Exploring the performance of responsible companies in G20 during the COVID-19 outbreak

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ABSTRACT

An uphill question of whether Environmental, Social, and Governance (ESG) directly impact firms' financial performance (FP) continues to vacillate between two opponent streams. In the present study, we argue that COVID-19 is an extreme event where the effect of ESG sharply manifests. We rely on cross-sectional data in the context of G20 countries for the year 2020. To avoid biased results due to governments support, we integrate four novel metrics provided by the Oxford Coronavirus Government Response Tracker (OxCGRT). We run sequential regressions (OLS; and quartiles to account for the Ingrained Income Bias (IIB) and ESG scores). We also perform robustness tests and account for the interaction between ESG and cash level. Our models were subsequently replicated for each ESG pillar. Findings indicate that ESG is beneficial during COVID-19, but the reward appears to be closely tied up to specific aspects of ESG, income level, and firm-specific variables. Results contribute to the burgeoning literature on ESG during COVID-19 by reflecting on firms' key attributes and the preponderance of government support.

1. Introduction

The emphasis on Environmental, Social, and Governance (ESG) is not a trend as some claim; rather, it is demand-based and emerges as a priority goal for a company's senior leadership.[1] ESG is a term commonly used to evaluate a company's non-financial performance indicators in three areas: environmental, social, and governance. Environmental area refers to the company's behavior toward the environment in terms of resource use, emissions, and innovation. In contrast, the social area considers the company's relationship with workspace, suppliers, customers, and the communities. Finally, the governance area examines its management, shareholders' rights, and CSR strategy. These three broad areas are often used by conscious investors to screen potential investments and are important measures for company valuation and risk management. A rising stream of ESG pros and cons is drifted by

skeptical and illusionary findings that raise concerns and inquietude. Whether ESG has a placebo effect and can shield investors in times of severe crisis such as the COVID-19 outbreak remains arguably incontestable. Recently, Demers et al. (2021) stress that ESG is not an equity vaccine during the COVID-19 crisis. On the contrary, they claim that companies' performance resides in accounting-based measures that reflect key internal qualitative and quantitative traits, industry affiliation, and traditional market-based measures. More critics point out that ESG scores are an outdated blunt aggregation. Aswath Damodaran, an NYU finance professor, described ESG as "a mistake that will cost companies and investors money while making the world worse off" and states that "it creates more harm than good for society". It is a "placebo" that allows people to avoid grappling with difficult environmental and social challenges.[2]

Irrefutably, the other side of the debate shows ESG legitimacy

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[1] https://www.forbes.com/sites/forbesfinancecouncil/2021/12/29/as-intangible-assets-grow-so-does-the-role-of-esg-standards/?sh=13ff6ce04d44.
[2] https://www.morningstar.com/articles/1058429/as-new-critiques-of-sustainable-investing-emerge-dont-dump-your-esg-fund.

whereby commendable efforts were dedicated to aligning and harmonizing its differing standards. The large-scale initiatives conducted and steered by standard-setters reflect the importance of the subject. For instance, the International Financial Reporting Standards (IFRS) Foundation proposed to set up an international sustainability standards board that would operate alongside the International Accounting Standards Board.[3] Recently, the Securities and Exchange Commission (SEC) has also formed a Climate and ESG Task Force to identify misconduct in ESG reporting. Alongside, the Sustainability Accounting Standards Board, the International Integrated Reporting Council, the Global Reporting Initiative, the Climate Disclosure Standards Board, and the Carbon Disclosure Project foster the integration of new regulations and strive to implement the existing ones.

Theoretically, the predominant view of socially responsible firms proclaims that the main driver of ESG activities is to maximize shareholder welfare (e.g., McWilliams and Siegel, 2001), while the opposite view claims that managers purvey ESG reports to generate benefits at the expense of shareholders. Thus, a central research question stems from the contemporary uphill debate "does it pay to be good?"

Though ESG adoption is still in its early innings, its effects seem to be more pronounced in times of severe crises. Coupled with steep economic and social downturns, the speed and exogenous nature of COVID-19 shock tantalize contrast and ambiguity. This crisis caused an unpredictable public health shock that has inflicted the global economy (the global gross domestic product declined by 6.7 percent in 2020[4]), but the ubiquitous nature of the 2008 global financial crisis (GFC) infers some resemblance. As such, firms' sustainability surges as a hot research question. Can ESG stand as a buffer shock for social and vigilant firms? What are the important lessons to learn from such a crisis that hardly dislocated the whole planet? What are the main factors that drive businesses to sustain? And do they bear common traits with ESG disclosure?

Relevant to the above discussion, uncertainty and contradiction inhibit the empirical investigation of the ESG topic. When tested relative to performance, findings diverge at different levels: country, industry, capital markets, law enforcement, governance, and reporting requirements. Some researchers argue that this divergence may be due to the problem of confounding or omitted variable bias that can largely and unfavorably affect results. Further key analyses gauge ESG score and tally performance to its magnitude. Others attempt to set a clear analogy between the pandemic and GFC. Lins et al. (2017) and Cornett et al. (2016) find clear evidence about the positive effect of ESG practice on firm performance (FP) during GFC. Notwithstanding the results are currently limited to market performance within specific areas and geographical contexts (Albuquerque et al., 2020; Broadstock et al., 2021; Ding et al., 2021; Folger-Laronde et al., 2022; Lee and Lu, 2021), the pandemic is pushing forward the research on the role of ESG in a financial distress context.

In the present paper, we pay particular attention to specificities such as the country effect, country income level, industry, and other interesting dimensions. Hence, we extend our analysis to cover G20 countries. We include firms from different industries conditional on ESG and financial data availability. First, the baseline analysis integrates the whole sample, and at a later stage, we account for the Ingrained Income Bias (IIB) to divide the sample into developed and developing countries. Moreover, to cope with the existing hurdle of performance, we support our choice for ESG disclosure based on three important facts: (1) the global economy shift towards more services and knowledge industry that encompasses intellectual capital, intellectual property, and intangible assets that are hard to measure; (2) the evolution of corporate value and current accounting systems that contribute to improving

financial and non-financial disclosure, including material ESG risk and opportunities that uniquely affect each sector and industry; (3) the intersection between ESG and inherently embedded assets and the efforts to ensure their sustainability.

On another note, we argue that the COVID-19 pandemic presents an incomparable shock as it presents a severe disruption whose entrenched effects have aggregately affected the global economy. In response, many governments promptly reacted to support the business sector and provided funds and debt reliefs and extensions. Thus, to avoid bias caused by governments' deployed efforts and isolate the benefits of ESG, we consider four novel metrics provided by the Oxford Coronavirus Government Response Tracker (OxCGRT)[5]: the overall Government Response Index (GI), the Stringency Index (SI), the Economic Support Index (EI) and the Containment Health Index (CHI).

We also dissect ESG to test whether there are asymmetries in the relationship between each of the three pillars and FP. We also split firms into quartiles based on their ESG scores and perform several robustness tests to confirm our results.

In addition to contributing to the recent literature on the impact of COVID-19 on market and accounting performance measures (Al-Awadhi et al., 2020), the benefits of the study manifest in the following areas: First, we evaluate the financial performance of sustainable investments in times of exceptional crisis from a worldwide health emergency and by controlling for the measures put in place by governments to preserve global health. Second, few studies have analyzed the link during market downturns. Third, we disaggregate ESG scores and resonate on the different behaviors of the three pillars in the particular context of the COVID-19 crisis. Fourth, we include several control variables to see whether the impact of ESG on FP is conditional on a firm's financial health (size, leverage, cash holding, growth opportunities). Fifth, we differentiate ourselves by controlling for novel metrics measuring the governments' response to COVID-19, namely the above-mentioned indices, GI, SI, EI, and CHI.

The rest of the paper is organized as follows. The relevant literature and hypotheses are presented in Section 2, while the methodology and key variables used are described in Section 3. The empirical results and robustness test results are reported in Section 4. Finally, section 5 concludes with the summary, main implications, and recommendations.

2. Literature review

Whether or not ESG helps alleviate crisis gravity remains one of the hottest contemporary debates. Theoretical and empirical analyses were conducted in different countries, contexts, frameworks, vis-à-vis pre-and post-integrated reporting (Albitar et al., 2020), and voluntary disclosures (Wang and Hussainey, 2013). Previous crises were heavily investigated upon which a myriad of explicative scenarios was drafted. Yet, the analogy between the pandemic and other crises is sometimes rudimentary. Still, further exploration of some invisible variables and unknown metrics is essential. Supposedly, investments in corporate social responsibility are drivers for agility and proactivity in times of constraints (Nasrallah and El Khoury, 2021).

As companies are the economy's blood-irrigators, they become aware of the importance of setting strategic goals and plans to shield against potential exogenous and endogenous shocks. Big conglomerates strive to conserve their image and reputation in a belief that such inherent and qualitative characteristics are the baseline for their survival and existence. This implores building a strong relationship with all stakeholders as ESG activities strengthen trust and loyalty and hence

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reduce susceptibility to economic downturns.

In parallel, the accounting systems appear insufficiently vague to convey a clear and complete picture of the whole performance. With time, governments, policymakers, and standard setters reflect on the imminent utility to conjugate the financial reports with non-financial metrics (Nasrallah and El Khoury, 2020) to signal companies' ESG behaviors. An uphill question vacillates between three main concerns: ESG scores validity (Gyönyörová et al., 2021), financial performance sufficiency, and corporate internal weaknesses (Cheema-Fox et al., 2021). Do ESG metrics truly reflect the other hidden parts not reflected through financial reports? The pandemic soars as an extreme-case scenario to test the ESG effect on companies' performance.

Theoretically, there are two conflicting hypotheses: The social impact hypothesis (a positive relationship) and the trade-off hypothesis (a negative relationship). In this sense, ESG has an intrinsic value as it converges with the social impact and the stakeholder theories (Freeman, 1984). It is seen as a source of competitive advantage where corporations have a duty to society (Carroll, 1999). Long-term core strategies espoused agents' interests and stakeholders' benefits, including employees, consumers, banks, governments, and locals (Su and Baird, 2017). On the contrary, the neoclassical theory of Friedman (1962) concentrated on profit maximization and value creation for owners and managers. Pros of the latter theory reported that satisfying other stakeholder groups might negatively impact firm performance (Stuebs and Sun, 2015). On the other side, according to the trade-off hypothesis or traditionalist view, there is a negative relationship between ESG and FP. Spending resources to accomplish social and environmental goals (such as investment in pollution reduction, higher employee wages and benefits, donations, and sponsorships for the community) increases costs, harms profitability, and impairs competitive advantage (Galant and Cadez, 2017).

Empirically, many studies explore the relationship between ESG disclosure and FP. Some of them report positive, negative, and neutral impacts, while others identified U-shaped or inverted U-shaped relationships. The positive relationship suggests that being socially responsible improves profitability (Harun et al., 2020; Lins et al., 2017; Fatemi et al., 2015; Malik et al., 2015), while the negative relationship supports the trade-off theory stating that ESG inflates costs (Lyon and Montgomery, 2013; T. Wang and Bansal, 2012). The neutral relationship suggests that being socially responsible does not affect profitability (Gilley and Rasheed, 2000; Surroca et al., 2010) as positive and negative effects are offset. For instance, Broadstock et al. (2021) find that high-ESG portfolios generally outperform low-ESG portfolios within China's CSI300 constituents, suggesting that ESG mitigates financial risk during the pandemic. Ding et al. (2020) support the positive link using a global sample of over 6000 companies in 56 economies stating that firms with higher pre-pandemic CSR investments experienced better stock price performance during the pandemic. Moreover, Albuquerque et al. (2020) find that firms with higher environmental and social performance had higher returns and lower volatility during the pandemic. Lee and Lu (2021) suggest that Taiwanese CSR companies were less affected by the pandemic. However, Demers et al. (2021) support the irrelevance of ESG scores in determining stock returns during the pandemic.

Thus, we formulate our first hypothesis as follows:

Hypothesis 1 (H1). ESG performance positively contributes to companies' performance during COVID-19.

Properly said, one of the major drawbacks of previous studies on ESG-FP demarcates from the non-inclusion of the country's income effect. In this context, the standard growth theory predicts that poorer countries tend to grow faster and "catch up" to rich countries. Yet, the debate over this theory or what economists call the convergence

hypothesis has a long history whereby policymakers have become preoccupied with the notion "stuck in a middle-income trap.[6] On the contrary, Johnson and Papageorgiou (2020) find little evidence that the poorest economies are catching up to their wealthiest peers. There is a lack of progress in closing the gap between countries as most low-income countries could not sustain or spur growth as supposedly anticipated based on the traditional standard economic theory.

