The opaque scorecard: Environmental, social and financial information during a crisis

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Abstract

We show that firms with higher environmental and social (ES) engagement exhibited lower financial reporting quality (FRQ) during the COVID-19 crisis—a pattern not observed in the pre-crisis period. We argue that this decline can be driven by increased complexity and reduced monitoring effectiveness under crisis-induced uncertainty. The result is robust across different ES measures, including ES scores and (social) media sentiment, and holds under both standard and synthetic difference-in-differences approaches. The effect is more pronounced in contexts with greater government intervention via income support and debt relief, policies that may have added to reporting complexity. At the firm level, the decline in FRQ is stronger among firms with weaker governance or management practices—specifically when the CEO pay is not linked to shareholder returns or that of senior executives to sustainability objectives, and with lower strategic or institutional ownership. We identify potential channels for the decline in FRQ, such as increased variation in depreciation and amortization expenses, intangible assets, R&D spending, inventories, and labor costs during the crisis.

Keywords: environmental, social, governance, financial reporting quality, crisis
JEL codes: G18, G32, G34, M14, M41

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1   Introduction

Environmental and social (ES) reporting is at the center of business and policy debates. Initiatives range from the Business Roundtable's "Statement on the Purpose of a Corporation," which emphasizes benefits for all stakeholders, to the European Union's progressively expanding regulations on corporate sustainability reporting.[1] Pressures for ES disclosure are also high in the U.S., where approximately 83% of companies registered with the Securities and Exchange Commission report sustainability information (Amel-Zadeh and Serafeim, 2018; Christensen *et al.*, 2021). A new equilibrium is emerging in which ES disclosure accompanies financial reporting, echoing the seminal "balanced scorecard" concept of Kaplan and Norton (1992).

The COVID-19 crisis brought renewed attention to longstanding concerns about disclosure and financial reporting quality (FRQ) during times of economic distress. A substantial body of literature has examined the consequences of disclosure and the potential externalities arising from changes in financial reporting during downturns (Leuz and Wysocki, 2016). More recently, deHaan *et al.* (2023) documented perceived—but not actual—effects of the COVID-19 shock on FRQ, which may have emerged due to changes in disclosure timeliness (Goldstein and Wu, 2015). Others argued that FRQ declined during the crisis in the presence of country-level COVID-19 relief mechanisms (Buchetti *et al.*, 2023).

The pandemic also renewed interest in how ES engagement can help insulate firms during systemic crises, such as the global financial crisis (Lins *et al.*, 2017; Amiraslani *et al.*, 2023). One proposed mechanism is that high pre-crisis ES levels build social capital and trust with stakeholders and investors, yielding benefits during a crisis. However, recent evidence is mixed on the existence of a beneficial ES effect during the COVID-19 pandemic, with some studies supporting its presence (Albuquerque *et al.*, 2020; Ding *et al.*, 2021) and other

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[1]See the Business Roundtable's "Statement on the Purpose of a Corporation" and the "Directive (EU) 2022/2464 of the European Parliament and of the Council of 14 December 2022", accessed May 20, 2025.

challenging it (Bae *et al.*, 2021; Demers *et al.*, 2021).

In this paper, we examine whether a "balanced scorecard" that discloses both financial and non-financial (ES) information during normal economic periods became unbalanced during the COVID-19 crisis. Using an inductive accounting and governance approach, we treat the pandemic shock as a "laboratory" to uncover changes to firm reporting (Bonacchi *et al.*, 2023). Our analysis builds on theoretical and empirical literature linking the complexity of reporting to a firm's ES information. High ES engagement has been associated with more negative auditor assessments of the firm's reporting quality due to both difficulty of assessment and agency concerns (LópezPuertas-Lamy *et al.*, 2017). First, firms with greater ES engagement tend to be more complex, and their multidimensional disclosures may be more susceptible to diverse deviations from established trends during systemic shocks (see, e.g., Saha 2022). Second, ES-myopic management may manifest more during turbulent times (Ding *et al.*, 2024). Therefore, we expect that the interaction between high ES engagement and the disruption caused by COVID-19 leads to lower FRQ, compared to both firms with lower ES engagement and to the pre-crisis period.

Next, we conjecture that our main result will exhibit heterogeneity due to country and firm governance characteristics.[2] At the country level, we expect a stronger effect due to enhanced complexity where governments intervened more to mitigate crisis effects through income support and debt relief. This can affect financial reporting directly (Buchetti *et al.*, 2023) or via reduced timeliness (Watkins, 2022). In addition, government-provided stimuli during the uncertainty period lowered the incentives to monitor FRQ otherwise required for market-based financing (Breuer *et al.*, 2017). At the firm level, we do not consider governance an ES attribute, an approach consistent with literature in accounting (e.g. Lys *et al.* 2015; LópezPuertas-Lamy *et al.* 2017), finance (e.g. Ding *et al.* 2021), and management (e.g. Ioannou and Serafeim 2012; Desender and Epure 2021). Instead, we argue that firm

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[2]An accounting literature has developed to highlight the importance of both macro and micro attributes for FRQ (see, e.g, Bonetti *et al.* 2016).

governance associated with better or worse monitoring of shareholder and stakeholder interests will amplify or dampen the decline in FRQ in firms with high ES engagement. Our premise is that governance effectiveness matters more when complexity increases in firms with multiple objectives proxied by high ES engagement (Rajan *et al.*, 2023).

For the empirical analysis, we construct a database of 7,212 listed firms from 82 countries between 2017 and 2021. We exploit the COVID-19 shock to international markets, which occurred in 2020 and the related market uncertainty that followed through 2021. We find that during normal economic times there is no significant relationship between ES information and FRQ. However, we systematically show that during the COVID-19 crisis firms with higher ES engagement exhibit significant declines in FRQ.

This effect is robust to controlling for time-varying firm financial and governance characteristics, firm fixed effects, and conservative clustering of standard errors accounting for country-time characteristics. It remains unchanged when using environmental and social information separately, and alternative definitions of FRQ. It holds both in dynamic settings (using contemporaneous ES and FRQ measures), and when designing standard and synthetic difference-in-differences estimations showing that high pre-COVID-19 ES levels are related to lower FRQ during the COVID-19 period. Parallel trends and placebo crisis analyses corroborate the results.

Next, we confirm that the decline in FRQ for high ES firms is stronger in contexts in which governments provided more income support and debt relief to firms during the crisis. Exploring firm governance heterogeneity, we find that our main result is stronger for firms with worse governance or management practices (two proxies of long-term shareholder value monitoring), and when CEO pay is not linked to shareholder returns or the pay of senior executives to ES objectives (two proxies of incentives to monitor). Ownership concentration also matters, with the effect materializing for firms with less strategic and institutional holdings, potentially more detached from owners' long-term interests. Furthermore, we un-

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cover the accounting channels through which higher ES engagement relates to lower FRQ (or higher accounting opaqueness). Higher ES firms display higher variability in depreciation and amortization expenses, intangible assets, R&D expenses, value of inventories, and labor costs during the COVID-19 crisis.

Finally, we move beyond analyst-constructed ES data and confirm our results using non-financial information automatically generated through natural language processing algorithms. While ES information based on standardized data gathering schemes is suited for our study, a sentiment analysis of firm non-financial characteristics present in news and social media allows us to reduce two concerns. First, it captures information trends from a wide array of unstructured sources. Second, measures based on machine learning on big data allow to check for potentially biased results due to human data gathering flaws; they also help to tackle concerns on the content and reliability of analyst-produced ratings (see, e.g., Chatterji *et al.* 2009).

Contributions to the literature Our paper contributes to three strands of literature. First, we contribute to a literature that found mixed effects on the relationship between ES information and FRQ. Hong and Andersen (2011) and Kim *et al.* (2012) show that high ES firms are less likely to engage in earnings management, and Lee (2017) finds that such firms provide higher quality earnings forecasts. In contrast, Petrovits (2006) document that firms use social engagement such as charity foundations to manage earnings, and Prior *et al.* (2008) find more accrual-based earnings management in high ES firms. Chih *et al.* (2008) provide mixed evidence, with high ES firms engaging less in earnings smoothing but more in earnings aggressiveness.[3] Using exogenous variation provided by the COVID-19 shock, we show that a mixed (and thus insignificant) effect in normal economic times becomes significant with higher ES engagement related to lower FRQ during a crisis. In addition, we highlight which governance characteristics can alleviate or exacerbate this effect.

