LIQUIDITY AND PROFITABILITY'S EFFECT ON THE ENVIRONMENTAL, SOCIAL, AND GOVERNANCE SCORES OF S&P 500 COMPANIES

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Abstract

The relationship between financial performance and environmental, social, and governance (ESG) metrics in businesses has garnered significant interest in recent years. Unlike most previous research that primarily examines the impact of ESG initiatives on a firm's financial performance (Whelan et al., 2022), this paper explores how financial liquidity and profitability influence ESG performance. We hypothesize that profitable firms are more likely to invest in ESG initiatives. We collect financial and ESG data of S&P 500 companies from Bloomberg. Using principal component analysis (PCA) to mitigate multicollinearity, the study identifies the main principal components representing various associations of liquidity and profitability metrics. Linear regression analysis is conducted with the identified principal components as the independent variables and ESG scores as the dependent variables. The analysis reveals that profitability positively affects ESG scores, while liquidity has a negative impact. The findings suggest that our hypothesis — that profitable companies are more likely to invest in ESG initiatives — is confirmed, whereas high liquidity may indicate underinvestment in such activities. This research contributes a fresh perspective to the empirical evidence in the existing literature (Friede et al., 2015; Hang et al., 2019; Whelan et al., 2022) on the relationship between financial and ESG performance.

Keywords: Environmental, Social, Governance, Financial Liquidity, Profitability

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1. INTRODUCTION

Environmental, social, and governance (ESG) principles refer to a set of criteria used to evaluate and measure the sustainability and ethical impact of a company's operations and business practices. In recent years, there has been a notable shift in the business landscape towards incorporating ESG principles into corporate strategies. Once regarded primarily as matters of corporate social responsibility (CSR), ESG factors are now recommended as integral components of sustainable business practices

(Eccles & Serafeim, 2013). This shift is driven by a growing awareness of the connections between business operations and broader societal and environmental challenges (Cheng et al., 2014). At the same time, there are anti-ESG initiatives in the investment community based on the assumption that ESG-oriented investments have low expected returns (Pástor et al., 2021).

Understanding the relationship between ESG initiatives and corporate profitability is crucial for businesses seeking to thrive in today's complex and rapidly evolving marketplace. This relationship is multifaceted and dynamic (Whelan et al., 2022), influenced by various factors including regulatory trends, shifting consumer preferences, investor demands, and the evolving risk landscape (Friede et al., 2015). While some existing studies have investigated this linkage, the findings are not always consistent (Eccles & Serafeim, 2013; Whelan et al., 2022). Researchers have identified several plausible reasons for these inconsistencies, such as variability between different economic sectors (Gaweda, 2022), the markets in which companies operate and their regulatory environments (Asamoah & Puni, 2021; Shahrour et al., 2022), and evolving public opinion regarding ESG principles (Liu et al., 2023).

Most studies to date have focused on the effect of ESG metrics on financial performance (Friede et al., 2015; Whelan et al., 2022). These inquiries are natural, as proving that ESG initiatives lead to improved corporate financial performance (CFP) would incentivize companies to adopt more of such initiatives. However, in this study, we reverse the question and explore the effect of financial performance on ESG metrics. We aim to determine if better CFP leads companies to invest in activities that improve their ESG metrics. In other words, we posit that more profitable companies have the funds necessary to invest in initiatives that enhance their ESG performance. At the same time, we aim to fill a gap in the literature regarding the impact of a company's financial liquidity on its ESG performance. We posit that firms with too much liquidity do not use funds for investment opportunities and thus potentially for ESG initiatives. Specifically, we investigate the impact of S&P 500 companies' financial liquidity and profitability on their ESG performance. Many financial metrics frequently used in similar studies are correlated. To avoid the statistical bias of multicollinearity, we employ the principal component analysis (PCA) methodology to derive an orthogonal set of principal components that captures the most important features of corporate liquidity and profitability. This approach, which creates composite indexes of financial performance, ensures that the findings are more robust from a statistical point of view. Using data retrieved from Bloomberg Terminal on S&P 500 companies, we conduct PCA and regression analysis. The findings reveal that profitability positively affects ESG scores, while liquidity has a negative impact.

The rest of the paper is organized as follows. Section 2 reviews the existing literature on the relationship between ESG and financial performance. Section 3 describes the PCA research methodology, its theoretical justifications, and the data collection process. Section 4 reports the findings from our data analysis. Section 5 discusses the results. Section 6 concludes the paper with potential implications for research and practice, and suggestions for future research.