Based on the World Bank Report, about 90 percent of sovereign ESG scores can be explained by a country's national income (Pesme and Caputo Silva, 2021). There exists an Ingrained Income Bias (IIB) in the ESG investigation. Higher-income countries tend to have stronger institutions and less inequality. This drives ESG scores higher and pushes to inevitably allocate more funds toward richer countries. The magnitude is highly centered in countries' frameworks (Pesme and Caputo Silva, 2021). In developed and emerging markets, Singhania and Saini (2021) find that ESG practices heavily depend on country voluntary or mandatory codes, sustainability reporting and integrated reporting, and environmental commitment. This would lead to the establishment of resilient business operations and reporting practices. Garcia et al. (2017) document that BRICS companies in sensitive industries present superior environmental performance. Iamandi et al. (2019) find that the ESG approach of the European reporting companies is mainly mature, strategic, and long-term oriented. It contributes to increasing corporate competitiveness and supporting societal well-being altogether.

Within the pandemic context, Gianfrate et al. (2021) examine a sample of more than 6000 stocks in 45 countries and find that during the pandemic, the ESG-FP relationship is heterogeneous depending on home countries' stocks. More specifically, they find that the effect of ES on abnormal returns is positive and significant for companies located in Canada and USA but insignificant for other regions (Europe, Japan, Asia-Pacific, and Emerging Countries). Moreover, the social pillar shows a positive impact only on North America. Taken together, we expect that the ESG-FP link would not be the same in a global setting while shedding light on the heterogeneous response to the pandemic of socially responsible firms worldwide. In the same context, Engelhardt et al. (2021) suggest that ESG is significantly important for low-trust countries or countries with poor security regulations and disclosure requirements, while Bae et al. (2021) find that the relationship is positive for companies located in Democratic states. Ding et al. (2020) prove that the firms in rich countries have withstood the pandemic better than those operating in poor countries, given the considerable resources needed to address this crisis. Thus, the effect of ESG factors on a firm's performance is contingent on countries' characteristics and income classification. Accordingly, we formulate our second hypothesis as follows:

Hypothesis 2 (H2). The link between ESG and FP depends on the income classification.

Under the new emergent ESG-efficient frontier, Pedersen et al. (2021) attempt to reconcile the opposing views about the costs and benefits of responsible investing. They empirically prove that most investors choose portfolios on the ESG-efficient frontier and show how ESG screens can have surprising effects. Based on the cost-efficiency principle, ESG investments should be well-balanced and not excessive. The debate triggers another important question that was tackled in previous studies. What is the optimal level of ESG investments? Mittal et al. (2008) and Barnett and Salomon (2012) proved the existence of a U-shaped ESG-FP relationship. ESG activity in its early stage negatively affects FP as costs outweigh benefits, whereas the relationship reverts and becomes positive at a later stage. The U-curve relationship is supported by Nollet et al. (2016) in the context of US corporations, El Khoury et al. (2021) in the MENAT region, and by Han et al. (2016) in the spectrum of Korean corporations. From another perspective, some

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[6] https://documents1.worldbank.org/curated/en/965511468194956837/pdf/104230-BRI-Policy-1.pdf.

studies conducted the analysis from an investment perspective. Hartzmark and Sussman (2019) find that investors actively responded to the 'shock to the salience of the sustainability', steering money away from funds with low portfolio sustainability ratings to those with high ratings.

In the context of the pandemic, Ding et al. (2021) discuss how ESG performance, among other factors, could provide 'corporate immunity' and find that high-CSR firms perform better in response to the pandemic. More recently, Lee and Lu (2021) investigate the impact of the pandemic on the Taiwan stock market and find that companies with CSR commitment were less affected. However, Takahashi & Yamada (2021) find that the ESG score, in all quintiles, has no impact on the abnormal returns of Japanese companies during the pandemic, a similar finding to the performance of Japanese companies during the GFC (Berkman et al., 2021). On a global level, Gianfrate et al. (2021) mention that although firms with higher ESG achieve higher returns during the COVID-19 crisis, this positive relationship is conditional on the home countries' stocks. Thus, there is a growing agreement that the ESG-FP link might correlate with companies' level of ESG, as a high ESG score is associated with a lower cost of debt and equity, which will increase the company's valuation, leading to better performance. Hence, we develop the third hypothesis of this study:

Hypothesis 3 (H3). The positive link between ESG and FP depends on the level of ESG

Connectively, three important theories emphasize the cash management practices: trade-off theory, pecking order theory, and free cash flow theory. The optimal level of cash and short-term investments has long intrigued many researchers. According to the trade-off theory, firms maintain the optimal level of cash at the breakeven point where the marginal cost and benefit of holding cash are equal (Al-Najjar and Belghitar, 2011; Martínez -Sola et al., 2013). In this perspective, companies tend to appropriately manage short-term assets as keeping a high level of cash arises as an idle investment while lowering it could probably threaten firms' day-to-day activities. Added to this, companies should be aware of exogenous competitive factors that might alter normal liquidity levels, and this specific problem might become steeper in times of conflicts and major disruptions. From another perspective, the pecking order theory grounded by Myers and Majluf (1984) showcases an overarching financing preference mode that prioritizes internally generated funds and liquid assets, followed by debt issuance and equity as a last resort. In the context of the recent global crises, several studies stress the importance of liquidity and cash levels to surmount sudden shocks and unexpected disruptions. As such, they have accounted for the effect of financial conditions and leverage while investigating the causal ESG-FP relationship (Giroud and Mueller, 2017). Other analyses were triggered to test the link while conferring great emphasis to cash holdings (Fresard, 2010) and lines of credit (Berrospide and Meisenzahl, 2015). Yet, in the context of GFC, many studies have contemplated firms' ability to sustain by regarding key accounting variables embedded in their balance sheets (e.g., Kahle and Stulz, 2013). The pandemic outbreak created a new environment in which the imposed governmental restrictions disrupted the economic activity, leading to a decline in firms' revenues. The result was a dramatic decline in firms' liquidity (De Vito and Gómez, 2020) with a reluctance from lenders to provide funds. Thus, financial flexibility is a must in dealing with financial distress (Fahlenbrach et al., 2021). In line with shareholder theory, an increase in ESG will improve financial performance for companies enjoying liquidity and flexibility. However, illiquid firms might be obliged to reduce their ESG projects to lower costs and maintain flexibility. The contemporary studies of Albuquerque et al. (2020) and Ramelli and Wagner (2020) pinpoint important factors that led to stock price rebound during the COVID-19 pandemic. Still, they clearly state that cash and debt levels were two key aspects for companies to sustain. Coupled with this, the access to liquidity and reliance on a quick line of borrowing prove to act as a buffer shock against the pandemic (Acharya and Steffen, 2020), whereby firms with higher cash holdings and lower financial leverage are relatively less affected (Fahlenbrach et al., 2021; Ramelli and Wagner, 2020). Hence, we formulate our fourth hypothesis as follows:

Hypothesis 4 (H4). The positive link between ESG and FP is stronger for firms with greater cash holdings.

From a deeper perspective, it is important to disaggregate ESG pillars and contemplate if they move in tandem. In other terms, it will be interesting to discover which pillar is strongly associated with financial performance and what specific pattern it follows. The pillar effect on FP was investigated by Nau and Breuer (2014), who found unequal and divergent effects when addressing separately the environmental (E), social (S), and governance(G) factors. Based on stakeholder and legitimacy theories, social performance improves financial performance (Freeman et al., 2010; Velte, 2017), public perception (Gangi et al., 2019), and reputation (Salman and Laouisset, 2020)0). In a systematic review, Dartey-Baah and Amoako (2021) highlighted the dominance of quantitative CSR studies in the context of emerging countries and showed that the principal published themes tackled (1) the effects of CSR, (2) drivers of CSR, and (3) challenges of CSR. Cannon et al. (2020) asserted that social disclosure contributes to the above-industry median and better operating margins. Esteban-Sanchez et al. (2017)and Lo et al. (2021) found a positive impact of employees' motivation on FP but a negative effect of community involvement and product responsibility on FP. Moreover, companies must rethink their value chain structures, reconceive governance mechanisms (Youssef and Diab, 2021), and innovate business models (Elali, 2021; Shashi et al., 2021). According to the agency theory, governance practices positively affect performance by boosting reputation, increasing supervision, and mitigating mismanagement (Zehri and Zgarni, 2020). Interestingly, Queiri et al. (2021) found that some governance elements positively correlate to FP while others behave oppositely.

From an environmental perspective, the stakeholder and resource-based theories, there is a positive relationship between environmental practices and FP (Youn et al., 2013). Green ecological activities such as resource efficiency (Beckmann et al., 2014), material waste, reuse, recycling, and energy consumption (Min and Galle, 2001; Zsidisin and Siferd, 2001) yield performance. Nakao et al. (2007) find that scoring high on environmental performance is seen as an 'important strategic factor'. Environment practices lead to higher productivity, better customer service, enhanced employee morale, resulting in financial gains such as Return on Investment (ROI) (Green et al., 2012; Laosirihongthong et al., 2013).

Given the inconclusive evidence on the relationship between ESG and FP during the pandemic, it is important to go deeper to understand what pillars affect the company performance in line with previous studies (Capelle-Blancard and Petit, 2017). Broadstock et al. (2021) show that the cumulative returns of Chinese companies are positively and only affected by the environment and governance pillars, concluding that both pillars are more tangible metrics for a firm's strength during the pandemic. Boldeanu et al. (2022) show the different impacts of ESG pillars on the renewable electricity firms in Europe, whose abnormal returns are positively affected by the environmental and social scores during the pandemic. They also find that when the ESG score is not statistically significant during the pandemic, It is important to weigh the impact of each ESG pillar. They conclude that each pillar is differently affected based on its respective sector and surrounding context. Moreover, the COVID-19 crisis is expected to stimulate a green recovery, as pointed out by a PWC report.[7] Given that the protection of the environment will be a priority plan, investors might put more emphasis on environmental performance. Thus, we formulate our fifth hypothesis as follows:

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[7] https://www.pwc.co.uk/services/sustainability-climate-change/insights/post-pandemic-world-and-climate-change.html.

Hypothesis 5 (H5). FP is differently affected by each ESG pillar.

3. Sample and data

3.1. Sample

In our study, we extract data about G20[8] countries from Refinitiv Reuters. We first get 4528 firms with available ESG scores. Then, we search for firms with available financial reports for 2020. This refinement results in a sample of 4380 firms based on Return on Assets and Return on Equity and 4242 based on the Price to Book variable. Further details on the sample determination are provided in Table 1. Data for firms' financial performance and control variables are retrieved from Reuters, while macroeconomic data are collected from Oxford COVID-19 Government Response Tracker (OxCGRT).

Table 2 shows the country- and sector-wise distributions of the data. Results show that the highest number of firms is 2307 from the USA (46.51%), followed by 596 from China (13.61%) and 353 (8.06%) from Japan. Furthermore, the highest number of firms is 725 from the financial sector (16.55%), 665 from Healthcare (15.18%), and 654 from Industrial (14.93%).

3.2. Dependent variable

The dependent variable is Financial Performance (FP) and is measured using accounting- and market-based measures. While accounting measures are sensitive to company-specific risk, market measures are sensitive to systematic risk. In line with the existing literature, four different measures are used, mainly return on assets (ROA) and return on equity (ROE) as accounting-based measures (Atan et al., 2018; Duque-Grisales and Aguilera-Caracuel, 2019), stock return (TR) as the market measure (Miralles-Quirós et al., 2019), and price to book ratio (PB) as the mixed measure (Giese et al., 2021).

3.3. Independent variables

This study investigates the impact of ESG practices on performance amid COVID-19. The main independent variable is the ESG score collected from the ASSET4® database provided by Refinitiv, which is considered as one of the most reliable sources of data (Galbreath, 2018; Ortas et al., 2013, 2015). ESG comprises seventy key performance indicators, classified into 18 measures measuring three pillars, namely Environmental Score, Social Score, and Governance Score, as described below:

- Environmental score (ENV): It analyzes the contributions of companies to their environment. It reveals the level to which a firm uses management practices to reduce environmental risks and includes

Table 1
Sample determination.

Number of observations for FY 2020 with ESG data	4528
Dropping Missing ROA data	−137
Dropping Missing Size	−1
Dropping Missing Slack	−10
Number of observations for ROA and ROE	**4380**
Dropping Missing Price to Book ratio	138
Number of observations for PB	**4242**

Table 2
Sample distribution.