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[3]Others argue that earnings management positively affects ES levels through a reputation-building mechanism, but that there is no effect in the opposite direction (Anderson *et al.*, 2024).

Second, the paper speaks to a literature on the use of financial information during the COVID-19 crisis. deHaan *et al.* (2023) argue that actual FRQ did not change during the pandemic, only its perception. These effects may become real in the presence of government interventions (Bischof *et al.*, 2020) affecting firm accounting (De Vito and Gómez, 2020; Buchetti *et al.*, 2023). We add to our previous contribution that—while there may be no significant changes at the average FRQ for all firms—during the COVID-19 crisis higher ES firms exhibit lower FRQ. Connecting to a literature on reporting regulation during economic distress (Leuz and Wysocki, 2016), we show that our results are stronger with more government interventions for firm liquidity during crisis periods.

Third, we respond to the call for an economic analysis of ES information (Edmans, 2023a) through design-based approaches to accounting (Leuz, 2022). While we acknowledge that ES information may be noisy or depend on analyst perception (Edmans, 2023b), a feature partially shared with FRQ estimation (e.g. Dechow *et al.* 2010), we underscore that it relates to mechanisms that help to gauge firm value.[4] We study firm behavior in a crisis (Lins *et al.*, 2017; Albuquerque *et al.*, 2020; Ding *et al.*, 2021; Flammer and Ioannou, 2021) and reveal how financial and non-financial information may become unbalanced.

2 Context and Predictions

The COVID-19 crisis   The 2020 pandemic shares its systemic nature with other economic distress periods, such as the dot.com bubble in 2001 and the global financial crisis in 2008. But it is a special case since its source was exogenous to firm and macroeconomic fundamentals, and it was not triggered by financial misbehavior or misguided regulatory oversight. It came along with quick restrictions to production and mobility, and lengthy disruptions to supply chains and (international) contracts, with major implications for firms around the world.

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[4]Responding to pressures to disclose ES information, earnings calls increasingly include firm sustainability characteristics (Bochkay *et al.*, 2021).

The crisis responses included stimuli packages of different intensities to firms and relaxed corporate disclosure timeliness (see, e.g., the Oxford COVID-19 Government Response Tracker).[5] These interventions may have helped economies withstand a high uncertainty period, but may have also altered the content of financial information. Discerning informational distortions (Leuz and Wysocki, 2016) through design-based approaches to accounting (Leuz, 2022) can help to uncover whether financial and non-financial disclosure became unbalanced during the COVID-19 crisis.

Information types A first set of evidence on the role of financial information optimistically indicates that FRQ fundamentals have not been altered during COVID-19 (deHaan et al., 2023). Some argue that certain accounting channels served to immunize firms during the pandemic (Demers et al., 2021). Others document that the ES information signal remains valid, as it was during the global financial crisis (Ding et al., 2021). Our conjecture is that analyzing these dimensions separately provides an incomplete picture of the nuances of firm disclosure during COVID-19 uncertainty.

We do not expect firms to alter their ES engagement, as the stakeholder-related social capital could serve to navigate the crisis uncertainty (Lins et al., 2017; Albuquerque et al., 2020; Amiraslani et al., 2023). Yet, the COVID-19 disruption may have affected differently the reported information by firms with higher or lower ES engagement. First, restrictions to business transactions altered the costs and revenues of all firms, particularly increasing the already existing reporting complexity of firms with higher ES levels (see, e.g., LópezPuertas-Lamy et al. 2017). Second, the continued disclosure of non-financial information by high ES firms may have reduced managerial focus on financial reporting—highlighting the challenge of managerial myopia amid competing corporate objectives (Rajan et al., 2023; Ding et al., 2024)—particularly as the uncertainty surrounding the crisis unfolded. Taken together, these arguments lead us to predict that firms with higher ES engagement exhibited declines in FRQ

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[5]https://www.bsg.ox.ac.uk/research/covid-19-government-response-tracker, accessed February 24, 2023.

during the COVID-19 crisis.

The role of relief mechanisms Adding to the evidence on the U.S. market (deHaan *et al.*, 2023), Buchetti *et al.* (2023) discuss how FRQ may decrease during COVID-19 largely due to the intensity of government intervention in providing liquidity to firms. Indeed, the initial COVID-19 cash crunch could have led to decreases in the sales of listed firms of 50% to 70% (De Vito and Gómez, 2020), with potentially fatal liquidity effects swiftly curtailed by government relief mechanisms. Thus, the timing-indistinguishable COVID-19 pandemic and government responses may have substantially altered the content of financial information. Building on our first prediction, we posit that the decline in FRQ of high ES firms is stronger in contexts with a higher intensity of government economic support to firms. Since these relief mechanisms involved income support and debt relief, they directly affected the content of firm reporting. Indirectly, the extensive liquidity support provided to firms and markets reduced the need to monitor FRQ, which would otherwise facilitate access to external financing (see, e.g., Breuer *et al.* 2017; Duro *et al.* 2022).[6]

Firm governance We expect the decline in FRQ for firms with high ES engagement to be either aggravated or mitigated by firm-level governance mechanisms related to the long-term interests of shareholders. Our overarching premise is that the benefits of strong governance and management practices become more salient when both contextual uncertainty and firm complexity are high—conditions that are especially pronounced during a crisis for firms with high ES engagement.

First, echoing the potential shortcomings of corporate multi-objective functions in high-ES firms (Jensen, 2002), which represents a growing trend (Rajan *et al.*, 2023), decision makers face weaker incentives to monitor FRQ particularly in firms with poorer governance and management practices. This effect is exacerbated when monitoring ability declines fur-

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[6]This is different to the context of the global financial crisis, when the bank channel was blocked and capital markets drained.

ther due to increased complexity amid crisis uncertainty. Second, the effect can be further amplified if executives' compensation—known to respond to both financial and non-financial targets (Cohen *et al.*, 2023)—is not aligned with long-term shareholder value or firm sustainability. Third, the effect may be mitigated by closer monitoring from strategic owners (see, e.g., Shleifer and Vishny 1986). In such cases, shareholder preferences are more effectively transmitted across both financial and non-financial objectives (see, e.g., Hart and Zingales 2017), and the joint monitoring of these dimensions is arguably more effective in the presence of institutional blockholders (Azar *et al.*, 2021; Aguilera *et al.*, 2025).

3   Data and Variables

Sources   We draw on multiple data sources with the comprehensive international coverage required to examine empirically our theoretical predictions. We retrieve financial accounting information from Worldscope and environmental, social and governance (ESG) data from ASSET4 (both previously owned by Thomson Reuters and now integrated in LSEG). COVID-19 government policies are obtained from the Oxford COVID-19 Government Response Tracker, and macroeconomic and regulatory data come from the World Bank's World Development Indicators. We start from a sample of about 39,000 listed firms around the world for which we have sufficient financial information to compute FRQ. We then merge these data to available ES, governance and ownership information which yields an unbalanced panel of 7,212 publicly listed non-financial firms from 82 countries between 2017 and 2021.

To validate results based on analyst-imputed scores, we also gather ESG sentiment data from MarketPsych. These data, based on natural language processing of news and social media, allow us to reduce concerns on analyst-biased information (see, e.g., Chatterji *et al.* 2009, as well as to confirm the results using an extended sample of more than 14,000 firms.

FRQ models Our main measure of FRQ is based on computing accruals following Dechow *et al.* (1995) and as used in an international context by Leuz *et al.* (2003). We start by specifying accruals as:

$$Accruals_{it} = \Delta CA_{it} - \Delta Cash_{it} - \Delta CL_{it} + \Delta STD_{it} + \Delta TP_{it} - Dep_{it}, \tag{1}$$

where ΔCA_{it} is the change in current assets, $\Delta Cash_{it}$ is the change in cash and cash equivalents, ΔCL_{it} is the change in current liabilities, ΔSTD_{it} is the change in short term debt, ΔTP_{it} is the change in income taxes payable, and Dep_{it} is the depreciation and amortization for firm i in year t. Similar to Leuz *et al.* (2003), if a firm does not report information on taxes or short term debt, we assume the changes in these variables to be zero.

