} \quad (2)$$

$$ROA_{it} = \alpha_0 + \alpha_1 ROA_{it-1} + \alpha_2 G_{it} + \alpha_3 Size_{it} + \alpha_4 Age_{it} + \alpha_5 Debt_{it} + \epsilon_{it} \tag{3}$$

$$ROA_{it} = \alpha_0 + \alpha_1 ROA_{it-1} + \alpha_2 ES_{it-1} + \alpha_3 G_{it-1} + \alpha_4 Size_{it} + \alpha_5 Age_{it} + \alpha_6 Debt_{it} + \epsilon_{it} \tag{4}$$

We then ran separate Models (2)–(4) where we dropped the G score in Model (2), dropped the E/S score in Model (3), and included both the E/S score and G score in Model (4).

We have employed various econometric approaches (such as OLS, Fixed Effects, Diff-GMM, and Sys-GMM) to estimate Equation (1). Our favored estimation technique is the Generalized Method of Moments (GMM), which is particularly effective in addressing the potential endogeneity of the right-hand-side variables, including the lagged dependent variable, as highlighted by [Arellano and Bond \(1991\)](#). Given the need to account for the effects of unobserved heterogeneity in a panel model, traditional panel estimators can generate biased results. Furthermore, even conventional panel estimators with fixed and random effects can introduce bias, unless the sample size, denoted T, is sufficiently large. On the other hand, panel estimators using first differences can be inconsistent even when T is large. To overcome these problems, we opted for the use of GMM estimators, supporting the methods developed by [Arellano and Bond \(1991\)](#) and [Arellano and Bover \(1995\)](#). The underlying idea is to initially calculate the first differences to deal with unobserved heterogeneity, while using valid instruments based on lagged endogenous variables (as proposed by [Maitra 2017](#)).

To identify potential non-linearities in the correlation between corporate performance and sustainability performance, we incorporated a squared term for ESG and conducted the subsequent regression analysis:

$$ROA_{it} = \alpha_0 + \alpha_1 ROA_{it-1} + \alpha_2 ESG_{it} + \alpha_3 ESG_{it}^2 + \alpha_4 Size_{it} + \alpha_5 Age_{it} + \alpha_6 Debt_{it} + \epsilon_{it} \tag{5}$$

In assessing the existence of an inverted-U relationship, the prevalent approach involved the inclusion of a quadratic term within the linear model ([Lind and Mehlum 2010](#)).

5. Empirical Results

Our investigated firms are distributed over the following business sectors: Oil and gas producers, Health care equipment and services, Pharmaceuticals and biotechnology, Construction and materials, Industrial engineering, and Equity investment instruments as follows (see [Table 1](#)).

Table 1. Description of Business sectors.

Business Sectors	
Oil and gas producers	30
Health care equipment and services	30
Pharmaceuticals and biotechnology	20
Construction and materials	7
Industrial engineering	5
Equity investment instruments	1
Total	93

[Table 2](#) displays the descriptive statistics for the variables employed in this study. In fact, the average Return on Assets (ROA) for the sample stands at 5.79. The variables used in the study are platykurtic, with a kurtosis of less than three, except for ROA which is antiplatykurtic with a kurtosis of 6.33. The Jarque–Bera test rejects the normality hypothesis for the distribution of the variables (*p* value = 0.00). These results suggest that the distribution of the variables is not normal.

Table 2. Summary statistics.

Variable	Obs.	Mean	Std.dev	Min	Max	Kurtosis	Jarque–Bera
ROA	930	5.796	12.242	−119.83	8.441	6.332	0.002
Size	928	7.015	0.633	4.322	8.642	2.628	0.035
Age	930	4.112	4.205	0.000	0.263	2.311	0.049
Debt	930	−3.729	5.083	−1.724	3.627	2.630	0.001
E	869	32.754	8.335	0.000	96.831	2.149	0.003
S	869	46.594	13.912	3.381	97.628	1.228	0.078
G	869	53.110	2.828	3.366	96.023	2.825	0.033

5.1. Discusses the Negative Relationship between Financial Performance and ESG Level

When controlling for size, age, and debt, the tables reveal that an enhanced ESG score has a negative impact on financial performance when ROA is used as the measure. Table 3 displays the outcomes of Model (1), which assesses the relationship between the aggregated ESG score and ROA using OLS and FE methods.