2. LITERATURE REVIEW

As ESG initiatives are increasingly becoming a priority for companies worldwide, there has been strong interest in examining the relationship between a company's ESG initiatives and its financial performance. Some studies focus on identifying the theoretical underpinnings of the impact of ESG initiatives on a company's profitability metrics. Many other studies collect empirical data to examine the relationship through quantitative and qualitative analysis. This literature review summarizes and synthesizes some of the key findings from studies that have investigated this subject.

2.1. Theoretical frameworks

There are several theoretical frameworks to explain the relationship between a company's ESG efforts and its financial performance. In a meta-analysis, Whelan et al. (2022) identify the following social science theories that dominate ESG-related research:

- Stakeholder theory: To be successful, companies need to manage a wide variety of stakeholders such as employees, civil society, suppliers, and investors.
- Shared value: Companies creating shared value for all stakeholders do better financially.
- Legitimacy theory: If a social contract between the corporation and society is broken, consumers will reduce demand, or governments will impose regulatory restrictions.
- Resource-based view: both internal resources such as employees and intangible assets such as ESG image are essential for achieving a competitive advantage.

DasGupta (2022) points out that prospect theory (Kahneman & Tversky, 1979) and agency theory (Chari et al., 2019) may also suggest a positive relationship, but with a twist: a decrease in a firm's financial performance should drive the key decision makers to take risky actions such as engaging in socially disapproved behaviors. This perspective indicates the potentially positive impact of a firm's financial performance on ESG initiatives and metrics.

While many of the above theoretical frameworks tend to support a positive relationship between a firm's financial and ESG performance, there are some different views pointing to a negative relationship. For instance, some anti-ESG legislations in the US reflect the shared concerns that ESG factors are a serious encroachment on free-market capitalism (Padfield, 2022). Eccles and Serafeim (2013) point out the trade-offs existing between ESG and financial performance. This is because the costs of negative externalities such as pollution and abusive labor practices are borne by society but benefit shareholders. On the other hand, activities that help society often create costs for the firm. Their analysis of 3000 companies from 2002 to 2011 indicates that even though ESG initiatives addressing the interests of all stakeholders should become a company's sustainable strategy, there is a negative impact of a firm's ESG improvements on its financial performance and, the absence of major innovations.

2.2. Empirical studies on the relationship between ESG and financial performance

The theoretical frameworks mentioned above are the basis for many empirical studies that test the expected relationship between a firm's ESG and financial performance. Some studies focus on a specific ESG area. For example, Dike and Tuffour (2021) employ a qualitative research approach to investigate how corporate governance practices influence banks' financial performance. Baalouch et al. (2023) examine the impact of environmental disclosure (ED) quality on the cost of equity capital, market valuation, and institutional investors. They find ED quality is negatively associated with the cost of equity capital as well as market valuation. It is positively linked to institutional ownership. Barauskaite and Streimikiene (2021) conducted a systematic literature review to develop the conceptual framework for linking CSR with the financial performance of companies. They find most studies show a positive or neutral relationship between CSR and financial results although the negative and alternative connections between these issues are less frequent. Another interesting angle of research is about the ESG disclosure. Isiaka (2022) investigates the trend of voluntary sustainability reporting in Africa and the relationship between disclosures and financial performance. The findings reveal a positive relationship between the level of sustainability disclosures and financial performance. In examining the impacts of CSR on firm default risk, Shahrour et al. (2022) find that legal contexts play a moderating role. In particular, CSR is found to significantly reduce default risk, with the effect being more pronounced in civil law countries than in common law countries.

In assessing a firm's financial performance, there are primarily two categories of metrics. One category focuses on the firm's financial performance based on operational metrics such as return on assets (ROA) or return on equity (ROE). These are also known as accounting performance metrics. The other category of financial performance measurement employs the perspective of the firm's investors by focusing on the stock performance and investment metrics like alpha and Sharpe ratio (Whelan et al., 2022), also known as market-oriented metrics. There are many studies done worldwide on this topic (Friede et al., 2015; Hang et al., 2019; Whelan et al., 2022). In the following, we review selected studies that investigated the relationship between a firm's operational performance and various metrics of ESG performance to show the general patterns of the empirical studies.