Next, we estimate discretionary (abnormal) accruals as:

$$\begin{aligned} Accurals/TA_{it-1} = \beta_1(1/TA_{it-1}) &+ \beta_2((\Delta Rev_{it} - \Delta Rec_{it})/TA_{it-1}) \\ &+ \beta_3(PPE_{it}/TA_{it-1}) + \epsilon_{it}, \end{aligned} \tag{2}$$

where TA_{it-1} is the value of total assets, ΔRev_{it} is the change in revenues, ΔRec_{it} is the change accounts receivable, and PPE_{it} is the value of property, plant and equipment. We estimate equation 2 for each year-industry pair (using NAICS3 codes).[7] We compute $Abacc_{it}$ as the difference between actual and predicted accruals. Larger values of $Abacc_{it}$ correspond to lower accrual quality. We specify our preferred dependent variable as the percentile rank of the absolute value of abnormal accruals (i.e. $AbaccRank_{it}$) or the absolute value of the measure (i.e. $AbaccAbs_{it}$). For robustness, we also compute $AbaccAbsMod_{it}$ following Kothari *et al.* (2005) who added the term $+ROA_{it}$ (the firm's return on assets) to

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[7]We include pairs with at least 10 observations; for robustness we ensure results do not change when limiting to 20 observations per year-industry pair. We estimate equation 2 for all firms with sufficient accounting information, which is representative of the population of listed firms around the globe.

equation 2.

ES measures We use benchmarked environmental and social information. For the main measure, we construct a composite ES index as the average of the environmental and social pillars. For robustness, we use the two pillars separately. We do not include corporate governance attributes, since they are more disconnected from the notion of environmental and social disclosure. This approach is common across studies in accounting (e.g. Lys *et al.* 2015; LópezPuertas-Lamy *et al.* 2017), finance (e.g. Ding *et al.* 2021), and management (e.g. Ioannou and Serafeim 2012; Desender and Epure 2021). Instead, we employ governance, management and ownership characteristics to uncover firm-level heterogeneity (as we describe below). To illustrate the content of the ES measure, the environmental pillar is based on information on resource use and emission reduction, and environmentally-related product innovation. The social pillar reflects practices on product responsibility, community, human rights, diversity, training and development, health and safety, and employment.

For the sentiment analysis, we rely on the firm's representation of non-financial characteristics in the news and social media. Our measures are constructed using natural language processing on a wide range of sources such as news outlets, social media, and other online content. This approach has two advantages: it provides (1) a composite view of ESG sentiment and trends, and (2) an "automatic" machine learning-generated dataset based on big unstructured data thus avoiding rater-schemes' biases.[8] Specifically, we use an overall measure of the average ESG sentiment during the year and a net measure of the sentiment, which adjusts downwards the ESG sentiment score of a firm which exhibits controversies in the media.

Firm characteristics We control for a series of time-varying firm attributes. For financial controls we include the logarithm of total assets, ROA, the ratio of debt to total assets,

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[8]We use the composite measure in this case since perceptions on ESG pillars are less separable in news and social media than in analyst measures.

and the ratio of cash to total assets. To explore the accounting channels behind potential changes in FRQ, we retrieve the firm's depreciation and amortization expenses, intangible assets, research and development (R&D) expenses, value of inventories, and labor cost; we scale each of these variables by the value of total assets. We also control for corporate governance characteristics such as the percentage of independent members on the board of directors, the percentage of women on the board of directors, the number of seats on the board of directors, an indicator taking the value of one if the CEO also holds the chairman of the board position (and zero otherwise), and an indicator taking the value of one if the executives' compensation is linked to long-term objectives (and zero otherwise).

To explore firm-level heterogeneity, we use the firm's governance pillar score (capturing systems and processes in place to ensure that board members and executives act in the best interests of its long term shareholders); the firm's management score (reflecting the firm's commitment and effectiveness towards following best practice corporate governance principles); an indicator which takes the value of one if the CEO's compensation is linked to total shareholder return (and zero otherwise); and a similar indicator capturing whether senior executives' compensation is linked to sustainability targets. We also examine the role of ownership concentration captured by the percentage of strategic holdings and an indicator of institutional blockholdings (i.e. holdings of at least 5%).

Macroeconomic data To estimate models related to our predictions on the context and government interventions during COVID-19, we use data from the Oxford COVID-19 Government Response Tracker. For the main analysis, we use an index of economic measures such as income support and debt relief. We also use an overall index of the intensity of all (not only economic) responses of governments during the pandemic. For both cases, the index varies at country-year during 2020-2021 (and is zero otherwise), with higher values indicating a higher intensity of government interventions.

Table 1 summarizes the variables and Table A1 provides their complete definitions.

4 Empirical Specifications

Baseline The specification to examine the relationship between ES information and FRQ during the COVID-19 crisis for firm i in period t takes the form:

$$Abacc_{it} = \beta_1 C19 + \beta_2 ES\ score + \beta_3 C19 \times ES\ score + Controls + \eta_i + \gamma_t + \epsilon_{it}, \tag{3}$$

where $Abacc_{it}$ can be the ranked (AbaccRank) or absolute (AbaccAbs) value of abnormal accruals, with higher values indicating lower FRQ (or higher accounting opaqueness). For robustness we also use the absolute values from the modified FRQ model (AbaccAbsMod). C19 is an indicator that takes the value of one for 2020-2021 (the COVID-19 crisis years) and zero for 2017-2019. To explore the ES - FRQ dynamics during the pre- and COVID-19 periods, we replace the C19 indicator with a set of year dummies. We also check the sensitivity of our results to placebo crisis analyses. In the baseline, the ES score enters contemporaneously with the FRQ measure to explore the potentially dynamic effects. We use the average of the environmental and social pillars, and check potentially different results by pillar. Controls include the time-varying financial and governance characteristics described in Section 3. We include firm fixed effects (η_i) to control for unobserved time-constant heterogeneity and year fixed effects (γ_t) to account for time-specific conditions that may affect all firms. Standard errors are clustered at the firm and country-year level. In line with our predictions we expect β_3 to be positive and significant.

Standard and synthetic difference-in-differences The COVID-19 shock was unexpected, but doubts may exist on whether firms with different pre-COVID-19 ES scores already exhibited diverging trends in FRQ. In the spirit of Lins *et al.* (2017) and Ding *et al.* (2021), we replace the ES score in equation 3 by each of the following three variables. First, we compute a "High ES" indicator that takes the value of one for all sample years if the firm's average ES score in the pre-COVID-19 years (i.e. 2017-2019) is above the median of

the distribution and zero otherwise. Second, we define "ES Q4 vs. Q1-3" which takes the value of one if the firm's pre-COVID-19 ES score is in the top quartile of the distribution and zero otherwise. Third, we compute "ES Q4 vs. Q1-2" taking the value of one if the firm's pre-COVID-19 ES score is in the top quartile of the distribution, and zero if the score is in the bottom two quartiles (excluding firms in the third quartile). For each case, the treatment is the interaction between the C19 dummy and the corresponding higher ES indicator. We check for the fulfillment of the parallel trends assumption by replacing the C19 dummy with year dummies.

To further lower concerns on pre-trends and comparability of firms in the pre-crisis period, we follow Arkhangelsky *et al.* (2021) to implement a synthetic difference-in-differences estimation. This method relies on the synthetic control methodology to reweight and match pre-shock trends, thus reducing the reliance on the parallel trend assumption. It uses two way fixed effects (firm and year in our case), requires a balanced panel, and puts more weight on control units that on average were similar in their trends to the treated units.[9] We implement the synthetic difference-in-differences estimation using a similar specification and variables to the standard case described above.

Government interventions in COVID-19   To test our second prediction related to heterogenous effects hinging on government intervention for liquidity support during the pandemic, we estimate:

$$Abacc_{it} = \beta_1 Oxford\ index + \beta_2 ES\ score + \beta_3 Oxford\ index \times ES\ score$$
$$+ Controls + \eta_i + \gamma_t + \epsilon_{it}, \tag{4}$$

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[9]Specifically, the synthetic control algorithm uses a nested minimization process to compute the weighted average of all potential control units closest to a treated unit in the pre-COVID-19 period. In this sense, the main distinction with respect to a standard difference-in-differences estimation—which equally weights treated and control firms—is that the synthetic approach relaxes the parallel trends assumption by finding more closely comparable treated and control units.

where the Oxford index is the average number of government interventions to for income support and debt relief defined using data from the Oxford COVID-19 Government Response Tracker. For robustness, we replace this Oxford economic support index with the Oxford overall government response index including all types of government interventions (e.g. including also health-related policies, among other). The other characteristics of equation 4 are the same as in equation 3.