Table 3. Impact of ESG on ROA.

Variables	OLS		Fixed Effect		GMM	
	Coefficient	Prob	Coefficient	Prob	Coefficient	Prob
l.ROA					0.262	0.222
ESG	−0.458 *	0.059	−0.785 **	0.009	−4.556 **	0.001
Size	0.043 **	0.015	1.425 ***	0.000	0.155 **	0.008
Age	−0.085 *	0.061	−0.817 **	0.045	−0.63 2 **	0.010
Debt	−0.756 ***	0.000	−0.061	0.147	−0.956 **	0.152
Constant	−1.615 ***	0.000	−4.942 ***	0.000	9.255	0.956
R-squared	0.046		0.623		0.956	
AR(2)					0.525	

Notes: ***, **, * demonstrate the rejection of the null hypothesis at significance levels of 1%, 5%, and 10%, respectively.

Our findings reveal that the ESG score has a statistically significant negative influence on ROA, with both methods producing similar results. Specifically, a one-unit increase in the ESG score leads to a decrease of 0.458 in ROA using OLS and 0.785 using FE. This aligns with previous research, including Sarkis and Cordeiro (2001), that has shown a negative link between ESG performance and financial firm performance.

However, the magnitude of this effect is relatively small compared to the impact of control variables such as firm size and debt. Our results also confirm the expected positive impact of size on both financial performance measures in all regressions. When we analyze Model (2) and (3), the stand-alone effect of the ES score, we obtain a significant positive effect with OLS and significantly negative effect with the Fixed effect (see Table 4). Consequently, companies that enhance their combined Environmental (E) and Social (S) scores by one unit can anticipate a 0.166 increase in ROA using OLS and a 0.151 decrease with fixed effects. This means that E/S has a positive effect only in the short term, which then turns negative after a period.

Table 4. Impact of ES on ROA.

Variables	OLS		Fixed Effect		GMM	
	Coef	Prob	Coef	Prob	Coeff	Prob
L.ROA					0.245	0.001 **
E-S	0.166 **	0.021	−0.151 **	0.020	0.485	0.002 **
Size	0.420 **	0.035	0.062	0.143	0.158	0.112
Age	−0.492 *	0.099	−0.538 **	0.034	−0.215	0.005 **
Debt	−0.446 ***	0.000	−0.861 ***	0.000	−0.326	0.033 **
Constant	−1.081 **	0.009	−4.562 ***	0.000	1.266	0.962
R-squared	0.448		0.789		0.896	
AR(2)					0.562	

Notes: ***, **, * demonstrate the rejection of the null hypothesis at significance levels of 1%, 5%, and 10%, respectively.

When assessing Model (3) in Table 5 and isolating the impact of the G score, we observe a statistically significant adverse influence on both ROA and FE. Specifically, a reduction of one unit in the G score corresponds to a decrease of 0.225 when employing OLS and a more substantial decline of 0.410 when employing FE. In Table 4, we present the results obtained when we include interaction terms between the control variables and the ESG score. The findings indicate that the interaction terms involving ESG and factors such as size, age, and debt exhibit statistically significant relationships. The negative effect of ESG on ROA is more pronounced for larger firms, younger firms, and firms with high levels of debt. These findings suggest that the negative impact of ESG on financial performance is amplified in these contexts.

Table 5. Impact of G on ROA.

Variables	OLS		Fixed Effect		GMM	
	Coef	Prob	Coef	Prob	Coef	Prob
L.ROA					0.264 **	0.001
G	−0.225 ***	0.000	−0.410 *	0.081	0.556 **	0.021
Size	0.511 **	0.046	0.170	0.128	0.458 *	0.078
Age	−0.123 *	0.093	−0.118 **	0.010	0.215 **	0.015
Debt	−0.873 ***	0.000	−0.587 ***	0.000	0.965 ***	0.000
Constant	−1.657 ***	0.000	−4.572 ***	0.000	−3.266	0.988
R-squared	0.760		0.865		0.969	
AR(2)					0.425	

Notes: ***, **, * demonstrate the rejection of the null hypothesis at significance levels of 1%, 5%, and 10%, respectively.