Multiple studies have found a positive relationship between diverse metrics of a company's ESG performance and its profitability. For instance, Khan et al. (2016) analyze a dataset of a large number of US companies from 1991 to 2012. They find that companies with strong ESG performance, in particular material sustainability, had higher profit margins than companies with weaker ESG performance. They also find changes in return-on-sales (ROS) and sales growth are more positive for the firms performing better on material issues. Kim and Li (2021) use a larger dataset extracted from S&P Capital IQ (172,437 observations from 1991 to 2013 based on 4,708 firms in all industries) to assess the impact of ESG practices on corporate financial metrics. The study finds a positive effect of ESG factors on corporate profitability (measured by ROA), and the effect is more pronounced for larger firms. Many more studies are conducted for specific industries (Gholami et al., 2022; Naeem & Cankaya, 2022) or a particular ESG factor (Aupperle et al., 1985; Halimatusadiah et al., 2015).

In the international market, Dalal and Thaker (2019) collect annual ESG data of 65 Indian firms covering the period from 2015 to 2017. Their findings indicate that good corporate ESG performance enhances financial performance measured by accounting as well as market-based measures, including ROA and Tobin's Q ratio. Koundouri et al. (2022) collect a sample of the top 50 European companies in terms of ESG performance and additional 19 companies in the Euro STOXX 50 Index but not in the top ESG list. They find there is a clear superiority in the profitability of companies (ROA, ROE, and profit margin) that have good ESG performance in all sectors. Mamun (2022) explores the relationship between sustainability reporting practices and financial performance in Australia's electricity sector. The study finds that economic and social performance disclosures significantly influence financial performance, while ED does not have a notable impact.

Compared to profitability, financial liquidity was not as widely studied for its relationship with ESG performance. Bruna et al. (2022) incorporate a measure of liquidity as one of the five factors used to generate the financial performance score, which is then assessed for its relationship with the ESG scores. Through a time-lagged panel regression, they find the marginal impact of ESG performance on financial performance, with a nonlinear relationship between the two. D'Amato et al. (2021) include the current ratio (current assets/current liability) and debt to total assets ratio as the liquidity and solvency factors from the balance sheet to assess their impact on ESG performance. Through a machine learning approach in data analysis, they find an insignificant impact for the current ratio and slight significance ($p < 0.1$) in the debt to total assets ratio's negative impact on ESG performance.

Meta-analysis (Friede et al., 2015; Hang et al., 2019; Whelan et al., 2022) has shown mixed results in the studies investigating the relationship between financial and ESG performance, with the majority showing positive relationships. At the same time, some studies have found negative relationships. For instance, 8% of corporate studies and 14% of investor studies found a negative relationship between financial and ESG performance (Whelan et al., 2022). While there are many possible explanations for such inconsistent findings, the lack of standard ESG measurement and financial metrics in such studies has been frequently pointed out (Eccles & Serafeim, 2013; Whelan et al., 2022). In addition to the mentioned studies, a recent paper by Zhou et al. (2023) on a set of listed Chinese companies found that CFP Granger cause some of the ESG metrics and that there is a bilateral causality between CFP and other metrics. Thus, the problem clearly is more complex and the results are dependent on the data set and time period. This further justifies our research investigating the relationship between ESG metrics as dependent variables and CFP metrics as independent variables.

3. RESEARCH METHODOLOGY

In this study, we reverse the research question and ask what, if any, is an effect of financial performance on ESG metrics. In other words, we want to explore how selected financial metrics affect ESG metrics. Tan and Tuluca (2023) find that there is a relationship between liquidity and profitability that depends on the level of aggregation (index, sector, company). Following these findings, we consider profitability and liquidity as financial metrics for this study. We hypothesize that profitable companies have more funds to invest in ESG actions. At the same time, companies having too much liquidity might have that level of liquidity because they were not using funds for ESG actions. We recognize that liquidity is needed for many reasons however, too much liquidity might signal that the company does not invest in opportunities and thus, at least at some level, in ESG activities. Thus, we posit a positive relationship between profitability and ESG and a negative relationship between liquidity and ESG metrics. Many financial performance and liquidity metrics are correlated, yet each might capture a different aspect of a relationship. When they are included in the same analysis, the results may be influenced by the correlation between them. We attempt to mitigate this issue by employing PCA to derive a small set of components that represent a firm's liquidity and profitability.