Governance heterogeneity and accounting channels For our last prediction on firm-level heterogeneity, we estimate equation 3 splitting the sample between firms with: (i) high vs. low governance score; (ii) high vs. low management score; (iii) CEO's compensation linked to total shareholder return or not; (iv) the senior executive's compensation linked to sustainability targets or not; (v) high vs. low strategic holdigns; and (vi) institutional blockholdings or without.[10]

Last, we explore the accounting channels through which changes in FRQ may propagate during COVID-19 by estimating:

$$AccChannel_{it} = \beta_1 C19 + \beta_2 ES\ score + \beta_3 C19 \times ES\ score + Controls + \eta_i + \gamma_t + \epsilon_{it}, \quad (5)$$

where $AccChannel_{it}$ is sequentially the ratio of the following variables to total assets: depreciation and amortization (DeprAmt_TA), intangible assets (Intang_TA), R&D expenses (R&D_TA), value of inventories (Invent_TA), and labor cost (Labor_TA). The other characteristics of equation 5 are the same as in equation 3.

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[10]The high vs. low sub-samples are defined as above vs. below the median of the corresponding variable's distribution.

5 Results

5.1 ES Information and FRQ during COVID-19

Baseline results Table 2 presents the estimations on the relationship between ES engagement and FRQ during the COVID-19 crisis. Following equation 3, we start with a specification that includes the interaction terms of interest, and controls for time-varying firm financial characteristics and unobserved heterogeneity using firm fixed effects in columns 1-2. Results show that for both ranked and absolute measures of abnormal accruals higher ES engagement is positively and significantly related to lower FRQ (or higher accounting opaqueness) during the crisis.

To illustrate this effect, Figure 1 plots the coefficients corresponding to the term "C19 × ES score" in column 2 of Table 2 alongside 95% confidence intervals, for the pre- (left panel) and COVID-19 (right panel) periods. The lower part of the figure shows that the distribution of ES scores is similar between the pre-crisis and crisis periods. While the figure and table estimates may suggest a potential positive role of ES for FRQ before the crisis, this result is not robust to the different measures of accounting opaqueness. Next, columns 3-4 of Table 2 show that our results remain unchanged when adding time-varying firm governance characteristics and year fixed effects. Importantly, when replacing the crisis dummy with a set of year effects (omitting the first year of the sample), we find that the significant effect of ES scores on FRQ appears only during the crisis period.

We run an additional set of robustness checks presented in Table A2. In columns 1-2 we find the same results using as dependent variables the rank or level of abnormal accruals from the modified model.[11] In columns 3-6 we corroborate that the predicted effect holds when using the environmental and social scores separately.[12] We further confirm that our

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[11] In untabulated checks we confirm that our results hold when adding the terms C19 × ROA and C19 × lnTA to the specifications in columns 3-4 of Table 2. In addition, results do not change if we add industry × year fixed effects, or if we cluster standard errors at the country-year and industry-year level.

[12] The correlation between the two pillars in the cross-section is 0.74, impeding estimating them jointly.

results are driven by the COVID-19 shock. In Table A3, we find insignificant effects when we define a placebo-COVID-19 dummy which takes the value of one for year 2018 and zero otherwise. Last, in Table A4 we show that the null effect of the COVID-19 shock on FRQ is robust to estimations using the complete sample of listed firms (columns 1-6), or only firms with available ES data (columns 7-8). This provides strong support to our interpretation that the decline in FRQ significantly materializes only for high ES firms during the crisis period.

Results from (synthetic) difference-in-differences To reduce concerns about potential endogeneity in the cross-section and pre-COVID-19 trends, we implement a series of difference-in-difference estimations which we report in Table 3. Here we use the firm's average ES score in the pre-COVID-19 period and define whether the firm pertains to the top two quartiles (above the median) of the distribution (High ES), to the top quartile and compare to the rest of firms (ES Q4 vs. Q1-3), and to the top quartile and compare to the bottom two quartiles (ES Q4 vs. Q1-2). Across all specifications and for both standard (columns 1-6) and synthetic (columns 7-12) difference-in-difference estimations we find that higher pre-crisis ES scores are related to lower FRQ (or higher accounting opaqueness) during COVID-19.[13]

While the synthetic difference-in-differences estimator has the advantage of reducing pre-trends concerns, this problem may still occur with a higher probability in standard estimations. To estimate pre-trends, we replace the C19 dummy in columns 2 and 8 of Table 3 with a set of year dummies (using 2017 as a reference year), while maintaining the complete set of controls and fixed effects. Figures 2 (for standard difference-in-differences) and A1 (for the synthetic approach) illustrate the obtained year × High ES coefficients

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[13]The synthetic difference-in-differences estimations include fewer observations due to requiring a balanced panel throughout the sample period and reweighting and adjusting pre-shock trends. The results are robust to starting the estimation period in 2017, as reported, or starting in 2018. The drop in observations is partially caused by missing ES information in year 2017, while the financial information used for computing FRQ (benchmarked in the population of listed firms) is available in a close-to-balanced panel.

alongside 95% confidence intervals. The effects are not different from zero in the pre-crisis period, and become and remain significant in the COVID-19 period.[14] Altogether, the evidence substantially reduces concerns on potentially diverging pre-trends and supports our prediction that higher ES firms exhibited lower FRQ during the COVID-19 crisis.

5.2 The Role of Government Interventions

Our second prediction posits that the decline in FRQ for firms with high ES is stronger in contexts with a higher intensity of government economic support during the COVID-19 crisis. We test this prediction in Table 4 by interacting the Oxford economic support index (whose higher levels indicate more government-mandated income support and debt relief during the pandemic) with the ES score (see equation 4). We control for the full set of time-varying firm financial and governance characteristics, firm fixed effects (across all columns) and year effects (in columns 3-4). The results confirm the baseline estimates, showing a positive link between ES scores and accounting opaqueness during crisis times. But, importantly, such link becomes stronger when the government-provided liquidity support arguably affects more the structure of firms' reporting, incrementally increasing complexity especially for high ES firms. This result is robust to using the Oxford index for economic support, as well as the overall index of government intervention across all types of policies (see Table A5).

5.3 Governance Characteristics and Accounting Channels

Does the ES - FRQ relationship during the COVID-19 crisis depend on firm governance characteristics? To address this question, we rerun our baseline estimations splitting the sample by firm characteristics capturing governance and management practices (which may affect monitoring effectiveness) and senior executives' compensation structure (which may influence incentives to monitor). The findings in columns 1-2 of Table 5 show that the

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[14]Note also that the studied effect does not appear in 2019, which was not economically affected by the COVID-19 shock but whose firm-level financial information was largely made available during 2020.

decline in FRQ for high ES firms during COVID-19 occurs in the presence of poorer gover-
nance mechanisms protecting long term shareholder value. Similarly, it is stronger in firms
with a lower management effectiveness (columns 3-4). Moving to the incentives to monitor,
columns 5-8 illustrate that the COVID-19 × ES score interaction leads to higher accounting
opaqueness when the CEO pay is not linked to shareholder return, and when there is no
link of senior executives' pay to sustainability targets. Finally, monitoring also varies with
the presence of strategic owners. The effect is stronger in firms with lower percentages of
strategic holdings (ownership concentration) and without institutional blockholdings, which
otherwise dampen the effect (columns 9-12).

Through what accounting channels do the governance shortcomings for long-term share-
holder value in higher ES firms propagate? We investigate this question in Table 6 following
the general specification in equation 5. We show that, with respect to pre-COVID-19 years,
higher ES firms display more variation in depreciation and amortization expenses (column
1), the capitalization of intangible assets (column 2), R&D expenses (column 3), value of
inventories (column 4), and labor cost (column 5). These results support that higher ES
firms exhibit higher variability of accrual components between good and bad economic times,
displaying more opaque accounting information during the COVID-19 crisis.

