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Article

Does corporate financial performance promote ESG: Evidence from US firms

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ACCOUNTING, CORPORATE GOVERNANCE & BUSINESS ETHICS | RESEARCH ARTICLE

Does corporate financial performance promote ESG: Evidence from US firms

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Abstract: Studying Corporate Environmental, Social and Governance responsibility (ESG) and its consequences remain a topical concern of the company's stakeholders including governmental and non-governmental organizations, investors and researchers over the past few decades. While most research has studied and validated the beneficial effect of ESG on financial performance. The few studies that have explored the nexus between financial performance and ESG relationship are conducted in a double causality framework. Thus, this research fills this gap by studying the effect of financial performance on ESG. Using a random-effects panel data model for more than 10,000 firm-year observations of 504 U.S. firms during the period 2000–2020, the results show a positive relationship between financial performance and ESG. Furthermore, cash holding, minority interest and inflation have significantly the expected sign. Yet, the market-to-book value seems insignificant. Interestingly, during periods of high economic policy uncertainty, oil price uncertainty and leverage, the impact of companies' financial performance on ESG decreases differently according to the three components of the ESG. These findings are robust and consistent with alternative econometric specifications and alternative measures of dependent variable and control variables.

Subjects: Corporate Finance; Corporate Governance; Corporate Social Responsibility

Keywords: Corporate Financial Performance; ESG performance; Economic Policy Uncertainty; Oil Price Uncertainty; Leverage; US firms

1. Introduction

The issue of the ESG dimension within companies has become an undeniable reality and requirement that companies must take into account in order to guarantee their survival, sustainability and performance. On the macroeconomic level, most studies have focused on the effects of ESG on risk and economic policy uncertainty (Shaikh, 2021; Borghesi et al., 2019; Ahsan & Qureshi, 2021; Çigdem, 2000; Aboud and Diab, 2018; Guenichi and Khalfaoui, ; Zhao et al., 2021; Albuquerque et al., 2019; Benlemlih et al., 2018; Cai et al., 2016; Sassen et al., 2016) or on the ongoing capital market volatility (Deng et al., 2022, 2022; Dai, 2021; Li et al., 2022; Brandon et al., 2021; Jagannathan et al., 2017). On the microeconomic level, other studies have examined the impact of ESG on corporate financial performance (CFP) and market value (Van Linh et al., 2022; Atan et al., 2018; Xie et al., 2019; Wasiuzzaman et al., 2022; P & Busru, 2021; Chouaibi et al., 2022; Velte, 2017; Sinha Ray and Goel, 2022; Tampakoudis et al., 2021; Malik, 2015; Setiadi et al., 2017; Purnomo & Widianingsih, 2012; Suhardjanto et al., 2018; Haninun et al., 2018; Friede et al., 2015; Ahmad et al., 2021; Xie et al., 2019; Bahadori et al., 2021; Melinda & Wardhani, 2020) while,

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the opposite sense relating to the effect of the company's financial performance on ESG practices remains unexplored.

At the beginning, ESG has conceived as a responsibility and not a duty. Firms are not required to participate in social, environmental and governance activities. During the last two decades, the notion of ESG has become a strongly recommended requirement for different companies in order to respond to new values demanded by the firm's stakeholders, investors, donors, governments and other environmental and energy organizations, such as "fair trade, equal treatment, green consumption and environment-friendly product". These values enable them to face the challenges of economic, climate, environmental and governance changes. The ongoing commitment to ESG responsibility allows sustainable development. For this reason, some companies are aware of these issues and have taken important steps in implementing the ESG approach, while, others are still lagging because of financial and risk reasons. In other words, the fulfillment of social, environmental and governance responsibility is not only linked to the financial and economic conditions of the firms but also to their economic and socio-political environment on a national and international scale. Among these conditions, firm performance, represented by the financial and economic profitability and/or the market value, is crucial in the decision-making of investors when determining the ESG score firm. Generally, both shareholders and investors are looking for their interests by making profits before even thinking about an ESG approach (Friedman, 1962). Given that the company's target is to make a profit, the main actions carried out are commercial by nature. Besides, according to stakeholder theory, Freeman (2001) suggests that a firm can only exist if it can meet the needs of stakeholders, who can significantly affect the firm's welfare. It is therefore natural that economic responsibilities should form the basis of corporate social responsibility (CSR). Based on legal theory, Suchman (1995) shows that compliance with the law, the company's second responsibility, is fundamental to CSR, as laws represent a process of moral values' codification that is present in society. Ethical and Philanthropic responsibilities ranked third and fourth, respectively, require companies to do what is seen as good, right and honest. These are the actions that stakeholders expect a company to take even if it is not legally obliged to do so. A company's commitment to CSR reaches its peak when it voluntarily carries out actions desired by society for the well-being of its employees and/or the community at large (Carroll's, 1979).

The ESG concept is a result of the ongoing commitment to corporate social responsibility. It is composed of the three pillars of extra-financial analysis that converge toward sustainable development (Lokuwaduge & Heenetigala, 2017). From an environmental perspective, it is about protecting the environment through waste recycling and reducing greenhouse gas emissions to fight global warming and ensure the energy transition by promoting renewable energies. From the social point of view, it is about the promotion and the management of staff careers through training, assistance and support, the protection of the employee's rights, participation in the social dialogue and social inclusion. As for governance, it is about the independence of the board of directors, the presence of audit, risk, nomination and remuneration committees, the protection of minority shareholders' rights, the establishment of good practices, the respect of the law and meeting the needs of stakeholders (Oliver Sheldon, 1924; Sethi, 1975; McWilliams and Siegel, 2000; Marrewijk, 2003; Lokuwaduge & Heenetigala, 2017)

Based on this definition, it is important to link financial performance to each company's ESG score. The higher the financial performance, the higher the contribution and integration in the ESG fields are. In fact, there is a double interaction between financial performance and ESG scores. On the one hand, financial performance determines the level of a company's involvement in an ESG approach. On the other hand, ESG is an important determinant of the company's results whereas a company that recognizes a loss cannot devote a dedicated fund to sustainability issues.