PCA reduces the number of variables in a dataset while retaining most of the original information by transforming the data into a new set of uncorrelated, orthogonal, variables called eigenvectors (Dunteman, 1989). Thus, principal component scores are linear combinations of the original variables of the dataset. The extraction of principal components is designed to maximize the explained variance of the overall dataset. PCA has been extensively used in empirical studies in social sciences (Maćkiewicz & Ratajczak, 1993). In the literature on the relationship between financial and ESG performance, PCA has not been widely used. Naffa and Fain (2022) reduce 28 raw style descriptors into 11 style factors using PCA when they study the financial performances of ESG leaders and laggards. Bruna et al. (2022) also employ PCA to construct a synthetic index of financial performance. However, all their measures are based on accounting metrics.

In the present study, we first identify eight metrics, listed in Table 1, for financial liquidity and profitability.

Table 1. Financial metrics definition

Financial metrics	*Code*	*Definition*
Economic value added	*EVA*	Profitability
Return on invested capital	*ROIC*	Mixed profitability
Return on equity	*ROE*	Accounting profitability
Current ratio	*CR*	Liquidity
Quick ratio	*QR*	Liquidity
Earnings before interest and tax	*EBITDA*	Mixed profitability
Sustainable growth rate	*SGR*	Accounting profitability
Free cash flow	*FCF*	Profitability

The choice of financial metrics for profitability represents a mixture of market-oriented and accounting measures. *EVA* and *FCF* are market-oriented measures, while *ROIC* and *EBITDA* are mixed measures with both accounting and market components. *ROE*, *CR*, and *QR* are purely accounting measures. *SGR*, an accounting measure, indirectly captures the dividend distribution ratio. For any given *ROE*, a higher distribution ratio will yield a lower *SGR* due to fewer retained earnings. Thus, *SGR* can be interpreted as a proxy for the company's concern for shareholders and their wealth.

While corporate performance should ideally be measured with market-oriented metrics, it is customary to use accounting measures as well. To be consistent with previous studies that primarily use accounting measures such as *ROA* and *ROE*, we included some of these in our analysis.

We collected a dataset of S&P 500 companies from 2015 to 2022, during which ESG data were available in the Bloomberg Terminal. We justified our choice of using PCA due to the presence of multicollinearity among the different competing metrics for profitability. We chose to use multiple metrics for profitability and liquidity as each captures a different aspect of performance. We focused on metrics that represent profitability for shareholders.

Table 2 shows the correlation matrix of the eight financial metrics identified above. The size of the correlations between variables indicates that using PCA is indeed justified. Using more nuanced measures of profitability and creating indexes of profitability and liquidity with PCA makes the results more credible. Using only one measure, as most other research has done, raises questions about whether the results would be robust against other competing metrics.

Table 2. Correlation matrix

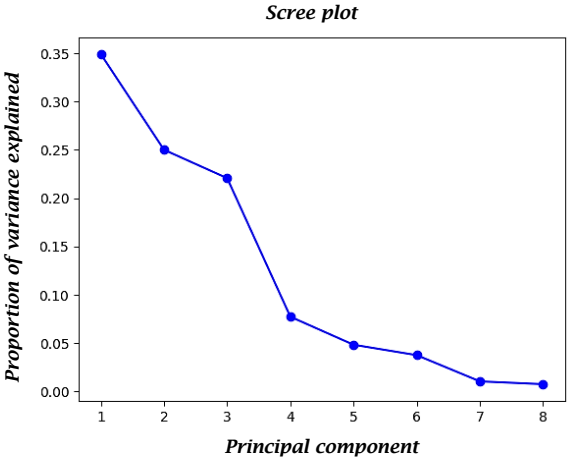
Variables	*EVA*	*ROIC*	*ROE*	*CR*	*QR*	*EBITDA*	*SGR*	*FCF*
EVA	1.000	0.359	0.177	0.048	0.070	0.655	0.130	0.744
ROIC	0.359	1.000	0.510	0.216	0.194	0.097	0.382	0.187
ROE	0.177	0.510	1.000	-0.032	-0.022	0.060	0.583	0.095
CR	0.048	0.216	-0.032	1.000	0.939	-0.053	0.023	0.029
QR	0.070	0.194	-0.022	0.939	1.000	0.006	0.025	0.084
EBITDA	0.655	0.097	0.060	-0.053	0.006	1.000	0.049	0.905
SGR	0.130	0.382	0.583	0.023	0.025	0.049	1.000	0.076
FCF	0.744	0.187	0.095	0.029	0.084	0.905	0.076	1.000

With the variables defined above we conducted a panel data PCA. Bartlett's test of sphericity is significant at p = 0.001 level, while Kaiser-Meyer-Olkin (KMO) measure is at 0.62. These statistics indicate that PCA is appropriate.