Country- and Sector-wise distribution observations

Country	Communication services	Consume discretionary	Consumer staples	Energy	Financials	Health-care	Industrial	IT	Materials	Real Estate	Utilities	Total	Percentage
Argentina	1	2	4	0	0	0	2	1	1	1	2	14	0.32%
Australia	15	40	17	23	40	28	32	24	76	33	6	334	7.63%
Brazil	1	11	9	2	5	3	8	1	6	2	10	58	1.32%
Canada	7	10	6	5	15	11	12	12	37	11	2	128	2.92%
China	34	54	50	16	70	71	93	97	62	31	18	596	13.61%
France	9	15	8	3	5	5	18	7	3	5	5	83	1.89%
Germany	7	16	3	2	7	13	36	14	11	4	4	117	2.67%
India	7	10	7	2	23	8	9	8	11	4	5	94	2.15%
Indonesia	1	1	3	3	3	1	1	0	3	0	1	17	0.39%
Italy	5	7	3	1	16	2	9	3	2	1	8	57	1.30%
Japan	22	57	22	4	41	25	86	41	34	11	10	353	8.06%
South Korea	2	0	3	0	3	2	5	1	2	0	0	18	0.41%
Mexico	0	2	1	1	1	0	3	0	4	1	0	15	0.34%
Russia	0	0	1	0	1	0	1	0	4	0	1	8	0.18%
Saudi Arabia	0	0	1	1	4	0	1	0	2	0	0	9	0.21%
South Africa	4	19	12	1	14	4	17	5	15	13	0	104	2.37%
Turkey	0	1	1	1	4	2	2	0	1	1	1	13	0.30%
United Kingdom	16	53	22	10	50	22	68	29	23	26	6	325	7.42%
USA	73	232	69	72	423	468	251	257	60	105	27	2037	46.51%
Total	204	530	244	146	725	665	654	500	357	249	106	4380	
Percentage	4.66%	12.10%	5.57%	3.33%	16.55%	15.18%	14.93%	11.42%	8.15%	5.68%	2.42%		

resource use (water, energy, sustainable packaging, and environmental supply chain), innovation (implement new ideas, improve services, and create dynamic products), and emissions (CO2 emissions, waste, biodiversity, and environmental management systems) (Thomson Reuters, 2017).
- Social score (SOC): It discusses how well the company treats customers and focuses on four areas: a workplace (diversity and inclusion; career development and training; working conditions; and health and safety), human rights (a commitment to both business ethics and human rights that will be driven by values such as dignity, justice, fairness, equality, respect, and responsibility), community (wellbeing of society, positively benefiting society), and product responsibility (healthy product, product safety and instructions) (Thomson Reuters, 2017).
- Governance (GOV) is evaluated in three dimensions: management, shareholders, and corporate social responsibility strategy. Each subcategory contains several ESG themes (Thomson Reuters, 2017).

The score for each of the three pillars ranges from 0 to 100.

Fig. 1 shows the median, interquantile range, and the minimum and maximum values of each pillar. The results show significant variations across sectors, within the same sector, and across pillars. However, the median of ENV appears to be the lowest in all sectors, with highlighted substantial discrepancies in two sectors: Financial and Health care.

3.4. Control variables

To inspect the nexus between ESG and FP, several control variables are included. They are subdivided into two broad categories: firm- and country-level variables.

3.4.1. Firm-level variables

To account for their confounding effects, some company-specific characteristics should be controlled when studying the ESG- FP link. More specifically, firm's size (SIZE), leverage (LEV), slack resources (SLACK), and loss (LOSS) were taken into consideration as follows:

- Size (SIZE): It is measured as the natural logarithm of total assets. Larger companies generally have a greater capability of implementing sustainable business models. Moreover, size affects economies of scale and FP (Najaf et al., 2021; Ramaswamy, 2001).
- Leverage (LEV): It is measured as debt divided by total assets and is included since the capital structure influences financial performance (Zeitun and Tian, 2007). Moreover, it was found that the impact of leverage on FP is positive in some studies (Akhtar, 2012; Oware and Mallikarjunappa, 2021), and negative in other studies (Ali et al., 2020; Foo et al., 2015; Margaritis and Psillaki, 2010; Pouraghajan, 2012). However, during market downturns, Opler and Titman (1994) pinpoint the significant extent of leverage impact on firms' daily activities and operating performance.
- Financial Slack: It is defined as cash and short-term investments divided by total assets and is a good predictor of a firm's capacity to react to any unexpected contingency (Liargovas and Skandalis, 2008) such as COVID-19. Fahlenbrach et al. (2021) and Ramelli and Wagner (2020) show that companies with higher financial flexibility (i.e., more cash and less debt) did significantly better during the COVID-19 crisis (Bates et al., 2009; Eggers, 2020).
- Loss Indicator (LOSS): It is a dummy variable equal to 1 if net income is negative, and zero otherwise. It is included since there is an association between FP and financial loss faced by a firm (Byard et al., 2006).

All continuous variables (dependent and control) are winsorized at the 1st and 99th percentiles.

3.4.2. Country-level variables

Since our sample includes firms operating in different countries, we include a set of country-level variables to control for government response to COVID-19. The latter comprises four variables made publicly available by the Oxford Coronavirus Government Response Tracker (OxCGRT)[9]:

- Economic Support Index (EI): It records two measures: income support (stimulus, etc.) and debt relief (rescheduling, forgiving a portion of the debt, etc.). The index on any given day is calculated as the mean score of four indicators, each taking a value between 0 and 100.

$$Index = \frac{1}{k} \sum_{j=1}^{k} I_j$$

where k is the number of component indicators in the index and I_j is the sub-index score for an individual component indicator.

- Containment Health Index (CHI): It combines eight containment and closure policy indicators (school closures; workplace closures; cancellation of public events; restrictions on public gatherings; closures of public transport; stay-at-home requirements; restrictions on internal movements; and international travel controls) with eight health system policy indicators such as testing regime, investment into healthcare, and vaccination policies[10].
- Overall Government Response Index (GI): It records the response of the government across four metrics, and it is calculated based on 23 indicators covering containment and closure policies (8 indicators), economic policies (4 indicators), health system policies (8 indicators), and vaccine policies (3 indicators).[11]
- Stringency Index (SI). It is calculated by using nine scaled indicators, including eight containment and closure indicators (school closures; workplace closures; cancellation of public events; restrictions on public gatherings; closures of public transport; stay-at-home requirements; restrictions on internal movements; and international travel controls) and public information campaigns.[12] This index records the strictness of government policies without implying the appropriateness or effectiveness of a country's response. Since this index is part of CHI, we cannot include it simultaneously with CHI due to the multicollinearity problem.

Fig. 2 shows the country's score on each index. Economic support receives the lowest score for all countries, except Australia, France, Japan, Turkey, and United Kingdom. The figure also shows that countries' response significantly differs which highlight the need to control for such indices.

Finally, we control for sectors by including dummy variables. Information about sector classification is gathered from Refinitiv's Global Industry Classification Standard (GICS) sector which was developed jointly by Morgan Stanley Capital International (MSCI) and Standard & Poor's. According to GICS, companies are divided into eleven economic sectors: Communication Services, Information Technology, Health Care, Materials, Consumer Discretionary, Consumer Staples, Industrials, Utilities, Energy, Financials and Real Estate. These economic sectors are divided into 24 groups composed of 68 industries which include 157

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[9] https://www.bsg.ox.ac.uk/research/research-projects/covid-19-government-response-tracker.

[10] https://www.bsg.ox.ac.uk/research/research-projects/covid-19-government-response-tracker.

[11] https://www.bsg.ox.ac.uk/research/research-projects/covid-19-government-response-tracker.

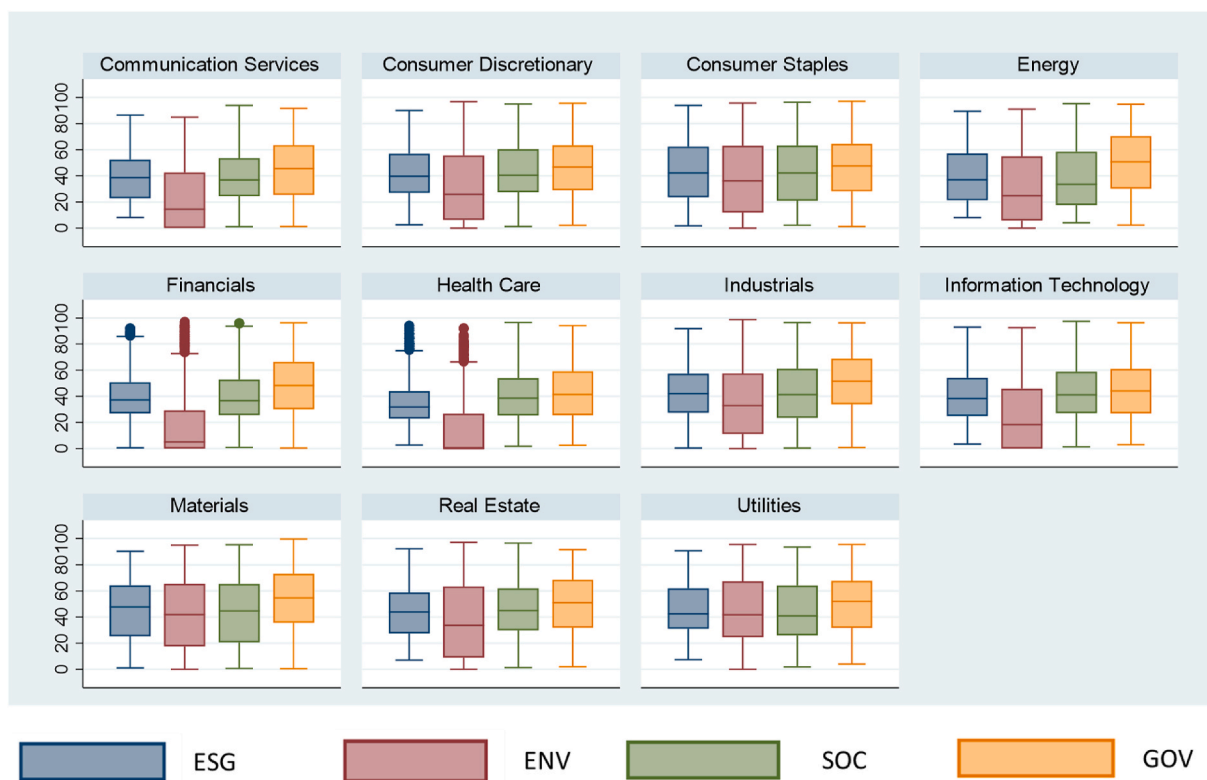[12] https://www.bsg.ox.ac.uk/research/research-projects/covid-19-government-response-tracker.

Fig. 1. Median, Interquantile Range, and the Minimum and Maximum values of ESG pillars across sectors and pillars
Notes: Fig. 1 represents the median, maximum, minimum, and interquantile range descriptive statistics of our dependent variables (ESG, ENV, SOC, and GOV) for 4380 observations across 11 GISC sectors. ESG = Environmental, social, and governance score; ENV = Environmental score; SOC= Social score; and GOV = Governance score. Data is collected from ASSET4® database provided by Refinitiv.
Source: Author's calculation.

sub-industries. Presumably, variant sectors have different levels of risk and opportunities and reflect on the specific business environment, which thus potentially leads to some sectors outperforming others.

Definitions of all dependent, independent, and control variables along with their acronyms and data source are shown in Appendix A.

3.5. Descriptive statistics

Descriptive statistics for our sample firms are provided in Table 3. 31.58% of firms reported negative income for 2020, while the average firm's ROA and ROE for that year was approximately −1.91% (-3.57%). Surprisingly, the average total return is positive (22.61%).

The mean overall Refinitiv ESG summary score for sample firms is approximately 41.01 out of a theoretical maximum of 100. This variable is bounded between 0.37 and 94.11 which implies a high variation in our sample. The firms have the highest score on GOV and the lowest on ENV. The environmental score has a mean value of 28.64 with a standard deviation of 28.27. To more emphasize, many companies have an environmental score of 0 and most of them are concentrated in industries witnessing scarce reporting on environmental issues (Healthcare, Financials, and Technology).

Table 4 presents the pairwise Pearson correlations between all variables and FP measured by ROA and ROE in Panel A, Total Return in Panel B, and PB in Panel C. We split them into three Panels to cope with the different numbers of observations for each model.

ESG, ENV, SOC, and GOV are positively correlated with ROA and ROE, suggesting that ESG acts as a buffer during COVID-19. Distinctly, correlation coefficients between ESG and total return and ESG and PB are negative. Moreover, the link between ESG and FP measures is not conclusive. This draws on the importance to test the association between ESG and FP while simultaneously incorporating all factors in a multiple regression analysis.