Studying the nexus between performance and ESG cannot be conducted without integrating the firm's environment such as political and economic uncertainty, oil price uncertainty, economic and health crises, its debt ratio, stock market volatility, etc., in order to know how it reacts to ESG. Also, the CFP-ESG relationship depends on other factors such as the culture, size, market value, business

area, governance mode and the level of trust with its stakeholders (Çigdem, 2020; Lins et al., 2017; Eliwa et al., 2019; Albuquerque et al., 2019; Benlemlih et al., 2018; Cai et al., 2016; Sassen et al., 2016; Borghesi et al., 2019; Cornell, 2021; Shakil, 2021; Hassen and Hamdi, 2021; Bauer et al., 2007; Mittal et al., 2008; Julio & Yook, 2012; Gulen & Ion, 2016; Wasiuzzaman et al., 2022; Ray & Goel, 2022; Yoon et al., 2018; Ahmad et al., 2021).

The objective of our study aims to explore for the first time the relationship between corporate financial performance, measured by ROA and ROE ratio, and ESG score as well as the factors that may moderate this relationship. We consider that the cash holding, the market-to-book value (MTB), the respect of minority shareholders' interest and inflation can also moderate ESG performance. Besides, we consider that the relationship linking financial performance to ESG is highly dependent on the economic policy uncertainty (EPU), the oil price uncertainty (OPU) and the leverage level.

Using a random-effects panel data model, we find that financial performance is positively and significantly correlated with ESG activities, meaning that investments in ESG are highly dependent on the US firm's earnings. Also, cash holding and minority interest respond positively and significantly to the ESG score. However, inflation is negatively and significantly correlated with ESG, but the market-to-book value seems insignificant.

In addition, we find that overall, an increase in EPU, OPU and leverage reduces the positive effect of US companies' financial performance on ESG score. Individually, this performance reduction mainly affects the governance pillar in the case of high leverage, the environmental and social pillars in the case of high EPU, and the three ESG pillars in the case of increased oil price volatility.

The rest of the paper is organized as follows: section 2 reviews the recent related literature. Section 3 describes the data, the empirical model and the methodology. Section 4 presents empirical results and their interpretation. Section 5 contains the robustness checks. Section 6 concludes and provides some limitations.

2. Literature review

The contemporary financial and managerial literature linking ESG to corporate financial performance, market value, risk and uncertainty is still controversial. The majority of studies find a positive ESG-CFP relationship, proving that the positive impact of global and individual ESG score on financial performance is stable over time and space (Malik, 2015; Gunnar et al., 2015). Indeed, the ESG score seems to have a positive and significant impact on financial performance and firm value in several samples located in different countries. According to stakeholder theory (Freeman, 1984), most studies find evidence that companies with better ESG performance have better financial performance and are better valued in the market compared to their counterparts in the same sector (Aboud & Diab, 2018; Ahmad et al., 2021; Chouaibi et al., 2022; Deng et al., 2022; Melinda & Wardhani, 2020; Ray & Goel, 2022; Xie et al., 2019). However, this positive relationship between ESG-CFP does not hold for all parts of the ESG score depending on the specific case of each market. By analyzing the three ESG components, Xie et al. (2019) and Velte (2017) show that governance performance has the strongest impact on financial performance compared to environmental and social performance. Similarly, Setiadi et al. (2017) document that only board independence and environmental disclosure have a significant effect on firm value. These results support the argument that monitoring, independence and transparency as pillars of corporate governance increase firm value. Haninun et al. (2018) show that environmental performance and its disclosure positively and significantly affect financial performance. However, the results of Purnomo and Widianingsih (2012) indicate that environmental performance has a positive effect on financial performance while CSR disclosure does not. Also, the results of Van Linh et al. (2022) revealed a positive relationship between sustainability reporting and firm value of 360 firms listed on the Vietnamese stock exchange in the period 2015–2019.

The literature review illustrates that firms with ESG activities have lower total, systematic and idiosyncratic risk and, therefore, their financial performance and market values are higher. Numerous studies claim that the relationship between ESG and non-ESG earnings is countercyclical (Albuquerque et al., 2019; Benlemlih et al., 2018; Cai et al., 2016; Sassen et al., 2016, Eliwa et al., 2019). Other studies, however, show that incorporating ESG criteria into fund managers' investment strategies reduces portfolio risk, increases risk-adjusted returns and improves portfolio diversification (Dai, 2021; Jagannathan et al., 2017). Nevertheless, some authors find that ESG investment can have a mixed, controversial and non-linear effect on financial performance and firm value (Cornell, 2021; Fatemi et al., 2018; El Khoury et al., 2021; Purnomo & Widianingsih, 2012; Velte, 2017; Yoon et al., 2018). They show that, using various methods and econometric models that ESG strengths increase the value of the company whereas its weaknesses decrease it. Moreover, a high ESG score can increase the financial performance of the firm without increasing its value or reducing its cost of capital. However, the literature review has not ruled out the absence of a relationship or the existence of a negative effect of the ESG score on the value and financial performance of the firm. Wasiuzzaman et al. (2022) show that the impact of ESG disclosure on a firm's financial performance is significantly negative. Similarly, P and Busru (2021) argue that the disclosure of environmental and social scores has a negative effect on the profitability and the value of 386 companies listed in the BSE 500 Indian index for ten years from 2007 to 2016. However, Atan et al. (2018) show that, in the case of Malaysian firms that there is no significant relationship between individual and combined ESG factors and firm profitability (ROE) as well as firm value (Tobin's Q). Furthermore, Gibson et al. (2021) find that stock returns are positively related to ESG disagreement, suggesting a risk premium for firms with higher ESG disagreement. In addition, using a set of over 4000 firms from 58 countries during 2002–2011, Aouadi and Marsat (2018) surprisingly show that ESG controversies are associated with higher firm value.