5.4 Sentiment Analysis

Do our results change when using automatically generated data rather than information
gathering schemes designed by human analysts? To examine this question, we replace the
ES score in equation 3 with machine learning-generated sentiment from a large set of news,
social media, and other online content. Column 1 of Table 7 shows that our findings are
robust to using an overall measure of the ESG sentiment during a given year. They are
also robust to correcting the sentiment measure for the presence of firm-level controversies,
rather than just considering tone (column 2). Next, in columns 3 and 4 we use the overall

and net measures of ESG sentiment, respectively, to support our main results on the role of government interventions (see equation 4).

Since the algorithm-generated data are available for a larger number of firms, in Table A6 we are able to validate our baseline results on a sample of over 14,000 firms. However, we refrain from extending the analysis on this sample, for which we cannot control for or explore heterogeneity by detailed firm governance and ownership characteristics. Overall, the ESG sentiment analysis adds confidence to our results based on more standard ES information and governance characteristics, which given their definitions are better suited to empirically test the study's predictions.

6   Conclusions

Accounting scholars have become increasingly concerned with the quality of information during financial (Bischof *et al.*, 2020) and COVID-19 (deHaan *et al.*, 2023) crises, while economists have focused on information depletion in the aftermath of such events (Asriyan *et al.*, 2022). Another important strand of literature has focused on the potentially beneficial role of ES engagement (a stakeholder trust-building mechanism) for firms' resilience during crisis times (Lins *et al.*, 2017; Amiraslani *et al.*, 2023). In this paper, we narrowed down on the relationship between the two types of information, non-financial (ES) and financial, and how such relationship may change during crisis times. To shed light on the existing mixed results on the link between ES engagement and FRQ, we answer the call for design-based approaches to accounting analysis (Leuz, 2022) and employ the COVID-19 shock as a "laboratory" to test our empirical predictions.

We argue and show that firms with higher (pre-COVID-19) ES levels exhibit lower FRQ (increased accounting opaqueness) during the crisis-induced uncertainty. Two mechanisms are at play behind this effect, absent in the pre-crisis period. First, firms with high ES engagement entail more reporting complexity, which arguably increased with the COVID-19

disruptions to activity and therefore to reporting. Second, high ES firms focusing on multiple corporate objectives may have exhibited reduced incentives to monitor FRQ. Indeed, we predict and show that the decline in FRQ for high ES firms occurs especially in contexts with more government interventions to support firm liquidity. The latter affected reporting content and reduced incentives to monitor.

Firm governance matters. We posit and find that high ES firms featuring more effective monitoring of long-term shareholder value do not exhibit lower FRQ during the COVID-19 crisis. Specifically, the effect is present mostly for firms with worse governance and management practices, and for firms in which the CEO pay is not linked to shareholder return or the executives' pay to sustainability targets. It is also stronger when ownership concentration is low and in the absence of institutional blockholdings, which otherwise alleviate the effect. The less effective monitoring was transmitted via accounting channels. During the crisis, higher ES firms display increased variability in key components such as depreciation and amortization expenses, the capitalization of intangible assets, R&D expenses, value of inventories, and labor cost.

Overall, our findings contribute to ongoing debates on monitoring information disclosure (Graham *et al.*, 2005), as well as on the integrated reporting of financial and non-financial information (Bucaro *et al.*, 2020; Wu and Zhou, 2022). Our results are also relevant to current discussions within the Securities and Exchange Commission (see Cunningham *et al.* 2022) and to recent European directives on mandatory ES reporting. Integrated reporting may not affect information quality during tranquil economic times, but may increase the complexity of interpreting information during uncertainty periods. The willingness and ability of firms to monitor different information types are particularly important in a crisis featuring economic support and potential externalities from the relaxation of accounting policies (see Leuz and Wysocki 2016). Our work shows that the balanced scorecard of financial and non-financial information became opaque during the COVID-19 crisis.

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Figure 1: **ES Scores and FRQ pre- and during COVID-19**
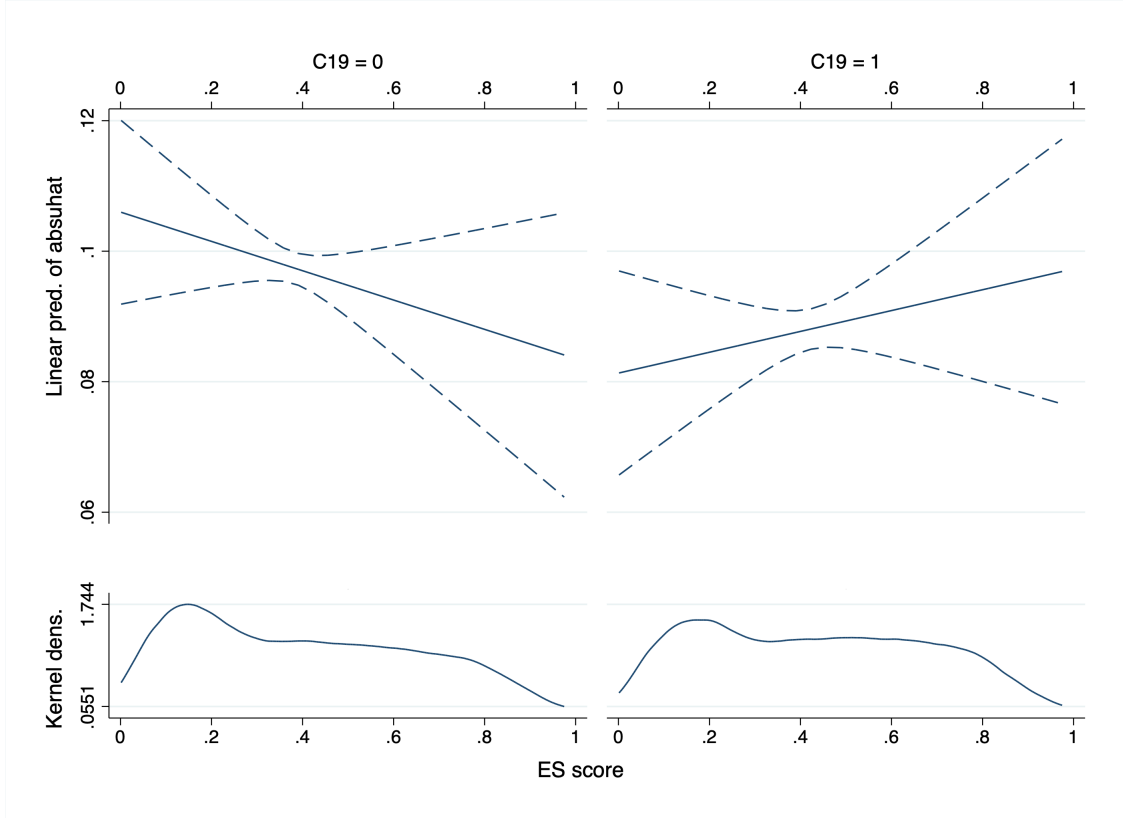
Notes: This figure plots the coefficients corresponding to the term "C19 × ES score" in column 2 of Table 2 alongside 95% confidence intervals, for the pre- (left panel) and COVID-19 (right panel) periods.

Figure 2: **The Effect of pre-COVID-19 High ES on FRQ during the Crisis**
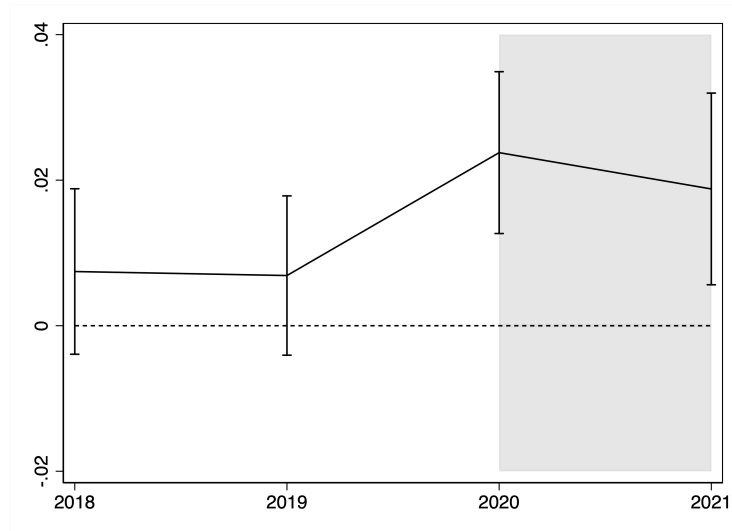
Notes: This graph illustrates the coefficients and 95% confidence intervals of the interaction between a set of year dummies (using 2017 as a reference year) and a "High ES" indicator. The "High ES" indicator takes the value of one for each firm for all sample years if the firm-level average of ES in the pre-COVID-19 period (2017-2019) is above the sample median, and zero otherwise. The dependent variable is AbaccAbs and the control variables and fixed effects are as in column 6 of Table 2.