Furthermore, the results indicate that the negative effect of ESG on ROA is not driven by a specific industry or year, as the coefficients for the industry and year fixed effects are not statistically significant. Overall, our results indicate that firms that perform well on ESG measures may face financial performance penalties, particularly if they are large, young, or heavily indebted. These findings hold significant implications for companies, investors, and policymakers keen on understanding the connection between ESG factors and financial performance.

When we test model (4), i.e., having the disaggregated E/S and G scores in one model, we get a significant relationship (see Table 6). Our results indicate that within the chosen American industry sectors, regardless of whether ESG performance is examined in an aggregated or disaggregated manner, and irrespective of the financial performance metric employed, there is a consistent negative impact of ESG performance on financial performance. This may be discouraging for firms that prioritize ESG strategies. However, we posit that the positive impacts of ESG activities, particularly in environmental strategies, may not be immediately visible in the financial performance in the short term. For example,

improving productivity and efficiency through environmental strategies may lead to lower costs for raw materials and left-over disposal, which can ultimately yield financial benefits for the company. Previous studies have also found support for the long-term financial benefits of ESG activities (Hart and Ahuja 1996; Orlitzky et al. 2003). Moreover, our research has limitations regarding its capacity to draw conclusions about the enduring association between financial performance and ESG. It is possible that improved an ESG performance can lead to improved stakeholder relations, which can in turn lead to price premiums or increased market share and revenue (Porter and Kramer 2006). We propose that future research endeavors delve into assessing the long-term correlation between ESG factors and financial performance. Overall, while our findings suggest a negative relationship between financial performance and the ESG level in the short term, we acknowledge the potential long-term benefits of ESG activities and the need for further research to fully understand this relationship. Furthermore, it should be noted that the positive relationship between ESG performance and financial performance is not always straightforward and may depend on various factors such as industry, region, and time frame. Our study specifically focuses on firms within the American basic materials industry, which might explain the lack of positive effects on financial performance. Firms in this industry face challenges in improving their ESG profiles due to their products and activities being perceived as unsustainable or unethical. Additionally, the business-to-business market, which is prevalent in this industry, is less sensitive to ESG-related issues, making it harder for firms to gain a competitive advantage through engagement in ESG. Previous studies have confirmed a favorable connection between ESG performance and financial performance, particularly in terms of cost of capital. For example, research conducted by Peylo (2012) has demonstrated that sustainable companies tend to benefit from a reduced cost of capital compared to their counterparts.

Table 6. Impact of ES and G on ROA.

Variables	OLS		Fixed Effect		GMM	
	Coef	Prob	Coef	Prob	Coef	Prob
L.ROA					0.144	0.008
E-S	0.425 ***	0.001	0.115 **	0.040	0.425 **	0.001
G	−0.235 ***	0.000	−0.001 **	0.044	−0.542 **	0.002
Size	0.502	0.151	−0.562	0.644	−0.125 *	0.71
Age	−0.494 **	0.018	−0.826 **	0.035	−0.325 *	0.052
Debt	−1.483 ***	0.000	−0.770 ***	0.000	−0.692 **	0.002
Constant	−0.034 **	0.028	−4.507 ***	0.000	1.026	0.956
R-squared	0.772		0.895		0.956	
AR (2)					0.526	

Notes: ***, **, * demonstrate the rejection of the null hypothesis at significance levels of 1%, 5%, and 10%, respectively.

Nonetheless, it is worth noting that these investigations have primarily concentrated on sectors other than basic materials. This discrepancy in findings may partially be attributed to the industry-specific context, which could account for the inverse association between financial performance and ESG factors observed in American firms within this study. This indicates that shareholders may value the “dirty” factor more than the good ESG performance in the basic materials industry. Although lower costs of capital may exist in these industries, our results suggest that the costs associated with ESG initiatives outweigh these benefits in the short term. Other studies such as Thornton et al. (2005) have also found a negative relationship between ESG and financial performance in firms within the basic materials industry, further supporting this study’s findings. Hart and Ahuja (1996) have also used the same methodology as this study and found a negative relationship between financial performance and the ESG level, with their evaluation of financial performance shown as ratios and ESG performance measured with time lags.