The controversial effect of ESG on the financial performance and market value of the company is dependent on interacting control factors. Indeed, based on institutional theory, Wasiuzzaman et al. (2022) show that Hofstede's (2011) cultural dimension represented by LTO (long-term orientation) and PD (power distance) seems to have a moderating effect on the ESG-CFP relationship. Ahmad et al. (2021) and Shakil (2021) indicate that firm size moderates, respectively, the relationship between ESG performance and corporate financial performance and ESG performance and stock price volatility. Bahadori et al. (2021) suggest that after controlling for firm size and leverage, firms with higher ESG scores have higher levels of profitability.

During uncertainty and crises period, the effect of ESG on performance is also controversial. Shaikh (2021) shows the existence of a negative correlation between Dow Jones sustainability indexes and the EPU of companies listed during the period 2000–2017. While for Ahsan and Qureshi (2021), the ESG score of European companies exerts a positive moderating effect on the EPU-financial performance relationship which initially seems negative. Besides, Çigdem (2020) find evidence that during periods of high EPU, European firms increase their ESG practices in order to essentially reduce risk and preserve firm value. However, in the specific context of state-owned firms, the empirical results of Zhao et al. (2021) show that the increase in EPU limits corporate social responsibility behavior. Thus, the inhibiting effect of EPU on CSR is stronger for financially distressed firms. On the financial market, CSR practices also serve as insurance that protects firm value from economic policy uncertainty (Borghesi et al., 2019). Li et al. (2022) suggest that during the COVID-19 crisis, ESG performance significantly increases firms' cumulative returns and generates asymmetric effects. Lee et al. (2013) and Lins et al. (2017) document that during crisis periods, companies with high ESG scores experienced higher financial performance and market value than companies with low scores. This indicates that in part the trust between the firm, its stakeholders, and its investors, depends to some extent on investments in ESG activities. However, Tampakoudis et al. (2021) show for acquiring firms that during the COVID-19 crisis, the impact of ESG is negative and significant for investors, as the costs of sustainability activities exceed the potential gains. This suggests that during the economic turmoil due to the pandemic, the costs of

ESG activities exceed the expected gains, providing evidence to support the over-investment hypothesis. Furthermore, Guenichi and Khalfaoui (2022) find evidence that oil price uncertainty negatively affects corporate social responsibility for 507 US firms over the period 1985–2019.

The above literature review reveals that to date, there have been no studies investigating the impact of a company's financial performance or its market value on ESG performance. Even the few studies that have explored this nexus are conducted in a double causality framework. Hence, this study attempts to shed light on the extent to which financial performance of 504 U.S. companies influence environmental, social and governance performance during the period 2000–2020. Based on stakeholder theory, if a company achieves a significant financial performance sufficient to generate cash holding, it will be invested in ESG activities.

On the social side, financial performance improves working conditions and consequently increases productivity. It allows the company to contribute to social, cultural and sports actions in order to satisfy its stakeholders and subsequently improve its social score. On the environmental side, a good financial performance encourages the firm to take actions necessary to overcome the challenges of sustainable development, especially the protection of the environment. These actions encompass the fight against global warming and the transition to a green and circular economy favoring renewable energies, which build a positive reputation for the company and provide trust from their stakeholders. Furthermore, these actions condition the company's sustainability, gradually abandoning the fossil fuels which often burden its expenses, and consequently improving its environmental score. On the governance side and according to agency theory, a good result allows the company to strengthen its governance practices such as the independence of the directors' board, the audit and risk committee and the internal control efficacy. It preserves the rights of minority shareholders undoubtedly, strengthens control over the manager, minimizes conflicts of interest between shareholders and manager, leads to better financial reporting and sets up a sustainable and efficient value-creation process beneficial to all stakeholders. Such practices improve the company's governance score (Setiadi et al., 2017). Nevertheless, when the firm accounts for losses, the investments in the ESG field will be reduced or canceled.

Based on the literature review and the above developments, we formulate the following hypotheses:

Hypothesis H1: There is a positive and significant relationship between corporate financial performance and ESG performance.

According to the competent literature, the positive relationship between combined and individual ESG and financial performance is verified in most studies. The few studies that found a negative, insignificant or controversial relationship are often justified by the fact that during periods of crisis and uncertainty, ESG cannot promote financial performance (Atan et al., 2018; P & Busru, 2021; Purnomo & Widianingsih, 2012; Tampakoudis et al., 2021; Wasiuzzaman et al., 2022). Moreover, moderating variables can negatively affect the relationship between ESG and financial performance. However, the opposite sense between ESG and financial performance has only been treated in a double causality approach. Hence, we have been motivated to explore the impact of financial performance on ESG performance, believing that a firm can only invest in ESG actions if it is profitable. Consequently, financial performance is expected to have a positive and significant impact on ESG performance.

Hypothesis H2: Economic uncertainty and leverage moderate negatively the effect of corporate financial performance on ESG performance.

The several studies that have found an incongruous and controversial relationship between combined or individual ESG and financial performance have tried to explain this result by the existence of moderating variables (debt, audit quality, cultural, leverage, risk, level of trust with

stakeholders, etc.) that may interact with the ESG approach and consequently influence financial performance, or by the existence of economic policy uncertainty context that may hinder any beneficial ESG approach in terms of financial performance and sustainable development (Ahmad et al., 2021; Albuquerque et al., 2019; Benlemlih et al., 2018; Borghesi et al., 2019; Cai et al., 2016; Çigdem, 2020; Cornell, 2021; Eliwa et al., 2019; Gulen & Ion, 2016; Lins et al., 2017; Ray & Goel, 2022; Shakil, 2021; Van Linh et al., 2022; Wasiuzzaman et al., 2022; Yoon et al., 2018). In our study, we used EPU, OPU and leverage as moderating variables that can be considered to have an influence on the relationship between financial performance and ESG performance whether combined or individual.