4. RESULTS

Figure 1 shows the proportion of variance explained by the principal components in a scree plot. We retain the first three components for the follow-up analysis. We do this because each of their eigenvalues is greater than 1 (Kaiser Rule) and the scree plot indicates a substantial drop towards the fourth principal component. Together, the first three principal components explain 82% of the variance of the original variables which makes them representative of the original dataset.

Figure 1. Proportion of variance explained by principal components



The list of each of the eight metric's weights on the three principal components can be found in Table 3.

Table 3. Financial metrics' weights (loadings) on each of the first three eigenvectors

	PC1	***PC2***	***PC2***
Eigenvalues (explained variance)	2.79	2.00	1.77
Explained variance ratio	0.35	0.25	0.22
Variables	***Weight***	***Weight***	***Weight***
EVA	**0.502**	-0.139	-0.113
ROIC	**0.331**	0.252	0.334
ROE	0.257	0.119	**0.563**
CR	0.122	**0.624**	-0.286
QR	0.145	**0.606**	-0.304
EBITDA	**0.471**	-0.277	-0.244
SGR	0.228	0.147	**0.518**
FCF	**0.512**	-0.216	-0.240

Note: Absolute values of weights corresponding to a correlation of the original variable with the principal components greater than or equal to 0.50 are in bold font. The correlations are equal to the loadings multiplied by the square root of the respective eigenvalue of the principal component.

The three principal components represent various aspects of a firm's financial liquidity and profitability. Eigenvector 1 (PC1) represents profitability as measured by financial performance metrics: *EVA*, *ROIC*, *EBITDA*, and *FCF*. The higher these measures are, the higher the PC1 scores will be. Eigenvector 2 (PC2) represents liquidity as measured by the standard ratios *CR* and *QR*. Similarly, the higher the *CR* and *QR*, the higher the PC2 scores will be. Eigenvector 3 (PC3) represents profitability as measured by the well-known accounting measure of performance, *ROE*, and also gives an indication of the dividend distribution ratio through the *SGR* metric. Since both load positively, it appears that PC3 will have higher scores when the distribution rate is lower, allowing companies to retain more funds. Retaining more funds enables companies to invest in diverse opportunities, including ESG initiatives.

We retrieved select ESG data for each company and each year from the Bloomberg Terminal. Bloomberg ESG scores use publicly available, company-reported ESG data, such as company filings (annual reports), corporate responsibility reports, disclosure against ESG reporting frameworks, corporate governance documents, and other ESG releases. Three scores (*ENV*, *SOC*, and *GOV*) are used to measure performance in specific areas of ESG. ESG is a composite score computed by the Bloomberg system. *ESG_Disclosure* reflects the level of disclosure on ESG issues. The detailed ESG scores are reported in Table 4.

Table 4. ESG scores retrieved from Bloomberg Terminal

Name	*Description*	*Example of issues*	*Range*
ENV	Bloomberg environmental pillar score: Evaluate a company's aggregated environmental performance	Energy management Sustainable product Water management Waste management Environmental supply chain management	0 to 10 (10 is best)
SOC	Bloomberg social pillar score: Evaluate a company's aggregated social performance	Customer welfare Data security and customer privacy Product quality control Marketing & labeling Social supply chain management	0 to 10 (10 is best)
GOV	Bloomberg governance pillar score: Evaluate a company's aggregated governance performance	Board composition Executive compensation Shareholder rights Audit	0 to 10 (10 is best)
ESG	Overall ESG score: Weighted generalized mean of the above ESG pillar scores		0 to 10 (10 is best)
ESG_Disclosure	Bloomberg ESG disclosure score: Evaluate the extent of a company's ESG disclosure		0 to 100 (100 is best)

For each of the five Bloomberg ESG scores, we conduct a panel data linear regression analysis with the three principal components as the independent variables. The results are summarized in Table 5.