Table 1: **Descriptive Statistics**

Variable name	Obs	Mean	Std. dev.	Median
Financial reporting quality (FRQ)				
AbaccRank	28,392	0.426	0.268	0.404
AbaccAbs	28,392	0.093	0.142	0.053
Environmental and social (ES)				
ES score	28,392	0.413	0.247	0.394
Environmental score	28,392	0.363	0.286	0.345
Social score	28,392	0.463	0.242	0.451
Overall ESG sentiment	21,470	0.524	0.174	0.517
Net ESG sentiment	21,470	0.456	0.153	0.453
Firm financials				
lnTA	28,392	14.640	1.717	14.729
ROA	28,392	0.050	0.237	0.066
Debt_TA	28,392	0.307	0.252	0.267
Cash_TA	28,392	0.172	0.182	0.108
DeprAmt_TA	28,392	0.044	0.039	0.037
Intang_TA	25,857	0.250	0.400	0.126
R&D_TA	11,608	0.089	0.182	0.032
Invent_TA	24,371	0.138	0.199	0.096
Labor_TA	18,091	0.150	0.211	0.091
Governance				
Board independence	28,375	59.163	24.809	60.000
Board gender diversity	28,369	50.396	28.288	50.396
Board size	28,375	9.114	2.869	9.000
CEO duality	28,392	0.341	0.474	0.000
Excec. comp. LT obj.	28,392	0.095	0.293	0.000
Governance score	28,392	0.504	0.223	0.508
Management score	28,392	0.525	0.280	0.532
CEO link SH return	28,392	0.440	0.496	0.000
Excec. comp. susty. targets	28,392	0.167	0.373	0.000
Strategic holdings	28,000	28.041	26.469	20.327
Institutional blockholdings indicator	28,392	0.339	0.473	0.000
COVID-19 variables				
C19	28,392	0.459	0.498	0.000
Oxford econ. index	28,351	23.925	28.729	0.000
Oxford overall index	28,351	25.364	28.136	0.000

Notes: Summary statistics for selected variables in the regression sample. See complete variable definitions in Table A1.

Table 2: **ES Scores and FRQ during COVID-19**

Dep. var.:	(1) AbaccRank	(2) AbaccAbs	(3) AbaccRank	(4) AbaccAbs	(5) AbaccRank	(6) AbaccAbs
C19	-0.0085	-0.0247***				
	(0.010)	(0.005)				
ES score	-0.0585*	-0.0225	-0.0353	-0.0124	-0.0286	-0.0191
	(0.034)	(0.019)	(0.030)	(0.018)	(0.035)	(0.022)
C19 × ES score	0.0532***	0.0384***	0.0588***	0.0372***		
	(0.015)	(0.007)	(0.015)	(0.008)		
2018 × ES score					0.0021	0.0097
					(0.019)	(0.013)
2019 × ES score					-0.0206	0.0095
					(0.021)	(0.013)
2020 × ES score					0.0491**	0.0466***
					(0.023)	(0.014)
2021 × ES score					0.0520**	0.0419***
					(0.025)	(0.015)
Observations	28,392	28,392	28,364	28,364	28,364	28,364
R^2	0.392	0.403	0.394	0.404	0.394	0.404
Firm financial controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm governance controls			Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE			Yes	Yes	Yes	Yes

Notes: The dependent variable is specified at the top of each column. Firm financial controls are: lnTA, ROA, debt_TA, and cash_TA. Firm governance controls are: board independence, board gender diversity, board size, CEO duality, and exec. comp. LT obj. Standard errors are reported in parentheses and are clustered at the firm and country-year level. *** indicates significance at the 1% level, ** at the 5% level, and * at the 10% level. See Table 1 for descriptive statistics of the variables, and Table A1 for their complete definitions.

Table 3: **The Effect of Pre-COVID-19 ES on FRQ in Crisis-Times**

Dep. var.:	(1) AbaccRank	(2) AbaccAbs	(3) AbaccRank	(4) AbaccAbs	(5) AbaccRank	(6) AbaccAbs
Difference-in-differences						
C19 × High ES	0.0236*** (0.008)	0.0161*** (0.004)				
C19 × ES Q4 vs. Q1-3			0.0264*** (0.009)	0.0141*** (0.004)		
C19 × ES Q4 vs. Q1-2					0.0307*** (0.010)	0.0183*** (0.005)
Observations	26,517	26,517	26,517	26,517	19,650	19,650
R^2	0.373	0.378	0.373	0.378	0.383	0.391

	(7) AbaccRank	(8) AbaccAbs	(9) AbaccRank	(10) AbaccAbs	(11) AbaccRank	(12) AbaccAbs
Synthetic difference-in-differences						
C19 × High ES	0.0207** (0.008)	0.0149*** (0.004)				
C19 × ES Q4 vs. Q1-3			0.0248** (0.010)	0.0143*** (0.004)		
C19 × ES Q4 vs. Q1-2					0.0281** (0.012)	0.0175*** (0.005)
Observations	14,830	14,830	14,830	14,830	11,120	11,120
Firm financial controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm governance controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The dependent variable is specified at the top of each column. High ES takes the value of one for all sample years if the firm's average ES score in the pre-COVID-19 years (i.e. 2017-2019) is above the median of the distribution and zero otherwise. ES Q4 vs. Q1-3 takes the value of one if the firm's pre-COVID-19 ES score is in the top quartile of the distribution and zero otherwise. ES Q4 vs. Q1-2 takes the value of one if the firm's pre-COVID-19 ES score is in the top quartile if the distribution, and zero if the score is in the bottom two quartiles (excluding firms in the third quartile). Firm financial controls are: lnTA, ROA, debt_TA, and cash_TA. Firm governance controls are: board independence, board gender diversity, board size, CEO duality, and exec. comp. LT obj. Standard errors are reported in parentheses and are clustered at the firm and country-year level. *** indicates significance at the 1% level, ** at the 5% level, and * at the 10% level. See Table 1 for descriptive statistics of the variables, and Table A1 for their complete definitions.

Table 4: **The Role of Government Interventions**

Dep. var.:	(1) AbaccRank	(2) AbaccAbs	(3) AbaccRank	(4) AbaccAbs
Oxford econ. index	-0.0001	-0.0004***	-0.0003	-0.0002*
	(0.000)	(0.000)	(0.000)	(0.000)
ES score	-0.0448	-0.0218	-0.0293	-0.0080
	(0.034)	(0.019)	(0.030)	(0.018)
Oxford econ. index $\times$ ES score	0.0008***	0.0006***	0.0009***	0.0006***
	(0.000)	(0.000)	(0.000)	(0.000)
Observations	28,319	28,319	28,319	28,319
R^2	0.392	0.403	0.394	0.404
Firm financial controls	Yes	Yes	Yes	Yes
Firm governance controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Year FE			Yes	Yes

Notes: The dependent variable is specified at the top of each column. Firm financial controls are: lnTA, ROA, debt_TA, and cash_TA. Firm governance controls are: board independence, board gender diversity, board size, CEO duality, and exec. comp. LT obj. Standard errors are reported in parentheses and are clustered at the firm and country-year level. *** indicates significance at the 1% level, ** at the 5% level, and * at the 10% level. See Table 1 for descriptive statistics of the variables, and Table A1 for their complete definitions.