3. Data, model and methodology

3.1. Data

Our database covers the period 2000 to 2020 at the yearly frequency. Our data include 504 United States firms. The dependent variable is the Environment, Social and Governance (ESG) score which is measured by the average of the three pillars: $(\text{gov} + \text{soc} + \text{env})/3$.

ESG investing refers to a set of standards for a company's behavior used by socially conscious investors to screen potential investments. Environmental criteria consider how a company safeguards the environment, including corporate policies addressing climate change, resource management, to labour practices as well as product safety and data security. Social criteria examine how it manages relationships with employees, suppliers, customers, and the communities where it operates. Governance deals with a company's leadership, executive pay, audits, internal controls, and shareholder rights.

The main independent variable is the firm's performance measured by returns on assets (ROA). All model variables that are downloaded from the Thomson Reuters ESG database are described in Table 1.

3.2. Model

On database of 504 firms, our empirical analysis is based on data that contains observations about different cross sections across time. The panel data approach is the appropriate model which can model both the common and individual behaviors of groups. It also contains more information, more variability, and more efficiency than other kind of econometric models. Panel data approach minimizes estimation biases and gives efficient results. Our analysis must begin with Hsiao (1986) specification tests which check for heterogeneity, homogeneity or individual effects. Then, Hausman (1978) show if the individual effects are fixed or random. Moreover, we check for cross-section dependence to apply the appropriate panel unit root test. These entire steps will be well described in the methodology section.

To better show the relationship between ESG and our independent we start our analyses by Granger causality test to allow us to determine the causation significance of variables on ESG. As the work of Guenichi & Khalfaoui (2021) The Granger causality tests indicate that our main model is based on the main idea that ESG is a function of one-lagged variable of returns on assets (ROA), cash-holding, inflation, minority interest and MTB. Indeed, the model has the following form:

$$\begin{aligned}\text{ESG}_{i,t} = {} & \alpha + \beta_1 \text{ROA}_{t-1} + \beta_2 \textit{cash_holding}_{i,t-1} + \beta_3 \text{minority_interest}_{i,t-1} + \beta_4 \text{MTB}_{i,t-1} \\ & + \beta_5 \text{inflation}_{i\,t} + \varepsilon_{it} \end{aligned} \quad (1)$$

where i and t are index firm and time, respectively.

3.3. Methodology

Econometrically, panel data analysis requires the specification of Hsiao (1986), which considers the following model:

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Table 1. Variable description

Variables	Description
ESG	ESG score is based on voluntary company self-disclosure and other data. ESG score include real-time analysis of millions of pieces of publicly available print, online and broadcast news, and social media content. Its scope should span everything from national reporting to blogs, regulatory disclosures and non-governmental organization communications. If a firm has strength within each subcategory and assigns one point to these strengths; 0 is assigned if otherwise. The ESG engagement of a firm is measured by the total points a firm receives after counting all subcategories. A high ESG score indicates that the firm is friendly to its stakeholders and invests highly in ESG activities. But if there are separate environmental, social and governance scores, ESG is calculated as the average of Governance, social, and environment
RAO	Returns on assets
Minority interest	Minority interest refers to having an ownership stake in a company that is less than 50% of the total shares in terms of voting rights. Essentially, minority shareholders don't exercise control over a company by way of votes, leaving them with little influence in the overall decision-making process.
Cash holding	The amount of cash held and available to spend rather than investing.
Market to book ratio (MTB)	Calculated as the ratio of the firm's total market value divided by its total asset value
Inflation	Inflation is presented by the consumer price index

$$y_{it} = \alpha_i + \beta_i x_{it} + \varepsilon_{it} \qquad with\ i = 1, 2, \ldots, Nett = 1, 2, \ldots T_i$$

- y_{it} are the endogenous variables observed for individual i at period t,
- x_{it} is the vector of k observed explanatory variables for individual i at time t,
- β_i is the vector of k coefficients of the exogenous variables for individual i,
- α_i constant term for individual I, and ε_{it} is the error term for individual i at period t.
- To test for homogeneity, Hsiao (1986) use the following statistic:

$$F_1 = \frac{(SCR_{c1} - SCR)(N.T - N(K+1))}{SCR.(N-1)(k+1)} \tag{2}$$

To test $H_0^1 : \alpha_i = \alpha and \beta_i' = \beta'; \quad i$

In cases of rejecting H_0^1, the Following F2 is used for testing heterogeneity.

$$F_2 = \frac{(SCR_{c2} - SCR)(N.T - N(K+1))}{SCR.(N-1).k} \tag{3}$$

To test $H_0^2 : \beta_i' = \beta'; \quad i$

Finally, after accepting the null hypothesis of H_0^2, Hsiao (1986) calculated the statistic F3 to test the presence of the individual effects in the panel data model. This test is defined as $H_0^3 : a_{0i} = a_0 \quad i$, and the F" is defined as follows.

$$F_3 = \frac{(SCR_{c1} - SCR_{c2})(N.(T-1) - K)}{SCR_{c2}.(N-1)} \tag{4}$$

For the three tests, if the $F_j > F^{\alpha}_{(df,df)}$ *with* $j = 1, 2, 3$ the p-value is lower than 5% and we reject the null hypothesis. Then we proceed by testing the variable cross-section independence by using the CD-test of M. Pesaran (2004), M.H. Pesaran (2015). The test is suited for both balanced and unbalanced panels.