In summary, these results imply that the adverse influence of ESG factors on financial performance is closely tied to the industry sector and the specific contextual factors at play.

5.2. The Inverted-U-Shaped Association between Financial and Extra-Financial Performance

To investigate the potential presence of a U-shaped or inverted U-shaped relationship within their dataset, the researchers performed a regression analysis wherein they regressed the squared ESG score against financial outcomes using Model (5). Their analysis outcomes indicated that the association between the ESG and financial performance does not exhibit a U-shaped or inverted U-shaped pattern. This was evident from the insignificant results for the squared ESG coefficient in Model (5). The results are presented in Table 7. Consequently, the conclusions drawn in previous research, exemplified by Barnett and Salomon (2012) and Wagner and Schaltegger (2004), may not be directly transferable to American firms. In light of the findings from their preceding regression analyses, the researchers posit that the relationship between financial performance and the ESG level is, in essence, negative.

Table 7. Impact of squared and G (OLS).

Variables	OLS		Fixed Effect		GMM	
	Coef	Prob	Coef	Prob	Coef	Prob
L.ROA	0.233 **	0.001	0.956 **	0.022	0.415 ***	0.000
ESG	0.632 **	0.002	0.622 **	0.001	0.562 **	0.001
ESG ²	−0.452 **	0.007	−0.512 **	0.018	−0.632 **	0.002
Size	0.144	0.126	0.554 **	0.003	0.152	0.152
Age	0.113 **	0.020	0.629 **	0.025	0.415 *	0.082
Debt	0.811 **	0.020	0.589 **	0.028	0.689 *	0.062
Constant	−1.408	0.930	−6.408	0.112	2.362	0.898
R-squared	0.884		0.998		0.788	
AR(2)	0.955		0.725		0.655	

Notes: ***, **, * demonstrate the rejection of the null hypothesis at significance levels of 1%, 5%, and 10%, respectively.

Our study contradicts previous research, such as Barnett and Salomon (2012), which shows a U-shaped relationship between the ESG and financial performance. One possible explanation for this contradiction is that the companies in our sample may perform poorly on ESG parameters, which prevents them from being found on the right side of the U-shaped curve where ESG activities translate into improved financial results. However, this explanation is not supported by our data, as the mean ESG score in our sample is around 44, with a significant dispersion between the best and worst performers. A more plausible explanation is that firms in our sample, which operate in a typically “dirty” industry, cannot benefit financially from ESG activities, as stakeholders may view such activities as “greenwashing” and not genuine efforts to improve sustainability. Indeed, some companies exaggerate or distort their environmental or social initiatives to improve their image, while maintaining sub-optimal practices. However, this channel is based on the theory of information asymmetry, where investors and the public are deceived by misleading information, which can damage reputations and, ultimately, financial performance (Li et al. 2023).

Hence, these companies may encounter challenges in cultivating improved relationships with stakeholders and may not reach a critical juncture where unfavorable financial outcomes transition into positive ones. This observation aligns with the rationale proposed by Barnett and Salomon (2012) and is substantiated by our findings. Moreover, our study implies that firms operating in this sector may not pursue a profit-maximizing objective or strategy in their ESG endeavors, given the absence of evidence supporting an inverted U-shaped association between ESG performance and financial performance. Additionally, the stringent regulations surrounding sustainability in this industry may make it difficult for firms to invest more in ESG activities than those they are already involved in, as this could have a negative effect on financial results. Overall, our findings indicate that in the

American basic materials industry, the association between financial performance and ESG performance is negative, and that stakeholders prioritize the financial costs associated with ESG activities over any potential financial benefits.

In conclusion, our findings support our hypothesis that the influence of ESG on financial performance in the selected American firms from the dirty industry sectors is negative. Nonetheless, we are unable to definitively ascertain whether the actual correlation between ESG and financial performance follows a linear or non-linear pattern. It is unclear if the financial results decrease at a constant rate for every additional unit of the ESG score or if the rate of decrease varies.