Slack seems to be negatively correlated with accounting FP, although it is expected that firms with an excess of liquidity would sustain during the market implosion. The negative sign of LEV with ROA and ROE is consistent with the expectation that firms with more significant debt burdens are less agile. Surprisingly, we find that SOC and ENV are highly correlated which might create a multicollinearity problem. As expected, GI is highly correlated with SI and CHI and SI is highly correlated with CHI. Thus, the regression model shall include either GI or CHI and EI at a time to avoid any multicollinearity problem.

3.6. Model

To center our problem, we run a number of variants on the following regression (with only one observation per firm, so firm and time subscripts are suppressed, while g refers to country):

$$FP = \beta_0 + \beta_1 ESG + \beta_2 SIZE + \beta_3 LEV + \beta_4 SLACK + \beta_5 LOSS + \beta_6 GI_g + \Sigma \, SectorDummies \tag{1}$$

$$FP = \beta_0 + \beta_1 ESG + \beta_2 SIZE + \beta_3 LEV + \beta_4 SLACK + \beta_5 LOSS + \beta_6 CHI_g + \beta_7 EI_g + \Sigma \, SectorDummies \tag{2}$$

These two equations measure the association between ESG, and the dependent FP variable measured by ROA, ROE, PB, and TR while controlling for firm characteristics and country control variables (Hypothesis 1). Country control variables are measured by Government Response Index (GI) in Equation (1) and by Containment Health Index (CHI) and Economic Support Index (EI) in Equation (2).

At another stage, Equations (1)–(4) are rerun by splitting the sample based on the income classification of each country (developing versus developed) (Hypothesis 2).
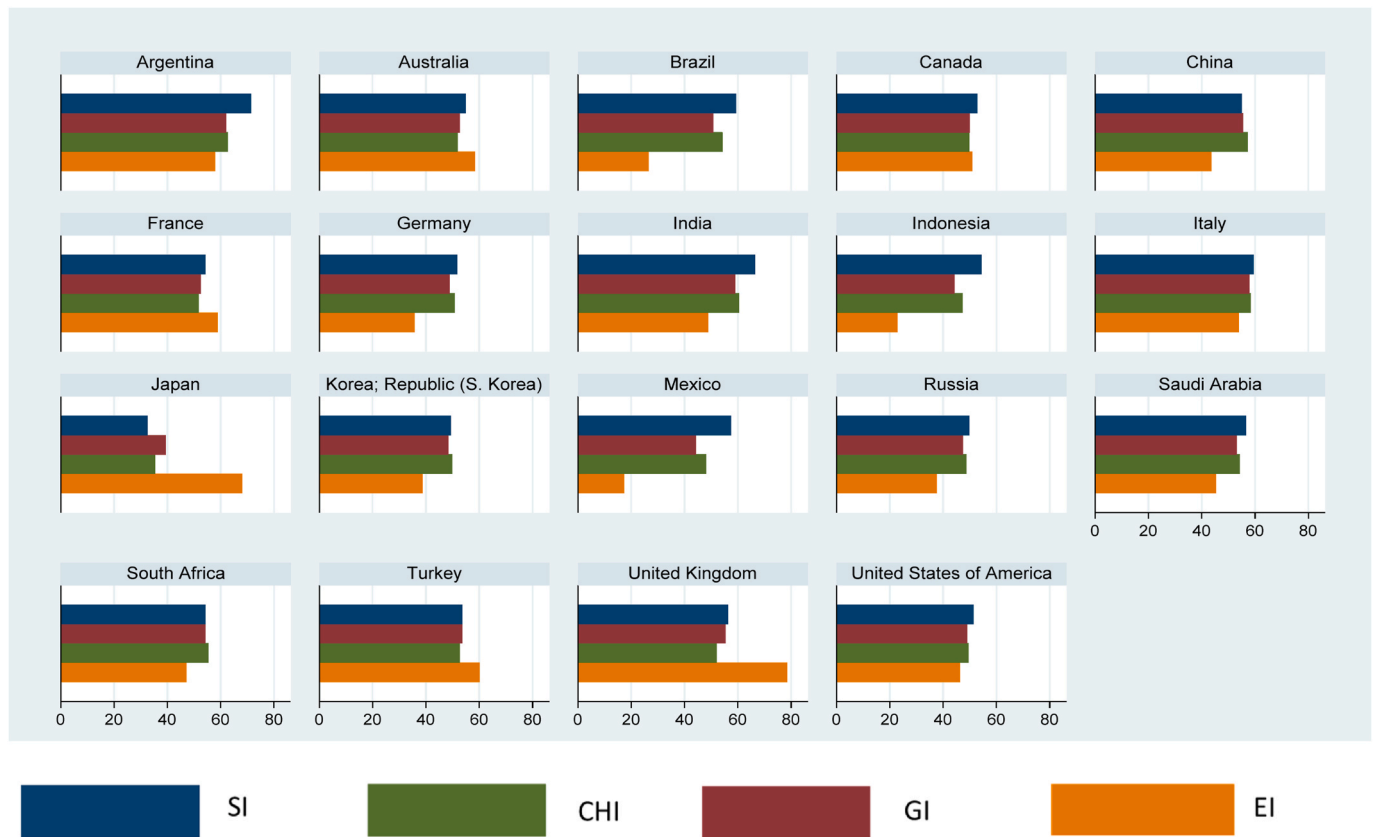
Fig. 2. Oxford Coronavirus Government Response Tracker (OxCGRT) Subindices Scores by Country
Notes: This figure represents the mean of each of the four country-level variables across 19 counties. SI= Stringency Index; CHI= Containment Health Index; GI = Government Response Index; and EI = Economic Support Index. Data is collected from Oxford Coronavirus Government Response Tracker (OxCGRT)
Source: Author's calculation.

Table 3
Variable descriptive statistics.

		Obs	Mean	Std.Dev.	Min	Max
Dependent Variables	ROA	4380	−1.911225	17.30156	−91.32874	26.8381
	ROE	4380	−3.573392	53.72853	−332.3715	145.4329
	TR	2514	22.61231	71.18893	−73.41946	335.3264
	PB	4242	4.136845	5.991467	0.2639014	36.738
Independent Variables	ESG	4380	41.01447	19.81733	0.3696013	94.11448
	ENV	4380	28.63878	28.26901	0	98.76039
	SOC	4380	42.54111	22.52154	0.3797824	97.4296
	GOV	4380	47.52177	22.4537	0.3873162	99.48218
Firm-Specific Variables	SIZE	4380	22.53952	2.821151	17.22949	30.92738
	LEV	4380	0.5721042	0.2636189	0.0539523	1.328386
	SLACK	4380	0.1579484	0.1712615	0.0008412	0.8560145
	LOSS	4380	0.3157534	0.4648683	0	1
Country-Level variables	SI	4380	51.78623	6.429202	32.60574	71.33516
	EI	4380	50.82597	11.2209	17.21311	78.51968
	GI	4380	50.49083	4.4609	39.41298	62.08315
	CHI	4380	50.44385	5.457708	35.31437	62.68477

The third model includes the sectorial level of ESG by splitting the companies into four quartiles based on ESG scores as compared to the sector ESG median (Hypothesis 3):

$$FP = \beta_0 + \beta_1 ESGscore2 + \beta_2 ESGscore3 + \beta_3 ESGscore4 + \beta_4 SIZE + \beta_5 LEV + \beta_6 SLACK + \beta_7 LOSS + \beta_8 CHI_g + \beta_9 EI_g + \Sigma\ SectorDummies \quad (3)$$

The fourth model splits the sample based on cash holding by sector (Hypothesis 4). HighSlack is a dummy variable equals to 1 when slack falls in the top quartile:

$$FP = \beta_0 + \beta_1 ESG + \beta_2 HighSlack + \beta_3 ESG*HighSlack + \beta_4 SIZE + \beta_5 LEV + \beta_6 SLACK + \beta_7 LOSS + \beta_8 CHI_g + \beta_9 EI_g + \Sigma\ SectorDummies \quad (4)$$

The fifth and sixth equations include the association between each pillar and the dependent variable measured by ROA, ROE, PB and TR while controlling for firm characteristics and country control variables related to government response indices measured by GI in Equation (5) and by CHI and EI in Equation (6) (Hypothesis 5):

$$FP = \beta_0 + \beta_1 ENV + \beta_2 SOC + \beta_3 GOV + \beta_4 SIZE + \beta_5 LEV + \beta_6 SLACK + \beta_7 LOSS + \beta_8 GI_g + \Sigma\ SectorDummies \quad (5)$$

Table 4
Pearson correlation tables.

Panel A: Correlation between all variables and FP measured by ROA and ROE

N = 4380	ROA	ROE	ESG	ENV	SOC	GOV	SIZE	LEV	SLACK	LOSS	SI	EI	GI	CHI
ROA	1.000													
ROE	0.550	1.000												
ESG	0.191	0.108	1.000											
ENV	0.231	0.121	**0.840**	1.000										
SOC	0.090	0.049	**0.883**	**0.705**	1.000									
GOV	0.149	0.091	**0.708**	0.407	0.408	1.000								
SIZE	0.337	0.209	0.407	0.493	0.273	0.238	1.000							
LEV	−0.065	−0.004	0.142	0.077	0.130	0.090	0.215	1.000						
SLACK	−0.358	−0.169	−0.192	−0.208	−0.116	−0.162	−0.297	−0.299	1.000					
LOSS	−0.637	−0.441	−0.158	−0.191	−0.055	−0.135	−0.360	−0.001	0.241	1.000				
SI	−0.007	−0.006	−0.003	−0.067	0.031	0.050	−0.341	0.028	−0.081	0.079	1.000			
EI	0.051	0.006	0.188	0.236	0.146	0.084	0.107	−0.043	−0.024	−0.034	−0.287	1.000		
GI	0.059	0.027	0.017	0.009	−0.001	0.074	−0.203	−0.019	−0.074	0.007	**0.913**	−0.075	1.000	
CHI	0.040	0.024	−0.039	−0.061	−0.044	0.044	−0.221	−0.005	−0.062	0.016	**0.937**	−0.364	**0.956**	1.000

Panel B: Correlation between all variables and FP measured by Total Return

N = 2514	RETURN	ESG	ENV	SOC	GOV	SIZE	LEV	SLACK	LOSS	SI	EI	GI	CHI
RETURN	1												
ESG	−0.0871	1											
ENV	−0.0505	**0.8156**	1										
SOC	−0.0512	**0.855**	**0.6544**	1									
GOV	−0.104	**0.7024**	0.3978	0.3438	1								
SIZE	−0.1074	0.3931	0.491	0.2186	0.2648	1							
LEV	−0.2201	0.1138	0.0309	0.0968	0.0667	0.2601	1						
SLACK	0.231	−0.1716	−0.1889	−0.056	−0.184	−0.3931	−0.3342	1					
LOSS	−0.0156	−0.1422	−0.1835	0.0114	−0.1649	−0.4494	−0.0504	0.3156	1				
SI	0.001	0.2033	0.3816	0.0583	0.1388	0.4681	−0.1229	−0.0677	−0.2011	1			
EI	−0.0876	0.2893	0.2542	0.2866	0.1629	−0.1107	0.0308	−0.0685	0.0753	0.3226	1		
GI	0.0221	0.1174	0.315	−0.055	0.1188	0.5031	−0.1408	−0.05	−0.2407	**0.8881**	0.2844	1	
CHI	0.0557	0.0142	0.2328	−0.1642	0.0627	0.5645	−0.1579	−0.0264	−0.2784	**0.8033**	−0.0772	**0.9339**	1

Panel C: Correlation between all variables and FP measured by PB

N = 4242	PB	ESG	ENV	SOC	GOV	SIZE	LEV	SLACK	LOSS	SI	EI	GI	CHI
PB	1												
ESG	−0.0652	1											
ENV	−0.0918	**0.8397**	1										
SOC	−0.008	**0.8832**	**0.7053**	1									
GOV	−0.0808	**0.7057**	0.4038	0.4057	1								
SIZE	−0.1933	0.4047	0.4898	0.2732	0.2346	1							
LEV	0.0043	0.1831	0.1199	0.1542	0.1174	0.2925	1						
SLACK	0.2797	−0.1958	−0.2075	−0.1221	−0.166	−0.2901	−0.3673	1					
LOSS	0.0673	−0.1525	−0.1853	−0.0505	−0.132	−0.3572	−0.0768	0.2422	1				
SI	0.0731	−0.0046	−0.0708	0.0303	0.0508	−0.3517	0.018	−0.0794	0.0732	1			
EI	−0.0911	0.1816	0.2303	0.1403	0.0806	0.1057	−0.0275	−0.023	−0.03	−0.2951	1		
GI	0.0497	0.0131	0.0036	−0.004	0.073	−0.2147	−0.0166	−0.0701	0.0039	**0.9134**	−0.086	1	
CHI	0.0728	−0.0407	−0.0637	−0.0446	0.0445	−0.2309	−0.0074	−0.0586	0.0124	**0.9372**	−0.3714	**0.957**	1

Values in bold letters show high correlations, source of multicollinearity problems.

$$FP = \beta_0 + \beta_1 ENV + \beta_2 SOC + \beta_3 GOV + \beta_4 SIZE + \beta_5 LEV + \beta_6 SLACK + \beta_7 LOSS + \beta_8 CHI_g + \beta_9 EI_g + \Sigma \; SectorDummies \qquad (6)$$

All variables are defined in Appendix A. Standard errors are robust to heteroscedasticity and clustered by country.