Due to bias given by LM test of Breusch and Pagan (1980) in cases of the finite sample (T), M. Pesaran (2004) has proposed the following alternative test of cross-section dependence.

$$CD = \sqrt{\frac{2T}{N(N-1)}}\left(\sum_{i=1}^{N-1}\sum_{j=i+1}^{N}\hat{\rho}_{ij}\right) \tag{5}$$

Where $\hat{\rho}_{ij}$ is the sample estimate of the pairwise correlation of the residuals, and under the null hypothesis of no cross-sectional dependence $CD \rightarrow N(0,1) for N \rightarrow \infty$ *andTsufficientlylarge*. For an unbalanced panel, M. Pesaran (2004) proposed the following statistic:

$$CD = \sqrt{\frac{2T}{N(N-1)}}\left(\sum_{i=1}^{N-1}\sum_{j=i+1}^{N}\sqrt{T_{ij}\hat{\rho}_{ij}}\right) \tag{6}$$

Where T_{ij} is the number of common time series observations between units i and j. The modified statistic accounts for the fact that the residuals for subsets of t are not necessarily mean zero.

In the next step, we test for panel unit root by using the appropriate generation tests. So, according to the results of the Pesaran CD test, we use the first generation of panel unit root tests (Levin & Lin, 1993; Harris & Tzavalis, 1999; Hadri, 2000; Im et al., 2003; etc.) or the second generation of unit root tests which applied in cross-section dependence cases (Bai and Ng, 2003; H.M. Pesaran, 2003; Chang, 2004; etc.) Given the results of panel unit root tests with cross-section dependence, and after calculating the three Fisher statistics of Hsiao (1986), we conclude that our panel variables are stationary and we decide about the individual effects or not in our main model. In the last step, we apply the Hausman test with a null hypothesis of random effects which will be accepted if the p-value is higher than 5%.

Afterward, we estimate our model in the relevant individual effect and we use the appropriate estimation method (LSDV or GLS). Thus, we have to make a diagnosis of the estimated model by checking the existence or not of some problems such as autocorrelation, heteroscedasticity and normality of the residuals.

In our empirical part, we introduce some interaction moderating variables with firm performance such as leverage, oil price uncertainty and economic policy uncertainty. We use the leverage variable to show if the nexus between ESG and ROA is most influenced in the case of high-leveraged firms or lower-leveraged ones. Also, theoretically, uncertainty impacts all relationships between micro or macroeconomic variables. In this study, we look for the effects of oil price uncertainty and economic policy uncertainty on the ESG-ROA relationship.

3.3.1. Descriptive statistics

Table 2 summarizes the descriptive statistics of the independent and dependent variables of the studied US firms. The above table shows the mean, the median, the maximum, the minimum and the SD for each variable.

As shown in Table 2, the mean and median of ESG are 45.31 and 50.44, respectively. This means that 50% of US firms succeed to solve environmental, social, and governance problems. This also indicates that approximately 50% of firms do not succeed to take care of ESG. The mean (maximum) value of ROA is 5.77 (102.29), with an SD of 11.68 suggesting that ROA in US firms is rather high on average.

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Table 2. Descriptive statistics

Variables	Mean	Median	Std.dev	Min	max
ESG	45.31593	50.44121	26.37697	0	97.49098
ROA	5.778461	5.409104	11.68207	−415.0148	102.2925
Cash holding	31.04416	25.25000	24.47297	0.12	99.38
Minority interest	310,078	0.000000	855,735	166,000	5.66e+07
MTB	3.293151	2.740000	36.76464	−1256.79	1404.12
Inflation	2.059492	2.099724	1.111107	−0.3555463	3.8391

The mean of cash holding and minority interest are, respectively, 31.04 and 310,078 and the medians are, respectively, 25.25 and 0.0000. These ratios show that firms under study are performing well, despite facing uncertainty and financial crisis. The minimum (maximum) of MTB and inflation are, respectively, −1256.79 (1404.12), −0.355 (3.83) and the means are, respectively, 3.29 and 2.05 which reflect that The United States attaches great importance to issues of inflation and corporate compliance.

3.3.2. Tests of specification and unit root test

In order to verify the homogeneous or heterogeneous specification of the data generation process, we proceeded with the tests of equality of the coefficients of the studied model in the individual dimension. These tests are generated by the three tests defined above H_0^1, H_0^2 and H_0^3. The results of the calculated three statistics are illustrated in Table 3.

The p-value of F1 is 0.000 which is lower than 5% and indicates that our model is not homogenous. The intercepts α_i and the coefficients β_i' are different over individuals' i. The results in Table 3 show that the calculated F2 is 0.8202 with a p-value equal to 0.256. These results indicate that our model is not a heterogeneous panel. The same tests give an F3 equal to 19.59 with a p-value equal to zero, suggesting that our model presents individual effects. So, the remaining estimations and analysis tests must take into account this Hsiao's (1986) test results. Then, we started our empirical part by testing cross-sectional dependence in each variable and applying the CD-test of H.M. Pesaran (2003) which can be applied in the balanced and unbalanced panel. Also, this CD-test can be applied in a heterogeneous panel.

The results of CD-test, shown in Table 4, indicate that all variables under investigation present CD-test statistics with a p-value higher than 5%. So, all variables are cross-sectional independent. According to these results, the panel unit root tests that we can apply are those of the first generation. So, we can test for the stationary of each of the variables by implementing the first-generation unit root tests, proposed by Im et al. (2003) and Hadri (2000).

Table 5 shows the unit root test results. The results indicate that the Im, H.M. Pesaran (2003) and Hadri (2000) tests give calculated statistics with p-values, respectively, lower and higher than 5%. So, we can conclude that our panel variables are stationary. In this case, we can estimate our model in the appropriate individual effect and we use the adequate estimation method (LSDV or GLS) according to the Hausman specification test. The results illustrate that the calculated Chi-

Table 3. Hsiao's (1986) panel specification test

Hsiao test	Statistics	*P*-value
F1	61,244.945	0.000
F2	0.8202	0.256
F3	19.59577	0.000

Table 4. Results of cross-section dependence Pesaran CD test

Variables	CD-test	*p*-Value	Accepted hypothesis
ESG	0.3219	0.7895	Cross-section independence
ROA	0.9854	0.5478	Cross-section independence
Cashholding	1.0587	0.4850	Cross-section independence
Minority interest	1.2154	0.4108	Cross-section independence
MTB	0.7955	0.6981	Cross-section independence
Inflation	1.1058	0.3621	Cross-section independence

Table 5. Panel unit root test

	Im-Pesqaran—Shin unit root test		Hadri stationary test	
Variables	**Statistics**	***p*-Value**	**Statistics**	***p*-Value**
ESG	29.0245	0.000	1.5789	0.6520
ROA	57.0234	0.000	0.32897	0.8965
Cash holding	25.8599	0.000	2.01233	0.1485
Minority interest	32.8577	0.000	1.1245	0.5231
MTB	27.3256	0.000	1.5689	0.5589
Inflation	−30.9820	0.000	2.0937	0.1088

squared is equal to 0.34 with a probability higher than 5%, indicating that our panel model is random effects and can be estimated by GLS method.