Table 5. Linear regression analysis for each ESG score

		ESG	*ENV*	*SOC*	*GOV*	*ESG_Disclosure*
Adjusted R-squared		**0.02**	**0.04**	**0.01**	**0.08**	**0.04**
Const.	Coefficient	**4.30**	**3.68**	**3.22**	**7.23**	**55.40**
	t-stat	173.11	96.95	84.01	496.32	252.04
	p-value	0.00*	0.00*	0.00*	0.00*	0.00*
PC1	Coefficient	**0.03**	**0.20**	**-0.09**	**0.04**	**0.51**
	t-stat	2.00	8.82	-4.03	4.11	3.85
	p-value	0.04*	0.00*	0.00*	0.00*	0.00
PC2	Coefficient	**-0.12**	**-0.12**	**-0.12**	**-0.13**	**-1.39**
	t-stat	-6.69	-4.29	-4.37	-12.64	-8.96
	p-value	0.00*	0.00*	0.00*	0.00*	0.00
PC3	Coefficient	**0.02**	**-0.07**	**0.03**	**0.05**	**-0.15**
	t-stat	1.51	-2.44	0.91	4.74	-0.89
	p-value	0.25	0.02*	0.37	0.00*	0.37

*Note: * Significant at less than 0.05%.*

5. DISCUSSION

From the outset, we must note that the relationship between our variables and the ESG variables is weak, as indicated by the adjusted R-squared. This is expected, as many factors contribute to a company's ESG conscientiousness. As shown in the regression analysis, a company's profitability and liquidity, represented by the three principal components, largely have a statistically significant impact on the five ESG variables. However, the impact is not uniform across all ESG measures.

Only the more market-oriented profitability (PC1) and liquidity (PC2) have a significant effect on the overall ESG score, which is the weighted mean of environmental, social, and governance performance, and ESG disclosure. As hypothesized, profitability has a positive effect on ESG, while liquidity has a negative effect. This could be because profitable companies generate free cash flow (*FCF*) that can be used for ESG initiatives rather than being kept in short-term investments and cash accounts.

ENV and *GOV* are similarly affected by the three PCs. In this case, along with PC1 and PC2, the accounting profitability (PC3) might capture a higher retention rate, which, along with a higher *ROE*, could provide even more incentive for companies to invest in such initiatives. At the same time, retaining more earnings could increase liquidity. This might explain why there is a negative relationship between PC3 and *ENV*. More liquidity might mean less money to invest in environmental projects like sustainable technologies. Conversely, more money might be spent on *GOV* issues that require more liquidity, which might explain the positive relationship with PC3.

The odd one out seems to be *SOC*, where both PC1 and PC2 load negatively. While *SOC* is a complex measure, one can speculate that profitable companies pay less attention to the factors captured by *SOC*, which include many stakeholders and activities, while lower liquidity still favors such activities.

We recognize that our explanations of the relationships are incomplete. To provide more comprehensive explanations, we need a much broader context than the scope of this paper, which is limited to investigating whether financial performance impacts ESG metrics. It is clear from the rather weak association that many other variables explain the ESG metrics, and this could be a future direction for research.

6. CONCLUSION

In this study, we investigate the relationship between a company's ESG performance, profitability, and liquidity. To utilize more financial metrics for profitability and liquidity, which are correlated but each potentially explains different aspects of the relationship, we employ PCA on a large set of panel data. We retain a set of three principal components, based on standard statistical selection

rules, that capture a significant portion of the original variables' variance. Using pooled regression analysis, we provide evidence of statistically significant, albeit weak, relationships between profitability, liquidity, and ESG performance. Given the increasing demand for companies to pursue sustainable initiatives, our study offers practitioners insights into the determinants of ESG initiatives and may help them better strategize such efforts.

Our research is limited by the availability of ESG performance data on the Bloomberg Terminal. As more data become available, new directions for this type of research will open up. Future research could proceed in several directions. First, it could identify the variability in the effect of profitability and liquidity on ESG performance across different industries or sectors. Second, it could include other financial metrics, such as stock returns or Tobin's Q, that might impact ESG performance. Third, as time series data become more available, a Granger causality investigation that could follow Zhou et al. (2023), could determine whether ESG improves financial performance, financial performance improves ESG, or if there is a feedback effect between the two for the sample of companies considered in this paper.

Further research can also provide a more nuanced analysis of how contextual factors influence the relationship between financial performance and ESG metrics. This addition will help contextualize our results within the broader regulatory and sectoral environment (Shahrour et al., 2022), offering a more comprehensive view of the dynamics at play.