4. Results

4.1. ESG and FP- baseline

Table 5 shows the results of regressing FP on firms' ESG and other firm characteristics. All regressions are clustered by country to account for countries' Ingrained Income Bias (IIB). The effect of ESG on ROA and ROE is positive and significant at the 1% level, even after controlling for all variables. This suggests that responsible companies experience better ROA and ROE during the pandemic. These results are in line with several studies that addressed the relationship between ESG and FP (such as Fatemi et al., 2015; Lins et al., 2017; Malik et al., 2015; Albuquerque et al., 2020). Larger firms and firms with lower leverage perform better in terms of ROA. Yet, firms with lower cash (slack) also seem to perform better in terms of accounting performance measures (ROA, ROE) against

all expectations. This may be explained by the adoption of optimal cash management reducing cash levels, which seemingly translates into better accounting performance.

In Models 1.c, 1.d, 2.c and 2.d, we reproduce the regressions using two alternative dependent variables: stock returns (TR) and price to book ratio (PB). The results show that ESG score has a negative and significant effect on TR significant at 5% and 1% in Models 1.c and 2.c respectively where government response to COVID-19 is proxied by GI. Our results are in line with studies such as Wang and Bansal (2012), and Lyon and Montgomery (2013). However, ESG score has no significant impact on market performance measured by PB in Models 1.d and 2. d which supports the findings of Gilley and Rasheed (2000) who find no overall effect of environmental initiatives on stock returns, and Surroca et al. (2010) who realize that corporate responsibility and financial performance are indirectly associated due to the mediating effect of firms' intangible resources. Moreover, our results support the findings of contemporaneous studies that suggest that cash and debt levels were important determinants of stock price rebound during the market downturn induced by the COVID-19 pandemic (Albuquerque et al., 2020; Fahlenbrach et al., 2021; Ramelli and Wagner, 2020).

Table 5

Regression analysis of ESG with FP during COVID-19: Baseline.

Panel A: Full Sample

	ROA				ROE				TR				PB			
	Eq (1).a		Eq (2).a		Eq (1).b		Eq (2).b		Eq (1).c		Eq (2).c		Eq (1).d		Eq (2).d	
	Coeff	P-value	Coeff	P-value	Coeff	P-value	Coeff	P-value	Coeff	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value
ESG	0.0405763	0.000***	0.0427344	0.000***	0.0449115	0.019**	0.055	0.007***	−0.229	0.041**	−0.1572901	0.092*	−0.0026919	0.696	0.0000829	0.99
SIZE	0.522121	0.006***	0.5236	0.008***	0.9169873	0.000***	0.923	0.000***	1.157	0.403	0.2422409	0.891	−0.2890424	0.000***	−0.2867469	0.000***
LEV	−12.78279	0.000***	−12.869	0.000***	−7.67725	0.171	−8.069	0.155	−27.627	0.000***	−26.46785	0.000***	6.958	0.006***	6.832789	0.006***
SLACK	−19.96809	0.000***	−19.935	0.000***	−18.13525	0.000***	−17.983	0.000***	54.242	0.000***	52.04891	0.000***	8.718	0.000***	8.7533	0.000***
LOSS	−18.57852	0.000***	−18.565	0.000***	−45.70431	0.000***	−45.643	0.000***	−15.064	0.000***	−14.60564	0.001***	−1.250	0.000***	−1.23298	0.000***
GI	0.2208801	0.001***			0.3984188	0.018**			−1.2466	0.1300			0.0654	0.053*		
CHI			0.1898	0.000***			0.3330	0.01**			−0.5518311	0.4660			0.0522828	0.032**
EI			0.0071	0.783			−0.0433	0.4950			−0.4093298	0.014**			−0.0187559	0.026**
Constant	−16.05369	0.002***	−14.9381	0.002***	−32.07211	0.000***	−26.9975	0.001***	76.6190	0.005***	78.35812	0.000***	1.671948	0.406	3.149299	0.17
N	4380		4380		4380		4380		2514		2514		4242		4242	
Sector Dummies	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
R2	0.5304		0.5306		0.2065		0.2068		0.1398		0.1407		0.2015		0.2038	

Panel B: Excluding US Companies

	ROA				ROE				TR				PB			
	Eq (1).a		Eq (2).a		Eq (1).b		Eq (2).b		Eq (1).c		Eq (2).c		Eq (1).d		Eq (2).d	
	Coeffi	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value
ESG	0.042334	0.003***	0.04333	0.003***	0.0578971	0.082*	0.062	0.057*	−0.343	0.03**	−0.1818278	0.283	−0.0089693	0.058*	−0.0060374	0.181
SIZE	0.372120	0.003***	0.36033	0.006***	1.376729	0.002***	1.329	0.005***	−0.567	0.790	−2.97858	0.21	−0.2608921	0.000***	−0.2981983	0.000***
LEV	−11.48200	0.000***	−11.48918	0.000***	−18.48899	0.046**	−18.518	0.046**	−21.508	0.069*	−16.17202	0.22	3.237	0.009***	3.22972	0.008***
SLACK	−6.704526	0.168	−6.72695	0.165	−10.78978	0.222	−10.881	0.214	91.549	0.000***	83.59935	0.001***	9.669	0.000***	9.582124	0.000***
LOSS	−16.44822	0.000***	−16.43980	0.000***	−41.94804	0.000***	−41.914	0.000***	−21.462	0.012**	−21.45748	0.012**	−1.359	0.000***	−1.331482	0.000***
GI	0.212907	0.000***			0.6199874	0.000***			−0.6212	0.7130			0.0806	0.011**		
CHI			0.18041	0.000***			0.518	0.002***			−0.4466645	0.065*			0.0516596	0.095*
EI			0.01776	0.398			0.041	0.620			0.5562862	0.739			−0.0174751	0.097*
Constant	−11.133880	0.028**	−10.12702	0.077*	−44.9136	0.002***	−40.8065	0.028**	75.4056	0.4050	83.12343	0.375	1.865105	0.436	5.031335	0.124
N	2343		2343		2343		2343		984		984		2297		2297	
Sector Dummies	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
R2	0.4520		0.4521		0.2212		0.2213		0.1748		0.1791		0.1846		0.1885	

This table reports the results of regressions of firms' ESG using different measures of FP: ROA (Equations (1a) and (2a)), ROE (Equations (1b) and (2b)), TR (Equations (1c) and (2c)) and PB (Equations (1d) and (2d)). Equation (1) controls only for GI, while Equation (2) controls for EI and CHI. Control variables are winsorized at the 1% level in each tail. Standard errors are heteroscedasticity robust, clustered by country. Table A1 in the appendix defines all variables used in the paper. Panel A includes all companies, while Panel B includes non-US companies.
$*p < .1$; $**p < .05$; $***p < .01$.

The inconclusive results regarding ESG impact on performance measures, namely ROA and ROE on one side and TR and PB on another, maybe due to the dominant presence of US companies that represent 46.51% of our sample. To avoid US bias in our results, Panel B regression excludes US firms. ESG remains positive and significant with ROA and ROE, while it loses its negative sign on TR only in Equation (2).c. Thus, for non-US companies, ESG improves ROA and ROE during the pandemic, with a slight negative impact on TR and PB depending on the country's reaction to the pandemic in terms of economic support and containment and heath index. Our results are consistent with the meta-analysis conducted by Orlitzky et al. (2003) in which they find that ESG is more correlated to accounting-based measures than to market-based measures. Moving to control variables, the results suggest that debt is negatively associated with crisis period performance except with PB (Ali et al., 2020; Foo et al., 2015; Margaritis and Psillaki, 2010; Pouraghajan, 2012), while the firm size is positively related to accounting measures (Najaf et al., 2021; Ramaswamy, 2001). As for cash holdings, they are negatively associated with accounting performance, but positively correlated with market performance, similarly to Albuquerque et al. (2020), Ramelli and Wagner (2020), and Fahlenbrach et al. (2021) who emphasize the power of the twin factors (higher cash holdings and lower financial leverage) to shield firms in time of constraints.

4.2. ESG and FP- the role of country classification

Given the ample evidence that ESG-FP impact differs between countries, we perform a robustness check and split the sample into two main groups. Table 6 reports the results for developing (Panel A) and developed countries (Panel B). Interestingly, ESG seems to play a significant role only in improving ROA in developing countries. As for developed countries, ESG has a negative impact on ROE and TR significant at 10% and 5% respectively, while it has a positive impact on PB, significant at 5%. Again, the divergence in ESG impact on FP in developing versus developed countries confirms the findings of Singhania and Saini (2021) who state that ESG practices heavily depend on the country's voluntary or mandatory codes, sustainability reporting, and integrated reporting, and environmental commitment. Supposedly, these aspects are more developed and mature in developing countries as demonstrated in the findings of Garcia et al. (2017) about BRICS companies and Iamandi et al. (2019) about European companies. Conclusively, ESG stems as a strategic and long-term medium that leads to enhance companies' competitive advantage and foster their societal ties with surrounding environments. Hence, our second hypothesis is supported.

4.3. ESG and FP- the role of ESG level

To further investigate the response to ESG levels (Hypothesis 4), we split firms into quartiles following ESG scores by industry and assign a metric for each group as follows: "ESG score 1" for 25% lowest, "ESG score 2" for the second quartile and so on. Table 7 reports the regression results for the quartile indicators of ESG scores. We omit the first group "ESG score 1"[13] for statistical reasons. For convenience, only equation (2) where we control for EI and CHI will be reported as similar results were obtained for Equation (1).

The results for ROA reveal that the coefficients on all ESG scores are positively significant, with ESG score 4 showing a significantly larger coefficient. As for ROE, only ESG score 3 and ESG score 4 are positive and significant. Results indicate that the impact of ESG on FP is asymmetrical and depends on ESG scores. Similar to the baseline model, we identify a significant negative relationship between ESG and TR. Yet,

this negative association prevails only for ESG score 2 and ESG score 3, while it turns out to be insignificant for firms whose scores fall in the top 4th quartile. This supports the findings of Barnett and Salomon (2012); El Khoury et al. (2021); Mittal et al. (2008); Nollet et al. (2016) who suggested the existence of a U-shaped relationship between ESG and FP for companies operating in different regions. This is attributable to the fact that ESG activity in its early stage negatively affects FP, as costs outweigh benefits, whereas at a later stage the relationship reverts and becomes positive. Also, Albuquerque et al. (2020), Broadstock et al. (2021), Deng et al. (2021), Hartzmark and Sussman (2019), and other studies addressed the ESG effect from an investment perspective. Some identified a higher stock market performance for firms with higher ESG scores during the pandemic while others relate the importance of high ESG performance to regulate the level of financial risk, especially during crisis time.

4.4. ESG and FP- the role of slack

Third, we complement this analysis by investigating the role of slack in affecting the ESG-FP link. Table 8 presents regressions of FP on the interaction between ESG and HighSlack Score (i.e., a dummy variable of one for cash ratio that falls in the top quartile of the distribution). A positive and significant coefficient is depicted at the 5% level for the said interaction, indicating that firms with high cash positions combined with ESG have better ROA during the COVID crisis, supporting that the positive link is stronger for firms with greater cash holdings (Hypothesis 4). This supports the findings of several studies (Albuquerque et al., 2020; Fahlenbrach et al., 2021; Ramelli and Wagner, 2020) that suggest that cash or liquidity level is an important buffer during market downturns and contributes to stock returns.

However, the impact of ESG on market return remains negative when FP is measured by TR and insignificant when it is measured by PB, regardless of the cash position of the company (Equation 4.c and 4.d respectively).

The results of Table 8 support our baseline results and further stress the importance of ESG that stems as a driving factor for firms' performance (ROA) during the COVID-19 crisis (supporting Hypothesis 3 as well).