Table 5: **Firm Governance Heterogeneity**

| Dep. var.: AbaccRank | (1) | (2) | (3) | (4) |
Sample:	HGovscore	LGovscore	HManagscore	LManagscore
ES score	-0.1181***	0.0210	-0.0986**	0.0127
	(0.044)	(0.047)	(0.046)	(0.043)
C19 × ES score	0.0210	0.0701***	0.0184	0.0953***
	(0.026)	(0.026)	(0.025)	(0.024)
Observations	13,897	12,510	13,825	12,570
R^2	0.406	0.456	0.408	0.459
	(5)	(6)	(7)	(8)
	CEOShReturn	noCEOShReturn	ComplinkSusty	noComplinkSusty
ES score	-0.0023	-0.0506	-0.0361	-0.0259
	(0.052)	(0.035)	(0.088)	(0.033)
C19 × ES score	0.0336*	0.0827***	-0.0930	0.0673***
	(0.020)	(0.021)	(0.057)	(0.016)
Observations	11,936	15,260	3,992	23,161
R^2	0.409	0.439	0.450	0.415
	(9)	(10)	(11)	(12)
	HOwnConc	LOwnConc	InstitBlockhld	noInstitBlockhld
ES score	-0.0446	-0.0315	0.0568	-0.0937***
	(0.040)	(0.042)	(0.054)	(0.031)
C19 × ES score	0.0334	0.0702***	0.0402	0.0678***
	(0.021)	(0.020)	(0.025)	(0.019)
Observations	13,610	13,697	9,623	18,741
R^2	0.420	0.388	0.376	0.405
Firm financial controls	Yes	Yes	Yes	Yes
Firm governance controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes

Notes: The dependent variable is AbaccRank. The sample in each regression is specified at the top of each column. Firm financial controls are: lnTA, ROA, debt_TA, and cash_TA. Firm governance controls are: board independence, board gender diversity, board size, CEO duality, and exec. comp. LT obj. Standard errors are reported in parentheses and are clustered at the firm and country-year level. *** indicates significance at the 1% level, ** at the 5% level, and * at the 10% level. See Table 1 for descriptive statistics of the variables, and Table A1 for their complete definitions.

Table 6: **Accounting Channels**

Dep. var.:	(1) DeprAmt_TA	(2) Intang_TA	(3) R&D_TA	(4) Invent_TA	(5) Labor_TA
ES score	-0.0119**	-0.1020***	-0.0117	-0.0156	-0.0280
	(0.006)	(0.031)	(0.014)	(0.017)	(0.017)
C19 × ES score	0.0039*	0.1002***	0.0446***	0.0174***	0.0195**
	(0.002)	(0.019)	(0.012)	(0.005)	(0.010)
Observations	28,364	26,298	12,418	24,599	18,383
R^2	0.712	0.741	0.922	0.854	0.834
Firm financial controls	Yes	Yes	Yes	Yes	Yes
Firm governance controls	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes

Notes: The dependent variable is specified at the top of each column. Firm financial controls are: lnTA, ROA, debt_TA, and cash_TA. Firm governance controls are: board independence, board gender diversity, board size, CEO duality, and exec. comp. LT obj. Standard errors are reported in parentheses and are clustered at the firm and country-year level. *** indicates significance at the 1% level, ** at the 5% level, and * at the 10% level. See Table 1 for descriptive statistics of the variables, and Table A1 for their complete definitions.

Table 7: **Sentiment Analysis**

Dep. var.: AbaccRank	(1)	(2)	(3)	(4)
C19:	Indicator	Indicator	Oxford	Oxford
ESG sentiment:	Overall	Net	Overall	Net
ESG sentiment	0.0153	-0.0033	0.0190	0.0015
	(0.027)	(0.032)	(0.026)	(0.031)
C19 × ESG sentiment	0.0432*	0.0634**	0.0007*	0.0010**
	(0.024)	(0.029)	(0.000)	(0.000)
Observations	21,470	21,470	21,438	21,438
R^2	0.383	0.383	0.384	0.384
Firm financial controls	Yes	Yes	Yes	Yes
Firm governance controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes

Notes: The dependent variable is AbaccRank. The C19 variable definition is indicated at the top of each column, and can be the C19 dummy or the Oxford econ. index. The ESG sentiment indicated at the top of each column can be based on the overall or net measures. Firm financial controls are: lnTA, ROA, debt_TA, and cash_TA. Firm governance controls are: board independence, board gender diversity, board size, CEO duality, and exec. comp. LT obj. Standard errors are reported in parentheses and are clustered at the firm and country-year level. *** indicates significance at the 1% level, ** at the 5% level, and * at the 10% level. See Table 1 for descriptive statistics of the variables, and Table A1 for their complete definitions.
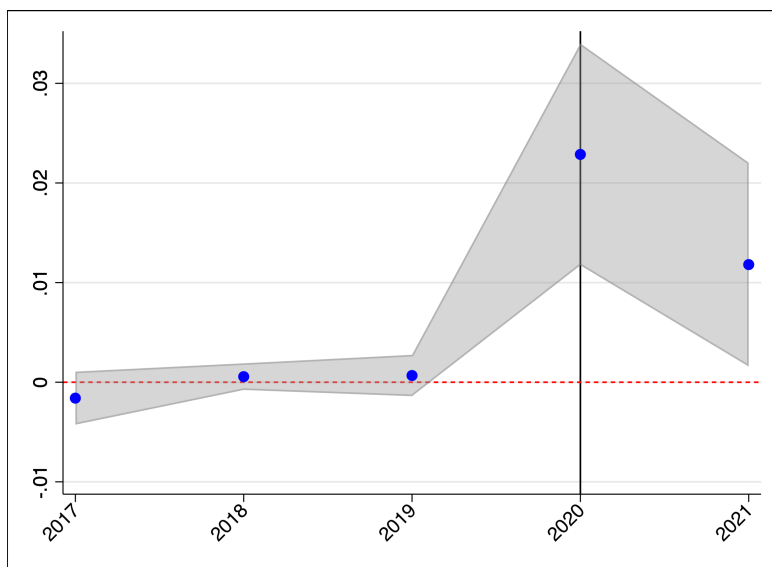
Figure A1: **The Effect of Pre-COVID-19 High ES on FRQ during the Cris: Synthetic Difference-in-Differences Estimations**

Notes: This graph illustrates the yearly point estimates alongside 95% confidence intervals from the synthetic difference-in-differences model in column 8 of Table 3.

Table A1: **Variable Definitions**

Variable name	Definition
Financial reporting quality (FRQ)	
AbaccRank	The percentile rank of the absolute value of abnormal accruals, as per equations 1 and 2.
AbaccAbs	The absolute value of abnormal accruals, as per equations 1 and 2.
AbaccAbsMod	The absolute value of abnormal accruals , as per equation 1 and the modified equation 2.
Environmental and social (ES)	
ES score	The average value of the benchmarked environmental and social pillars' scores.
Environmental score	Benchmarked score reflecting the firm's information on resource use and emission reduction, and environmentally-related product innovation.
Social score	Benchmarked score reflecting the firm's practices on product responsibility, community, human rights, diversity, training and development, health and safety, and employment.
High ES	An indicator that takes the value of one for all sample years if the firm's average ES score in the pre-COVID-19 years (i.e. 2017-2019) is above the median of the distribution and zero otherwise.
ES Q4 vs. Q1-3	An indicator that takes the value of one for all sample years if the firm's average ES score in the pre-COVID-19 years (i.e. 2017-2019) is in the top quartile of the distribution and zero otherwise.
ES Q4 vs. Q1-2	An indicator that takes the value of one for all sample years if the firm's average ES score in the pre-COVID-19 years (i.e. 2017-2019) is in the top quartile of the distribution and zero if the score is in the bottom two quartiles (excluding firms in the third quartile).
Overall ESG sentiment	Overall measure of the news, social media and other online content ESG sentiment during the year.
Net ESG sentiment	Net measure of the news, social media and other online content ESG sentiment during the year, which adjusts downwards the overall ESG sentiment score of a firm which exhibits controversies in the media.
Firm financials	
lnTA	The natural logarithm of total assets.
ROA	Return on assets defined as earnings before interests and taxes (EBIT) divided by the lag value of total assets.
Debt_TA	Total debt divided by total assets.
Cash_TA	Cash and cash equivalents divided by total assets.
DeprAmt_TA	Depreciation and amortization divided by the lag value of total assets.
Intang_TA	Intangible assets divided by the lag value of total assets.
R&D_TA	Research and development expenses divided by the lag value of total assets.
Invent_TA	The value of inventories divided by the lag value of total assets.
Labor_TA	Labor cost divided by the lag value of total assets.
Other financials for FRQ	
Current assets	The value of the firm's current assets.
Cash and cash equivalents	The value of the firm's cash and cash equivalents.
Current liabilities	The value of the firm's current liabilities.
Short term debt	The value of the firm's short term debt.
Income taxes	Income taxes payable for the period.
Depreciation and amortization	The value of the firm's depreciation and amortization expenses.
Revenues	Total revenues from business activities.
Accounts receivables	The value of account receivables.
Property plant and equipment	The value of property, plant and equipment.
Governance	
Board independence	The percentage of independent members on the board of directors.
Board gender diversity	The percentage of women on the board of directors.
Board size	The number of seats on the board of directors.
CEO duality	An indicator taking the value of one if the CEO and chairman of the board positions are held by the same person and zero otherwise.
Excec. comp. LT obj.	An indicator taking the value of one if the executives' compensation is linked to long-term objectives and zero otherwise.
Governance score	Benchmarked score reflecting the firm's systems and processes in place to ensure that board members and executives act in the best interests of its long term shareholders.
Management score	Benchmarked score reflecting the firm's commitment and effectiveness towards following best practice corporate governance principles.
CEO link SH return	An indicator taking the value of one if the CEO's compensation is linked to total shareholder return and zero otherwise.
Excec. comp. susty. targets	An indicator taking the value of one if the senior executives' compensation is linked to sustainability targets and zero otherwise.
Strategic holdings	The percentage of strategic holdings (ownership concentration) defined as 100 minus the free float as a percentage of traded shares.
Institutional blockholdings indicator	Indicator that takes the value of one if the institutional ownership percentage is at least 5% for the primary share issue calculated by taking the latest ownership record for each fund reported in the last two years, summing them, and then dividing the sum by the total primary shares outstanding. Static datapoint that if such information is missing takes the value of zero.
COVID-19 variables	
C19	An indicator that takes the value of one for 2020-2021 (the COVID-19 crisis years) and zero for 2017-2019.
Oxford econ. index	Index reflecting the intensity of government measures such as income support and debt relief introduced during 2020 and 2021. Data retrieved from the Oxford COVID-19 Government Response Tracker.
Oxford overall index	Index reflecting the intensity of government measures on all economic and social aspects introduced during 2020 and 2021. Data retrieved from the Oxford COVID-19 Government Response Tracker.