Lastly, this relationship can be investigated with alternative data analytics techniques, such as unsupervised machine learning, as the relationship is likely more complex than the linear one assumed in this research (D'Amato et al., 2021). Qualitative studies on this subject can also provide more insight into the mechanisms that explains the identified relationship between financial performance and ESG metrics.

REFERENCES

Asamoah, E. S., & Puni, A. (2021). Corporate governance and financial performance of listed companies: A case of an emerging market. *Corporate Governance and Sustainability Review, 5*(3), 8–17. https://doi.org/10.22495/cgsrv5i3p1

Aupperle, K. E., Carroll, A. B., & Hatfield, J. D. (1985). An empirical examination of the relationship between corporate social responsibility and profitability. *Academy of Management Journal*, *28*(2), 446–463. https://doi.org/10.5465/256210

Baalouch, F., Ayadi, S. D., Hussainey, K., & Salem, I. H. (2023). The consequences of environmental disclosure quality: Evidence from France. *Corporate Governance and Sustainability Review, 7*(3), 8–20. https://doi.org/10.22495/cgsrv7i3p1

Barauskaite, G., & Streimikiene, D. (2021). Corporate social responsibility and financial performance of companies: The puzzle of concepts, definitions and assessment methods. *Corporate Social Responsibility and Environmental Management, 28*(1), 278–287. https://doi.org/10.1002/csr.2048

Bruna, M. G., Loprevite, S., Raucci, D., Ricca, B., & Rupo, D. (2022). Investigating the marginal impact of ESG results on corporate financial performance. *Finance Research Letters, 47*, Article 102828. https://doi.org/10.1016/j.frl.2022.102828

Chari, M. D. R., David, P., Duru, A., & Zhao, Y. (2019). Bowman's risk-return paradox: An agency theory perspective. *Journal of Business Research, 95*, 357–375. https://doi.org/10.1016/j.jbusres.2018.08.010

Cheng, B., Ioannou, I., & Serafeim, G. (2014). Corporate social responsibility and access to finance. *Strategic Management Journal, 35*(1), 1–23. https://doi.org/10.1002/smj.2131

D'Amato, V., D'Ecclesia, R., & Levantesi, S. (2021). Fundamental ratios as predictors of ESG scores: A machine learning approach. *Decisions in Economics and Finance*, *44*(2), 1087–1110. https://doi.org/10.1007/s10203-021-00364-5

Dalal, K. K., & Thaker, N. (2019). ESG and corporate financial performance: A panel study of Indian companies. *The IUP Journal of Corporate Governance, 18*, 44–59. https://www.econbiz.de/Record/esg-and-corporate-financial-performance-a-panel-study-of-indian-companies-dalal-karishma/10012035566

DasGupta, R. (2022). Financial performance shortfall, ESG controversies, and ESG performance: Evidence from firms around the world. *Finance Research Letters*, *46*, Article 102487. https://doi.org/10.1016/j.frl.2021.102487

Dike, V. O., & Tuffour, J. K. (2021). Effect of corporate governance practices on bank performance: The perspective of board members. *Corporate Governance and Sustainability Review, 5*(1), 54–64. https://doi.org/10.22495/cgsrv5i1p6

Dunteman, G. H. (1989). *Principal components analysis*. SAGE Publications. https://doi.org/10.4135/9781412985475

Eccles, R. G., & Serafeim, G. (2013, May 1). The performance frontier: Innovating for a sustainable strategy. *Harvard Business Review*. https://hbr.org/2013/05/the-performance-frontier-innovating-for-a-sustainable-strategy

Friede, G., Busch, T., & Bassen, A. (2015). ESG and financial performance: Aggregated evidence from more than 2000 empirical studies. *Journal of Sustainable Finance & Investment*, *5*(4), 210–233. https://doi.org/10.1080/20430795.2015.1118917

Gaweda, A. (2022). ESG rating and market valuation of the firm: Sector approach. *European Journal of Sustainable Development, 11*(4), 91–104. https://doi.org/10.14207/ejsd.2022.v11n4p91

Gholami, A., Sands, J., & Rahman, H. U. (2022). Environmental, social and governance disclosure and value generation: Is the financial industry different? *Sustainability*, *14*(5), Article 2647. https://doi.org/10.3390/su14052647