4.5. ESG pillars and FP

At this stage, we presume that ESG is beneficial specifically during the COVID-19 outbreak and that there is a reward for responsible practices. The effect was manifested via a higher ROA in our former tests. However, the reward appears to be tied up to specific aspects of ESG. To examine this link, we replicate Table 5 and derive Table 9 by replacing the overall ESG score with respective pillars scores. However, given the high correlation between SOC and ENV and to avoid multicollinearity, we run the regression by accounting for ENV and GOV on one side (Panel A), and for SOC and GOV on the other side (Panel B). Results show that the coefficients on environmental scores are statistically not significant in all regressions. As for SOC, it has a positive and significant impact only on ROA. Similarly, we find that the governance score coefficient is positive and significant for ROA, negative and significant for TR, while it shows no significant impact on ROE and PB. Given that the results in Panel A are similar to those in Panel B, we display here the results of Equation (6) where ESG is represented once by two pillars ENV and GOV then by SOC and GOV, while again controlling for government response proxied by EI and CHI due to correlation concerns.

4.6. ESG pillars and FP- the role of the pillar level

Similar to the setup in Table 9, we examine the role of the pillars levels in Tables 10–12. In Table 10, we attempt to uncover convergence and divergence of results stemming from the test of the three models

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[13] Since we create ESG as dummies based on relative performance scores, we drop one dummy to avoid the problem of multicollinearity or the "**Dummy Variable Trap**".

Table 6

Regression analysis of ESG with FP during COVID-19: By country classification.

Panel A: Developing Countries

Variables	ROA				ROE				TR				PB			
	Eq (1).a		Eq (2).a		Eq (1).b		Eq (2).b		Eq (1).c		Eq (2).c		Eq (1).d		Eq (2).d	
	Coeff	P-value	Coeff	P-value	Coeff	P-value	Coeff	P-value	Coeff	P-value	Coeff	P-value	Coeff	P-value	Coeff	P-value
ESG	0.045857	0.04***	0.04574	0.031**	0.0301473	0.624	0.030	0.600	−0.005	0.964	−0.03522	0.818	−0.00398	0.772	−0.004102	0.746
SIZE	0.346919	0.05**	0.35393	0.046**	0.3300806	0.628	0.351	0.581	−5.675	0.001***	−5.15687	0.001***	−0.28217	0.325	−0.278611	0.334
LEV	−14.561800	0.000***	−14.60721	0.000***	7.919333	0.370	7.787	0.378	5.753	0.338	3.593252	0.451	1.110	0.250	1.100622	0.236
SLACK	4.825775	0.028**	4.70427	0.022**	15.03465	0.013**	14.681	0.01**	70.570	0.000***	74.25985	0.000***	9.575	0.001***	9.458602	0.000***
LOSS	−14.15123	0.000***	−14.09911	0.000***	−34.22981	0.000***	−34.078	0.000***	−34.999	0.000***	−34.5077	0.000***	−0.938	0.047**	−0.883656	0.057*
GI	0.246860	0.109			0.0849327	0.818			1.8479	0.04**			0.0815	0.4900		
CHI			−0.01828	0.755			−0.133	0.421			1.031689	0.086*			−0.037122	0.515
EI			0.32217	0.181			0.384	0.543			−0.338171	0.8410			0.1741196	0.375
Constant	−12.606330	0.072*	−16.705180	0.130	−8.553855	0.5350	−20.5086	0.4230	37.0672	0.5610	101.6253	0.256	3.161244	0.719	−0.751169	0.948
N	946		946		946		946		648		648		926		926	
Sector Dummies	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
R2	0.4915		0.4921		0.2000		0.2006		0.1594		0.1617		0.1923		0.1941	

Panel B: Developed Countries.

Variables	ROA				ROE				TR				PB			
	Eq (1).a		Eq (2).a		Eq (1).b		Eq (2).b		Eq (1).c		Eq (2).c		Eq (1).d		Eq (2).d	
	Coeff	P-value	Coeff	P-value	Coeff	P-value	Coeff	P-value	Coeff	P-value	Coeff	P-value	Coeff	P-value	Coeff	P-value
ESG	−0.00209	0.921	−0.01171	0.599	−0.022259	0.265	−0.044	0.075*	−0.179	0.024**	−0.173496	0.020**	0.016715	0.02**	0.0168516	0.037**
SIZE	1.119911	0.057*	1.50915	0.045*	1.932183	0.001***	2.809	0.000***	1.676	0.042**	1.736076	0.026**	−0.571419	0.004***	−0.576772	0.024**
LEV	−12.45072	0.000***	−13.3161	0.000***	−11.12819	0.188	−13.078	0.150	−30.877	0.000***	−30.9953	0.000***	8.905	0.001***	8.920991	0.000***
SLACK	−20.53658	0.000***	−19.5589	0.000***	−18.88469	0.000***	−16.682	0.001***	49.094	0.001***	49.31737	0.001***	8.492	0.000***	8.480121	0.000***
LOSS	−18.53976	0.000***	−18.5021	0.000***	−47.52264	0.000***	−47.438	0.000***	−10.687	0.000***	−10.4440	0.000***	−1.178	0.000***	−1.178273	0.000***
GI	0.536756	0.056*			0.9973334	0.005***			−3.3097	0.003***			−0.1009	0.1110		
CHI			−0.02011	0.62400			−0.072	0.350			−0.058734	0.900			−0.011496	0.293
EI			0.62622	0.036**			1.225	0.000***			−6.771159	0.2840			−0.090428	0.262
Constant	−43.6154	0.072*	−54.3836	0.047**	−78.47502	0.005***	−102.741	0.000***	177.2565	0.006***	351.8316	0.241	14.38703	0.052*	14.53575	0.111
N	3434		3434		3434		3434		1866		1866		3298		3298	
Sector Dummies	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
R2	0.5409		0.5439		0.2036		0.2052		0.1492		0.1495		0.2342		0.2342	

This table reports the results of regressions of firms' ESG using different measures of FP: ROA, ROE, TR and PB by income classification. Control variables are winsorized at the 1% level in each tail. Standard errors are heteroscedasticity robust, clustered by country. Table A1 in the appendix defines all variables used in the paper. Panel A includes companies operating in developing countries, while Panel B includes companies in developed countries.

*p < .1; **p < .05; ***p < .01.

Table 7
ESG score quartiles and FP during COVID-19.

Variables	ROA		ROE		TR		PB	
	Equation 3a		Equation 3b		Equation 3c		Equation 3d	
	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value
ESGscore2	1.265287	0.008***	1.007741	0.574	−6.537536	0.008***	0.0947376	0.425
ESGscore3	1.536667	0.001***	3.451852	0.003***	−3.993126	0.003***	−0.1408183	0.575
ESGscore4	2.390963	0.000***	2.913099	0.012**	−5.795194	0.162	0.0754863	0.826
SIZE	0.5359655	0.008***	0.9319548	0.000***	−0.2459595	0.885	−0.28859	0.000***
LEV	−12.87451	0.000***	−8.103396	0.156	−25.99542	0.000***	6.831722	0.006***
SLACK	−19.90306	0.000***	−17.91121	0.000***	51.05239	0.000***	8.756525	0.000***
LOSS	−18.55292	0.000***	−45.60964	0.000***	−14.55803	0.002***	−1.233345	0.000***
CHI	0.0078614	0.7650	−0.0431621	0.4960	−0.4838402	0.005***	−0.018963	0.025**
EI	0.1894954	0.001***	0.3288954	0.012**	−0.3607248	0.6310	0.0523014	0.034**
Constant	−14.84519	0.004***	−26.66987	0.001***	104.4876	0.000***	3.197681	0.15
N	4380		4380		2514		4242	
Sector Dummies	Yes		Yes		Yes		Yes	
R2 Squared	0.5308		0.2071		0.1409		0.204	

This table reports the results of regressions of firms' ESG using different measures of FP: ROA, ROE, TR and PB. The main independent variables are the ESG score 2 (i. e., a dummy variable that takes the value of one if a firm has an ESG score in the second quartile of the distribution), ESG score 3 (i.e., a dummy variable that takes the value of one if a firm has an ESG score in the third quartile of the distribution), and ESG score 4 (i.e., a dummy variable that takes the value of one if a firm has an ESG score in the top quartile of the distribution). Control variables are winsorized at the 1% level in each tail. Standard errors are heteroscedasticity robust, clustered by country. Table A1 in the appendix defines all variables used in the paper.
*p < .1; **p < .05; ***p < .01.

Table 8
ESG and FP: The role of slack.

Variables	ROA		ROE		TR		PB	
	Equation (4).a		Equation (4).b		Equation (4).c		Equation (4).d	
	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value
ESG	0.0267559	0.065*	0.0474923	0.104	−0.1472229	0.061*	0.0000582	0.993
HighSlack	−6.753992	0.006***	−3.793366	0.329	17.31766	0.021**	2.372851	0.000***
ESG*HighSlack	0.0909834	0.033**	0.0620637	0.523	−0.0014743	0.992	0.0002036	0.979
SIZE	0.629211	0.011**	1.034967	0.001***	−0.0279706	0.987	−0.3178129	0.000***
LEV	−11.36999	0.000***	−6.242448	0.266	−28.87984	0.000***	6.187651	0.016**
LOSS	−19.24945	0.000***	−46.32824	0.000***	−12.80453	0.002***	−0.939738	0.000***
CHI	0.2285416	0.001***	0.3732612	0.015**	−0.6074483	0.3740	0.0375219	0.142
EI	0.0109597	0.7240	−0.0407758	0.5540	−0.4404636	0.009***	−0.0206624	0.016**
Constant	−16.85904	0.003***	−25.41297	0.009***	88.0036	0.000***	4.454962	0.138
N	4380		4380		2514		4242	
Sector Dummies	Yes		Yes		Yes		Yes	
R2	0.5111		0.2047		0.1392		0.1881	

This table reports the results of regressions of firms' ESG using different measures of FP: ROA, ROE, TR, and PB. The main independent variable is the interaction between ESG score and HighSlack (i.e., a dummy variable that takes the value of one if a firm has a slack score in the top quartile of the distribution). Control variables are winsorized at the 1% level in each tail. Standard errors are heteroscedasticity robust, clustered by country. Table A1 in the appendix defines all variables used in the paper.
*p < .1; **p < .05; ***p < .01.

(ENV–FP; SOC–FP; GOV-FP) during the COVID-19 crisis by splitting our sample into developing (Panel A) and developed countries (Panel B). Then, in Table 11, we split firms into quartiles based on their respective pillar scores and assign a metric for each group. Env score 1 is a dummy variable equal to 1 for the environmental score that falls in the 25% lowest and so on. Thus, Table 11 reports the results of the quartile regressions. Results support the presence of an asymmetrical relationship. ENV score 2, ENV score 3, and ENV score 4 are now significant with a positive impact on ROA (Beckmann et al., 2014; Min and Galle, 2001; Zsidisin and Siferd, 2001), supporting the superiority of environmental pillar.

Finally, Table 12 shows the contribution of the HighSlack Score (i.e., a dummy variable of one for a cash ratio that falls in the top quartile of the distribution) to the different measures of FP: ROA, ROE, TR, and PB while breaking the ESG down into its three pillars. In both regressions that account for ENV and GOV then SOC and GOV separately, we show that the higher the cash level, the higher the market performance (TR and PB) with a larger coefficient for TR (Acharya and Steffen, 2020; Ramelli and Wagner, 2020). The opposite prevails for the link between

HighSlack and ROA with no significance on ROE. There is no evidence of a significant impact of the environment pillar (ENV) and social pillar (SOC) on any of the performance measures shown in Table 12. Nonetheless, the government pillar (GOV) seems to have a positive impact on ROA at 5% significance level but a negative effect on market performance measures (TR and PB) at 1% significance level. The significant positive interaction term between ENV and HighSlack score reveals that firms that combine a higher cash position with efforts to improve ENV score can reduce the negative impact of HighSlack on ROA and has a positive contribution to ROE (Acharya and Steffen, 2020). Furthermore, there is no impact of the interaction between ENV and HighSlack on market performance measures (TR and PB). We show the same for the interaction between HighSlack and SOC which seems not to affect all performance measures. In this sense, the trade-off theory might explain these conflicting results, as firms maintain the optimal level of cash at the breakeven point where the marginal cost and benefit of holding cash are equal (Al-Najjar and Belghitar, 2011; Martínez -Sola et al., 2013).

The last interaction term between HighSlack and GOV has a positive coefficient significant at a 5% confidence level, which can be interpreted

Table 9

Regression analysis of ESG Pillar with FP during COVID-19: Baseline.