6. Conclusions

This study employs multiple regression analysis to investigate the connection between the ESG (Environmental, Social, and Governance) performance and the financial performance of U.S. companies. Our results align with previous analyses that the relationship is negative. However, the true nature of this relationship remains unclear, indicating the need for further research. Our findings suggest that in the U.S. market, the financial advantages of ESG, particularly in terms of corporate governance initiatives, do not surpass the associated costs. This suggests that companies in this sector lack the necessary conditions to fully benefit from ESG activities. Stakeholder relationships are a crucial aspect of ESG's business case, but our sample did not involve any improvement in stakeholder relations. ESG activities are not compatible with the unsustainable nature of companies, which makes them less credible to stakeholders.

Stakeholder relationships are not improved by ESG activities, which leads to a lack of a positive impact on financial performance. Additionally, companies are burdened with the costs of ESG and corporate governance activities due to strict regulations. While ESG activities can lead to cost reductions in areas such as energy efficiency and waste reduction, these savings are not enough to cover the initial investment in the short run. Nevertheless, it is plausible that ESG factors could exert a positive influence on the long-term financial performance, as the prior literature indicates that there may be a time lag before ESG initiatives translate into tangible financial outcomes. Therefore, we suggest that future studies investigate this relationship over an extended period.

In order to combat global environmental degradation, it is crucial to provide financial incentives for companies in high-risk sectors, such as the one we examined, to engage in ESG practices. Shifting the focus from short-term financial goals to long-term financial goals is one strategy to encourage companies to prioritize ESG activities. Additionally, imposing stricter penalties, such as higher fines for poor ESG performance, would create a financial incentive for companies to improve their ESG practices. Another approach would be to increase the transparency and accessibility of information about ESG activities, through integrated reporting. This would address the credibility issue and improve stakeholder relationships, which are essential for creating a competitive edge in various markets. Ultimately, by engaging in ESG activities, U.S. companies in this sector would have the potential to positively impact their financial performance. Future research should explore these strategies further.

We anticipate that these findings will inspire additional precise empirical research and theoretical advancement in the field of corporate sustainability performance and ESG disclosure. Subsequent investigations could explore the correlation between sustainability and corporate governance within Asian firms, building upon the insights provided by Li (2018), who offers a comprehensive overview of research exploring the consequences of various corporate governance mechanisms on corporate sustainability.

In future empirical models, it may be worthwhile to incorporate the impact of economic cycles, such as periods of economic growth or recession stemming from events such as natural disasters or the Covid-19 pandemic. For instance, economic fluctuations can impact decision making in response to various ESG initiatives, which encompasses corporate resource allocation, interactions with the community and employees, environ-

mental stewardship, and product/safety quality, all of which can exert an influence on firm performance. During challenging economic periods, firms may deprioritize certain aspects of social responsibility, only to reinvigorate their commitment to these areas when economic conditions improve.

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Appendix A

Table A1. Variables description and data source.

Variables	Label	Measurements	Source
Dependent variable			
Operational performance	ROA	Net income divided by total assets	Worldscope
Independent variables			
ESG	ESG	Mean of the 3 ASSET4-Pillars: Social, Environmental, Corporate Governance.	ASSET4
Environmental	E	The environmental score, which evaluates the company’s disclosure of energy use, waste, pollution, conservation of natural resources, and treatment of animals.	ASSET4
Corporate social responsibility	S	The social score assesses the extent to which the firm discloses its business relationships, corporate donations, volunteer efforts, employee well-being, and safety measures.	ASSET4
Corporate governance	G	The governance score, which assesses disclosure of the corporate governance code.	ASSET4
Control variables			
Market capitalization	Size	Market capitalization, which measures the total dollar value of all a company’s outstanding shares at the current market price.	Worldscope
Age	Age	Years since incorporation.	Worldscope
Total debt asset	Leverage	The leverage ratio of the total amount of debt relative to assets owned by a company.	Worldscope

Appendix B

Table A2. Correlation matrix.

Variables	ROA	ESG	E	S	G	Size	Leverage	Age
ROA	1.000							
ESG	0.895	1.000						
E	0.462	0.869	1.000					
S	0.726	0.755	0.829	1.000				
G	−0.269	0.896	0.178	0.253	1.000			
Size	0.859	0.216	0.162	0.161	0.111	1.000		
Leverage	0.336	0.895	−0.216	0.189	0.962	−0.196	1.000	
Age	0.215	−0.162	0.162	−0.266	0.269	0.266	0.456	1.000

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