Halimatusadiah, E., Sofianty, D., & Ermaya, H. N. (2015). Effects of the implementation of good corporate governance on profitability. *European Journal of Business and Innovation Research, 3*(4), 19–35. https://www.eajournals.org/wp-content/uploads/Effects-of-the-Implementation-of-Good-Corporate-Governance-on-Profitability.pdf

Hang, M., Geyer-Klingeberg, J., & Rathgeber, A. W. (2019). It is merely a matter of time: A meta-analysis of the causality between environmental performance and financial performance. *Business Strategy and the Environment*, *28*(2), 257–273. https://doi.org/10.1002/bse.2215

Isiaka, A. S. (2022). Voluntary sustainability reporting and financial performance: Evidence from Global Reporting Initiative disclosures in the developing economy. *Corporate Governance and Sustainability Review, 6*(4), 54–64. https://doi.org/10.22495/cgsrv6i4p5

Kahneman, D., & Tversky, A. (1979). Prospect theory: An analysis of decision under risk. *Econometrica, 47*(2), 263–292. https://doi.org/10.2307/1914185

Khan, M., Serafeim, G., & Yoon, A. (2016). Corporate sustainability: First evidence on materiality. *The Accounting Review, 91*(6), 1697–1724. https://doi.org/10.2308/accr-51383

Kim, S., & Li, Z. (2021). Understanding the impact of ESG practices in corporate finance. *Sustainability, 13*(7), Article 3746. https://doi.org/10.3390/su13073746

Koundouri, P., Pittis, N., & Plataniotis, A. (2022). The impact of ESG performance on the financial performance of European Area companies: An empirical examination. *Environmental Sciences Proceedings*, *15*(1), Article 13. https://doi.org/10.3390/environsciproc2022015013

Liu, M., Luo, X., & Lu, W.-Z. (2023). Public perceptions of environmental, social, and governance (ESG) based on social media data: Evidence from China. *Journal of Cleaner Production, 387*, Article 135840. https://doi.org/10.1016/j.jclepro.2022.135840

Maćkiewicz, A., & Ratajczak, W. (1993). Principal components analysis (PCA). *Computers & Geosciences, 19*(3), 303–342. https://doi.org/10.1016/0098-3004(93)90090-R

Mamun, M. (2022). Sustainability reporting and financial performance: Evidence from Australia's electricity companies. *Corporate Governance and Sustainability Review, 6*(1), 15–21. https://doi.org/10.22495/cgsrv6i1p2

Naeem, N., & Cankaya, S. (2022). The impact of ESG performance over financial performance: A study on global energy and power generation companies. *International Journal of Commerce and Finance, 8*(1), 1–25. https://ijcf.ticaret.edu.tr/index.php/ijcf/article/view/285/pdf_161

Naffa, H., & Fain, M. (2022). A factor approach to the performance of ESG leaders and laggards. *Finance Research Letters, 44*, Article 102073. https://doi.org/10.1016/j.frl.2021.102073

Padfield, S. J. (2022). An introduction to anti-ESG legislation. *Transactions: The Tennessee Journal of Business Law, 24*, Article 291. https://doi.org/10.70658/4486-1457.1632

Pástor, L., Stambaugh, R. F., & Taylor, L. A. (2021). Sustainable investing in equilibrium. *Journal of Financial Economics*, *142*(2), 550–571. https://doi.org/10.1016/j.jfineco.2020.12.011

Shahrour, M. H., Girerd-Potin, I., & Taramasco, O. (2022). Corporate social responsibility and firm default risk mitigation: The moderating role of the legal context. *Finance Contrôle Stratégie, 25*(1), 1–30. https://doi.org/10.4000/fcs.8784

Tan, X., & Tuluca, S. A. (2023). Liquidity and profitability: Not a "one size fits all" proposition! *Journal of Accounting and Management Information Systems*, *22*(1), 42–58. https://doi.org/10.24818/jamis.2023.01003

Whelan, T., Atz, U., Holt, T. V., & Clark, C. (2022). *ESG and financial performance: Uncovering the relationship by aggregating evidence from 1,000 plus studies published between 2015–2020*. https://www.stern.nyu.edu/sites/default/files/assets/documents/NYU-RAM_ESG-Paper_2021.pdf

Zhou, R., Hou, J., & Ding, F. (2023). Understanding the nexus between environmental, social, and governance (ESG) and financial performance: Evidence from Chinese-listed companies. *Environmental Science and Pollution Research, 30*(29), 73231–73253. https://doi.org/10.1007/s11356-023-27449-5