Panel A

Variables	ROA				ROE				TR				PB			
	Equation 5a				Equation 5b				Equation 5c				Equation 5d			
	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value
ENV	0.0148188	0.298			−0.001832	0.91			−0.047999	0.573			−0.000604	0.943		
SOC			0.0187098	0.066*			0.0103773	0.570			−0.0378322	0.706			0.0063099	0.543
GOV	0.0194707	0.003***	0.017885	0.005***	0.0414852	0.076*	0.03712	0.109	−0.226	0.000***	−0.2284528	0.000***	−0.007442	0.189	−0.0099031	0.085*
SIZE	0.5292332	0.024**	0.5623	0.004***	0.9819699	0.001***	0.9551793	0.000***	1.038588	0.487	0.9196825	0.493	−0.280588	0.000****	−0.2941458	0.000***
LEV	−12.64535	0.000***	−12.754	0.000***	−7.532306	0.1810	−7.628429	0.172	−27.82204	0.000***	−27.72994	0.000***	6.983842	0.006***	6.905864	0.006***
SLACK	−20.01267	0.000***	−19.966	0.000***	−18.0798	0.000***	−18.04345	0.000***	52.89806	0.000***	52.89907	0.000***	8.664	0.000***	8.683381	0.000***
LOSS	−18.55238	0.000***	−18.599	0.000***	−45.64619	0.000***	−45.66616	0.000***	−15.74035	0.001***	−15.62137	0.001***	−1.268	0.000***	−1.281863	0.000***
GI	4.660321	0.264	0.2224	0.001***	0.3950968	0.021**	0.3931306	0.017**	−1.100666	0.186	−1.169953	0.1920	0.069	0.039**	0.0681557	0.06*
Constant	−15.97787	0.017**	−17.0378	0.002***	−33.69501	0.001***	−33.19713	0.000***	75.9925	0.003***	82.08997	0.009***	1.592867	0.414	1.83626	0.363
	4380		4380		4380		4380		2514		2514		4242		4242	
Sector Dummies	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
R2	0.53		0.5301		0.2065		0.2066		0.1422		0.1421		0.2022		0.2026	

Variables	ROA				ROE				TR				PB			
	Equation 6a				Equation 6b				Equation 6c				Equation 6d			
	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value
ENV	0.0167349	0.205			0.0070126	0.642			0.003	0.972			0.0020947	0.805		
SOC			0.0197868	0.046**			0.0161583	0.373			0.0341324	0.69			0.0080648	0.415
GOV	0.0194682	0.002***	0.018072	0.004***	0.0414752	0.085*	0.0381253	0.107	−0.211	0.000***	−0.2176875	0.000***	−0.0074358	0.198	−0.0095612	0.106
SIZE	0.52651	0.029*	0.5654	0.006***	0.9693194	0.001***	0.9721048	0.000***	0.0001812	1.000	−0.1865966	0.911	−0.2840768	0.00***	−0.2884147	0.000***
LEV	−12.719	0.000***	−12.822	0.000***	−7.872019	0.1670	−7.989263	0.157	−26.38624	0.000***	−26.32879	0.000***	6.865503	0.007***	6.781155	0.007***
SLACK	−19.98777	0.000***	−19.942	0.000***	−17.96504	0.000***	−17.91779	0.000***	50.39915	0.000***	50.00825	0.000***	8.690525	0.000***	8.714202	0.000***
LOSS	−18.53971	0.000***	−18.591	0.000***	−45.58774	0.000***	−45.62422	0.000***	−15.17908	0.001**	−15.27279	0.001***	−1.250	0.000***	−1.268993	0.000***
CHI	0.1870216	0.001***	0.1921	0.0000***	0.3296962	0.016**	0.3308261	0.010**	−0.418939	0.592	−0.3083337	0.692	0.055	0.024**	0.05495	0.036**
EI	0.0084044	0.7300	0.0116	0.6590	−0.037413	0.5800	−0.0379644	0.5480	−0.429142	0.017**	−0.4524811	0.011**	−0.018	0.046**	−0.0191436	0.033**
Constant	−14.83396	0.018**	−16.1941	0.001***	−28.41339	0.003***	−28.66727	0.001***	82.2985	0.000***	81.12457	0.001***	3.239706	0.151	3.286186	0.135
	4380		4380		4380		4380		2514		2514		4242		4242	
Sector Dummies	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
R2	0.5301		0.5302		0.2068		0.2069		0.1434		0.1434		0.2044		0.2051	

This table reports the results of regressions on firms' ENV, SOC, and GOV using different measures of FP: ROA (Equations (5a) and (6a)), ROE (Equations (5b) and (6b)), TR (Equations (5c) and (6c)) and PB (Equations (5d) and (6d)). Equation (5) controls only for GI, while Equation (6) controls for EI and CHI. Control variables are winsorized at the 1% level in each tail. Standard errors are heteroscedasticity robust, clustered by country. Table A1 in the appendix defines all variables used in the paper. Panel A includes Equation (5), while Panel B includes Equation (6).

*p < .1; **p < .05; ***p < .01.

Table 10

Regression analysis of ESG Pillar with FP during COVID-19: By country classification.

Panel A: Developing Countries

C	ROA				ROE				TR				PB			
	Coeff	P-value	Coeff	P-value	Coeff	P-value	Coeff	P-value	Coeff	P-value	Coeff	P-value	Coeff	P-value	Coeff	P-value
ENV	0.02835	0.015**			0.00341	0.92			0.14359	0.123			−0.00862	0.265		
SOC			0.03378	0.044			0.02831	0.572			0.12912	0.361			0.00337	0.793
GOV	0.01136	0.156	0.00975	0.216	0.02406	0.475	0.01709	0.681	−0.20954	0.002***	−0.20657	0.001***	−0.00140	0.895	−0.00467	0.597
SIZE	0.35209	0.058*	0.36091	0.040*	0.38263	0.529	0.31829	0.616	−5.94428	0.001***	−5.43132	0.001***	−0.25537	0.366	−0.29220	0.328
LEV	−14.54225	0.000***	−14.65898	0.000***	7.99619	0.3670	7.64993	0.400	3.26261	0.563	2.07303	0.654	1.20772	0.211	0.98742	0.261
SLACK	4.49225	0.044**	4.85958	0.014**	14.78959	0.012**	14.84811	0.008***	69.72280	0.000***	69.42897	0.000***	9.54233	0.000***	9.43674	0.000***
LOSS	−14.00409	0.000***	−14.17746	0.000***	−34.00924	0.000***	−34.15583	0.000***	−34.86991	0.000***	−35.41223	0.000***	−0.88255	0.058*	−0.91908	0.06**
CHI	0.29903	0.223	0.33527	0.1580	0.37727	0.550	0.39996	0.5260	−0.12493	0.938	0.14330	0.9360	0.17778	0.354	0.17768	0.37
EI	−0.01565	0.7960	−0.02005	0.7270	−0.13779	0.4030	−0.13468	0.4140	1.05718	0.084*	1.02359	0.1010	−0.03915	0.4720	−0.03558	0.552
Constant	−15.20577	0.1820	−17.35137	0.1080	−20.93548	0.4140	−21.27220	0.4080	102.05650	0.226	77.74954	0.385	−1.26889	0.9130	−0.61867	0.958
N	946		946		946		946		648		648		926		926	
Sector Dummies	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
R2	0.4915		0.4924		0.2006		0.201		0.1665		0.1658		0.1953		0.1943	

Panel B: Developed Countries

Variables	ROA				ROE				TR				PB			
	Coeff	P-value	Coeff	P-value	Coeff	P-value	Coeff	P-value	Coeff	P-value	Coeff	P-value	Coeff	P-value	Coeff	P-value
ENV	−0.02700	0.174			−0.06611	0.018**			−0.01873	0.636			0.01408	0.1030		
SOC			−0.02987	0.227			−0.08843	0.025**			0.04384	0.513			0.02792	0.006***
GOV	0.01153	0.195	0.01232	0.216	0.02897	0.327	0.03463	0.284	−0.22091	0.000***	−0.23381	0.000***	−0.00775	0.3570	−0.01112	0.142
SIZE	1.63478	0.037**	1.60028	0.041**	3.00521	0.000***	3.02144	0.000***	1.66514	0.030***	1.25498	0.016**	−0.55822	0.0180**	−0.62535	0.009***
LEV	−13.41071	0.000***	−13.35197	0.000***	−13.30751	0.1490	−13.18003	0.149	−30.81991	0.000***	−30.67052	0.000***	8.96217	0.000***	8.98877	0.000***
SLACK	−19.38353	0.000***	−19.34486	0.000***	−16.31978	0.001***	−16.09247	0.001***	48.17806	0.001***	47.46580	0.002***	8.42735	0.000***	8.30894	0.000***
LOSS	−18.48052	0.000***	−18.44065	0.000***	−47.35602	0.000***	−47.24534	0.000***	−11.00675	0.000***	−11.03029	0.000***	−1.21036	0.000***	−1.24550	0.000***
CHI	0.65681	0.028**	0.66830	0.035**	1.25610	0.000***	1.32770	0.000***	−7.86668	0.242	−8.37376	0.2330	−0.07282	0.324	−0.11517	0.129
EI	−0.01299	0.7230	−0.02045	0.6240	−0.05714	0.4640	−0.07426	0.3250	0.03602	0.9420	0.04388	0.9320	−0.01321	0.3010	−0.00997	0.417
Constant	−59.14539	0.038**	−58.34619	0.044**	−110.31120	0.000***	−112.32830	0.000***	407.63170	0.2000	439.58170	0.1870	13.95469	0.0910	16.86449	0.046**
	3434		3434		3434		3434		1866		1866		3298		3298	
Sector Dummies	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
R2 Squared	0.5446		0.5445		0.2055		0.2057		0.1525		0.1526		0.2346		0.2383	

Table 11
ESG Pillar score quartiles and FP during COVID-19.

C	ROA				ROE				TR				PB			
	Coef	P-value	Coef	P-value	Coef	P-value	Coef	P-value	Coef	P-value	Coef	P-value	Coef	P-value	Coef	P-value
ENVscore2	2.53546	0.000***			−2.25864	0.066*			−4.46522	0.224			0.32042	0.012**		
ENVscore3	3.03000	0.000***			−0.11374	0.914			−2.54048	0.261			0.58635	0.016**		
ENVscore4	3.24176	0.003***			0.51167	0.641			3.75849	0.338			0.78382	0.229		
SOCscore2			1.69995	0.000***			5.07379	0.005***			−0.50232	0.767			−0.16286	0.541
SOCscore3			1.31398	0.005***			3.68253	0.049**			5.50881	0.020**			0.22469	0.535
SOCscore4			1.14210	0.078*			1.11828	0.414			−0.91136	0.831			0.41140	0.476
GOVscore2	−0.18768	0.818	0.00656	0.994	−0.13116	0.970	0.21691	0.950	−6.40147	0.122	−6.65312	0.105	−0.20431	0.254	−0.17820	0.386
GOVscore3	−0.24957	0.496	0.07428	0.853	2.33932	0.179	2.02462	0.285	−9.86159	0.017**	−10.30003	0.012**	−0.00691	0.980	0.03027	0.914
GOVscore4	0.69802	0.047**	1.17012	0.004***	2.42069	0.141	2.39228	0.208	−12.89464	0.000***	−12.85636	0.000***	−0.69573	0.045**	−0.64960	0.060*
SIZE	0.40820	0.056*	0.60334	0.006***	0.94083	0.001***	1.08517	0.000***	−0.44638	0.816	−0.05993	0.974	−0.32368	0.000***	−0.29254	0.000***
LEV	−12.73412	0.000***	−12.77228	0.000***	−7.99775	0.161	−8.08335	0.161	−26.31210	0.000***	−26.25754	0.000***	6.81172	0.007***	6.82822	0.007***
SLACK	−19.36837	0.000***	−20.01594	0.000***	−18.12062	0.000***	−17.85354	0.000***	49.19393	0.000***	50.17698	0.000***	8.82849	0.000***	8.72924	0.000***
LOSS	−18.52912	0.000***	−18.65781	0.000***	−45.56865	0.000***	−45.81606	0.000***	−15.15197	0.001***	−15.33732	0.001***	−1.23207	0.000***	−1.25311	0.000***
CHI	0.15460	0.002***	0.19979	0.000***	0.33494	0.010**	0.35182	0.009***	−0.28184	0.730	−0.32498	0.687	0.04694	0.063*	0.05381	0.036**
EI	−0.00604	0.775	0.01375	0.597	−0.04147	0.550	−0.03134	0.616	−0.49820	0.006***	−0.44682	0.009***	−0.02242	0.035**	−0.01913	0.034**
Constant	−10.68630	0.039**	−17.15399	0.002***	−26.25895	0.007***	−33.35165	0.001***	111.01720	0.001***	100.42930	0.000***	4.21310	0.065*	3.31521	0.140
N	4380		4380		4380		4380		2514		2514		4242		4242	
Sector Dummies	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
R2	0.5343		0.5310		0.2073		0.2084		0.1449		0.1449		0.2070		0.2064	

This table reports the results of regressions of firms' ESG pillars using different measures of FP: ROA, ROE, TR and PB. The main independent variables are the ENV score 2 (i.e., a dummy variable that takes the value of one if a firm has a ESG score in the second quartile of the distribution), ESG score 3 (i.e., a dummy variable that takes the value of one if a firm has a ESG score in the third quartile of the distribution), and ESG score 4 (i.e., a dummy variable that takes the value of one if a firm has a ESG score in the top quartile of the distribution). Control variables are winsorized at the 1% level in each tail. Standard errors are heteroscedasticity robust, clustered by country. Table A1 in the appendix defines all variables used in the paper.
*p < .1; **p < .05; ***p < .01.