Notes: See Table 1 for descriptive statistics. The financial accounting variables are winsorized at 1% and 99%.

Table A2: **Robustness Checks on Baseline Estimations**

Dep. var.:	(1) AbaccAbsMod	(2) AbaccAbsMod	(3) AbaccRank	(4) AbaccAbs	(5) AbaccRank	(6) AbaccAbs
ES score	-0.0199	-0.0185				
	(0.023)	(0.024)				
C19 × ES score	0.0417***	0.0413***				
	(0.011)	(0.011)				
Social score			-0.0394	-0.0140		
			(0.025)	(0.016)		
C19 × Social score			0.0723***	0.0342***		
			(0.016)	(0.008)		
Environmental score					-0.0218	-0.0095
					(0.026)	(0.013)
C19 × Environmental score					0.0361**	0.0308***
					(0.014)	(0.007)
Observations	28,370	28,343	28,364	28,364	28,364	28,364
R^2	0.392	0.392	0.394	0.403	0.393	0.404
Firm financial controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm governance controls		Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The dependent variable is specified at the top of each column. Firm financial controls are: lnTA, ROA, debt_TA, and cash_TA. Firm governance controls are: board independence, board gender diversity, board size, CEO duality, and exec. comp. LT obj. Standard errors are reported in parentheses and are clustered at the firm and country-year level. *** indicates significance at the 1% level, ** at the 5% level, and * at the 10% level. See Table 1 for descriptive statistics of the variables, and Table A1 for their complete definitions.

Table A3: **Placebo COVID-19**

Dep. var.:	(1) AbaccRank	(2) AbaccAbs
ES score	-0.0096	0.0048
	(0.030)	(0.018)
Placebo C19 × ES score	-0.0151	-0.0138
	(0.015)	(0.009)
Observations	28,392	28,392
R^2	0.393	0.403
Firm financial controls	Yes	Yes
Firm governance controls	Yes	Yes
Firm FE	Yes	Yes
Year FE	Yes	Yes

Notes: The dependent variable is specified at the top of each column. Firm financial controls are: lnTA, ROA, debt_TA, and cash_TA. Firm governance controls are: board independence, board gender diversity, board size, CEO duality, and exec. comp. LT obj. Standard errors are reported in parentheses and are clustered at the firm and country-year level. *** indicates significance at the 1% level, ** at the 5% level, and * at the 10% level. See Table 1 for descriptive statistics of the variables, and Table A1 for their complete definitions.

Table A4: **Sample Sensitivity of the COVID-19 Effect**

Dep. var.:	(1) AbaccRank	(2) AbaccAbs	(3) AbaccRank	(4) AbaccAbs	(5) AbaccRank	(6) AbaccAbs	(7) AbaccRank	(8) AbaccAbs
C19	0.0029	-0.0040	0.0040	-0.0030	-0.0086	-0.0150	0.0153	-0.0075
	(0.018)	(0.012)	(0.015)	(0.011)	(0.018)	(0.011)	(0.023)	(0.009)
ES score							-0.0368	-0.0067
							(0.061)	(0.033)
Observations	168,611	168,611	168,611	168,611	166,896	166,896	28,384	28,384
R^2	0.124	0.235	0.138	0.247	0.396	0.520	0.392	0.402
Firm financial controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes				
Country FE			Yes	Yes				
Firm FE					Yes	Yes	Yes	Yes

Notes: The dependent variable is specified at the top of each column. Firm financial controls are: lnTA, ROA, debt_TA, and cash_TA. Standard errors are reported in parentheses and are clustered at the country-year and industry-year level. *** indicates significance at the 1% level, ** at the 5% level, and * at the 10% level. See Table 1 for descriptive statistics of the variables, and Table A1 for their complete definitions.

Table A5: **The Role of Government Interventions: Robustness Checks**

Dep. var.:	(1) AbaccRank	(2) AbaccAbs	(3) AbaccRank	(4) AbaccAbs
Oxford overall index	-0.0002	-0.0004***	-0.0018***	-0.0008***
	(0.000)	(0.000)	(0.001)	(0.000)
ES score	-0.0454	-0.0200	-0.0288	-0.0099
	(0.035)	(0.019)	(0.030)	(0.018)
Oxford overall index $\times$ ES score	0.0009***	0.0007***	0.0010***	0.0007***
	(0.000)	(0.000)	(0.000)	(0.000)
Observations	28,319	28,319	28,319	28,319
R^2	0.392	0.403	0.394	0.404
Firm financial controls	Yes	Yes	Yes	Yes
Firm governance controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Year FE			Yes	Yes

Notes: The dependent variable is specified at the top of each column. Firm financial controls are: lnTA, ROA, debt_TA, and cash_TA. Firm governance controls are: board independence, board gender diversity, board size, CEO duality, and exec. comp. LT obj. Standard errors are reported in parentheses and are clustered at the firm and country-year level. *** indicates significance at the 1% level, ** at the 5% level, and * at the 10% level. See Table 1 for descriptive statistics of the variables, and Table A1 for their complete definitions.

Table A6: **Sentiment Analysis: Robustness to a Larger Sample**

Dep. var.: AbaccRank	(1)	(2)	(3)	(4)
C19:	Indicator	Indicator	Oxford	Oxford
ESG sentiment:	Overall	Net	Overall	Net
ESG sentiment	0.0018	-0.0033	0.0027	-0.0022
	(0.016)	(0.018)	(0.016)	(0.017)
C19 $\times$ ESG sentiment	0.0358**	0.0418**	0.0007***	0.0008***
	(0.016)	(0.019)	(0.000)	(0.000)
Observations	60,479	60,479	60,382	60,382
R^2	0.393	0.393	0.393	0.393
Firm financial controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes

Notes: The dependent variable is AbaccRank. The C19 variable definition is indicated at the top of each column, and can be the C19 dummy or the Oxford econ. index. The ESG sentiment indicated at the top of each column can be based on the overall or net measures. Firm financial controls are: lnTA, ROA, debt_TA, and cash_TA. Standard errors are reported in parentheses and are clustered at the firm and country-year level. *** indicates significance at the 1% level, ** at the 5% level, and * at the 10% level. See Table 1 for descriptive statistics of the variables, and Table A1 for their complete definitions.