4. Results and discussions

4.1. The CFP-ESG relationship

The results of the above tests show that our panel model has individual effects, and all variables are independent of the cross-section and stationary according to the applied root unit test. Table 6 provides the results of the estimation model analysing the nexus between firm financial performance and ESG performance. It reveals that the sign of the coefficient of ROA is positive and

Table 6. Estimation results

$ESG_{i,t}$	Coefficients	*P*-value
$ROA_{i,t-1}$	0.089168	0.000
$Minority_interest_{i,t-1}$	1.64e-06	0.000
$Cash_holding_{i,t-1}$	0.0575539	0.000
$MTB_{i,t-1}$	0.0020664	0.727
$Inflation_{i,t}$	−3.175071	0.000
Intercept	54.23425	0.000
Wald chi2(5) = 332.06 Prob > chi2 = 0.0000		
Shapiro_Wilk residual normality statistics 0.5156 with P-value = 0.2154		
F-statistic = 46.70620 Prob(F-statistic) = 0.000000		

significant at 1% level, suggesting that increasing US corporate financial performance increases ESG performance.

The results of the assessment of the control variables are in line with our expectations regarding the sign and significance level. Inflation impacts negatively and significantly the ESG. The minority interest and cash holding positively and significantly influence ESG performance. However, the market-to-book value coefficient is not significant. Our results are surely unbiased due to the results of the global significance test (F statistic = 46.70620, with a zero p-value) which indicate that our estimated panel model is globally significant. Also, the Shapiro-wilk test of residual normality gives a p-value equal to 0.000 which is higher than 5% and indicates that the estimated residuals are normally distributed.

The results seem to be implicative. Indeed, the higher the financial profitability of companies, the better ESG performance is. This implies that investment in environmental, social and governance actions depends on the company's financial performance. Except for the results of Deng et al. (2022), which show that capital market opening mechanisms influence corporate ESG performance, most of the previous studies sought to analyze the impact of ESG on financial performance, market value and underlying risk, by incorporating ESG criteria into their investment strategies (Wasiuzzaman et al., 2022; Rupamanjari and Sandeep, 2022; P & Busru, 2021; Chouaibi et al., 2021; Bahadori et al., 2021; Ahmad et al., 2021; Tampakoudis et al., 2021; Melinda & Wardhani, 2020; Xie et al., 2019, 2019; Atan et al., 2018; Suhardjanto et al., 2018; Haninun et al., 2018; Velte, 2017; Setiadi et al., 2017; Malik, 2015; Friede et al., 2015; Purnomo & Widianingsih, 2012.) Implicitly, the assumption that the costs of ESG activities outweigh the possible gains leads shareholders and company managers to link the investment decision of ESG actions to the company's performance. For them, it is the financial performance that determines ESG performance. Improved corporate performance encourages shareholders and management to invest more in sustainability and governance actions (First basis of Carroll's, 1979). Consequently, the company's ESG score increases, its reputation improves and provides confidence to its stakeholders.

However, we find that market to book ratio (MTB) does not affect ESG performance. This implies that participation in ESG actions does not depend on the company value. However, this result, which corroborates that of Aouadi and Marsat (2018), is often controversial in the literature due to the problems of the sample's heterogeneity and firm's value measurement. Besides, our results show that cash holding has a positive and significant impact on the firm's ESG score. Indeed, an excess of liquidity constitutes for investors a sign of corporate ESG performance. This result, which corroborates to some extent that of Uyar et al. (2022) and Arouri and Pijourlet (2017), implies that investors attach particular importance to cash-holding firms and investment in ESG activities. The minority interest variable is positively and significantly correlated with the ESG score. This suggests that the protection of minority shareholders' interests and voting rights positively influences the firm's ESG approach. This variable, which also reflects the weight of minority shareholders in the decision-making process and control of the firm through voting, improves corporate governance, reassures investors to invest more and gives stakeholders more confidence in the firm. Finally, the inflation variable negatively and significantly affects the firms' ESG score. This means that the increase in the consumer price index hinders the firm's ESG activities. Indeed, when inflation increases, it reduces consumer spending and leads to a decrease in the demand for products for the different categories of firms. As a result, environmental, social, and governance investments will be slowed or canceled.

However, the CFP-ESG relationship can be influenced by interaction variables such as culture, size, leverage, risk, uncertainty, etc.