Table 12
ESG Pillar and FP: The role of slack.

C	ROA Coeff	ROA P-value	ROA Coeff	ROA P-value	ROE Coeff	ROE P-value	ROE Coeff	ROE P-value	TR Coeff	TR P-value	TR Coeff	TR P-value	PB Coeff	PB P-value	PB Coeff	PB P-value
ENV	0.00102	0.942			−0.00698	0.636			−0.00915	0.895			0.00447	0.573		
HighSlack	−6.28337	0.001***			−1.09076	0.803			22.80415	0.001***			2.10990	0.000***		
ENV* HighSlack	0.07046	0.000***			0.06273	0.074*			0.07796	0.389			−0.00597	0.514		
SOC			0.01573	0.235			−0.00147	0.945			0.01000	0.893			0.01061	0.275
HighSlack			−6.54441	0.016**			−2.76235	0.615			19.70288	0.012**			2.19107	0.000***
SOC*HighSlack			0.02280	0.412			0.08179	0.116			0.11981	0.160			−0.00516	0.52
GOV	0.01867	0.013**	0.01028	0.172	0.05831	0.187	0.05430	0.213	−0.16604	0.001***	−0.17223	0.000***	−0.01111	0.027**	−0.01327	0.012**
GOV*HighSlack	0.02561	0.269	0.05203	0.015**	−0.04388	0.625	−0.04192	0.632	−0.17253	0.064*	−0.16959	0.064*	0.00899	0.237	0.00868	0.164
SIZE	0.62956	0.031**	0.67204	0.008***	1.08760	0.002***	1.10207	0.001***	−0.26071	0.892	−0.40561	0.802	−0.33780	0.000***	−0.32080	0.000***
LEV	−11.31457	0.000***	−11.24823	0.000***	−6.10905	0.000***	−6.15465	0.275	−28.69985	0.000***	−28.85084	0.000***	6.24408	0.016**	6.13958	0.017**
LOSS	−19.16680	0.000***	−19.29389	0.000***	−46.22797	0.000***	−46.33239	0.000***	−13.36987	0.001***	−13.54005	0.001***	−0.96742	0.000***	−0.98243	0.000***
CHI	0.22252	0.004***	0.23239	0.001***	0.36688	0.023**	0.37065	0.015**	−0.47155	0.516	−0.35190	0.620	0.04087	0.105	0.04082	0.143
EI	0.01267	0.669	0.01549	0.015**	−0.03418	0.639	−0.03402	0.619	−0.45836	0.012**	−0.47919	0.007***	−0.02043	0.029**	−0.02116	0.022**
Constant	−16.64290	0.019**	−18.26732	0.002***	−27.32842	0.015**	−27.67243	0.006***	89.89955	0.000***	88.02438	0.000***	4.43196	0.1100	4.42163	0.119
N	4380		4380		4380		4380		2514		2514		4242		4242	
Sector Dummies	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
R2	0.5343		0.5101		0.2048		0.2048		0.1424		0.1425		0.1892		0.1899	

This table reports the results of regressions of firms' ESG pillars using different measures of FP: ROA, ROE, TR and PB. The main independent variables is the interaction between ENV score, SOC Score and GOV score with HighSlack (i.e., a dummy variable that takes the value of one if a firm has a slack score in the top quartile of the distribution). Control variables are winsorized at the 1% level in each tail. Standard errors are heteroscedasticity robust, clustered by country. Table A1 in the appendix defines all variables used in the paper.
*p < .1; **p < .05; ***p < .01.

as an interaction contributing to reduce the negative impact of High-Slack on the accounting performance ROA. When it comes to market performance measures, the interaction term between HighSlack and GOV turns out to be negatively significant on TR at 10%. This result can be perceived as contributing to increase the negative impact of GOV on TR and/or reducing the positive impact of HighSlack on TR in the regression that solely includes SOC and GOV out of the three ESG pillars.

All these opposing results open the door for another intriguing question: What is the optimal level of investment in each ESG pillar? This point was investigated and pinpointed as a U-curve relationship studied by Nollet et al. (2016), and advanced by the search for the inflection points studied by El Khoury et al. (2021). Added to this, the issue of corporate short-term policies and the quest for the optimal cash level are focal points to address in the presence of such exceptional circumstances as COVID-19. The statement "cash is more important than your mother"[14] proves the importance of liquidity in crisis times and its role to support companies. Yet, there exists also here inflection points as cash level can act as a buffer shock in extreme case scenario while it might turn to be an idle investment for excessive levels. This can maybe explain the divergent results depicted in ESG pillars. The triple dimensional interaction of people, structure, and processes fosters cash excellence and implicates to follow prudent cash and liquidity strategies. In doing so, companies can prevent financial distress and potential bankruptcy[15] where the shift from earnings before interest and taxes to cash became more centric. All of the preceding elements along with the country, industry, institutional, and regulatory frameworks, can explain the divergent results when testing the cash level in the context of ESG pillars and the effect of cash holdings to mitigate adverse exogenous market shocks (Zheng, 2021).

5. Conclusion

This paper explores the impact of sustainable investments on the performance of G20 companies in times of exceptional crisis stemming from a worldwide health emergency. We extract data related to ESG scores and companies' financial performance from Refinitiv Reuters for the year 2020. FP measures were proxied by ROA, ROE, TR, and P/B. We control for the firm- and country-level variables. The novelty of the study resides in the fact that it also controls for the efforts deployed by governments to preserve global health and support the business sector through providing funds, debt reliefs, and extensions. These are measured by four Oxford Coronavirus Government Response Tracker (OxCGRT) metrics: the overall Government Response Index (GI), the Stringency Index (SI), the Economic Support Index (EI), and the Containment Health Index (CHI). We account for the aforementioned metrics to isolate ESG benefits and avoid biased results due to the efforts deployed by governments.

The empirical results show that ESG is beneficial during COVID-19 but its effect seems to be closely tied up to its pillars, income level, and firm-specific variables. More specifically, the ESG effect on accounting performance measured by ROA and ROE remains positive in all regression sets. Yet, it shows a negative or insignificant relationship with market performance measures (TR and PB). Previous studies (Gilley and Rasheed, 2000; Surroca et al., 2010) explain that corporate responsibility and financial performance are indirectly associated due to the mediating effect of firms' intangible resources. When considering only non-US companies, ESG seems to improve ROA and ROE during the pandemic, with a slight negative impact on TR and PB depending on the country's reaction to the pandemic in terms of economic support and

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[14] https://www.hec.edu/en/knowledge/instants/cash-management-times-crisis.
[15] https://www.mckinsey.com/business-functions/strategy-and-corporate-finance/our-insights/moving-from-cash-preservation-to-cash-excellence-for-the-next-normal.

containment and heath index. The battery of robustness checks we perform (accounting for the Ingrained Income Bias, ESG score levels, ESG pillars, cash holdings levels, and the moderating effect of slack in affecting ESG-FP link) confirm our baseline findings. We also reveal an asymmetrical impact of ESG on FP, based on the ESG score level. More specifically, when we replicate our regressions for each ESG pillar (ENV–FP; SOC–FP; GOV-FP), ENV scores seem to be statistically insignificant in all regressions while SOC and GOV scores positively affect ROA and GOV negatively affects TR. When accounting for IIB, results support the presence of an asymmetrical relationship and ENV renders a superior effect on ROA. ESG practices seem to heavily depend on the country voluntary or mandatory codes, sustainability reporting and integrated reporting, and environmental commitment.

Our findings contribute to the burgeoning literature on ESG during COVID-19 when academic research continues to be challenged by the variability and lack of standardization with ESG data on one side and the lack of distinction between different investment strategies on the other side. We offer a deeper analysis of the link between ESG and financial performance, which provides insights to researchers and corporate decision-makers. Although the growing body of literature infers that good corporate management and disclosure of ESG typically results in improved financial performance, we show that this presumption is valid for accounting performance but not for market performance. This suggests that investors may be sensitive to specific factors such as the sustainable investing strategy employed by corporations. ESG metrics do matter, but measuring them without an accompanying strategy seems ineffective (Whelan et al., 2021). Hence, academic and investment studies and corporate managers need to better distinguish between different types of responsible investment strategies and their performance implications on investors in order to better assess the ESG-FP relationship. They also have to consider other mediating factors such as innovation and operational efficiency metrics that might drive better corporate performance when combined with responsible investment.

However, we recognize some structural limitations. First, though we have incorporated OxCGRT metrics to allow for efficient and cross-national comparisons of government interventions, yet they still present some drawbacks. They don't constitute a clear-cut measure of the appropriateness or effectiveness of a government's response as they do not properly reflect on how well policies are enforced, nor do they capture demographic or cultural characteristics that may affect the spread of COVID-19. Second, we might have omitted important variables or factors that can improve financial performance such as sustainability-driven innovation, operational efficiency, etc. Third, we fail to account for some specific aspects that shed light on high ESG integration within a country's perspectives like culture and urbanization.

Further research may conduct a longitudinal study of the ESG effect on FP while accounting for the temporal effect of profitability indicators and country-level variables. Researchers are also encouraged to test whether the implication of optimal capital structure affects ESG investments. It would also be interesting to explore the optimal ESG portfolio in the context of G20 countries.

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CRediT authorship contribution statement

Rim El Khoury: Conceptualization, Methodology, Formal analysis, Investigation, Writing – original draft. **Nohade Nasrallah:** Conceptualization, Methodology, Formal analysis, Investigation, Writing – original draft. **Etienne Harb:** Conceptualization, Methodology, Formal analysis, Investigation, Writing – original draft. **Khaled Hussainey:** Conceptualization, Supervision, Writing – review & editing.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix

Table A1
Variables, their definition, and source

Variable (Abbreviation)	Definition	Source
Dependent Variable: Financial Performance		
Return on assets (ROA)	Net income after taxes divided by total assets.	RR
Return on equity (ROE)	Net income after taxes divided by total equity	RR
Stock return (TR)	Price change and any relevant dividends for one year compounded daily	RR
Price to book ratio (PB)	The price per share divided by the book value of equity per share	RR
Independent variables: ESG Combined and ESG Pillars		
ESG total score (ESG)		RR
Environmental (ENV)	The relative sum of category weights for three dimensions: resource use, emissions, and waste reduction, and innovation. It ranges from 0 to 100	RR
Social (SOC)	The relative sum of category weights for four dimensions: Workforce; Human rights; Community; and Product responsibility. It ranges from 0 to 100	RR
Governance (GOV)	The relative sum of category weights for three dimensions: Management and oversight; Shareholders rights; and CSR strategy. It ranges from 0 to 100	RR
Firm specific variables		
Size (SIZE)	The natural logarithm of total assets	RRC
Leverage ratio (LEV)	Total Debt divided by total assets	RRC
Financial slack (SLACK)	Cash and short-term investments divided by total assets	RRC
Loss indicator (LOSS)	Dummy variable equals to 1 if net income is negative, 0 otherwise	RRC
Country-level variables		
Economic support index (EI)	It records two measures mainly income support and debt relief	OxCGRT
Containment health index (CHI)	It combines eight 'lockdown' restrictions and closures with measures such as testing policy and contact tracing, short term investment in healthcare, as well investments in vaccines	OxCGRT
Overall government response index (GI)	It records how the response of governments has varied across four metrics, and it is calculated based on 23 indicators covering containment and closure policies (8 indicators), economic policies (4 indicators), health system policies (8 indicators), and vaccine policies (3 indicators).	OxCGRT
Stringency index (SI)		OxCGRT

Table A1 (*continued*)

Variable (Abbreviation)	Definition	Source
	It records the strictness of 'lockdown style' policies that primarily restrict people's behavior by using nine scaled indicators, including eight containment and closure indicators (school closures; workplace closures; cancellation of public events; restrictions on public gatherings; closures of public transport; stay-at-home requirements; restrictions on internal movements; and international travel controls) and public information campaigns.	

Notes: The abbreviations used in the text indicate the data sources: IFS= International Financial Statistics, RR = Refinitiv Reuters, RCC = Refinitiv Reuters Calculation (Computed by the authors with data from Thomson Reuters), OxCGRT = Oxford Coronavirus Government Response Tracker.

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