4.2. The moderating effect of interaction variables on the CFP-ESG relationship

We have already shown a positive association between financial performance and the firm's ESG score. Furthermore, we test whether this relationship changes sign by introducing interaction

variables. For this, we have chosen economic policy uncertainty (EPU), oil price uncertainty (OPU) and leverage (Lev) variables, given their ability to influence inter- and intra-firm relationships. So, we check the effect of the interaction variables on the ROA-ESG relationship at a global and individual level:

- First, we test whether the effect of the ROA on ESG, globally and individually, is influenced by introducing the leverage variable in the model. We calculate leverage as the ratio of a company's loan capital to the value of its common stock (equity).

$$\text{Leverage} = \frac{\text{total debts}}{\text{total assets}} \tag{7}$$

- Second, we interact our main independent variable ROA with oil uncertainty. We use the oil prices West Texas Index (WTI) in order to calculate the oil price uncertainty. The database of this variable is collected from the Federal Reserve Bank of St. Louis Web Site. Oil uncertainty is measured with variance or its square root, which is a standard deviation. The measurement of uncertainty through standard deviation is used in many experiments in social sciences and finance. So, the more risky and volatile firms have a higher standard deviation, and conversely. The standard deviation is the square root of the variance, and so computed by:

$$\sigma_y = \sqrt{\frac{\sum_{i=1}^{n} (y_i - \bar{y})^2}{n-1}} \tag{8}$$

- Third, we interact the firm's performance variable (ROA) with Economic Policy Uncertainty (EPU). For this variable, we use the index constructed by Baker et al. (2016). This index is a weighted average of three uncertainty components: (1) newspaper coverage of policy-related economic uncertainty, (2) the number of federal tax code provisions set to expire in future years and (3) a measure of disagreement among economic forecasters as a proxy for uncertainty.

Our main model becomes as follows:

$$\begin{aligned} \text{ESG}_{i,t} = \alpha + \beta_1 \text{ROA}_{t-1} + \beta_2 \text{ROA}_{t-1} * \begin{cases} Lev_{i,t-1} \\ OPU_{t-1} \\ EPU_{t-1} \end{cases} + \beta_3 cash_holding_{i,t-1} \\ + \beta_4 minority_interest_{i,t-1} + \beta_5 \text{MTB}_{i,t-1} + \beta_6 \text{inflation}_{i\,t} + \varepsilon_{it} \end{aligned} \tag{9}$$

Table 7 reports the coefficients and their significance level of the ROA and its interaction with leverage, OPU, and OPU variables. The results show that the effect of the firm's performance on ESG is always positive and significant but not necessarily on its three components. However, the coefficient of interaction between ROA and leverage is negative and statistically significant. This suggests that high leverage negatively influences the relationship between US corporate financial performance and ESG performance. So, the higher the company's debt ratio is, the more the positive effect of financial performance on ESG decreases. This decrease significantly affects governance performance. This result shows that the most indebted firms are obliged to reduce their governance score by reducing governance expenditures.

The interaction coefficient between ROA and EPU is negative and significant. This implies that a high EPU negatively affects the CFP-ESG relationship. Thus, high EPU reduces the positive impact of U.S. companies' financial performance on ESG activities. Indeed, on the individual ESG level, we note that this reduction is significant only for the environmental and social dimensions. Indeed, we deduce that in an increased EPU, profitable firms give less importance to social and environmental activities than to governance. This result, which partly corroborates those of Shaikh (2021) and Zhao et al. (2021), indicates that increased EPU limits the social and environmental responsibility of firms.

Similarly, the interaction coefficient between ROA and oil price uncertainty is negative and statistically significant. So, the high level of oil price uncertainty negatively and significantly

Table 7. Effects of OPU, EPU, and firm's leverage on CFP-ESG relationship

Interaction	Dependent variable	Coefficients	
		β_1	β_2
Interaction with leverage	ESG	0.0844***	−2.859**
	Environment	0.00585	−1.1141
	Social	0.0120	−2.5286
	Governance	0.05452***	−30.037**
Interaction with Economic Policy Uncertainty	ESG	0.92327***	−0.00709***
	Environment	0.45007***	−0.00375***
	Social	0.38016***	−0.00309***
	Governance	0.01955	−0.000484
Interaction with Oil Price Uncertainty	ESG	2.36568***	−0.09046
	Environment	1.5876***	−0.0616***
	Social	1.4329***	−0.05530***
	Governance	0.6200***	−0.0226***

influences the relationship between financial performance and individual and combined ESG factors. This finding, which joins in some way those of Guenichi and Khalfaoui (2022), implicitly indicates that high oil price volatility increases the marginal cost of production and consequently leads to a reduction in ESG investments.

In sum, EPU, OPU, and leverage have a negative moderating effect on the relationship between financial and ESG performance.

5. Robustness tests

In this section, we investigate whether the results found on the relationship between ROA and ESG are consistent and cannot be changed. To do this, we extend our empirical work by:

- Estimating the main model while taking into account other control variables. We check if the results change when we add micro and macro-economic variables (Net income and Gross National Product (GNP)) in our main model.
- Estimating the main model with an alternative ratio of the firm's performance; returns on equity (ROE). We anticipate that our results are still unchanged. If that is the case, our results are robust.
- Changing the estimation method suggests that ESG of time t depends on ESG in time t-1. So our model becomes a dynamic panel data which will be estimated by GMM method.

5.1. Robustness test with added variables

In this part, we test the consistency of our findings by adding further firm control variables and national control variables into the main ESG model. The regression takes the following form:

$$ESG_{i,t} = \alpha + \beta_1 ROA_{t-1} + \beta_2 cash_holding_{i,t-1} + \beta_3 minority_interest_{i,t-1} + \beta_4 MTB_{i,t-1} + \beta_5 inflation_{i\,t} + \beta_6 Net_income_{i\,t-1} + \beta_7 GNP_{t-1} + \varepsilon_{it} \quad (10)$$

Table 8 shows that the above results of the effect ROA on ESG are consistent. By adding other control variables, the coefficient of ROA is still significant and positive in the ESG regression model.

5.2. Robustness test with an alternative ratio of the firm's performance

For this robustness test, we use return on equity (ROE) as an alternative ratio of a firm's performance. With this alternative measure of performance our model is the following:

$$ESG_{i,t} = \alpha + \beta_1 ROE_{t-1} + \beta_2 cash_holding_{i,t-1} + \beta_3 minority_interest_{i,t-1} + \beta_4 MTB_{i,t-1} + \beta_5 inflation_{i\,t} + \varepsilon_{it} \quad (11)$$

Table 8. Estimation results with added control variables

$ESG_{i,t}$	Coefficients	*p*-Value
$ROA_{i,t-1}$	0.08860	0.000
Minority_interest $_{i,t-1}$	1.73e-06	0.000
Cash_holding $_{i,t-1}$	0. 05128	0.000
$MTB_{i,t-1}$	0. 000686	0.907
$Inflation_{i,t}$	−3.127553	0.000
GNP_{t-1}	.0000549	0.000
Net_income $_{i,t-1}$	7.87e-07	0.000
Intercept	52.84234	0.000
Wald chi2(7) = 459.47 Prob > chi2 = 0.0000		
Shapiro_Wilk residual normality statistics 06856 with P-value = 0.3550		
F-statistic = 49.629 Prob(F-statistic) = 0.000000		

Table 9. Estimation results with an alternative ratio of firm's performance

$ESG_{i,t}$	Coefficients	*p*-Value
$ROE_{i,t-1}$	0.08985	0.000
Minority_interest $_{i,t-1}$	1.69e-06	0.000
Cash_holding $_{i,t-1}$	0. 05377	0.000
$MTB_{i,t-1}$	0. 000662	0.787
$Inflation_{i,t}$	−2.92175	0.000
Intercept	48.4204	0.000
Wald chi2(7) = 319.75 Prob > chi2 = 0.0000		
Shapiro_Wilk residual normality statistics 0.1862 with P-value = 0.1989		
F-statistic = 47.911 Prob(F-statistic) = 0.000000		

The robustness test results, in this case, are reported in Table 9. These results show that the regression of the main panel model with the alternative ratio of performance gives the same findings as the first use of ROA ratio. The coefficient of ROE is significant and positive. So, our results are consistent with the baseline one.

5.3. Robustness test with alternative estimation method (GMM)

By suggesting that ESG is positively influenced by its lagged variable, our model will be estimated by GMM method. The results are reported in the following Table 10.

Results with alternative estimation methods are consistent with the above main findings. The effect of ROA on ESG is always positive and statistically significant. Thus, whatever the method of estimating firm performance, the effect of ROA influences positively and significantly ESG Investment.

6. Conclusion

In the recent literature, most studies have raised the issue of the impact of ESG score on corporate financial performance. However, the question of the impact of corporate financial performance on ESG score, as well as the interactive moderating variables likely to influence this relationship is not sufficiently discussed in the financial and managerial writings. Indeed, we mentioned above that actions in the environmental, social and governance fields correspond to a strongly recommended responsibility to promote sustainability and corporate governance. The ESG approach adopted by the majority of companies serves to improve their financial performance, preserve their market

Table 10. Estimation results with alternative estimation method (GMM)

$ESG_{i,t}$	Coefficients	*p*-Value
$ESG_{i,t-1}$	1.17512	0.000
$ROA_{i,t-1}$	0.08929	0.000
Min_interest $_{i,t-1}$	6.18e-07	0.000
Cash_holding $_{i,t-1}$	0. 04422	0.000
$MTB_{i,t-1}$	0. 000608	0.885
$Inflation_{i,t}$	−3.1121	0.000
Intercept	30.0454	0.000
Arellano-Bond test for AR(1) in first differences: z = −24.81 Pr > z = 0.000 Arellano-Bond test for AR(2) in first differences: z = 1.81 Pr > z = 0.170		
Sargan test of overid. restrictions: chi2(84) = 15.65 Prob > chi2 = 0.123		

value and reduce risk. It also serves as an insurance policy in the face of economic policy uncertainty. The engagement of firms in ESG activities is a positive sign for investors and stakeholders to meet their needs, who in turn can significantly affect the firm's welfare (Freeman, 1984). However, it is noteworthy that some companies engage in ESG actions to "greenwash" themselves by influencing stakeholder perceptions that they are pro-ESG actions (Clarkson et al., 2008).

Using a random-effects panel model, estimated by the GLS method, we find that the US corporate financial performance has a positive and significant effect on the ESG score. Except for the market-to-book value of the firm, which seems insignificant, all the control variables (cash holding, minority interest and inflation) are significant and have the expected sign. Indeed, financial performance measured by ROA and ROE improves the company's ESG performance. The more profitable the company, the more sustainable it is. The improvement of the company's financial performance encourages it to invest more in the ESG field and consequently satisfy the expectations of its stakeholders. Added to that, we find that under certain conditions, the positive impact of financial performance on ESG performance can be reduced. Indeed, a high level of economic and political uncertainty (EPU), oil price uncertainty (OPU) and leverage influence negatively and significantly the relationship between financial performance and ESG score. The moderating effect of the interaction variables reduces the investment in individual and combined ESG activities. It turns out that high leverage reduces spending on governance practices; EPU inhibits social and environmental development activities, while OPU limits the firm's responsibility in all three ESG areas. The results remain similarly robust and consistent, after adding other control variables, replacing the dependent variable by the return on equity and changing the estimation method.

The economic implications of this work are in favor of promoting ESG activities regardless of the outcome. This allows the company to maintain its sustainability, build a positive reputation, gain the trust of its stakeholders and participates in the country's sustainable development issues. Indeed, the causality between financial performance and ESG performance seems to be twofold, constituting a virtuous circle. On the one hand, investment in ESG activities improves the company's results, and on the other hand, the company's results determine the level of commitment of the company to ESG actions. This implies that ceteris paribus, the costs of sustainability activities should not outweigh the possible gains in order to avoid any assumption of over-investment.

While studying in depth the relationship between the financial performance of US firms and ESG, as well as the moderating variables that may influence this relationship, the present research has some limitations due to data availability and the paper's size. The first limitation is that we did not proceed empirically by causality between financial performance and ESG to better understand the most accurate meaning. The second limitation is that we did not expand our sample by

introducing other countries to compare with each other and test the robustness of our results. The third limitation is that we have not divided our sample into sub-samples according to criteria such as size, age, industry, etc. Future research is recommended to go beyond these limitations and analyze simultaneously CFP–ESG and ESG–CFP relationship.

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